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APPLICATION OF CLASSIFICATION MODELS IN STUDYING PRODUCTIVITY MANAGEMENT IN SERVICES

FARHAD SHAFTI

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To my Mother for her love, and my Father for his wisdom ...
for every good thing that they gave me, those that they know and those that they do not know.

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Every inhalation of the breath prolongs life and every exhalation of it gladdens our nature; therefore every breath confers two benefits and for every benefit, gratitude is due. So whose hand and tongue is capable to thank him (God) enough?

(Golestan - Sa'di)

Keeping the above in mind, I would first like to thank my supervisors Professor Terry Williams and Mr. Robert Van Der Meer, for their utmost support and invaluable advice throughout the process of completing my PhD. Doing a PhD is not a purely academic activity. At times an appropriate word of encouragement or warning can have much more benefit than academic advice. I can only say that my supervisors were good at both!

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Abstract

This is a report of research on the application of service classifications in studying productivity management aspects and issues in the service industries. After identifying certain gaps in the literature, a new empirical approach has been introduced.. Through a review of literature, the complexity of research on service productivity and its relationship with quality was observed and confirmed. It was found that productivity management is an appropriate context for studying and illustrating the new approach to service classification.

Twelve service sectors were selected to cover the range of different types of service clusters. The research methodology was heavily built on an inductive approach based on in-depth interviews, although a significant part of the research was carried out using quantitative analysis.

Quantitative analysis was done to find the most appropriate service dimensions that could be used as bases for service classifications for productivity management studies. Among the studied service dimensions, as proposed by the literature, it was found that the dimension of Front/back value added, initially proposed by David Maister, was the most appropriate one to be used as the basis for service classification schemes for productivity management purposes.

Through qualitative analysis of data a number of key factors in terms of service productivity management and their features were found. A service classification scheme was proposed, with no regard to service dimensions. The features of 'productivity friendly' services were studied. The factors that can reduce the need for trade off between productivity and quality were explored.

The contribution of this research can be summarised in two areas. A new approach to service classification has been proposed, that is derived from empirical study. A number of services are compared in terms of productivity management aspects, resulting in development of a number of models, to illustrate the general trend of services in the area of productivity management, including interactions with quality management.

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Abbreviations:

- Al: Airlines
- Bn: Banks
- Cs: Consultancies
- Ds: Department Stores
- Ff: Fast Foods
- Ht: Hotels
- In: Insurances
- Lg: Legal Services
- Pu: Power Utilities
- Rp: Auto-Repairing
- Tl: Telecommunications
- Un: Universities

- SD: Refers to one of the 12 service dimensions that are studied in this research, often referred to by:
  - LI: Labour Intensity
  - FVD: Front Value Added
  - CC: Customer Contact
  - CI: Customer Interaction
  - CUS: Customisation
  - PJ: Personnel Judgment
  - INT: Intangibility
  - CIV: Customer Inability to Evaluate the Quality
  - PF: Process Focus

- PAs: One of the nine categories of the Productivity Aspects in this research, these are often referred to as:

  - P/Q: Productivity and Quality trade off, including:
    - P/Q-P: Prioritising Productivity Over Quality
    - P/Q-Q: Prioritising Quality Over Productivity
    - P/Q-TRDOF: The Interaction between Productivity and Quality

  - PLC: "Broad Productivity" Improvement Policies, including:
    - PLC-Vl: Increasing Volume (cost and quality constant)
    - PLC-Q: Increasing Quality (volume and cost constant)
    - PLC-C: Decreasing Cost (volume and quality constant)

  - FCT: Productivity Factors, including:
    - FCT-I: Input
    - FCT-P: Process
    - FCT-O: Output
    - FCT-Fb: Feedback
    - FCT-Cm: Customer

- PRB: Productivity Improvement Problems, including:
  - PRB-Tc: Technology
  - PRB-M: Methodology
  - PRB-Pp: Competence of People
  - PRB-Cl: Climate

- APP: Productivity Improvement Approaches, including:
  - APP-Tc: Technology Based
  - APP-Pp: Employee Based
  - APP-Sr: Product/service Based
  - APP-Tk: Task/delivery based
  - APP-Cp: Capacity/material Based
  - APP-Cm: Customer Based

- MES: Productivity Measurement Problems, including:
  - MES-I: Different Categories of Input
  - MES-O: Different Categories of Output
  - MES-Rl: Relationship between Input and Output
  - MES-Fc: Input Measurement for Employees Facing Customers
  - MES-Int: Measuring Output and Their Validity Considering Intangible Outputs

- QCR: Quality Characteristics

- QGP: Quality Gaps, including:
  - QGP-1: Gap 1 in the Parasuraman Quality Gap Model
  - QGP-2: Gap 2 in the Parasuraman Quality Gap Model
  - QGP-3: Gap 3 in the Parasuraman Quality Gap Model
  - QGP-4: Gap 4 in the Parasuraman Quality Gap Model

- QCT: Quality Costs, including:
  - QCT-Pv: Prevention Cost
  - QCT-Ap: Appraisal Cost
  - QCT-In: Internal Cost
  - QCT-Ex: External Cost

- PA Subjects: Refers to one of the above-mentioned issues in the Productivity Aspect Categories.

Chapter 1: Introduction

1.1. Research Background

"When you look at a river, you are not looking at a constant object, (as the water is passing), yet the reflection of the moon on the passing water is constant. You are looking at a constant picture on an ever changing surface!"

(A Persian poem)

One of the interesting aspects of academic research is the possibility of approaching a "subject" in "different contexts" with the aim of comparing the specific "features" of the subject within different contexts. This can lead to exploration of "generic tools" that can be used for studying and/or indicating the specific features of the subject in different contexts.

The above becomes more interesting as well as useful when the Subject is complex and can have a wide range of features when in different contexts. The notion of Service is one of the most complex subjects in the business world and operations management in particular. Despite the widely recognised contribution of academia in studying managerial challenges in services, there are still significant concerns about whether all the research in service operations and service management have managed to separate themselves from a heavily rooted manufacturing background and to look at service context as a unique context that needs its own rules and discipline. Despite an undeniable similarity (and in fact unity) of the core concept of service and manufacturing operations, that is "transformation of input to output" (Slack et al., 2001), many authors raise the need for more research that is less rooted in manufacturing concepts (see for instance: Jones and Hall 1995, 1996; Gummesson, 1994b ; Vuorinen et al. 1998). Nigel Slack argued in his keynote speech in the first joint international Euroma-POMS conference that traditionally, in the area of operations management, it is the manufacturing context that defines the subjects and that service operations need to define their own specific subject based on their own specific context. He then concluded that the two worlds of Practice and Research are clearly apart from the point of view of Context (and not Content). The main factor that contributes in this undesirable separation of the two worlds, as Slack presented in his speech, is in fact the general service management researches that are heavily rooted in a manufacturing context (Slack, 2003).

One way of applying a fresh look at services (without being too much affected by the manufacturing dominating knowledge) is to approach services with a generic view to compare and model different types of services. A review of studies on service industries (as the Subject) reveals that many authors have tried to explore the similarities and differences of services in different businesses (as the Contexts) to find general rules about them. As mentioned at the beginning of this chapter, this can lead to exploration of generic tools for studying services. One of the well-known examples of such generic tools is Service Classifications (using Service Dimensions). Service dimensions are used by researchers in service studies as tools and indicators for generic research on service operations management. During the last couple of decades a large number of authors have suggested different service dimensions as tools for generic study of services: Among these works are the dimension of Customer Contact and its relation with Efficiency (Chase, 1978, Chase and Tansik, 1983); Dimensions of Labour Intensity and Customer Interaction & Customisation and their relation with Managerial Challenges (Schmenner, 1986), Lovelock's five schemes of classification of services and their relevance with operational and marketing issues (Lovelock, 1983), Maister's dimension of Front Value Added and its function in services as a whole and in particular in professional services (Maister, 1983, 1997) and Silvestro's et al. notion of Service Volume and its relation with improvement systems like TQM (Silvestro et al., 1992, Silvestro, 2001).

Despite the importance of service classifications and service dimensions, generally speaking, the research works in this area are mainly based on a theoretical approach and very limitedly rely on empirical studies. In most cases the implications of service classifications are not derived based on any empirically derived evidence, and in all cases the classification model itself is built mainly on a theoretical basis. This means that in all the works on service classifications (as far as the author is aware of) if there are any empirical studies, these are conducted only after selecting service dimensions for classification purposes. The selection of the dimensions itself is based on theoretical arguments. It is interesting to develop and examine a new approach to service classification that differs from similar studies by being heavily based on empirical work. This means an approach in which even the selection of service dimensions for classification purposes is based on empirical work. This empirical approach should lead to managerial implications that are based on the analysis of empirically derived data.

What makes such research even more interesting and essential is to specify the study of services to an area that is still fresh and subject to controversial opinions. One of the areas that can be seen as a major source of controversy in terms of 'being rooted in manufacturing' and 'applicability in services' is Productivity Management (Kupers, 1998 ; Gummesson 1992, 1993, 1994b ; Vuorinen et al., 1998 ; Adam and Gravesen 1996). The concern about the notion of productivity in services is emphasised by the fact that some authors have even proposed a new terminology (servicity) as an equivalent to the concept of productivity in services (Jones and Hall, 1996). It seems the difficulty of conceptualising and operationalising the concept of productivity and its complex relationship with other organisational factors in service organisations (like quality) has pulled the researchers out of the area of productivity in service organisations. The first International Conference of Productivity Management in Services was held in Belgium, 1994. The second conference was then held in Madrid, 1996. There was no third conference. In a private e-mail conversation with the academic organiser of the last two conferences (and one of the major researchers in the area of service productivity), Professor Evert Gummesson, when asked about the existence of any third conference of productivity in service management, this was the reply:

> *"... No, there were no followers. Service productivity has turned out to be a very difficult subject especially if you want to link it with quality and profitability. It is much easier to do a Servqual survey, so researchers seem to be discouraged ...."*
>
> (Gummesson, 2002, private e-mail to the author)

Further to the above comment, the author also believes that the significant contribution of Marketing discipline in the establishment of service research (Fisk et al., 1995) was another factor that had biased the area of service management, making it closer to marketing interest (like customer, quality) and farther from operations management interests (like productivity). Perhaps one of the most important applications of the notion of "return to roots" for the researches in the area of service operations management, as proposed by Johnston (1999), is to get out from the Marketing discipline influence.

Recently there have been a few works devoted to the area of productivity in services (see for instance Kupers, 1998; Vuorinen et al. 1998; Van Looy et al. 1998; Gummesson 1998;

Parasuraman, 2002; Johnston and Jones, 2004). An interesting point about most of these works (including those referred to) is that they emphasised the need for more studies on service productivity and its relationship with other aspects of performance like quality.

Overall it can be said that productivity management is still a fresh subject in the area of service management in particular when it comes to the relationship between this concept and other popular concepts like quality in services. This concept can be studied in a generic way and with an empirical approach by the use of service classifications using service dimensions, which is a notion that has been long discussed in service literature but mostly on a theoretical basis. In line with the notion of service classifications, this study can also explore and compare the main features of different services in terms of productivity management.

1.2. Research objectives

As discussed above, the primary interest of this research is in the application of service dimensions as tools and indicators for generic study of services. To fulfil this, the controversial area of productivity management is selected. Accordingly the present research also aims to explore and compare the main features of services in terms of productivity management. The research agenda therefore can be summarised as follows:

The objective of this research is to contribute towards fulfilling some gaps in the service industry research. The contribution is summarised here:

- Empirical measurement of a number of service dimensions for different service sectors
- Analysing the relationship between a number of service dimensions based on empirically derived data.
- Proposing and illustrating a new and advantageous empirical approach in using service dimensions for service operations' studies.
- Introducing service dimensions that are good for productivity management studies based on an empirical approach.

- Exploring differences and similarities between service sectors in terms of productivity management and identifying common trends for the purpose of theory building.
- Looking at the relationship between productivity and quality in services based on empirically derived data.

The main research question in this work and the relevant sub-questions to be attempted are given here:

Main Research Question:

"What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?"

Sub-Questions:

1. In terms of Productivity management, how are the service industries similar/different and how can they be classified?
2. How can the service industries be classified with regard to Service Dimensions?
3. What are the measurements of the studied service sectors for each of the service dimensions?
4. What are the relationships between the popular service dimensions?
5. Within the scope of the present research, what are the key factors and issues in productivity management in service industries?
6. Is there anything like productivity friendly services and if the answer is positive, what are the conditions of these services?
7. What is the interaction between productivity and quality in service operations?

The above should clarify the scope and the subject of the present research. Accordingly, it should be emphasised that this research is not looking to find measurement methods or tools for services nor it is looking for a new definition or conceptualisation of productivity in services. This is only an exploratory and a generic research on the area of productivity management in services.

1.3. Research Design

To answer the above questions, experts from twelve service sectors were selected. Two parallel streams of research took place. These were:

1. Measuring each of the services in terms of nine popular service dimensions.
2. Studying the services on the basis of selected productivity management aspects that also include quality considerations.

Given the exploratory nature of the work and the judgmental selection of respondents (Beranrd, 2000; Royer and Zarlowski, 2001a), structured and semi structured interviews were used (respectively) to collect data for the above two streams. The research analysis was conducted in two sections of quantitative and qualitative. This is in line with what is introduced as "Dominant-less dominant design" by John W. Creswell (Creswell, 1994). The term is used to refer to a situation where the researcher presents the study within a single dominant paradigm (here phenomenology) with one component of the overall study drawn from the alternative paradigm. In this research the whole data collection is based on the phenomenology approach and the research questions 1 (partially), 5, 6 and 7 are attempted via qualitative analysis. The main research question and questions 1 (partially), 2, 3 and 4 are attempted by quantitative analysis. The answer to the main research question is further elaborated through qualitative analysis.

The aim of the quantitative analysis is to attempt the main research question and also questions 1 (partially), 2, 3 and 4. The method of answering the main question was by conducting a correlation study between the two sets of collected data (service dimensions and productivity aspects). The dimensions that seemed to have a better correlation with the productivity aspects were introduced as the most relevant dimensions for studying productivity in services.

The aim of the qualitative analysis is to answer questions 1 (partially), 5, 6 and 7. This also provides more clarification about the answer that is achieved for the main research question. The qualitative analysis is heavily based on common qualitative tools like coding, mapping,

and within case and cross case displaying of data. The analysis consists of reducing the data, displaying the data and deriving conclusions from the data (Miles and Huberman, 1994).

1.4. Research Findings

Obviously the research findings are explained in detail in the relevant chapters of the present research. These are also summarised in the concluding chapter. Here a broad picture of what has been found is given to facilitate understanding the research aims:

Main research question:

As was expected, the relevant service dimensions were not as clear cut and robustly defined as the examples found in the literature. Certain service dimensions were found to be relevant to some of the productivity aspects, while no relevant service dimensions were found for few of the productivity aspects. The result was a number of classification models, each demonstrating the relationship between one or two of the service dimensions and one or more of the productivity aspects.

Research question 1: The studied services were classified based on each of the categories of productivity aspects after quantitative analysis of the data. A more structured and practical classification was achieved after finding the associated service dimensions. Moreover, a broader classification scheme was applied based on the qualitative analysis.

Research Question 2: The measurements of service sectors for each of the service dimensions were displayed with graphs. From there service sectors were put in clusters according to their measurements for the service dimensions. It was argued that a classification of services for the sheer reason of classification was of no use. The classification had to follow a certain objective that could form the pattern of classification. Accordingly the service sectors were classified based on the service dimensions and for the objective of studying productivity management in services.

Research Question 3: The measurements for the service sectors in terms of service dimensions were made (mostly by the experts in each studied service) using a measurement

scale. Another interesting result was some insights into the future movements of service sectors on the service dimensions scales.

Research Question 4: The statistical analysis revealed a direct or indirect relationship between all of the service dimensions except one. The link between some of the service dimensions was very strong.

Research Question 5: Through qualitative analysis, certain factors were found to be important from the point of view of productivity management in the studied service sectors. The issues surrounding each of these factors were summarised and put into simple schematic models/figures based on the qualitative analysis.

Research Question 6: It was difficult to judge whether some of the studied service sectors were more "productivity friendly" as compared to the others. The results of both qualitative and quantitative data analysis were used to reach some initial results. Accordingly, it could be suggested that a service dimension could be used as an indicator to identify if a service is "productivity friendly". More research is needed on this area before any definite concluding remarks.

Research Question 7: It was found through qualitative analysis the services are not the same when it comes to the relationship between productivity and quality. While in some services there was a significant trade off between the two in the short- and long- terms, in some other services the trade off was only in the short-term and even there, it was not very significant. A number of reasons and factors were explored through qualitative analysis to explain why in some services managing trade off between productivity and quality seemed to be easier.

1.5. Structure of the dissertation

This dissertation includes 8 chapters. The chapters are generally long but at the beginning of and throughout each chapter the author has tried to make the structure of the chapters as clear as possible. A brief description of the subject and content of each chapter follows:

Chapter 2 and chapter 3 are devoted to a literature review. In chapter 2 the literature on productivity management in services is presented. This chapter tends to remain focused on

the subject rather than touching on all the surrounding areas. The aim is merely to provide enough insights to lead to necessary concluding observations. The review remains on a broad level but is at the same time intensive. The main works that could provide insights into the state (of the art) of productivity in services were introduced without too much engaging with the details as this was not necessary for the objectives of the present research. The chapter leads to six concluding observations that altogether provide a helpful picture of the state (of the art) of service productivity.

Chapter 3 reviews the history and trends of service classification schemes from the1960s to the present time. Comparing to chapter 2, this is a very detailed review of the literature in which certain questions about the past research on service classifications are answered. The detailed review of literature in this chapter resulted in a number of gaps in the literature emerging. These are explained at the end of the chapter. Appreciating these gaps leads to the formation of the methodology of the present research.

The methodology chapter tries to distance itself from a traditional method of writing methodology chapters. The methodology chapter is constructed on the basis of 17 methodological questions. Answers to these questions have covered all the aspects of methodology that the author thought are necessary.

Chapters 5 and 6 are the main analysis chapters of this dissertation. Chapter 5 covers the quantitative analysis while chapter 6 covers the qualitative analysis. Chapter 5 attempts the main research question and the research question numbers 1, 2, 3 and 4. In chapter 6, through qualitative analysis, the research question numbers 5, 6 and 7 are answered. This also leads to clarification of the answer to the main research question as well as answering research question number one from another perspective.

It was interesting to compare the results of this study with three very similar and relevant works. In chapter 7, the three models of Customer Contact (Chase 1978), Service Process Matrix (Schmenner 1986) and Volume-Variety matrix (Silvestro et al. 1992) are visited again, this time in view of the results derived from the present research. Where possible, this chapter also applies the three models to the data available from the present research with some basic analysis, aiming at investigating the validity of the models based on the collected data in this research.

Chapter 8 summarises the conclusions from the literature review and the results of the work. The benefits for practitioners and academia are pointed out and the possible follow up studies for this research are proposed. Also the reliability and validity of the results of this research are discussed in this chapter.

Chapter 2 : Research on productivity in service industries

In this chapter the context within which the application of service dimensions is examined is introduced and the controversial issues surrounding this context are studied. As mentioned in chapter 1, this research aims to examine the application of service classifications, in studying the nature of service operations with regard to productivity management. In the process, a comparative study of widely selected service sectors is carried out and this has also provided an opportunity to derive some generic observations and theories in services (within the context of productivity management challenges). It was therefore imperative to study the main issues and challenges surrounding the area of productivity management in services in order to provide enough background information before conducting empirical research. This chapter presents the results of this study. The study is focused mainly on the area of Service Productivity and its unique features, as this is the specific context of the work. Works on general performance management/measurement are not directly relevant to this research and are therefore not included in this chapter.

The aim of the chapter is to report a logical sequence of observations from the literature (related to productivity management in services) that lead to a conclusion that becomes useful in choosing and approaching the context of the present research. These observations cover a number of issues including the roots of the concept of productivity, productivity measurements in the service sector, issues surrounding the concept of productivity in services, the relationship between productivity and quality in services and the extent of work that has been done in the field of service productivity. Each observation as well as the collectivity of observations contributed towards the design of this research. This will be explained at the end of the chapter. The different sections presented in this chapter are closely interrelated, however to clarify the different aspects of what was learnt from the literature, they are presented separately. An overall concluding view to all the sections will be presented at the end of this chapter.

2.1 Emergence and evolution of service industries literature (Operations Management contribution, compared to Marketing contribution)

In this section a brief overview of the emergence of service research and in particular the contributions of Operations Management in comparison to Marketing discipline are given.

It is evident that the first major contributions in the area of service industries research were provided by marketing discipline (Fisk et al. 1993, 1995, Johnston 1999). According to Fisk et al. the early contributions of marketing discipline in the area of services were in the form of PhD dissertations. Examples are "The marketing of consumer services" by McDowell in 1953, same title by Parker in 1958 and Johnson's "Are goods and services different? An exercise in marketing theory" in 1969 which can be seen as one of the first works in which the difference between services and goods are discussed (Fisk et al. 1995). Fisk calls this stage of the research in service industries, "The Crawling Stage", referring to Pre-1980s. The main agenda of the crawling stage is recognition of services as a distinct concept from goods. A good number of other works from the marketing discipline can be referred to at this stage, for example Judd 1964, Rathmell 1966 and Blois 1974. A major breakthrough in this stage was made by Lynn Shostack from marketing discipline. Shostack in her article "Breaking free from product marketing" blamed the Marketing discipline for not paying enough attention to the area of services (Shostack, 1977). The article "became a rallying cry that inspired numerous services marketing scholars." (Fisk et al. 1995: 8). Perhaps as a positive and supportive response to Shostack, Berry wrote his article "Services marketing is different" at the end of the period that is introduced as Crawling Stage (Berry, 1980).

In comparison to marketing discipline, it appears that operations management discipline has created less momentum for the service movement at this stage (Johnston, 1999). Two operations management oriented works appeared at this stage, these are Johnson et al. (1972) and Buffa (1976). In these two works there were some attentions to services. According to Johnston, these works "began transformation of the subject" (Johnston, 1999; 107). The very fact that the discipline of Operations Management in 1970 was known as Production Management reveals the lack of attention (Johnston, 1999). While (as discussed above) the research of marketing discipline in the era of services had practically begun in 1960s, the main work on service research from the operations management perspective took place only in 1976, with the publication of Sasser's article(1976) "Match supply and demand in service

industries". The article was followed by the book "Management of Service Operations" in 1978 (Sasser et al. 1978). Examples of Other Operations Management oriented contributions in this stage, as referred to by Johnston (1999) are Levitt, 1972; Hostage, 1975; Chase, 1978; Matteis, 1979; Lovelock and Young, 1979• . Like their Marketing colleagues, much of the work done by operations management researchers at this stage was to point out the differences between services and goods, but mostly from the Operations Management point of view.

In the next stage "Scurrying About: 1980 – 85" (as titled by Fisk et al. 1995) significant attention to service research can be seen in the marketing discipline. New journals specifically for services (and mainly marketing dominated) began publishing in this era (Service Industries Journal in 1980 and Journal of Professional Service Marketing in 1985). After a long debate to establish the differences between goods and services during pre-1980s, in this era the point of interest (and in fact the need) was in defining and explaining service characteristics by the use of conceptual frameworks. According to Johnston, at this stage the attention of operations management continued to be on Customer Operations and Service Encounter. Among the significant works in this era are Chase 1981 (effect of customer contact on efficiency of operations), Maister and Lovelock 1982 (characteristics of facilitating services), Wyckoff 1984 (quality in services) also the two textbooks of Fitzsimmons and Sullivan 1982 and Voss et al. 1985. Most of the works on service classifications by both operations management and marketing researchers belong to this era (as will be discussed in detail in chapter 3). The major breakthrough in the area of service quality by Parasuraman et al. (1985) also took place at the end of this era, when they discussed the characteristics of service quality and defined certain dimensions for studying service quality. Operations management discipline and marketing discipline (as well as human resource discipline) came close together at this stage to generate ideas and frameworks and models to conceptualise the nature of services.

The third stage according to Fisk et al. is "Walking Erect 1986-1995". The era is characterised as the time of explosive growth in the number of publications and increasing empirical and theoretical research in the context (Fisk et al., 1995). The Journal of Service Marketing began publishing in this period (1987). The International Journal of Service Industry Management started in 1990, now, one of the major sources of accessing the most

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• Lovelock and Young are from marketing discipline however in this article they look at productivity in services and that how marketing can help. The article will be discussed later in this chapter.

update research on service management. The era can be called Service Management Era due to the cross disciplinary nature of research at this stage (Johnston, 1999). The focus of the research at this stage was on testing the theories and models. The number of empirical researches in this stage was increasing. This is particularly evident in the area of service classifications (as will be pointed out in chapter 3). Johnston lists 24 distinct Operations Management subjects that were exposed to research at this stage (Johnston 1999: 111).

According to Fisk et al. the next stage (i.e. from 1995, when their paper was published) will involve more contributions from disciplines other than marketing. The authors, however, give the impression that this contribution will be part of multi-disciplinary research on services (Fisk et al. 1995: 20). Johnston, however, argues that from 1995 till the present, can be called Return to Roots era. The main focus according to Johnston is for researchers to be prescriptive so that the material and outcome of the researches can be (mostly) put into practice. The main feature of this stage however (which justifies the naming) is that the three disciplines (unlike what Fisk et al. suggest) are (and should) becoming separated again in an attempt to "re-establish the service material within core disciplines" (Johnston 1999: 113, also relevant: Johnston 1994). The Journal of Service Research was started publishing in this stage in 1998.

Looking at the above overview, it is not difficult to appreciate that the Operations Management discipline was very much under the influence of marketing discipline in the past (of course only in the area of research in services). This could be due to obvious direct link between most of services and the end customers. This is while other aspects of operations were not addressed as such. This is exactly what Robert Johnston concludes at the end of his review of research in services:

> "We seem to have been swept along on the tide of interest in service focused predominantly from a customer perspective"
>
> (Johnston 1994: 113)

The above discussion leads to the following observation:

<u>Observation One:</u>

"Research in service industries began by the marketing discipline. The contribution of operations management discipline started only later and (under the influence of multi-

disciplinary nature of research at the time) mostly focused on customer perspectives. There was less attention to some of the specific interests of operations management discipline like productivity."

The above observation makes it appropriate to investigate the extent to which Productivity has been the focal point of research in the context of services. Before doing this however, it is relevant and helpful to investigate the origins of the concept of productivity and to explore where the concept is rooted.

2.2 The origins of the concept of Productivity, a brief overview

Although there are some differences of opinion about the definition of productivity as distinct from other measures of performance like efficiency and utilisation, it seems that there is a general agreement that the ratio of "output per input" is a correct measure for productivity in general and in its pure sense (Sumanth 1984, Prokopenko 1987, Edosomwan 1987, Al-Darrab 2000, Johnston and Jones 2004, Mahoney, 1988.). The first time the word "Productivity" was used, was in an article by Quesnay in 1766 (sited in Sumanth 1984 and Edosomwan, 1987). More than a century later in 1883, according to Sumanth, Littre defined productivity as the "faculty to produce". In 1950, the organisation for European Economic Cooperation (OEEC) provided the following formal definition for productivity:

> *"Productivity is the quotient obtained by dividing output by one of the factors of production. In this way it is possible to speak of productivity of capital, investment, or raw materials according to whether output is being considered in relation to capital, investment or raw materials, etc."*
>
> *(sited in Sumanth, 1984: 3)*

It is obvious from the above-described background that (naturally), from the beginning, the concept of productivity has been raised in manufacturing context.

Sumanth produces a list of 9 different major definitions for productivity in the early history of emergence of the concept, starting from 1766 till 1979 (Sumanth 1984). Edosomwan extends the list to 17 definitions in the same period. According to Mahoney, although the basic definition remains the same, operationalisation of the concept varies considerably and

discussions on productivity have revealed disagreement and confusion over its meaning (Mahoney 1988).

In separating the concept of Productivity from Efficiency, again there are different views. According to Mali (1978), productivity is effectiveness divided by efficiency. Sumanth defines efficiency as "ratio of actual output to expected or standard output" and accordingly modifies Mali's suggestion by arguing that productivity can be seen as a function of effectiveness divided by a function of efficiency (Sumanth, 1984).

Prokopenko, on the other hand, distinguishes productivity from efficiency by defining efficiency as "producing high quality goods in the shortest possible time" (Prokopenko 1987). Arnold and Pulich define efficiency as the "ratio of standard hours of work produced per hours actually worked" (Arnold and Pulich, 2004). Burgess equalises the definition of efficiency and productivity of a system and defines both of them as output per input (Burges, 1990). According to Slack et al. "efficiency is the ratio of actual output to effective capacity" (Slack et al. 2001, see also Johnston and Jones 2004). Sherman (1988) considers efficiency to be a narrower concept when compared to productivity, but he uses the two terms interchangeably in his book.

The aim of this section of course is not to present a comprehensive review of the differences of opinion about productivity and its distinction with efficiency. The aim of this short section is to present the second observation:

Observation Two:

"Despite differences of opinion on the exact definition of productivity and its distinction with other measures of performance, the fact is that the notion, literally and conceptually is rooted in and originated from old traditional manufacturing factories of 18th century"

The above is more evident when considering the early views on service productivity. This is presented in the next section. After getting a picture of the roots of productivity and the general understanding of its concept, it is now appropriate to investigate the application of the concept in services. This is done firstly by looking at productivity measurements in the service sector and the surrounding debates.

2.3 Productivity of the service sector

A number of gurus in the areas of economy, industrial management and socio-politics never considered service activity as something that could contribute to wealth and be considered productive. Among them are Adam Smith, A. Marshall and Marx & Lenin.

Adam Smith argues in his famous book, "The Wealth of Nations":

"...Productive is all labour which fixes and realises itself in a particular subject or vendible commodity ...Unproductive is all labour which generally perish in the very instant of their performance•*"*

(Smith, 1776)

The view has been of course changed after the passing of an industrial based society (Fuchs and Wilburn, 1967) and it is now a common belief that services do contribute to wealth and are productive (Van Looy et al. 1998). Quinn (1992) argues that a safer, healthier, better educated or more stable society can be considered wealthier than one with more physical goods (Quinn, 1992). Drucker (1991: 69) says "The single challenge facing managers in the developed countries of the world is to raise the productivity of knowledge and service workers". In fact, there is now a major concern about whether productivity in the service sector is growing slowly and that (if this is true) how this should be tackled. This is the subject of the rest of this section:

There are many references to the notion that productivity in the service sector is lower than in the manufacturing sector (Lovelock and Young 1979; Cowel, 1984; Stanback and Noyelle, 1990; Burges, 1990; Drucker, 1991; Millward, 1990; Nachum, 1999; Sherwood, 1994; Van Biema and Greenwald, 1997; Sheehy and Schone, 2003; Helfrich, 1991; Murray, 1987). According to Gummesson, this seems to be a commonly held opinion (Gummesson 1993). Nachum derives a conclusion from statistical figures that while productivity in the manufacturing sector was growing in the last century, there was no significant growth in the service sector (Nachum 1999). Millward argues that a major characteristic of the service

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• This argument has been challenged and answered by J. B. Say in 1803 as described in chapter 3, section 3.2.1.

sector over the last 100 years is that, using official statistics, its productivity growth has been consistently below than of manufacturing (Millward, 1990). Levitt argues that the humanistic approach associated with services is the essential cause of its inefficiency, this is the main reason that he suggests a Production Line approach to services (Levitt 1972) which basically means to make service operations as similar as possible to a (manufacturing type) product line operation, in order to increase efficiency.

The above described condition of the service sector is despite the fact that the role of this sector in generating output, employment and GDP is increasingly higher than the manufacturing sector in almost all of the developed and developing countries (Fletcher and Snee, 1985; Riddle, 1986 ; Ghobadian et al., 1994). Van Looy et al. report that in 1999 the average share of GDP for developed countries and developing countries are respectively 71% and 51%. (Van Looy et al. 2003). In America for instance while employment is plummeting in the agriculture sector and gradually in the manufacturing sector, in the service sector it is shooting up (Fitzsimmons and Fitzsimmons, 2001). Fitzsimmons and Fitzsimmons describe current society as a post-industrial society, the characteristic of which, is that services form the pre-dominant activities and measures for standard of living. This is related to the service sector out put (Fitzsimmons and Fitzsimmons, 2001).

The above is in line with Blois argument about pressure on the service sector to increase productivity. According to Blois the pressure results from economic, competitive, marketing and managerial factors (Blois, 1984).

This not very promising situation in the service sector in terms of productivity, is even worse when considering that there is an element of vagueness in the issue of low productivity in services. It seems not all authors agree that it is possible to straightforwardly claim that productivity in services are low on the basis of some published figures. These authors put the blame on the definition of productivity and the measurements of output in services rather than services themselves.

Nachum argues that at least part of the disparity in productivity between services and manufacturing is a statistical illusion resulting from inadequacy of existing data and techniques of measurement (Nachum 1999: 922). Nachum refers to a number of authors who have the same concern about the reports of service productivity being low. These are Hjern, Stanback and Noyelle, Mellander, Gummesson and Gordon (Nachum 1999). Nachum refers

to intangible highly valuable yet not directly measurable nature of service output and in particular the output of professional services. In line with this, Blois argues that productivity measurement itself has difficulties and when it comes to service operations, the difficulties will be even worse. He introduces these additional difficulties to be the intangible nature of input and output and the lack of storability which can result in direct effects of variability in demand in employees' productivity (Blois, 1984). Gronroos and Ojasalo argue that being rooted in manufacturing domain, the concept of productivity (as defined in manufacturing context) is too limited for services. They argue that measuring productivity as an efficiency issue may be less appropriate in services. They point out the 'participation of customer in the process' as the main difference between manufacturing and service operations when it comes to productivity. In this regard they consider manufacturing as a close system while services (having customers involved) are open systems. They conclude that applying assumptions (that are true for manufacturing) to services when managing and measuring productivity leads to confusion. The authors introduce a new definition and new measures for productivity, this will be discussed in section 2.5 (Gronroos and Ojasalo, 2002). Gummesson blames traditional measures of productivity for being 'provider productivity' and 'internally oriented' and thus not adequate for services that are very much customer oriented (Gummesson, 1993). Adam and Gravesen argue that the reported low level of productivity in services could be reminiscent of the fact that productivity was developed in an industrial context and that immaterial production per se was not considered productive or valuable to society (Adam and Gravesen, 1996). Martin et al. argue that appropriate service productivity measures have not been defined (Martin et al., 2001).

Adapted from Ojasalo 1999, Gronroos refers to five assumptions that are true in the manufacturing and have resulted in the traditional concept of productivity, and explains that these assumptions are not valid in services. The assumptions are 1. production and consumption are separate, 2. customer does not participate in production, 3. input and output are homogenous, 4. productivity can be measured separately from sales volume (in services sales volume influences productivity because of perishability of the service), 5. output is tangible. Accordingly Gronroos (2000) questions the criticisms about assumingly low productivity in services.

Concerns and questions about applicability of productivity measures and concepts in services, is the most important concern of the researchers who do not entirely believe in the notion of 'low productivity' in services. Among other concerns (which are more from

economics point of view and therefore less relevant to the subject of this research) is the question of making the same judgement for all services. Betcherman et al. (1991) distinguish between different types of services in terms of the extent of competition and conclude that it is not correct to ascribe the notion of 'low productivity' to all services. In a major structural criticism, Aarnio argues that the whole notion of dividing economic sources into three sectors of agriculture, manufacturing and service and then comparing their performance measures with each other is irrelevant in this era. He asserts that the term 'service sector' is an anachronism. Referring to the vast variety of economic activities that are included in the category of service sector and in agreement with Betcherman, he suggests that the sector should be analysed at a more disaggregated level (Aarnoi 1999).

The notion of applicability of traditionally defined concept and measures for productivity in services is further discussed in the next section. It is appropriate to end this section with a quotation from Michael Van Biema and Bruce Greenwald. The authors review the justifications raised about low productivity in services. They identify three major justifications: 1. matter of measurement – 2. the problem of low wage overseas employees in manufacturing that forced this sector to work harder – 3. Macroeconomic factors. They then criticise each of these justifications and argue that the main factor in low productivity in services is "management":

> *"The primary reason why the productivity growth rate has stagnated in the service sector is management."*
>
> (Van Biema, Greenwald 1997: 89)

This is what Judson argued to be true for all organisations disregard of being service or not many years before Van Biema specifying it to services (Judson, 1982).

Among other authors who have discussed the issue of performance and in particular productivity measurements in services are Fitzgerald and Moon (1996), Brignall and Ballantine (1996), Coates (1991), Voss and Johnston (1995), Quinn and Gagnon (1986) and Mellander (1992), O'Mahony et al. (1998).

Observation Three:

"The issue of productivity indices in service sector is a controversial one: Beside the traditional argument that service operations are unproductive operations by nature, there is a strong belief that productivity in service sector is low (not due to its nature). There is an opposing argument that the notion of 'low productivity in service sector' is only a misunderstanding that is caused by the difference between service sector and manufacturing sector. There are also concerns that basically it is 'Management' that is to be blamed for low productivity in services."

In this section some of the concerns about productivity in services were briefly referred to. In the next section these concerns are further elaborated.

2.4 The concerns about productivity in services

The concerns about productivity in services among researchers in service operations is so serious and profound that some authors have even suggested using another term (servicity) to carry a similar concept in services (Jones and Hall, 1996). Jones and Hall report that authors believe that most, if not all, of the current thinking about productivity stems from a consideration of manufacturing industries in their Fordist stage of development (Jones and Hall, 1996: 231). This is in fact a further reference to observation number two in section 2.2. The authors point out that the manufacturing paradigm has changed to service paradigm with specific characteristic of 'recognition of services'. However according to Jones and Hall, in service paradigm it was really the manufacturing oriented concept of productivity that was attempted to be applied in services. They single out Levitt's concept of industrialisation of service (product-line approach) as the most typical example in this regard. Levitt (1976) argues that productivity in services can be improved by using methods applied in producing companies. Stressing that this view is not seen as applicable throughout the services, Jones and Hall suggest that a new paradigm should be appreciated when looking at services in terms of productivity and similar notions. They introduce this as neo-service paradigm. The main characteristic of the neo-service paradigm is that it calls for a new way of thinking about productivity. It is along these lines that the authors suggest inclusion of the notion of 'felicity' in a measure of productivity in services and at the end, suggest even changing the name to 'servicity'. They also suggest that the input-output model should be changed to input-outcome model (Jones and Hall, 1996), "Outcome" meaning the impact of service on the customer (Jones 1988). This is very much similar to Schneider and Bowen's proposal of including courtesy and style of performance in the definition of productivity on the basis that

in services the performance is directed to human rather than material i.e. in manufacturing (Schneider and Bowen, 1995).

The above is very much in line with (and summarises) what a number of other researchers in service operations have discussed and proposed regarding productivity in services. Armistead et al. determine three factors that can affect service productivity. These are volume, variety and variation (Armistead et al. 1988). Later, Armistead puts more emphasis on the major differences between productivity in services and manufacturing contexts. He proposes a business process management view to facilitate productivity management in particular in multi-stage networks (Armistead 1994, Armistead and Machin, 1998). At the end of the first workshop on service productivity, Armistead summarises the workshop by calling the field of service productivity a mess (Adam and Gravesen 1996). Vuorinen at el. have an opinion that the prolonged neglect of the productivity issue in services is due to the concept of productivity being deeply rooted in the context of mass manufacturing. Similar concerns regarding the inappropriateness of the manufacturing-oriented concept of productivity are raised by other authors in this specific area (McLaughlin and Coffey, 1990; Sherman, 1988; Ross and Shawn, 1987; Van Looy et al., 1998; Jones and Lockwood, 1989; Murdick et al., 1990; Johanson, 1994; Storbacka and Johanson, 1996).

Kupers includes emotion-oriented strategies in dealing with productivity in services (Kupers 1998). Gummesson argues that productivity approaches are usually based on a manufacturing paradigm and do not recognise the specific features of services (Gummesson 1994b); a similar notion that was used by Jones and Hall later in 1996. This is an issue that Gummesson has touched upon in a number of his works/talks (Gummesson, 1992, 1993, 1994c, 1998b). Baathe and Mattsson call productivity in services a fuzzy concept, indicating that in services the specific role of customer and employees should also be considered in productivity studies (Baathe and Mattsson, 1994).

Fitzgerald et al. argue that the unique characteristics of services do not allow for the transforming of precepts with regard to controlling and performance measurement from manufacturing to services. These characteristics are intangibility, heterogeneity, simultaneity and perishability. In particular when discussing productivity, the authors introduce productivity in services as a multi-dimensional concept due to complexity of the notion of 'transforming input to output' in services (Fitzgerald et al., 1991). Johnston (as well as being one of the co-authors with Fitzgerald) considers the unique characteristics of services to be

the main factors in making the concept of productivity in services even more problematic than how the concept is by its very nature (Johnston and Jones, 2004). Similar views are expressed by McLaughlin and Coffey, where they consider the slow development of productivity measures to be due to the unique characteristics of services as listed above. They also add some other general and/or external factors to the list such as complexity, entrepreneurial independence, lack of attention from professional societies, smallness of individual firms and complacency (McLaughlin and Coffey 1990). Thompson considers 'what is service productivity' and 'how a service attains sustainable productivity' as two questions that are yet to be answered by researchers in the field (Thompson, 1996).

Adam and Gravesen report the result of their analysis of the 26 papers presented in the first international workshop on service productivity by noting that the common denominator in these papers was the word 'difficulty'. In explaining these difficulties they discuss five factors. These are 1. the fact that productivity is rooted in manufacturing, 2. difficulty of defining input and output, 3. measurement difficulties, 4. relationship between productivity and quality and 5. Confusion between productivity and related concepts like efficiency and effectiveness. They conclude that the concept of productivity, its measurement and factors affecting it are changing in the new era of service domain societies. The authors finish their paper by asking a radical but interesting question: "Whether service productivity is a viable concept or not" (Adam and Gravesen 1996).

Even in an area as popular as the use of Information Technology (IT) and Information Communication Technology (ICT) in services, when it comes to the subject of application of IT in productivity improvement, the complexity and uncertainty emerges. The popular notion of "Productivity Paradox" is an evidence for this. The term refers to the observation that there is a little correlation between investments on IT (or ICT) and productivity improvement (Skinner, 1986, Lucas, 1999, Kaplan and Aronoff, 1996). Rei finds based on an empirical study that this is not specific to service sector and also (but perhaps not equally) applies in manufacturing. There are some debates that the notion (originated in 1980s) might no longer exist. This claim is however not yet established (Chaffey and Wood, 2005, Davenport, 1997).

Parasuraman points out that the producer-oriented view of productivity in manufacturing operations is insufficient for service context because of the simultaneity of consumption and production and also because of the role of customer as a co-producer. The need for adding a

customer perspective to the concept of productivity is also emphasised and elaborated by almost all the authors whose works were mentioned above and more recently by Martin et al. (2001) and Johnston and Jones 2004. The argument relates to the interaction between productivity and quality. This itself is a major concern among the researchers in the field of service operations. This is discussed in the next section.

Comments on difficulty of the concept of productivity in services have been made by other authors like Ross and Shawn (1987), Klassen et al. (1998), Haywood-Farmer and Nollet (1985), Dobni et al. (2000) and Bylund and Thoresson-Hallgren (1994).

Looking at the above different but mostly similar and inline comments on productivity in services, the fourth observation can now be made:

Observation Four:

"The single feature of productivity that almost all the researchers in the field agree upon, is its multi-dimensional and complex nature that makes it significantly different from the traditional concept of productivity."

2.5 Concerns about the relationship between productivity and quality (in services)

This section is in fact an extension of the previous section, intending to bring the focus of service productivity concerns into the area of productivity and quality relationship in services.

In almost all of the cases where researchers discuss their concerns about productivity in services, the issue of the relationship between productivity and quality comes up. The range of discussions varies from those who merely debate on the relationship between the two as the two separate concepts, to those who in a way include the concept of quality (or some of the aspects of quality) in their definition of productivity.

Most of the explorations come from the identification of customer's role as another side of the operations, to be distinguished from provider's role. There are a number of works being done on this basis:

Parasuraman makes an interesting comment about productivity in services:

> *"Productivity from the customer's perspective – defined as ration of the service output experienced by a customer to the inputs provided by a customer as a participant in service production – suffers when managers in service–producing businesses blindly mimic the productivity improvement methods of their peers in product-producing businesses. By the same token, service managers who focus solely on enhancing productivity from the customer's perspective cannot afford to continue to do so forever unless they are endowed with unlimited budget."*
>
> (Parasuraman 2002: 7)

Accordingly Parasuraman develops a model in which company's perspective of productivity is linked to customer's perspective of productivity. There are a few interrelated causal links between the elements of the model but the most interesting (and relevant one in this section) is the role of quality in the middle of the model. Service quality is shown to be affected by inputs from both company's and customer's perspective and consequently to affect the output of both perspectives. According to Parasuraman, high levels of company's input and low levels of customer's input increase service quality and higher quality increases the outputs of both perspectives (Parasuraman, 2002). It is not clear how the notion of 'low customer input leads to higher quality', takes into account the 'customer self-service' or more generally the notion of 'customer as co-producer' where it is argued that more input from customer (as co-producer) results in better productivity (Lovelock and Young, 1979; Blois, 1983; and Mills et al., 1983).

Very much in line with Parasuraman's work, and in fact one that took place before Parasuraman's work, is Martin et al. proposal. Martin et al. discuss the notion of client (customer) productivity as an important part of the overall productivity of the system. Pointing out that the client in services has two roles of co-producer and customer (Normann, 1984), and on the basis of Servuction model presented by Langeard and Eigler in 1987, the authors propose that in the same way as there is a backstage and on-stage for the service provider, this is true for clients (customers). From here the authors further developed Servuction model to include client's backstage. Being inspired by Servqual model of Parasuraman (Parasuraman et al. 1985) they propose an equivalent gap model to investigate issues in service operations that could lead to low productivity. To illustrate this, the model

is applied in a consulting business. Although it is not explicitly mentioned, it is however very clear that the developed model takes into account the effects of quality of the service (as well as quality of the client's input) on productivity (Martin et al. 2001).

Developing the Martin et al. notion of client (customer) productivity and based on Johnston and Clark's model of Customer and Operational Perspectives (2001), similar to Parasuraman, Johnston and Jones also identify two aspects of productivity: 1. operational productivity (quite similar to the traditional concept and what Parasuraman calls Company's perspective) and 2. customer productivity (quite similar to what Parasuraman introduces as customer's perspective). The top line of the ratio of customer productivity includes experience, outcome, value, etc. and the bottom line includes customer's times, effort, cost, etc. Johnston and Jones assert that while some authors (like Gummesson 1998b) have separated the two concepts of productivity and quality, the notion of satisfaction is included in the definition of customer productivity. The authors then discuss the harmonies as well as trade offs between the two aspects of productivity. They remark at the end that in the literature, productivity studies have been mostly dominated by operational productivity. As an example they put the application of the theory of Swift, Even Flow in services, under question (Schmenner and Swink, 1998, Schmenner 2001). According to the theory, the more swift and even the flow of materials or information through a process, the more productive is that process. Johnston and Jones argue that the theory only applies to Operational Productivity and does not consider the other side of productivity in services, that is Customer Productivity. They also raise a question mark on the notion that quality and productivity are totally separate in services (Johnston and Jones, 2004).

Gummesson argues that productivity, quality and profitability are a triplet and separating them will make an unhappy family (Gummesson, 1998b). He develops a causal map to illustrate the links between the three concepts of productivity, quality and profitability, indicating that improving quality leads to improved productivity and profit (Gummesson, 1992, 1994d). Gummesson later introduces three perspectives in organisations (called three tribes) that determine the relation between the three concepts of productivity, quality and profitability. These are referred to as productivity tribe, quality tribe and accounting tribe. Gummesson argues that top managers as the chief of the tribes need to have an overview and whole perspective but that this does not often happen. He then proposes a model much similar to that of Parasuraman 2002, Johnston and Jones 2004 and Martin et al. 2001, in that customer contribution in productivity and quality (customer induced productivity/quality) as

well as providers contribution to productivity and quality (provider induced productivity/quality) are both recognised as two sides of one concept between which there is interactive quality and interactive productivity (Gummesson, 1998b).

Gronroos asserts that productivity and perceived quality are inseparable phenomena, he calls this a dilemma in service processes. Gronroos argues that the 'constant quality' assumption (held in manufacturing context, on the basis of which managers focus on internal productivity) is not valid in services. Discussing the interaction between provider and customer participation, and based on Gumesson's model of interactive participation of service provider and customer (Gummesson 1998b) he concludes that productivity and quality are in fact "two sides of the same coin" (Gronroos 2000: 210). Based on Ojasalo's work in 1999, Gronroos presents a model in which input consists of service provider, and customer input and output consists of quantity and quality. Based on the model, productivity is defined as a function of 1. internal efficiency (similar to traditional concept of productivity), 2. external efficiency (based on perceived service quality) and 3. capacity efficiency (to take into the account the perishability of services). A high productivity in services (according to Gronroos and Ojasalo) means high measures for all the three dimensions (Ojasalo 1999; Gronroos 2000, Gronroos and Ojasalo, 2002).

In the above works the connection between productivity and quality was explored by reconsidering and redefining the concept of operations and the role of customer in service operations. The rest of this section is devoted to some examples of works that have mainly and specifically addressed the issue of relationship between productivity and quality:

Armistead and Machin mention that there is an implicit connection between quality and productivity in the service sector, they suggest adapting the EFQM model for studying processes in organisations in order to consider all business processes and to understand the relationship between customer satisfaction and productivity (Armistead and Machin 1998). Gupta refers to intangibility of services as a problem in defining productivity in services. He then suggests that the problem of intangible output of service can be solved by equalising this intangible output with 'quality'. Gupta then proposes models for measuring and improving productivity in services in which a Servqual measure of quality (Parasuraman et al., 1985) is included in the productivity index as output (a measure of level of staff skill is included in input) Gupta 1995. Jones presents a model in which he breaks down the different stages of operations and their effects from having Input to reaching Outcome. In this model,

productivity is seen as part of quality management (Jones 1988). As discussed in section 2.4., later Jones revised his views and suggested a totally different concept for productivity in services (servicity) that includes what he refers to as felicity which in effect, is a result of perceived high quality (Jones and Hall, 1996).

Van Looy et al. argue that productivity and quality are both an appreciation of how well the resources in any activity or transformation function are used. They assert that both concepts can be best looked upon simultaneously. To illustrate this, they present a case study in which the researchers have looked at both productivity and quality by integrating the three tools of activity based management, quality function deployment and process mapping. The authors finish their report by discussing the relationship between productivity and quality, pointing out that there is more empirical evidence showing that the two cannot improve at the same time (Van Looy et al., 1998).

Roth and Van der Velde as well as Siferd et al. argue that flexibility of operations facilitates the positive relations between productivity and quality (Roth and Van der Velde, 1991; Siferd et al., 1992). This is pointed out by Armistead and Clark as well as Miller and Adam, except that they refer to capacity and slack respectively (Armistead and Clark, 1994; Miller and Adam, 1996). Kupers criticises relying on manufacturing based definitions of productivity on the basis that these industrial-based operationalisation of the concept of productivity measures in services, produce misleading information and make productivity and quality appear in conflict (Kupers 1998).

Heskett at al. argue that service quality and productivity differ directly from one another and that it is not necessarily true that quality is achieved at the cost of low productivity and productivity gains affect quality (Heskett et al., 1990). In a popular work by another group of researchers, Heskett et al. develop a model called Service Profit Chain to demonstrate the relations between different elements of operations and working conditions that will lead to profit and growth. The model is based on studying a number of service organisations in America. In the model the two terms of productivity and output quality are placed next to each other as one integrated concept. The authors argue, based on their findings from case studies, that quality of service need not to be traded off for high productivity and that they must often go hand in hand (Heskett et al., 1994; Heskett et al., 1997).

Pickworth looks at productivity and quality in the hospitality industry and while appreciating the traditional concept of productivity, argues that based on stakeholder contributions and expectations and socio economic inputs and outputs, it is possible to link productivity and quality. He asserts that the organisations that work on both of the concepts find that the two reinforce each other and create innovative environment (Pickworth, 1987).

Vuorinen et al. include quality in the definition of productivity believing that the traditional manufacturing concept is too narrow and needs to be interpreted more broadly when it comes to services. The authors include quality in the top line of the productivity ration. They further argue that quality in this definition is not limited to the manufacturing concept of conforming to specifications and includes tangible and also intangible as well as customer perceived quality (Vuorinen et al. 1998).

The overlap between productivity and quality has been referred to by other authors like Nachum 1999 (specific to professional services) ,Hasan and Kerr 2003 (specific to TQM and service productivity), Filiatrault et al. 1996 (emphasising on the importance of management and common managerial areas between the two concepts), Adam and Gravesen 1996 (arguing that the concept of productivity in particular in services is changing towards both efficiency and effectiveness that includes quality). Among other authors who have discussed the issue are Larson (1998), Roth and Jackson III (1995), Collier (1995), Zimmerman (1985), Rohlfs (1987), Heap (1995) and Bylund and Lapidoth (1994).

It should be noted that the discussion about the relationship between productivity and quality (with favouring the view that the two concepts can have positive effects on each other) is not limited to service operations. A limited version of the same issues is discussed in manufacturing context as well. It is however evident that the issue is more concerned in services. Although this has long been a matter of discussion in a generic context by classical researchers (Deming (1982) a typical example), it might not be an exaggeration to argue that the attention of service researchers to the issue (as a matter of necessity) has inspired and encouraged researchers in manufacturing context to pay even more attention to the concept. No doubt the inclusion of service aspects in many manufacturing industries was also an effective factor. Among some of the more recent works on productivity and quality relationship in general with often similar conclusions about the overlap of the two concepts are Stainer and Stainer 1995, Shailendra and Noori (1996), Mohanty and Yadav (1994), Helms (1996), Al-Darrab (2000), Hoffman and Mehra (1999), Khan (2003), Shetty and

Buehler (1985), Scherkenbach (1982), (Maani 1989), Prokopenko (1996), Edosomwan (1987), Noori and Jha (1996). In their book Handbook for Productivity Measurement and Improvement, Christopher and Thor (1994) collect a series of works by other authors, many of them consider productivity and quality as two aspects of business that are integrated together. There are also works in this book that consider productivity and quality as essentially one concept (these are Juran, 1993, Smith, 1993 and Federal Express Papers, 1993).

It is now possible to write the fifth observation:

Observation Five:

"there are controversial discussions about the relationship between productivity and quality in services with different views on the nature and dynamics of this relationship. These are basically because of the role of customer in services. There however seems to be a general agreement that a useful and relevant study of productivity in a service operation should also take the notion of quality into the account, whether as part of productivity or as closely related concept to productivity."

2.6 The extent of research on productivity in services

In section 2.1. an observation was made (Observation One) indicating that most of the focus of operations management discipline in service research was from the customers' perspective in the past. In this section, this observation is further supported and its consequences in a specific area are discussed by investigating the amount of attention to productivity in services in the literature.

The first international research workshop on service productivity was held in 1994 (Belguim). The second workshop followed in 1996 in Spain. There were no more workshops on the subject after 1996 (till the time of completing this report i.e. 2005). In an e-mail conversation the author of the present work asked the organiser of the workshops, Professor Evert Gummesson, himself one of the well-known figures in the area of service productivity, whether there were any workshops on service productivity after 1996 which this author had missed and if not if there were any plans for the third service productivity workshop in future. The answer was interesting and enlightening:

"... No, there were no followers. Service productivity has turned out to be a very difficult subject especially if you want to link it with quality and profitability. It is much easier to do a Servqual survey, so researchers seem to be discouraged. ..."

(Evert Gummesson, E-mail to the author on 10-08-02)

The area of service productivity has enjoyed a number of interesting and thought provoking contributions by the researchers in the field of services, as presented above. This however has not stopped the researchers from pointing out how little has been done in this particular field of research, when compared to manufacturing, and in particular when considering the needs and questions that are still to be answered:

Vuorinen asserts that the current debate on service productivity is in its infancy and it is therefore essential to start from basics (Vuorinen at el. 1998). Martin et al. report that the attention to service productivity was mainly concerning internal aspects of productivity and has ignored the client's role, similar concerns have been raised by Parasuraman (Martin et al. 2001, Parasuraman 2002). When discussing the contribution of academia in the research on service productivity, Johnston and Jones can only refer to few recent works in their brief review of literature on this area. Johnston and Jones point out that the majority of operations text books are production oriented and have little more than passing references to the service sector. They point out how little empirical research has been done on the topic and introduce the area as one that is "ripe for development" (Johnston and Jones, 2004; 201). The authors assert that one of their motivations in writing the paper is to encourage more researches in the field (Johnston and Jones, 2004). At the end of the research workshop for service operations in London Business School, run by professor Chase and professor Voss, a list of most helpful papers on different subjects of service operations were given. Not finding any mentions of "productivity" as a subject the author asked the two researchers if they could also suggest a paper for service productivity and to his amazement, the researchers did not refer to any papers, stating that almost nothing has been done in this particular area (Service Research Workshop, London Business School, June 2004).

The above report is a brief but updated report that illustrates the state of the art in terms of the extent of research in the area of service productivity. The sixth and the last observation can now be formed

Observation Six:

"Despite the interest in service productivity and the apparent need to improve productivity in services, very little work has been done in this area and the subject can still be seen as a fresh one."

Summary and Conclusions

Six observations were derived from reviewing the research on productivity in services. As mentioned at the beginning of this chapter, these observations are all related to each other and some of them support or explain the others. The observations are now put together as one overall finding from the literature in the area of service operations:

It seems the service research was very much dominated by the Marketing discipline and under the influence of this discipline in the area of service research. This was not only because Marketing researchers were the first who categorically started introducing services as a separate concept (and establishing academic research on this area) but also due to the need for engaging in multi-disciplinary researches to generate basic theories in this field. One of the results of such influence and domination was that operations management researchers found less opportunities to look at the area from their core perspective and therefore some important concepts like productivity in services enjoyed less attention (observation one). This is in particular important when taking into the account the fact that the concept of productivity originated and is rooted in traditional industrial, manufacturing context (observation two). As a result, lots of controversial issues have emerged when attempting to apply the concept in services. The controversial issues are so serious that there is not even an agreement on whether the figures of productivity measurement in service sector can be trusted (observation three). This is because the authors in the service domain do not agree with the traditional, rather straight forward conceptualisation of productivity in manufacturing and firmly believe that in services, the concept is a multi-dimensional and complex one (observation four). One of the main aspects of complexity of service productivity is the relationship between productivity and quality in services. Authors

generally agree that in service operations, looking at productivity as an isolated concept, related only to internal processes, is less valid and relevant (observation five). Despite all the above, and ironically quite understandably, the field of service productivity has enjoyed little contributions from academia and is still a fresh area for research (observation six).

The above provides enough insights to set the context of this research and to justify the interest of the author and the general outline of the work. With such vastness and complexity of issues related to productivity in services and given that there is not yet any firmly-established-agreed-upon conceptual model for productivity in services, it seems appropriate as well as feasible to carry a generic research on productivity in service operations. The author's interest in operationalising service dimensions and classifications fits well with the research context as service dimensions are one of the most popular tools in conducting generic researches on services (as will be discussed in detail in the next chapter). Classification of services based on service dimensions (that are significantly associated with productivity management) can reduce the complexity of productivity management in services. Such classification models can illustrate the similarities and differences in managing productivity between different services and can model general trends in dealing with 'productivity related issues' for different clusters of services. In the area of service classification, there are already a number of works that are directly or indirectly related to productivity management in services (examples are Chase's notion of Customer Contact in 1976, Schmenner's Service Process Matrix in 1986 and Silvestro et al. Volume – Variety model in 1992). Developing and applying service classification models as tool, in the context of service productivity seems to be an appropriate and reasonable research. (Given that no definition of productivity in services is yet established) it seems safer to retain the traditional concept of output per input while at the same time studying the relationship between productivity and quality.

The above outline of the work is explained in detail in chapter 4. Chapter 3 covers the notion of service dimensions and service classifications, describing and investigating the works that have been done on this subject. The main aim is to illustrate the interests of the author in operationalising service dimensions by pointing out the research gaps and questions in this area.

Chapter 3: Service Classifications, their features and use

Introduction

In chapter 2 the importance and complexity of the notion of productivity in services were discussed in a literature review and by illustrating 6 concluding observations on different issues related to the subject. In chapter one, it was mentioned that this research carries out a generic study of productivity issues in the service industries aiming to develop an analytical model or theory that could be helpful in comparing productivity management challenges across different service sectors. It was also discussed in chapter one and two how this intention closely relates to another aspect of the present research, which is classification of services based on service dimensions. These two aspects of the present research are very much dependant on each other.

In Chapter one it was argued that "productivity management in services" is a reasonable context in which, to illustrate a new approach for classification of services. Here a discussion can be made vice versa, arguing that "service classifications and dimensions" are a reasonable tool and approach to a generic study of service productivity. The author found this to be an appropriate starting point for discussing the researches that have been carried out on the subject of service classifications and dimensions:

It is quite reasonable and helpful to find a tool that could serve as an indicating tool for the purpose of generic research on service productivity and to reduce the degree of complexity of such a study. This "tool" can be sought by studying the special features of service operation processes and products. These features can be seen as operational factors that can have different degrees (measurement) for each type of service and can be used as indicators to study the condition of different aspects of operations in each service. This is in fact the same approach that was taken (along with other approaches) for strategic and generic studying of operations and managerial challenges in the manufacturing context (as will be discussed later in this chapter). This is also a similar approach that is used in studying operations management as a whole by Slack et al. where the authors introduce the meaning and implications of the four dimensions of Volume, Variety, Variation of Demand and Visibility (Slack et al. 2001). In service operations too, these features can be called "Dimensions" or more specifically "Service Dimensions" (Silvestro et al. 1992). In the present research these are often referred to by "SD", because of frequent usage of the term. SDs are used to classify and explain or indicate the "behaviour" of service

operations of different kinds and to develop strategic positioning models for academic and practical purposes. In fact, SDs in service research are serving the same cause that is referred to by Hambrick:

> *"to classify things is to know one or two key attributes about an object and then infer (sometimes reliably, sometimes not so reliably) other attributes of the object"* (Hambrick, 1984: 27).

The above quote can be seen as another way of phrasing the research idea for this work. Here the key attributes are SDs and the object is the notion of services. Other attributes in this case are productivity management issues specific to each service.

It was also pointed out in chapter one that SDs are closely related to classification of services. In fact an easy way for utilising the notion of SDs in services is to use them as a basis for classification of services. The managerial implications can then be discussed and derived based on and from the developed classification scheme.

In this chapter a literature review on Service Classifications and their associated SDs is provided. While in chapter 2 the objective of literature review was to gain some useful insights from the literature by making a series of interrelated concluding observations, here the objective is to answer to some specific questions about service classifications and dimensions. These are:

1. To what extent have classification models based on the SDs been used for generic researches in services?
2. What (if any) are the gaps in the research on using classification models based on SDs for service research
3. Based on the answer to the above, what can be learned about an appropriate contribution in using SDs and classifications in this research?
4. What are the SDs that are appropriate for studying in this particular research?

Answers to the above questions, in particular question number 2, make a significant contribution in the design of the present research.

The chapter begins with briefing five reviewing papers in an attempt to provide a sharper and wider picture of the subject, including the importance of the subject, the motivations and aims behind it, the historical background and the general trend and features of

proposed models (that were built based on the SDs). At the next step, the classification models are clustered based on the nature of the chosen SDs. In each cluster, the models will be discussed and (where applicable) a critical discussion of each cluster or model will be taken place. Certain models will be discussed in more detail because of their relevance and similarity to this research. As a result, a number of gaps in the research on service classifications are identified. At the end of the chapter a number of SDs will be highlighted. These are the ones that are going to be examined and tested in the present research to serve as indicators for studying productivity management challenges across service industries. Answers to the above questions are summarised at the end of the chapter.

The Format of the Chapter:

Comparing to the last chapter, this chapter presents a rather long and detailed discussion of the relevant literature to meet its aims. The models are presented and (where applicable) the comments of other researchers about them are pointed out. Also (where applicable) the author of the present research raises his own comments. To make the reading of the chapter easier and make it more structured (apart from presenting the classification models in different categories), a specific format is used. Where the author of the present research discusses his comments in length, these are started by the title COMMENT. Star signs are also used to separate the streams of discussion where no separating title is applicable.

3.1 An Overall Review of the SDs and Service classifications

As stated above, an easy way to illustrate and appreciate the overall picture of the subject in the literature is to look at some review papers on the subject. Five papers are examined at this stage. These are a rather comprehensive critical review of the literature by Cook, Goh and Chung (Cook et al., 1999) and four other papers that provide a detailed review of the past works. These are the works by Silvestro et al. (Silvestro et al., 1992), Dotchin and Oakland (Dotchin and Oakland, 1994a) and two papers by Collier and Meyer (Collier and Meyer, 1998, 2000). Although the most recent paper among these belongs to 2000 and covers only the works that were done by 1999, this does not affect the value of this review, as the main aim is to provide a general picture of the literature. Moreover, it seems that the literature on SDs and service classifications has not been significantly added to since 1998. In any case, the more recent papers will be later referred to in this chapter.

This review will cover the historical background, aims and objectives and criticisms on service classifications, as and where illustrated by these four papers:

3.1.1 Historical Background

While stating that classification of services was made a long time ago merely for economical purposes (referring to Clark's classification of services in 1940), Cook et al. traced the history of service classification schemes, in managerial context, back to 1960s. Their list starts from Judd in 1964 with his rather simple but well recognised classification of rented good services, owned good services and non-goods services. The authors argue that classification of services started with economics and when it came to managerial context, it was addressed from marketing perspective and was not looked at by operations discipline till the 1970s. Dotchin and Oakland have traced the service classifications to much older times, starting with Copeland in 1923 with his very marketing-oriented classification of Convenience, Shopping and Speciality Goods. They argue that the majority of classification schemes of the early stages of developing service classifications were in fact emphasising physical goods and provide little insight for services. Like Cook et al. they too agree that the early classification schemes were marketing oriented. Both papers agree that a real attention from operations perspective to the area of service classifications was started by Chase in 1978 and with his suggestion of classifying services based on the notion of Customer Contact.

Cook et al. observed that there were only few classifications until the mid to late 1970s and that from this time until mid 1980s a large number of classifications appear. They seem to agree with Fisk et al. that in the period since 1986 the difference between goods and services appear to be assumed and researchers have begun to focus on substantive business issues and problems stemming from the implications of these basic service differences (Fisk et al., 1993).

Silvestro et al. and Collier and Meyer introduce the development of service classification schemes as a natural continuum of the manufacturing classification schemes and in particular the widely recognised manufacturing classification scheme of product versus process, as discussed by Hayes and Wheelwright in 1979 (Hayes and Wheelwright, 1979a,b). As Tinnila and Vepsalainen put it, it has been widely recognised that in the service sector a powerful analytical tool similar to the product-process matrix is missing (Tinnila and Vepsalainen 1995: 59). It is interesting that this is about the same time that

according to Cook et al. and Dotchin and Oakland, the classification schemes started to be seen from operations perspective. Silvestro et al. and Collier and Meyer give examples of authors who attempted to apply or adapt the same classification scheme to service operations. Silvestro et al. refer to Sasser et al. as authors who attempted to apply the same classification based on product-process matrix to services. They quote criticisms from Chase (1978) and Morris and Johnston (1987) on such attempts (these will be presented later in this chapter). They argue that many proposed classification schemes were in fact responses to such attempts with the idea that the difference between services and manufacturing operations need to be appreciated in any proposition for classifying services. Silvestro et al. themselves point out some of the difficulties of applying the model for services. These will be discussed later in this chapter. Among other authors who attempted to adapt the product-process matrix for services by using a similar idea are Slack et al. (2001) and Dilworth (1993). Interestingly enough, even Silvestro's et al. own classification is very similar to the product-process matrix, although it has gone through major adaptations in an attempt to make it purely based on service operations perspective. This will be discussed later.

Likewise, Collier and Meyer refer to Blois' (1983) work as an attempt to apply the product – process classification to services. They refer to Blois admitting that although there are similarities between applying the product – process matrix to manufacturing and service operations, there are also puzzling differences, a note worthy one being the simultaneity of production and consumption in services. Like Silvestro et al., Collier and Meyer quote some of the concerns and criticisms of authors about applying the manufacturing model for services. The references are made to Silvestro et al. (1992) and Kellogg and Nie (1995). These will be discussed later. Authors support Thomas' comment that "the use of product-based models and language to describe and manage service businesses restricts thinking in a way that limits innovative management approaches." (Thomas, 1978).

The above review of the historical background of service classifications is very much in line with the discussion in the previous chapter. Two important points that can be derived from the above discussion is:

- Classification of services was for a long time affected by manufacturing based views. This is in fact the general experience that the whole service research has

gone through as discussed in the previous chapter. Here it is evident that the bias was extended to the area of service classification as well.

- In the area of service expertise, the classifications were very much dominated by marketing perspective, just as the whole service literature and research. This was also discussed in the previous chapter.

3.1.2 Aim and Objectives

The use of any classification scheme depends heavily on the initial aim or objectives of the scheme developers. It is therefore interesting and helpful to have an overview of the service classification schemes from this perspective.

Cook et al. argue that researchers who propose typologies implicitly recognise that organisations are neither wholly different nor completely like other firms. They further suggest that facilitating the development of meaningful strategies and guidelines for service marketing and operations are the main purpose of developing service classification schemes. As discussed earlier, firstly marketing discipline and then operations management discipline were the two major sources of developing service classification schemes. Authors have identified the different aims that researchers in each of these disciplines were after:

Marketing discipline:

- positioning services in market place
- gaining insights into marketing strategy

Operations Management discipline:

- examining the strategic attributes (E.g. Shostack 1977)
- productivity and efficiency (E.g. Chase, 1978)
- organisational design (E.g. Mills and Margulies 1980)
- general managerial issues (E.g. Fitzsimmons and Sullivan, 1982)
- product design and service quality (E.g. Wemmerlov 1990, Haywood-Farmer 1988)

Cook et al. have provided a very helpful summary of service classification purposes at the end of their paper. 15 overall purposes are recognised. The most popular ones are:

- Strategic issues (18 out of the 39 studied classifications)
- Managerial issues (9 out of 39)
- Marketing issues (9 out of 39)

Cook at al. recognise some classification models to have more than one purpose. Chase model for instance is recognised to address three purposes of Efficiency, Strategy and Managerial Issues (Chase 1978). The authors state that most of the researchers have explicitly mentioned the purpose of their classification and in some cases that this was not mentioned; the authors have derived them based on the information in the papers. The authors conclude that overall, the primary intent of most service classification schemes and models appears to be to provide readers and managers with significant strategic insights for the management and positioning of service systems and organisations.

Dotchin and Oakland consider "exploring general principles" and "insights for the improvement of management and control" as the overall aim of the service classification schemes. It is based on this observation that they propose a classification scheme of their own (as will be discussed later in this chapter).

Silvestro et al. mainly refer to Schmennner's argument about the possibility of services learning from each other (Schmenner 1986). Schmenner holds that acceptance of a certain terminology to describe generic production processes has unified manufacturers and has helped them remove the myth that all manufacturing activities and problems are unique. He argues that this facilitated the sharing of ideas and techniques and the development of an understanding of process choice implications in manufacturing strategy. He also considered process typology as a powerful tool in the teaching and development of production and operations management in manufacturing. At the end of his paper on Service Process Matrix, Schmenner makes a very strong point:

> "Service managers who continue to claim that their operations are unique may be left in the dust by those who see their operations are more generic." (Schmenner, 1986: 32)

Along with Schmenner, Silvestro et al. consider an appropriate service typology to be helpful for cross fertilisation of ideas and for an understanding of the management methods and techniques appropriate to each service type. As discussed earlier, Silvestro et al. and Collier and Meyer consider the primary purpose of the developers of service

classification schemes to be finding an equivalent of the manufacturing widely used classification model of product vs. process. Collier and Meyer also emphasise the importance of service encounter (Normann, 1984) as a motivation for developing classification schemes in services. They argue that service organisations need business models that more accurately account for the effects of service system designs and the roles of customer and service-provider choices in creating and delivering service encounters.

Collier and Meyer also distinguish between two types of service classification models. In their own terminology these are:

- Classification schemes: these are typically clusters or categories of service entities that exhibit similar characteristics. Within each classification category certain management issues dominate and strategies are developed to move from one category to another. Examples are Maister and Lovelock (1982), Lovelock (1991) and Schmenner (1986).
- Positioning matrices: here superior performance is assumed if the service entity follows a certain pathway (usually up and down a diagonal) on the matrix and a direction of causation is implied by the positioning matrix such as from the product to the process. Examples are Silvestro et al. (1992), Tannila and Vepsalainen (1995), Kellogg and Nie (1995) and the Collier and Meyer's own proposal of Service Delivery System matrix (1998).

As it is obvious from the above, Collier and Meyer reasonably distinguish the underlined idea and the benefits sought for "classification schemes" and those of "positioning matrices".

The above review of the aim and objectives of the developers of service classification models illustrates the appropriateness and relevance of SDs in the present research. Inline with Schmenner's view, the intention is to find and use appropriate SDs as tool to facilitate the sharing of ideas and techniques and develop an understanding of process choice implications in service strategy in the context of productivity management. This provides significant strategic insights for the management and positioning of service systems and organisations, which according to Cook et al. is the primary objective of any service classification model. This should also lead to (as Silvestro et al. put it) cross fertilisation of ideas and to an understanding of the management methods and techniques

(in the area of productivity management) appropriate to each service type. Chapter 8 discusses to what extent the above goals were achieved in this research.

3.1.3 Criticisms on service classifications

The author's evaluation of the literature on service classifications is presented later in this chapter. Here an overall picture of what has been reflected in the literature about the classification models is provided.

Among the five papers that are reviewed in this section, Cook et al. provide a wider discussion on evaluation and on criticising the classification models. This is while the authors are not arguing that they have overcome the sought weaknesses by any developed model of their own.

Cook et al. begin their critical discussion by referring to Snyder et al. (1982) statement: "most service classification schemes are useless because the criteria and parameters used in their development are ambiguous. Furthermore the existence of multiple definitions for service and the service sector increases potential confusion when considering the service literature. This poses a challenge to managers and researchers to evaluate the merits of current classification schemes."

The authors support the above comment by emphasising that most service typologies have been developed on the basis of a limited research focus, addressing little more than a narrow band of service issues. They further argue that until recently most schemes have been developed and accepted on the basis of their intuitive appeal and have not been empirically tested. They point out that Bowen (1990), Silvestro et al. (1992) and Kellogg and Chase (1995) are exceptions. They make it clear that the fact that so few studies attempting to empirically validate the proposed service typologies have been conducted, indicates this area of research is in its infancy. Finally they conclude that further investigation is needed to reveal the relative importance of each of the proposed dimensions and to determine the SDs that are most important. They state that research that will lead to an empirically based taxonomy of organisations is desirable. They promise that such an empirically tested scheme can lead to a universally accepted comprehensive framework from which to view services and can also serve as common ground for research in services. The authors also emphasise the importance of appropriate data collection instruments for service classification researchers. Finally they argue that a

service classification model can be an integrated one in which the four perspectives of marketing, operations, economy and environmental factors are all included.

The latter comment is also supported by Verma (2000) when he identifies that more recent works on service classifications have taken into account the arguments that are in favour of having an integrated approach to service management. Based on these arguments, operations management researchers must include organisational behaviour and marketing constructs and techniques to address service operations problems adequately (Sullivan, 1981; Bowen and Cummings, 1990). According to Verma, the classification proposed by Lovelock (Lovelock 1983) is based on the above argument (Verma, 2000).

COMMENT:

There can be some concerns about the validity of the argument that a good service classification model should integrate the interest of different perspectives. As Johnston (1999) puts it, Service academics in their bid to develop cross-functional service management material may have lost or inadvertently ignored the strength of their core disciplines. It is interesting that Johnston, along with the co-authors, Silvestro, Fitzsimmons and Voss argues that a disadvantage of the previous works on service classifications was that there is a lack of a cohesive framework, which could derive benefit from all the proposed SDs. This might seem like a very similar criticism to the one made by Cook et al. about lack of an integrated service classification model. Nevertheless, in line with Johnston's recommendation of returning to roots, the model that is developed by Silvestro et al. only integrates SDs that are mostly relevant to operations management rather than marketing and the proposed implications of the model too are mostly in the area of operations management rather than marketing (Silvestro et al. 1992).

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Dotchin and Oakland have evaluated some of the specific service classifications (like the Schmenner's service process matrix) they however, have little discussion on an overall evaluation of literature on service classifications. In line with Cook et al. they too raise the concern that little empirical work has been done to confirm or deny the classification models. Referring to Schmenner's proposed SDs, they also highlight the problems of subjective, opinion-based classification and the need for objective measures.

Silvestro et al. provide a detailed critical discussion of some of the most popular service classification models. Some of these are referred to as appropriate later in this chapter. As an overall view they recognise the lack of a cohesive framework which could derive benefit from all the proposed SDs as the weakness of the reviewed classification models. They consider this as the reason why none of the classification models has proved as robust and useful as the product – process model in manufacturing. They argue that the strength of the manufacturing model is that it is multidimensional in that several different manufacturing process dimensions are unified in a single model by correlation against production volume. Silvestro et al. propose a new classification model based on "Service Volume" and argue that the model is capable of integrating the popular SDs in one axis and correlating them with the other axes (i.e. service volume). This model is discussed in detail later in this chapter and is investigated further in chapter 7.

COMMENT:

In the present research an approach to service classification research has been proposed (elaborated on Chapter 4) that if applied successfully, it could rule out the need and the justification for benefiting from all the proposed dimensions and including all in one cohesive model.

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One of the main criticisms of Collier and Meyer about the proposed service classifications is that none of them defines the relation between the service and the service delivery process. After evaluating and criticising a number of proposed service classification models (including Silvestro's et al. Volume-Variety matrix), they suggest that overall all the proposed service classifications include two concepts of "customer and employee involvement" and "service system design". They argue that sometimes these two different notions are found on the same axis and therefore make it very difficult to interpret the model. Also that, in the case of positioning matrices (as defined by the authors), the superior performance on the pathway that is introduced in these matrices does not have any empirical evidences. They further point out that in some of these matrices the definition of the direction of causation between the two axes is vague. In reviewing a number of classification works, they also refer to the fact that an unclear definition of the

proposed SDs is another difficulty in classifications of services (Collier and Meyer, 2000). Like Cook et al., Collier and Meyer call for empirical testing of the proposed service classifications.

COMMENT:

The criticism made by Collier and Meyer refers to a number of valid points although they seem to be very specific and technical and in this sense one might argue that not enough evidence is provided to support criticisms that are made about service classification models as a whole. The two papers of the authors are mainly covering the works of Schmenner (1986), Silvestro et al. (1992), Kellogg & Nile (1995) and Tinnila and Vepsalainen (1995) and the criticisms are made mainly based on the review of these few papers.

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Looking at some of the works other than the five papers that were discussed above, similar concerns about the classifications have been raised. Haywood-Farmer (1988) points out the advantage of using three dimensional models over the routine two dimensional models to be able to separate the often complicated combined dimensions proposed by authors.

Haynes (1990) has criticised the service classifications available then by referring to three categories of classifications. He refers to continuum-oriented classifications in which a pure service is on one extreme and a pure manufacturing good is on the other extreme. These include classifications like those of Sasser at. al. (1978) and Fitzsimmons and Sullivan (1982). Haynes argues that in these classifications there are no indications of what particular action should be taken based on the position of a specific type of operations on the continuum. The second type of classifications, according to Haynes, is multi-dimensional classifications. Works by Porter and Millar (1985) and Berry et al. (1985) are included in this category. Haynes argues that these models remain in a normative level and that management decision is not considered at the implementation level of activity. The third and the last category of classifications according to Haynes consists of massive matrices. The examples are Mills and Margulies (1980) and Wemmerlov (1984). Haynes argues that the complexities of the dimensions have a tendency to cloud the purpose of the model in each of these areas. Among the then

available classifications, Haynes excludes Schmenner's (1986) and Shostack's (1987) works from his criticisms.

Kellogg and Nie developed their Service Process / Service Package classification (as explained later in this chapter) based on the view that the previous works fall short in illuminating the complex strategic issues in service settings (Kellogg and Nie 1995).

Tinnila and Vepsalainen (1995) argue that the service classifications appear to have run into problems in finding operational measurements and normative bases for assessing the efficiency of services. They argue that this is because of the focus of these works on analysing separate service facilities instead of the whole service process.

COMMENT:

Beside the fact that Tinnila and Vepsalainen have developed a model of service classification that takes into account a more extensive view of service processes, this author has not found any evidence in the paper to support the argument that the previous service classifications have run into problems and that the reason is because of their limited view to service process.

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Verma (2000) argues that the early works on service classifications (e.g. Judd, 1964; Rathmell, 1974) did not really address the operational issues like design and managing of service processes. He introduces later works on service classifications as ones that attempt to address some operational issues (e.g. Shostack 1977, Sasser et al. 1978). Verma concludes that the single common characteristic of all the studies that are referred to in his work is that they are primarily conceptual or theoretical in nature. Verma then refers to the work done by Silvestro et al. (1992) as a more recent work on service classifications that is based on empirical research.

Bebko (2000) criticises marketers because of what he calls a microscopic view in service classifications. He argues that because of this, marketers have lost the view, which ultimately defines the service – product difference. He argues that none of the theorised classification schemes for services has been successful in reducing the complexities of

producing and consuming services to a manageable set of characteristics. He adds that little empirical evidence is available to support the validity of any of the classification schemes.

COMMENT:

Bebko's criticism is very much limited to the marketing domain and does not include works based on operational perspective in his criticism.

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The above general criticisms on service classifications can be summarised here:

- The criteria and parameters used in classifications are ambiguous (Snyder et al. 1982)
- Most service typologies have been developed on the basis of a limited research focus (Cook et al. 1999, Dotchin and Oakland 1994a, Collier and Meyer 1998, Verma 2000)
- Appropriate data collection instruments are needed (Cook et al. 1999)
- An integrated view to services is needed (Cook et al. 1999)
- There is a lack of a cohesive framework, which could derive benefit from all the proposed SDs (Silvestro et al. 1992)
- No definition of the relation between the service and the service delivery process(Collier and Meyer 1998)
- Very difficult to interpret the model because of complicated axes (Collier and Meyer 1998, Haynes 1990)
- The definition of the direction of causation between the two axes is vague. (Collier and Meyer 1998)
- Not a clear definition of the proposed SDs (Collier and Meyer 2000)
- Difficulties caused by combining many concepts into a merely two-dimensional model (Haywood-Farmer 1987).
- Focus on analysing separate service facilities instead of the whole service process. (Tinnila and Vepsalainen 1995)
- Falling short in illuminating the complex strategic issues in service settings (Kellogg and Nie 1995).
- Difficult to interpret the models in terms of managerial implications and required managerial decisions (Haynes 1990)

Looking at the above, summarising the criticisms in one phrase, the common criticism or the one that can be viewed as the cause of generating most of the other criticisms can be seen to be the lack of empirical studies in developing the service classifications. It is because of this that most of the other difficulties that are discussed by authors exist and become serious. A detailed critical evaluation of a selection of the proposed classification models is presented in the rest of this chapter.

3.2 Classification (clustering) of classification models

In the first section of this chapter, an overview of the history and trends of the service classification models was presented. This was followed with a review of common criticisms on the research on service classification. In this section some of the most relevant classification models are reviewed in more detail.

It has to be noted that the author cannot claim that this review contains all the classification models in the literature. There are many classification models in different disciplines (including operations management) for many purposes and the number is getting higher and higher with any (even remotely) relevant publication. Authors propose operational classifications (in services and manufacturing) for a vast variety of purposes. All these classifications are in a way relevant to this work and at the same time most of them are of no help for this research. The author has tried to collect a reasonable representation of the classification models that includes the most popular ones. These are also the ones that can contribute to the insight that is sought in this chapter for answering the four questions raised at the beginning of the chapter.

To be able to set a reasonable framework to look at some of the most relevant service classification models, the reviewed models are categorised in this section. This helps in assuring a reasonable review of the literature in terms of the weight of discussion given to the models and in terms of the structure. Some of the authors have used the same approach when reviewing the service classification models.

Haynes' categorisation of the classifications was discussed above (Haynes 1990). Cook et al. presents an interesting categorisation scheme based on the perspective of classification models. They categorise the service classification models into four categories of

Organisational Ownership perspective, Marketing perspective, Operations perspective and Interactions and Integrations perspective (Cook et al. 1999).

In this section the criterion for classification of the models is to some extent similar to that of Cook et al. The classification models are put on different clusters based on their perspectives. The marketing and organisational ownership perspectives are merged together along with Economics perspective. This way all the classification models that can be seen as based on non-operations-management perspective are put in one category. The operations management perspective is further divided into Operations-Customer Contact perspective and Operations-Other perspective. This is because a significant number of works are devoted to the dimension of Customer Contact in an attempt to improve and/or develop the classifications based on this dimension. The above three perspectives further generate four integrated perspectives.

Given that the main purpose of this categorisation is merely to provide a framework to review the models, decision about which category a classification model belongs to, is solely based on the author's judgement. This also highlights the fact that there is no intention in this chapter to propose a new categorisation scheme for service classification models.

The proposed categorisation of the classification models is given in figure 3.1. The rest of this section comprises of going through each of the seven categories in this figure and looking at a reasonable selection of the classification models in each of them. Certain models will be looked at in more detail because of their high degree of relevance to this research. The numbers at the top of each category in figure 3.1 are showing the number of section in which that category is discussed.

Figure 3.1. Categorisation of Service Classification Models for Presentation Purposes Only

3.2.1. Marketing, economics or organisational perspective

- Judd (1964)
- Rathmell (1974)
- Hill (1977)
- Shostack (1977)
- Sasser et al. (1978)
- Murphy & Enis (1986)
- Lovelock & Yip (1996)
- Stell & Donoho (1996)

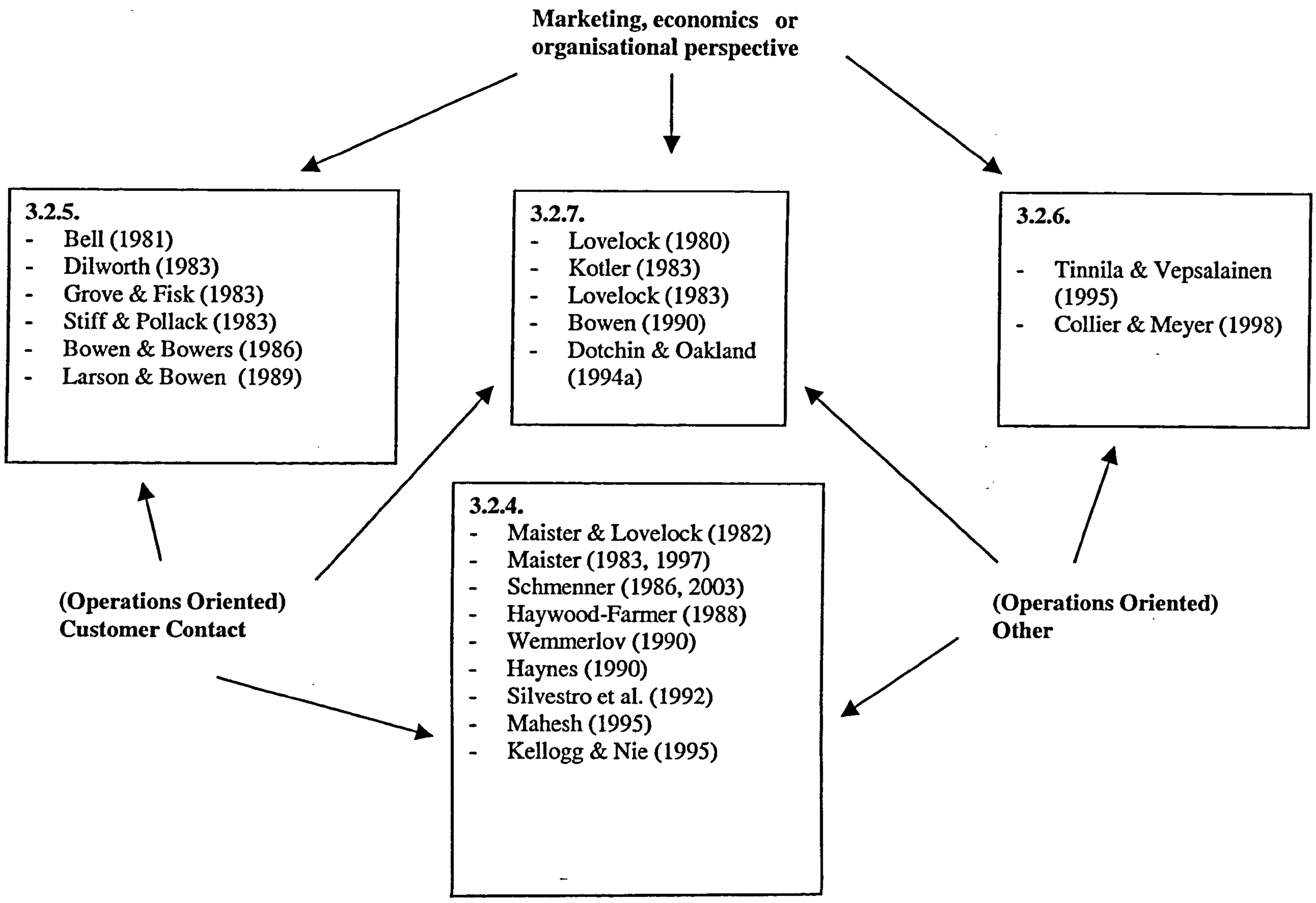
3.2.2. (Operations Oriented) Customer Contact

- Chase (1978)
- Mills & Margulies (1980)
- Silpakit & Fisk (1985)
- Mersha (1990)
- Kellogg & Chase (1995)

3.2.3. (Operations Oriented) Other

- Thomas (1978)
- Johnston & Morris (1985)
- Shostack (1987)
- Periera & Catini (2001)

Figure 3.1. (continued)



3.2.1 Marketing, economics or organisational perspective

This category consists of the classifications that are less operational–oriented and are mostly focused on marketing, economics or more general organisational perspectives. As discussed in section 3.1.1 and 3.1.2, most of the early works on service classifications fall into this category.

Judd, 1964:

Judd's work is referred to by a number of authors as one of the first important papers in this category (Lovelock 1992, Fisk et al. 1995, Cook et al. 1999, Verma 2000). Judd starts his argument by identifying a gap in providing a robust definition for services that could be used as a basis for further studies. He proposes a definition that he suggested in his PhD dissertation ("The Structure and Classification of the Service Market" - unpublished) in 1962 (sited in Fisk et al., 1995). Based on this definition he identifies three categories of services. These are:

1. Rented Good Services
2. Owned Good Services
3. None-Good Services

Perhaps one of the reasons that authors often refer to Judd's work as the first significant work on classification of services and tend to give less weight to the works before this is that in his very short paper Judd clearly argues for some managerial implications (in the context of marketing) for his classification scheme. Judd argues that service marketing researchers may come to recognise the common interest they have in solving problems they previously thought unique to their particular business. He illustrates the example of the possibility that all the businesses with rented good services might encounter more frequent problems in terms of marketing than the diversity of the items rented would ever suggest. It is interesting that what Judd was predicting in fact became true in both marketing and operations disciplines. An interesting quote from Schmenner was given in section 3.1.2. addressing the same issue (criticising the idea of uniqueness of the managerial challenges in each type of service). From the marketing perspective a similar quote from Lovelock is quite relevant:

> *"Recognising that the products of service organisations previously considered as 'different' actually face similar problems or share*

certain characteristics in common can yield valuable managerial insights." (Lovelock 1992: 62)

Lovelock however criticises Judd's classification with regard to its third category. He argues that the third category (None-Good Services) is too broad and ignores services like insurance, banking, legal advice and accounting. Cook et al. endorse this point by repeating the same comment in their work (Cook et al. 1999).

COMMENT:

It seems like Lovelock's point is a fair point. In particular if one wants to think about using Judd's classification scheme for the benefit that he suggests (finding common problems) then one will certainly find that the variety of services in the third category is much higher than those in the first two categories and this might make it difficult to find a reasonable amount (if any) of common problems between the services in this category. In fairness to Judd however, it should be taken into consideration that the available services in the third category of his classification scheme were not as many as the present when comparing it to the time that the classification was proposed (1964).

***

<u>Rathmell, 1974:</u>

Rathmell's work is another attempt from the marketing discipline to research the area of service classification. Cook et al. and Lovelock have introduced the Rathmell's classifications to be based on the dimensions of "type of seller", "type of buyer", "buying motives", "buying practice" and "degree of regulation". This however does not seem to be an accurate observation. Although Rathmell refers to these dimensions as possible tools for classifying services, he concludes that as these dimensions are heavily based on traditional marketing concept, some of them need to be removed and new dimensions should be created. He then introduces six dimensions or concepts to be used together for classifying services. These are "type of seller, "type of buyer", "character of selling enterprise", "absolute size", "type of regulation" and "the function of the service". Positioning services in the first five dimensions are intuitively determined (Rathmell, 1974: 17).

The criticism of Lovelock about the Rathmell's work, (that is also echoed by Cook. et al.) is that the classification is not specific to services and could be equally applied to goods (Lovelock, 1992).

COMMENT:

Although it seems that the criticism is correct, the relevance is not clear. One of the most important uses of classification schemes is to derive managerial and organisational implications from them. If this can be done, then it does not matter whether the scheme can be equally applied to manufacturing or not. The author finds it more reasonable to evaluate Rathmell's work in terms of its managerial implications rather than its uniqueness for services. On the other hand it should be noted that Rathmell is not alone in defining classifications that are not unique to services. Many of the classification schemes that are to be reviewed in this section could be equally applied to goods. Lovelock's classification schemes however are not included among those that could be applied to goods.

***

<u>Hill, 1977:</u>

Hill emphasises the importance of distinguishing between the effect of the services rather than the nature of their product (service or goods). Looking from an economics perspective he introduces a cross-classification scheme for services that result in nine sub-groups. The categories/dimensions he uses are "services affecting goods" vs. "services affecting persons"; "permanent effects" vs. "transitory effect"; "physical changes" vs. "mental changes" and "reversible changes" vs. "irreversible changes". Hill argues that this classification is rooted in the discussions about productive and unproductive labour by Adam Smith in 1930 and J. S. Mill in 1852 (sited in Hill 1977).

<u>Shostack, 1977:</u>

Intangibility, as one of the characteristics of services, has been the subject of many debates and discussions in the service literature. Many authors have deemed intangibility to be one of the most significant characteristics of services that can have a significant effect on many aspects of service management (Oberoi and Hales 1990, Morris and Johnston, 1987, Zeithaml and Bitner 1996, Wolak et al. 1998, Levitt 1981, Berry 1980,

Langeard, et al., 1980; Lovelock 1991, Rushton and Carson 1989). Shostack's work on classification of services based on a continuum from tangibility to intangibility is therefore quite well-known. Shostack argues that intangibility is not a modifier, it is a state. By this she implies that the characteristic of intangibility in services, makes services a completely different nature from goods. She argues that saying that services are just like goods except that they are intangible is like saying that apples are just like oranges except for their appleness (Shostack ,1977: 73).

Shostack then presents a simple model that consists of a continuum from purely tangible dominant to purely intangible dominant products. Services are falling on the half of the continuum that end in purely intangible dominant products. Shostack uses her idea of the continuum of tangible-intangible dominance to develop another model based on differentiating between the nature of dominance (tangible or intangible) and the link between these two different natures of dominance and what Shostack refers to as "tangible evidence" and "intangible image". This later model is not a classification model but in fact an accompanied model with the simple one dimensional classification model which together can be used to analyse and derive marketing implications for marketing managers in services and manufacturing organisations. This rather clear practical implication can be seen as one of the strengths of the Shostack's model (for more details on the practical implications refer to Shostack 1977: 77-80).

Sasser et al., 1978:

A very similar work to Shostack's is the work by Sasser et al. in which they classified services based on the percentage of the goods and services included in different products ("bundles" as they put it). Sasser's et al. classification has only one difference with Shostack's and that is the mixture of goods, and service in each product is represented by percentages. It doesn't seem that Sasser et al. are arguing for any managerial implications for their classification model. The model seems to be merely a framework to be used when deciding whether an organisation is a service or a manufacturing organisation. According to Sasser et al. the distinction becomes somewhat hazy at the margin (Sasser et al. 1978: 11).

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While Shostack's model is wholly based on the concept of intangibility, the concept itself has become a point of interest for researchers and many controversial arguments have

surrounded the concept. While (as stated) many authors have deemed intangibility to be one of the most important characteristics of services there are also some reservations about this.

There are arguments that the tangibility-intangibility dimension is difficult for the customer to understand and that the concept has been overemphasised (Bowen 1990). It seems this observation is mostly relevant to the marketing perspective and not to the operations perspective. It is obvious that the intangible aspects of services have significant effects on operations management no matter if the customer (or even the service provider) can understand the concept.

Sampson calls intangibility a myth. He argues that with services, the delivery and product are generally no less tangible than produced goods. He argues that the intangibility myth occurs because some people confuse the lack of ownership of the service provider with intangibility. He calls the concept of intangibility of services as the greatest fallacy authors and academics have created about services. To him, the real difference (that has caused the introduction of the concept of intangibility in services) is that in manufacturing, the tangible elements are provided (owned) by the providers while in services many of these tangible elements were already owned by the customer (Sampson, 1999).

COMMENT:

Sampson's argument is a complicated one. It does seem to be true for services like Airlines (where the customer owns his/her body and belongings) or banks (where customer owns his/her money and properties), however when thinking about services like teaching or museums the argument seems to lose its strength and become subjective to the points of view of individuals. Overall, what really matters is the managerial implications. The managerial implications that Sampson argues for, his notion of "the provider of intangibles", are almost the same as those argued by others about the tangibility-intangibility dimension. Sampson's argument effectively makes the readers to challenge their pre-assumption and mindset. However, it seems at the end, it is only the matter of the title given rather than the concept itself. One might argue that lack of tangibles from the provider can be termed as intangibility, no matter if the customer brings the tangibles with him/her.

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While Flipo suggests that the term "intangible" really means "untouchable" (Flipo 1988), Hill suggests that intangibility has nothing to do with services. He argues that there are tangible and intangible goods and then there are services. He provides an interesting insight into the history of the term "intangibility" and argues that the term was developed after J. B. Say's notion of "immaterial products" back in 1803. He provides evidence from Say's writings to prove that what Say really meant was to refute Adam Smith's argument that services are not the result of work by productive workers. He meant to argue that services are products but immaterial products (thus they have value and are in fact made by productive workers). According to Hill, the evidence shows that Say himself was not insisting on the word "immaterial". The word however was used by others and according to Hill by the middle of the nineteenth century the practice of describing services as immaterial became universal (Hill 1999: 4). A practice that to Hill was unfortunate. Hill then argues that intangibility (that is in fact the word that took over immateriality) is the characteristic of newly produced goods in the advanced technological world and that it should not be confused with services. He then defines services and distinguishes them as operations that do not involve an independent entity (unlike tangible and intangible products). Here independent means independent to producer or customer. Hill defines services as "some change, typically material, in the condition of one economic unit produced by the activity of another unit".

COMMENT:

It should be noted that Hills' emphasis throughout his paper is on output rather than the act. This is while the notion of intangibility is mainly attributed to the act of the operations rather than the output (Lovelock, 1983). This is also pointed out by Shostack when she calls the intangible nature of services, an experience (Shostack, 1977). It seems like Hill is looking at the subject from the pure economic perspective. No matter what was the history of the term "intangibility", as described above (and will refer to more works later in this chapter) many marketing and operations management researchers have found the concept a legitimate one and one that can provide us with helpful managerial and practical implications.

The last reference to Intangibility in this part of the review is the one from Gronroos who summarises the long debate with a moderate conclusion that intangibility cannot be seen as the key to distinguishing goods from services although it is the most cited characteristic of services (Gronroos 2000).

Murphy & Enis, 1986:

One of the rather different approaches to service classification in this category is the work by Murphy and Enis. The idea of this work is to present one classification scheme for all products, with products including goods, services and ideas. The classification is based on two dimensions related to price and the definition of product benefits. The two dimensions of price are Effort and Risk. Effort is the amount of money, time and energy that the buyer is willing to expend to acquire a given product. The risk is about the possibility that the product is not delivering the benefits sought. The benefits are categorised and titled as Convenience Products, Preference Products, Shopping Products and Speciality Products. This is based on a well-known taxonomy in the marketing discipline, as discussed by Copeland in 1923 and Holbrook and Howard in 1977 (sited in Stell and Donoho, 1996). These four categories find their specific position in the two by two matrix of price risk and price effort. Murphy and Enis argue that using this model, it will not be necessary to have different classifications for goods, services and ideas (Murphy and Enis, 1986: 25). They however argue that the model intends to achieve the marketing goal of finding and filling the needs of significant segments of buyers. Murphy and Enis develop a table for managerial implications of their model. The table illustrates the differences between each of the four (above mentioned) categories of products in terms of what the authors call "managerial road map for strategy development". Here strategy refers to marketing strategy. The authors also argue that the model can be used by researchers for identifying areas of research. Murphy and Enis do agree that the positioning of some of the products in this model might be too subjective as this is highly dependant on the type of buyer. They also agree that for some of the products, their position in the model might not necessarily be the one that is illustrated in the model.

COMMENT:

Although this classification has some similarities with the Rathmell's classification in terms of product benefits, including price dimensions in the model makes the classification a unique one in this category. One possible point for discussion is whether the price dimension is a strong enough indicator that could provide marketing managers with enough insights into the wide range of services.

***

Lovelock and Yip (1996):

An example of using service classifications for a rather new subject is Lovelock and Yip's work in which they classify services to study the application of globalisation drivers and the use of global strategies in different types of services. They propose three broad types of services. These are people-processing services (tangible actions to customers), possession-processing services (tangible actions to physical objects belong to customers) and information-based services (processing information to create value). Authors then elaborate on the features and dynamics of each of these three types of services in the context of globalisation (Lovelock & Yip, 1996). It should be noted that the importance of distinguishing between services targeting customers and those targeting customers' possessions was raised by Lovelock and Young before (1980) and again by Lovelock (1983). The latter work is presented in chapter 3.2.7.

Stell & Donoho, 1996:

Stell and Donoho took the Murphy and Enis' model and through an empirical study adopted the model exclusively for services. The results suggest that using the same model (as proposed by Murphy and Enis) exclusively for services is beneficial in terms of differentiating between services. Stell and Donoho argue that this will be helpful in developing segmentation, targeting and positioning strategies in marketing. In their study, Stell and Donoho came across some results that are different from the assumptions of Murphy and Enis. As these differences belong to a very detailed marketing perspective they are not elaborated here (for details refer to Stell and Donoho, 1996: 37).

Summary of this category of service classifications:

This category exclusively represents the economic, organisational or marketing perspectives. In an overall view, lots of emphasis is placed on two specific concepts. These are the nature of service (being tangible or intangible as discussed by Shostack, Sasser et al.) and the motives of or type of consumption by buyers (being rented, owned or non-good as introduced by Judd; using six dimensions/concepts related to seller, buyer and organisation as introduced by Rathmell and finally differentiating based on the nature of effect as developed by Hill.).

Among the reviewed classifications only one (Stell and Donoho) is based on an empirical study. This empirical study is not for finding an appropriate classification scheme but is

for assessing an already developed one. All the authors in this category have suggested classification models based on their extensive experience, yet still the selection of dimensions for the model are based on a theoretical ground.

A number of authors in this category discuss the managerial implications for their classification model. These implications however are not empirically tested by the authors.

3.2.2 Operations Oriented- Customer Contact perspective

This category consists of the classifications that are in the context of operations management and are specific to the dimension of Customer Contact. In this review it will be revealed that the dimension of Customer Contact (CC) was taken as a key dimension for classification of services by many researchers in the field of operations management. Researchers suggest changing the name, developing the concept, elaborating on measures However, the point that remains the same is that the focal point of research in all these works is the core concept of CC (that is presence of the customer at parts of the service process).

<u>Chase, 1978:</u>

The fact that in services, customers are present during part of the service delivery has been referred to by many authors at the very beginning stages of research in service operations. Kellogg and Chase traced back the concept as early as a published work by William Foote Whyte in 1946 (Kellogg and Chase, 1995). It is however reasonable to refer to Richard Chase as the first researcher who looked at this fact for the purpose of elaborating on managerial implications, specific to services, by the use of classifying services. Chase's concept of CC is being seen by him and one of his co-authors (Kellogg) as a contribution towards moving away from the assumption that product-oriented solutions are appropriate for service industry problems (Kellogg and Chase 1995: 1735). As explained in chapter 2, this assumption was partially based on Levitt's Product Line Approach (Levitt, 1972).

Chase starts his paper by arguing that most of the service classifications are based on the nature of the service that is provided and that this does not deal with the production activities through which the service is carried out. Obviously this applies to all of the

service classification models that were reviewed in the last section. In fact being from operations management discipline, Chase is calling for more works from operations management researchers in an area that (that far) was mostly filled with work from economists and marketing researchers.

Chase states:

> *"What the manager needs, it would seem, is a service classification system that indicates with greater precision the nature of the demands on his or her particular service system in terms of its operating requirements."*
>
> (Chase 1978: 138)

By Chase's definition, CC means the physical presence of the customer in the system. He suggests measuring the extent of contact by the use of an industrial engineering technique of work sampling to find out the percentage of time the customer must be in the system relative to the total time it takes to serve him. Chases' main point is that service systems with high customer contact are more difficult to control and more difficult to rationalise than those with low customer contact.

Based on the above argument Chase proposes a simple continuum of low to high CC. He then elaborates in detail about the managerial implications of the notion of CC by defining six strategic questions related to CC for managers of service organisations. In particular in terms of design, Chase elaborates on the differences between high and low CC systems in different areas of decisions making.

Although Chase's argument does imply that a lower customer contact is a better condition in terms of control, he however concludes that his six questions should lead management to question whether its strength lies in high contact or low contact and it should encourage reflection on what constitutes an optimal balance between the two types of operations relative to resource allocation and market emphasis (Chase 1978: 142).

In his later works, Chase continued to develop and elaborate his CC notion. In his paper in 1981, he presented the same analogy with the name "the customer contact approach". In this paper, Chase used the term "potential facility efficiency" for what he meant (in his original paper) by the broad term of control and rationalising. He introduces a simple

equation to clarify the relation between CC and Potential Facility Efficiency. In this paper Chase also refers back to a simple classification that was made by him and Aquilano in a work that was published in 1977 (before publishing of the paper on CC), suggesting that the notion of CC can be applied using this classification. There, Chase and Aquilano suggested classification of services based on their decreasing contact with customers. The result was three broad groups of Pure Service, Mixed Services and Quasi-Manufacturing Services (Chase and Aquilano, 1977). Chase admits that the distinction between pure services and mixed services is not precise. He also raises some questions that are needed to be answered like "at what point along the contact continuum does the presence of the customer entail a shift in service policy?". He makes it clear that there is the need to test the propositions and heuristics proposed for the CC notion.

Like some other researchers, Chase also recognises and appreciates the services in which promoting customer contact could increase the operating efficiency (Lovelock and Young 1979, Chase and Tansik 1983).

In his later work, Chase – with Tansik - adds a marketing perspective to his one dimensional model (making it a two dimensional one). In this model, along with the dimension of Production Efficiency (that is equivalent to what Chase called potential facility efficiency) the dimension of Sales Opportunity is added. The interaction between CC from one side and production efficiency and sales opportunity from the other side is respectively negative and positive. That is, the higher CC results in less production efficiency but high sales opportunities. Six clusters of CC are identified starting from Mail Contact and ending with Face-to-face total customisation. Different features are proposed for worker requirements, focus of operations and innovations in each of the six clusters (Chase and Tansik 1983, Chase and Aquilano, 1992). The Chase notion of CC and its implications for potential efficiency is discussed based on the results of this research in chapter 7.

Haynes criticises the CC notion proposed by Chase for not looking at factors like customer utility, organisational performance and marketing (Haynes 1990).

COMMENT:

From the above-mentioned factors, at least the latter (marketing) had been partially considered by Chase before publication of Haynes's paper (referring to Sales Opportunity as discussed above). "Not considering other factors" is a criticism that can be made for

almost all the service classifications (including Haynes' own classification model that will be discussed later). It seems reasonable to give a right to a researcher to draw some boundaries around what areas he/she has chosen to cover and what areas are the ones that he/she does not want to cover.

***

Chase's argument about the relationship between CC and easiness of control is partly based on the link that is suggested by Chase between CC and Customer Interaction. Although to Chase the link seems obvious, to Schmenner it is less than reasonable (1986). Using an example of hotel operations, Schmenner argues that some services will be scored as high CC in Chase's model even though they only shelter the customer. By comparing postal services with hotels service, Schmenner goes on arguing that this also puts the potential efficiency equation under question. Instead of CC, Schmenner suggests Customer Interaction. This will be further elaborated in section 3.2.4.

Mills and Margulies, 1980:

One of the issues about the CC approach is that potential efficiency is linked with a very straightforward numeric measurement of the percentage of contact time in the service creation time. There is less room in the CC approach to elaborate on the degree of complexity of the contact (or interaction). Mills and Margulies address this issue without any references to the Chase's CC notion. They introduce three types of customer contact (interaction); Maintenance Interactive, Task Interactive and Personal Interactive. Maintenance interactive is the simplest type of contact between the front line personnel and customer. Personal interactive is the most complex type of contact between the front line personnel and customer. Task interactive falls in between (Mills and Margulies 1980). Mills and Margulies define different features of information, employee decision, service time, customer problem awareness, transferability of employee, employee power and employee-customer attachment for each of the three types of customer contact. Unlike Chase, Mills and Margulies apply their typology to whole organisations rather than operations within an organisation. They argue that the objective of their work is to assist the prediction of future behaviour in the organisations that fall in each category. The authors conclude that research efforts should be directed at the examination of the relationship between the service organisation and the client/customer to further refine the typology.

Silpakit and Fisk, 1985:

In a similar attempt to bring some insight into the notion of CC, Silpakit and Fisk differentiate between CC and Customer participation. They argue that CC is a situational concept in which the system contact is focused while customer participation is a behavioural concept in which human (front office staff) contact is focused (Silpakit and Fisk 1985). The authors define customer participation as the degree of customer effort and involvement, mental and physical, necessary to participate in production and delivery of services. The authors illustrate examples where CC and customer participation are not necessarily positively coordinated. ATMs are cases with high customer participation and low customer contact. Accordingly the authors develop a two dimensional model using the dimensions of CC and customer participation. The authors then introduce a model that suggests a cause and effect chain from input factors (situational factors, service and consumer characteristics) to throughput factors (service system and consumer participation) to evaluative outcome that is based on customer's evaluation. From here the authors suggest three management strategies with regards to customer participation in the service encounter.

Mersha, 1990:

Mersha discusses the difference between Chase's notion of CC and Schmenner's notion of Customer Interaction. While expressing his agreement with Schmenner's criticism of Chase, he argues that looking at customer interaction should not make a researcher ignore the importance of CC. He therefore suggests using both concepts in a model. He suggests a broader definition for CC that could expand the concept to cases where the contact is made by mediation tools and also where instead of customers being in the service system, the service system's representative is in the customer's facilities. He subsequently defines two dimensions of active and passive CC. Active CC is what Schmenner refers to as customer interaction and passive CC is relevant to the original notion of CC by Chase. The result will be a two by two matrix with high and low measurements of passive and active dimensions of customer contact. The advantage of the model is that it distinguishes between services that have long time of customer presence in the system but short interaction time between the customer and the service provider and vice versa. Accordingly Mersha suggests improving the potential efficiency equation of Chase by replacing the top line (CC time) with Active CC time. He also suggests using weights for the top line and bottom line of the equation to take into account the use of different mixes

of sources for each type of contact. Mersha holds that his improved model has overcome the common criticism of the notion of CC, that is, not distinguishing between contacts that are merely accommodating customers and contacts that include interaction with customer (Mersha 1990)

Kellogg and Chase, 1995:

Chase comes back again, this time with Kellogg to add some more value to his concept of CC by proposing an empirically derived model for measuring CC. The work in fact originates from Kellogg's PhD dissertation in 1991. The model is based on linking three different (but related) concepts developed by past authors. These concepts, according to Kellogg and Chase, are in fact different dimensions of CC. These are the concepts of "loose and tight decoupling", "interdependence" and "information richness" respectively introduced by Weick in 1976, Victor and Blackburn in 1987 and Daft and Lengel in 1984 (sited in Kellogg and Chase 1995). The study was based on an empirical research that took place by looking at operations in a single hospital facility, using thirty three experts in service management. The model is made of three variables of "time of communication", "information richness" and "degree of intimacy i.e. mutual confiding and trust", all with positive interaction with overall measure of CC.

Through the analysis of the survey from the experts, Kellogg and Chase also came to the conclusion that there is far less disagreement between experts about the concept of CC, than what the theoretical articles lead readers to believe. Another interesting result was that time spent without communication in the CC time was not related to any of the other dimensions/variables that were found for CC. This can be seen as a support for, and agreement with the criticism of Schmenner of the original CC notion of Chase (as discussed above).

Kellogg and Chase argue that the three variables identified in the CC model (as mentioned above) can be measured fairly objectively by outside observers, using any Likert- type scale. Along with some technical features of the analysis methods and collected data that could lead to some biases in the results, the authors also recognised some limitations for the model. The model does not aggregate the measurements to form a single CC score for a job or a firm. Also the fact that only service management experts were used in the survey could bias the results. The authors propose that the same survey should be done this time with customers and also service managers to further support the results.

Kellogg and Chase discuss a number of usages for the developed CC measurement model for both researchers and service managers. The main idea is that the developed measuring model brings the CC notion closer to empirical researches and practical implications.

Kellogg further tested the above model by expanding the study. The same documents from the videotapes were shown this time to three groups of MBA students (independently). Similar techniques were used and the results show the robustness of the measurement model (Kellogg, 2000).

COMMENT:

Kellogg and Chase's work is a significant research that attempts to go beyond the mere theoretical perspective. The results of the two empirical studies do seem promising and the measurement model is a step forward towards operationalising the use of SDs. The authors themselves have pointed out a number of possible biases in the results and also proposals for further research to develop and improve the results. A few things that can be added in this regard are: Firstly the two dimensions of Information Richness and Intimacy seem to be quite subjective when it comes to measurement. This of course is not a severe weakness for the model but only an observation and a point that should be noted. It is very understandable that an SD like CC (which is heavily based on human relations) cannot be measured by straightforward quantitative observation. In fact, most of the SDs that are presented by researchers do not have even a remote tool of measurement accompanying them, let alone such a detailed empirically derived model. Secondly, the whole research is based on observation of facilities in a single service organization that is a hospital. Kellogg and Chase correctly point out that within a hospital structure, a parallel can be found for almost all other service industries. While this seems to be true, it however does not undermine the fact that some of the main services might find their parallels in hospitals to be too different from their operations, examples could be transportation, consultancy, legal services, financial services, consultancy, etc. It is also arguable that although many services can find their parallels in hospitals, this does not necessarily mean that they are also behaving like their parallels. The context and system in which a service operation takes place (here, health and treatment) cannot be ignored. It would be interesting to conduct the same research on a few significantly different service industries to test the robustness of the measurement model across the services. Another point (which is not a criticism but only a note for consideration) is that the empirical basis of the CC model developed by Kellogg and Chase is for the purpose of finding the different

variables of the dimension of CC and to find an equation to measure CC accordingly. The managerial implications of the CC dimension and its appropriateness for the purpose are yet to be empirically studied.

Summary of this category of service classifications:

The focus of this category of service classifications was on the concept of Customer Contact. Although the concept itself was referred to by many authors in the past, the first work that seriously discussed the concept for services in an attempt to derive some managerial implications from the concept was the work by Chase. Many authors use Chase's concept of CC to either improve it to a more appropriate meaning (as they believed) or to develop and elaborate on it. Most of these works were in recognition of the fact that the original CC concept (as proposed by Chase) lacks attention to the concept of interaction (a point that later on was also addressed by Chase through his follow up researches). The core idea for managerial implementation of the CC model is the negative interaction (as suggested by Chase) between high degree of CC and better control of operations. One of the major developments of the CC model was done by Chase himself (with Kellogg) in an attempt to develop a measurement tool, capable of measuring different elements of CC in operations.

The researches in this area are mostly concentrated on defining the concept and exploring its inner elements and also on measuring it. There are no significant works to test the proposed managerial implication (the link between CC and control) and its degree of applicability in the real world. Although the argument seems axiomatic in operations management, (in the highly complex nature of service organisation) it would be beneficial and interesting to delve into the argued link and explore its dynamics and possibly the way it works in different types of services.

3.2.3 Operations Oriented – Other perspective

Because of the extensive attention to the dimension of CC, service classifications from operations management perspective that are solely based on this dimension were singled out in the last section. Here the service classifications from operations perspective that have not included CC as a service dimension are reviewed. In the next sections classifications that have elements of two or three of the defined perspectives are discussed.

Thomas, 1978:

The first work in this category to be reviewed is the one done by Thomas. Thomas argues that the problem of many managers in service organisations is that they try to think about the strategic aspects of their service organisation from a product-oriented point of view. Thomas suggests that managers will be able to change their thinking pattern by changing the language system in the company (Thomas, 1978: 165). As a contribution to this, Thomas provides a classification system to help managers differentiate between different service organisations without mixing product-oriented terms with service-oriented ones. The classification is based on simply distinguishing between Equipment-based services and People-based services. The equipment-based services further break down to automated, monitored and operated systems. The people-based services also further break down to unskilled labour, skilled labour and professionals. Recognising possible difficulties in positioning some of the services in this classification scheme, Thomas argues that some service organisations might evolve from one cluster to another while others might involve operations that are in more than one of the clusters. Thomas does not categorically discuss any practical managerial implications for this classification, his classification scheme however became one that was used or adapted in some of the other works in classification of services (e.g. Kotler 1983, Schmenner 1986, Haywood-Farmer 1988). These will be discussed in the later sections.

Johnston & Morris, 1985:

Johnston and Morris introduce a new dimension to service classification from the operations management point of view. This is the dimension of product or process focus. They illustrate the concept by a continuum line on which there are two extremes of fully product oriented and fully process oriented. Services find more similar features to manufacturing when they are closer to product oriented end. Johnston and Morris use this dimension along with the dimension of Customisation to build a two dimensional model. Four zones are identified and managerial challenges for each zone are introduced. Based on a small survey of managers of seven services the authors conclude that there is a mismatch between what is being practiced and what is needed to be done. According to the survey, overall there was an over-emphasis on product by the managers and less emphasis on process. Johnston later uses the idea of product process focus as one of the elements of the volume variety model along with Silvestro and other co-authors. This work is presented in section 3.2.4.

Shostack, 1987:

In section 3.2.1, Shostack's classification based on intangibility was reviewed (Shostack 1977). Shostack makes another contribution to service classification, this time touching the areas of operations management although still to gain marketing insights. Shostack himself does not call this work a service classification. What he is really after, is to provide a tool for strategic positioning of services in the market. To this end, he suggests two dimensions of Complexity and Divergence (Shostack 1987). Complexity refers to the steps and sequences that constitute the process. The more sequences/steps involved, the higher the degree of complexity of the service. The dimension of Divergence is very much similar (if not the same) as the notion of standardisation vs. customisation in services. The notion has been referred to by several authors (Levitt, 1976; Maister and Lovelock, 1982; Maister, 1983; Johnston and Morris, 1985). Shostack defines divergence as variability of steps or sequences in a service process. High and low divergence of a service are each respectively equivalent to a customised and a standardised service. Shostack then uses blueprint tools with specific symbols to illustrate different degrees of complexity and divergence for services. The effects of different degrees of services for each of the two dimensions on marketing challenges and issues are discussed. Shostack argues that reducing divergence improves productivity (Shostack, 1987: 37).

While appreciating Shostack's work as a useful management tool, Silvestro et al. criticise the dimension of complexity by calling it ambiguous (Silvestro et al. 1992). Silvestro et al. argue that some operations are complex in the sense that they involve highly sophisticated difficult tasks while others are complex in that the service process involves a multiplicity of choices or roots from which customers can select.

COMMENT:

It seems that at least part of the Silvestro's et al. concern is clearly addressed by the second dimension: divergence. Shostack clearly uses this second dimension to look at processes in terms of multiplicity of choices and has separated this aspect of processes from what he calls complexity. As for the other aspect of complexity that Silvestro et al. are referring to (i.e. sophistication), again the sophistication can be due to less possibility of having standardised processes. This again is included in the divergence dimension. If however by 'sophistication', Silvestro et al. mean merely difficult tasks (in terms of the work per se) then the criticism seems to be more reasonable as it is true that none of the

two dimensions of Shostack have taken this aspect of operations into consideration. Nevertheless it should also be noted that 'difficulty of work' might not be seen as significantly helpful information from a marketing perspective.

Periera & Catini, 2001:

The last service classification that is discussed in this section is the one proposed by Periera and Catini in 2001. There are no significant attentions to the classification model developed by Periera and Catini in literature and no evidence was found to conclude that this classification has been further developed by the authors or received attention from practitioners. However the reason the work of these authors is referred to in this study, is not merely for the classification model that was made but the methodology that was used. The methodology of the authors is different from most of the other authors in service classifications in that it attempts to use an empirical study to develop a classification model. In chapter 4 it will be discussed that this is also the main differentiation between the methodology of this work and the ones used generally in the literature. Although this author is questioning the merits of the methodology used by Periera and Catini, it cannot be denied that their methodology was a genuine attempt to develop a service classification model based on empirical studies rather than mere theoretical perspectives.

Periera and Catini emphasise the importance of service classifications that could consider the client's needs and as a result they derived two service dimensions from the literature. These are Customisation (as suggested by Shostack 1987) and Customer Involvement (aspired by and based on Gronroos 1998). The next step was validating the choice by a survey based on the views of academics and practitioners. A questionnaire was sent to a number of specialists who were working in marketing or operations areas (academic and/or practitioners) in two Brazilian cities. The questionnaire gave a list of 12 suggested service dimensions in the literature (including the above two) and asked the respondents to firstly rank the importance of each of the dimensions in terms of their usefulness in classifying services and secondly to point out the dimensions that they considered to be related to the client's needs. At the end a two-dimensional classification model was developed. The first dimension is "the degree of customisation" and the second one "client's perception of his/her responsibility in the service". Accordingly four quadrants were identified (Periera and Catini, 2001).

COMMENT:

A number of concerns can be raised about the Periera and Catini's classification. Firstly it is not clear how the process of validation was made. Secondly, it is not clear how many of the respondents were practitioners rather than academics. No practical implications of the classification model have been discussed. Also the very idea of asking individuals to rank a number of service dimensions or to identify which ones are relevant to a client's need without asking for any concrete evidence can put the results of the study under question. It is however a fact (as mentioned earlier) that an attempt has been made to verify the relevance of a number of candidate service dimensions by doing some empirical work; although, given the nature of the empirical work as pointed out above, it seems fair to refer to it as a semi-empirical work.

Summary of this category of service classifications:

The focus of this category of service classifications was on service classifications that contain strong elements of operations management discipline (except the element of Customer Contact that was discussed in the last section). Works of Thomas, Shostack, Tinnila & Vepsalainen and Periera & Catini were introduced and discussed. It is possible to name "Customisation" as the main point of focus in this section. Except Thomas, the other three classifications are in a way using the concept (although not necessarily using the same title). The other service dimensions that are used in this category are Equipment or People Focus, Complexity, Product or Process Focus and Customer Involvement.

One thing that can be seen quite easily in this category is that, unlike the last category (Customer Contact), here less emphasis has been given to measurement of the introduced service dimensions. Dimensions like Complexity and Customer Involvement can produce different measurements depending on the accurate definition and the tool/criteria that are used for measuring.

While there are some attempts to use an empirical approach in choosing the dimensions, overall and in effect, the choice of dimensions is purely based on theoretical perspective and consequently the discussions on the managerial implications remain based on this perspective.

3.2.4 "Operations Oriented – Other" & "Customer Contact perspectives"

This section again is discussing the classifications from operations management perspective, this time including those that have used Customer Contact dimension in conjunction with other service dimensions in the operations management domain. In a way, this section can be seen to be based on ideas that belong to both the last two sections. Besides Chase's customer contact dimension, it is reasonable to argue that this category of classifications contains some of the most popular and controversial models.

Maister & Lovelock, 1982:

Maister and Lovelock developed one of the first two-by-two dimension models. The model is specific to facilitator services which in the Maister and Lovelock's definition include those industries that are in the business of facilitating market transactions, the buying and selling of other goods or services like travel agencies and employment agencies (Maister and Lovelock 1982). The main purpose of the model is to provide a tool for facilitator services so that they can learn from each other. Referring to the importance of learning from other organisations by the use of typological tools, the authors argue:

> *"however, much of what is known about such industry "types" has developed in the manufacturing sector. When we turn our attention to services, few such useful categorisations can be found."*
>
> (Maister and Lovelock 1982: 19)

The model that is developed by the authors is based on the idea that much of the success in transforming the facilitator industries (to more successful organisations) comes from two directions of standardising the customer contact process and learning how to take more steps in the process into the back room. As a result, a two dimensional model is developed with the dimensions of Extent of Client Contact and Extent of Customisation and accordingly four zones of Factory, Mass, Job Shop and Professional services are introduced. These titles are not unique to this work, there are a number of authors who have used the same titles but with different definitions (Maister 1983, Schmenner 1986, Silvestro et al.1992, Slack et al. 2001). Maister and Lovelock argue that as long as the process involves a high degree of customer contact, there will be a premium on the process skills required by frontline personnel, and the firm's added value will be

embedded mostly in its professionals. Maister and Lovelock do not elaborate significantly on the specific managerial challenges of each of the four zones in their model; they however discuss the trends from professional services towards Mass and Job shop services as a result of increasing application of soft and hard technology including the use of computers.

Maister, 1983, 1997:

Later on Maister developed a very similar model for another specific type of service: Professional services. Maister's name is recognised as an expert in professional services. The model uses similar dimensions as the ones that were used by him and Lovelock in 1982. In fact it is correct to say that the same model has been adapted by Maister to discuss the professional services. Unlike Maister's previous work with Lovelock, here he discussed in length the implications of the model for different aspects of managerial challenges like key skills, profit drivers, hiring, training, promotion, ownership aspects and also managing style (Maister, 1997). Maister also compares the four zones in his two by two classification in terms of profitability, arguing that the zone with high customisation and client contact will charge higher fees although their leverage is low.

One important point about the model is that since it is for professional services, it is based on individual professionals. He makes it clear that while an individual has to decide what kind of provider he/she is (based on the model), an organisation can have different kinds of providers, although they need to be appropriately organised in specialist groups (Maister, 1997: 121). Maister argues that the problem of many professionals is that they do not recognise and appreciate the kind of service provider that they need to be according to their clients. He argues that the model can helpful towards recognising this.

Maister's model also has another interesting aspect, which adds more value to the one he developed before with Lovelock, and that is emphasising the question of where the value is added. Maister argues that high customer client contact associates with front (office) value added and low customer contact associates with back (office) value added. This is based on another work by Maister in 1983.

In 1983 Maister develops a model for studying services based on Customisation and what he introduced as Front or Back Value Added. Front value added services are those in which the value added is mostly coming from the front office during client interaction, while in back value added services, it is mostly the back office that produces the value out of client contact. Customisation is based on four categories of "highly proceduralised", "standard", "few routine procedures" and "customerised" activities. The first two are features of programmatic control systems and the latter two are the features of non-programmatic control systems. For Front Value Added activities, emphasis is on technical skills and for the Back Value Added activities emphasis is on interactive skills (Maister, 1983, Armistead, 1985).

Silvestro et al. have taken this notion of the Maister's argument as his specific contribution to classification of services. Dotchin and Oakland call this proposal of Maister "an important contribution to understanding service operations" (Dotchin and Oakland, 1994a: 39). The relationship between the degree of front value added and the degree of customer contact is investigated and discussed later in this work (chapter 5).

Schmenner, 1986:

Schmenner developed one of the popular service classifications from the operations management perspective. As discussed in section 3.2.2. Schmenner criticises Chase's customer contact notion on the basis that not all contacts include the important element of interaction, which has a significant negative effect on productivity. Instead of CC, Schmenner proposes Customer Interaction. Schmenner also approves of the importance given to the notion of customisation in Maister and Lovelock's work. Schmenner combines the two ideas to propose an integrated dimension of Interaction and Customisation. As a second differentiating dimension, Schmenner proposes Labour Intensity, defined as the ration of the labour cost incurred to the value of the plant and equipment. As Silvestro et al. point out, this is similar to Thomas's dimension of people/equipment focus (Silvestro et al., 1992: 65). Schmenner says that the value of inventories is excluded "as the concept seems cleaner" without it. As a result he proposes a two-by-two classification model that is known as the Service Process Matrix (SPM). The matrix is based on the degree of Labour Intensity (as one axis) and the degree of Interaction and Customisation (as the second axes). For positioning services in terms of labour intensity Schmenner has used estimations based on published figures. He asserts that the labour intensity of specific types of service businesses is not routinely calculated.

Schmenner considers capital – labour ratios above 1 to be low labour intensive. The other dimension is not measured. Schmenner gives the four zones in his model with the same titles that were used by Maister and Lovelock in 1982.

COMMENT:

One problem with the SPM is that it is based on an assumption that customisation and interaction are fully correlated. This is an assumption that might not necessarily be the case, as pointed out by Dotchin and Oakland, giving an example from repairs in which customisation is quite high while interaction is low (Dotchin and Oakland, 1994a: 11). This will be explored in chapter 5. In fairness to Schmenner, he has clearly stated that the assumption might not be true for all services.

***

Schmenner has a very structured debate in terms of what he calls "managerial challenges". These include a variety of issues and subjects that managers could face in their respective service organisation. Managerial challenges are clustered in four groups and each zone in the SPM is associated with two of these groups. The main use of the SPM (as proposed by Schmenner) is for choosing appropriate operations through innovations and strategic changes, in other words strategic positioning of operations (Schmenner, 1986).

The interesting point about the SPM is that (by the definition of Collier and Meyer, 1998) it can be seen as both a Classification Scheme and a Positioning Matrix. What was described so far was the SPM as a classification scheme. Schmenner further argues that there is a general trend of movement among the services up a diagonal in the SPM that is stretched between high degrees of the two dimensions and low degrees of the two dimensions.

In effect, Schmenner argues that Service Shops, Mass Services and in particular Professional Services are moving towards a lower degree .of customer interaction & customisation and also a lower degree of labour intensity resulting these services to become come under the category of Service Factories. According to Schmenner the main driver of the change is better Control.

The SPM has been used or adapted by many researchers and has been criticised by some. Kellogg and Nie criticise the SPM on the basis that it does not separate operations and

marketing issues (referring to the integrated dimension of Customisation and Customer Contact). They also criticise the other dimension of the SPM (labour intensity) for being based on an old (and no longer relevant idea) that labour intensity is a significant factor in terms of complexity of a system. They point out, that today's service industries are becoming increasingly capital intensive and technologically based. They argue that technology can now significantly improve labour productivity. The significance of labour intensity and correlation between customisation and customer interaction will be discussed in chapters 5 and 7. Kellogg and Nie develop an improved version of SPM in an attempt to overcome what they found as weaknesses in the SPM. This will be discussed later in this section.

Tinnila and Vepsalainen consider the SPM to be an adapted version of the manufacturing Product-Process matrix in services. Concerning the proposed move towards up-diagonal in the SPM, the authors argue that Schmenner has not provided any theoretical explanation for the economic or technological drivers of the processes. They however do appreciate that even with this shortcoming, the SPM can be a helpful tool in analysis of repositioning strategies. Tinnila and Vepsalainen develop their own model (as is discussed later in his chapter). They compare their own model of service classification with the SPM. One of the outcomes of this comparison, which can be seen as a direct criticism of the SPM, is that the authors express their concerns about the notion that all services out of the diagonal in the SPM, are necessarily less efficient than those on the diagonal. They argue this on the basis that these services (like Hospitals, Restaurants and Banks) are subject to competition. They point out that having a mix of services can be a reason why it is not easy to make a general rule about these services.

One of the interesting critical works on the SPM is conducted by Rohit Verma. Verma reviews a number of service classifications and makes a general comment about all of them. The comment is "... *they are primarily conceptual or theoretical in nature*" (Verma, 2000: 12). This is a comment that will be supported later in this chapter. Verma's study is very straightforward. He uses a simple survey tool to investigate (using statistical analysis) the degree of significance of correlation between the different sets of managerial challenges and their associated service clusters in the SPM. This is done by conducting linear regression analysis on data collected from managers in four service sectors, each representing one of the clusters of the SPM. By looking at the statistical tables provided, it is obvious that while a good number of managerial challenges are associated with the two dimensions in the same way that Schmenner suggested, there are still enough different and

even conflicting results to bring some caution into appreciating the relationship between the clustered managerial challenges and different service types in the SPM. Verma does appreciate the importance of theoretical models as "tools that serve to focus our thoughts and provide an easily understood description of complex relationships". He however, asserts that "the role of empirical analysis is to test the extent to which such typologies fully represent reality and to suggest shortcomings which lead to further research and refinement" (Verma, 2000: 23). There seems to be one minor error in Verma's presentation of the work and that is he uses the title Customer Contact instead of Customer Interaction. However, as the service sectors have not been measured by Verma and their position in the SPM has been simply taken from the original Schmenner's model, this error does not affect the results of his work.

Schmenner, 2003:

In 2003, Schmenner revised his SPM model. In this revision he shifted the basic idea of the move along the diagonal from seeking for better Control to seeking more Productivity. He argues that it is really productivity that makes performance superior. He uses his theory of Swift, Even Flow as the basis of this revision. Accordingly he changes the titles of the axes on the model. In the revised model, Labour Intensity is replaced with Relative Throughput Time and Customer Interaction and Customisation is replaced with Degree of Variation. He suggests that based on the theory of Swift, Even Flow (Schmenner and Swink, 1998, Schmenner, 2001), the more "swift and even" the flow of materials or information through a process, the more productive is that process. Accordingly he argues that the above replacements for the two dimensions of the SPM not only capture the original dimensions but also take into account the theory of Swift, Even Flow and subsequently the notion of productivity. As a result the position of some of the service organisations in the revised model has changed, also some of the service organisations that have a single position in the original model are spread out in the revised model. Schmenner however emphasis that the sets of managerial challenges that were associated with his original SPM matrix are still valid (Schmenner, 2003, 2004). It should be noted that Schmenner's theory of Swift Even Flow is not specific to service operations.

COMMENT:

Schmenner's work (the original one) has inspired a lot of young researchers to explore the differences and similarities between managerial challenges of different services. This might be because of the fact that Schmenner's work has added a significant value to the works before that (like those of Maister and Lovelock, Thomas, Chase) by grouping and elaborating on managerial challenges that are associated with his model. Furthermore, the notion of moving towards and up the diagonal in the SPM can be seen as a new way of looking at and using service classifications to explore strategic changes in organisations. The revision of the SPM by Schmenner only covers the definition of the dimensions and raises Productivity instead of Control as the main idea of the diagonal. It however does not affect Schmenner's theory about the association of each cluster of the SPM with specific groups of managerial challenges. Schmenner's new model like the original model is wholly based on theory. Johnston and Jones' criticism of application of the theory of Swift, Even Flow in services was referred to in chapter 2. The Schmenner's original work is investigated in detail in chapter 7.

Haywood-Farmer, 1988:

Looking at all the service classifications that have been reviewed so far, an observation can be made. Most of the older classifications started as a single dimension models and later classifications started to use two-dimensional models, in some cases (like the ones in this section), to bring various aspects of operations in one model. Another observation is that so far, most of the models that are discussed from the operations management perspective are based on one or two of the dimensions of Customer Contact, Customisation and Labour Intensity.

Haywood-Farmer recognised this and developed a three dimensional model to capture and (at the same time) separate these three dimensions. This is a model based on Labour Intensity, Customisation and Customer Contact & Interaction. Naturally instead of 4 zones, 8 zones have been made. Haywood-Farmer's main aim in developing this is to investigate and discuss the different needs of each type of service in terms of quality, or in other words balancing different aspects of service quality for each type of service (Haywood-Farmer, 1987).

COMMENT:

Haywood-Farmer argues that the three dimensional model is better than the two dimensional ones as the latter confuses the readers. This seems to be a valid argument when a two dimensional model is based on integrated dimensions (like the SPM). Nevertheless it is also evident that a three dimensional model in routine two dimensional presentation frameworks (e.g. a paper) is not an easy tool to be used. Another point is that (inline with Verma's comments about theoretically driven classification models) a three dimensional model will be even more complicated and complex in terms of different relationships that could exist within the dimensions as well as between each one or each combination of dimensions and managerial challenges. When Verma finds significant complications in the Schmenner's two dimensional model of SPM, it is not difficult to imagine that a similar study for Haywood-Farmer's classification might lead to even more complicated issues.

Mahesh, 1995:

In an adaptation of the Haywood-Farmer's work, Mahesh replaces the degree of Interaction and Contact with the degree of Judgement by Front Line. His main motivation in this is to add a human resource perspective to a model that according to him captures both operational and marketing perspectives, therefore making it a three perspective model. Mahesh also argues that unlike Haywood-Farmer's or Schmenner's model, his model does not position services in one space, rather, the idea is that service organisations can see that each type of their task can be positioned in one of the 8 available positions in the model (Mahesh, 1995). It should be noted that using dimension of judgement by front line is not initiated by Mahesh. This was first proposed by Lovelock in 1983 as is discussed later in this chapter.

Wemmerlov, 1990:

Wemmerlov attempts to improve Chase's model of customer contact arguing that it "needs to be formulated more stringently in order to be applied appropriately" (Wemmerlov, 1989: 24). The main concern of Wemmerlov about the CC model (as pointed out before) is that it is assumed that the customer is the only source of uncertainties. Wemmerlov argues that there are other factors (e.g. variations in workflow patterns, task varieties and task volume) that could lead to uncertainties.

Wemmerlov makes a very clear and structured discussion when presenting his model. He first clarifies that the purpose of the model is to be used as a decision-making device for

design related problems. In terms of the organisational level of analysis, he points out that most of the previous classifications are at a very high level (macro level) and therefore they might not be applicable with the same relevance to individual work activities (micro level). He asserts that effective and unambiguous classifications can only be formulated at a fairly low level of aggregation. He then extensively elaborate on the nature and features of the dimensions he wants to propose for classification and at the end discusses operationalising (measuring) these dimensions.

The service dimensions presented by Wemmerlov are firstly customer contact (in a discrete scale of no contact – indirect contact – direct contact). Wemmerlov then proposes two other dimensions to cover the effect of technology in service processes. One of these is degree of routinisation (in a discrete scale of rigid processes – fluid processes). Wemmerlov does not provide a robust definition for a rigid or fluid process but he defines the features of each. The other dimension that is used as a sub-classification for each of the rigid and fluid process types is the 'subject' of service (again in a discrete scale of Goods – Information – People). The result is a two-by-two matrix in which CC is one axis and degree of routinisation is the other axis that is further classified based on the subject of service.

Another interesting point about Wemmerlov is that he does not leave the issue of measuring the dimensions untouched. Wemmerlov agrees that (being based on discrete scales) his dimensions are subjective, in particular the degree of routinisation. He however argues that this is a price that is needed to be paid for the sake of simplicity in a model and he presents a list of features for rigid and fluid processes so that the task of positioning could be done in a less subjective way for this dimension.

Wemmerlov presents a number of tables to point out specific features of design and managerial issues for each type of service based on his model. Wemmerlov has derived the concept of routinisation from Perrow's work on the effects of technology in operations (Perrow 1970, cited in Wemmerlov 1989). There is however a significant degree of similarity between Wemmerlov's dimension of routinisation and Shostack's concept of Divergence which itself is quite similar to the concept of Customisation (as discussed before). The notion of subject of the service is also similar to what Hill proposed in his classification (as discussed before, Hill, 1977), the same notion was also used by Lovelock as will be discussed later in this chapter.

COMMENT:

One of the advantages of Wemmerlov's work is the way he is presenting his research. The work has been presented in a very thorough and structured format. In terms of the work itself, it is reasonable to argue that Wemmerlov has adapted three of the service dimensions that were proposed before and have put them in one model after extensive discussions to justify the selection. Positioning services in Wemmerlov's model seems easier compared to some of the other classification models and (like for the Schmenner's SPM model) the managerial implications do make sense, although like Verma's work on the SPM model, Wemmerlov's model too is in need of verification. This is a point that Wemmerlov himself insists on at the end of his paper.

Haynes, 1990:

Haynes is inspired by the works of Schmenner (1986) and Shostack (1987). However, like Wemmerlov, he too has concerns about the lack of attention to the importance of technology in processes. He is also interested in the relationship between customer interface characteristics and user expectation's and capabilities. To cover these factors he adopts the Schmenner's and Shostack's models and develops his own. The model has two dimensions: Interface (mechanistic or organic) and Technology (simple or complex). The main characteristic of mechanistic interface is to be a rule-governed organisation. The main characteristic of organic interface is to be governed by personal interventions. Haynes derived the notion from Burns and Stalker although the dimension has similarities with both CC and customisation. Haynes suggests that typically (and with exceptions) the mechanistic interface is more associated with complex technology while organic interface is more associated with simple technology. Haynes argues that, as the effect of trade off between productivity and quality, the desirable location of services is somewhere on a diagonal that connects Organic-Complex to Mechanistic-Simple.

COMMENT:

In effect, Haynes model is almost the same as SPM. Labour intensity is replaced with Technology and Customer Interaction and Customisation is replaced with Customer Interface. Even the implication (i.e. the diagonal) is the same. Moreover even the zones are identified in the same way and titles are given to each zone that are different from those of the SPM but are really the same in nature. Haynes himself confesses to that but asserts that there is a fundamental difference between the two in that SPM is based on

process (how) while his model is based on transaction (what). An interesting point is what Haynes suggests as using the model as a prescription tool. Haynes proposes 6 steps to take one after the other by the use of the model to help with decision-making and strategic positioning in services (Haynes, 1990).

It is not easy to appreciate how Haynes' model is more based on transaction compared to the SPM model. The prescription that is given is one that usually researchers avoid. This of course does not mean that the prescription is invalid but it certainly needs a lot of verification by empirical studies. This is a point that the author himself agrees with.

Silvestro et al., 1992:

Silvestro's et al. work can be seen as one that summarises the works on service classifications and tries to put the main ones in one model using a correlating factor. Authors argue that what prevents us from using the product-process matrix in services is ambiguity of "volume of services". They argue that "heterogeneity and intangibility in services means that the measurement of service outputs is less straightforward than that of manufactured products" (Silvestro et al., 1992: 66). They also point out that in services volume increase does not necessarily affect service processes in a significant way. The authors then propose a substitute for volume in services that is "volume of customer", defined as "number of customers processed by an individual service unit per day". The authors suggest that the volume measure (as defined) can be used to integrate different service classification models together.

The authors test the validity of this idea using empirical data from 11 case studies in service organisations. Six service dimensions have been chosen from literature as the popular ones. These are 1. equipment/people focus (as proposed by Thomas, 1975 and Kotler, 1983). 2. customer contact (as proposed by Chase, 1978). 3.customisation (as proposed by Maister and Lovelock, 1982 and Johnston and Morris, 1985). 4. discretion or personnel judgement (as proposed by Lovelock, 1983). 5. front/back value added (as proposed by Maister 1983) and 6. product/process focus (as proposed by Johnston and Morris, 1985). All the classifications proposed based on these dimensions are discussed in this chapter.

The measurement of volume for the 11 service organisations was carried out in an ordinal scale based on the unit of measurement (e.g. tens, hundreds, etc.) by the authors. The customer contact dimension was measured (ranked) for each organisation based on

average dwelling time statistics provided by the organisations. The authors point out that as the rest of the dimensions were qualitative, a Delphi method was used among the research team to measure (rank) these dimensions for each of the services. The paper does not provide any statistical analysis. However, with the use of schematic figures it is shown that there is an apparent negative correlation between volume and the six service dimensions using the generated data for the 11 organisations. Overall, the figure shows that the higher the volume of service, the lower is the degree of the 6 service dimensions. Accordingly, the authors identified three clusters of professional services (low volume), service shops (medium volume) and mass services (low volume). The authors discussed the absence of "service factory" category in their categorisation and argue that this title has rarely been applied as a descriptor of service organisations. Quoting from Chase and Erikson they explain that the service factory has become an integrated view of product and service (Chase and Erikson, 1988). Accordingly, they argue that service factory forges the link between the production process types presented in the manufacturing model and the three service types presented by the authors. The authors propose that management concerns, service strategy, control and performance measurement are different between the three identified service clusters.

In a follow up paper, Silvestro reviews the literature to describe the features of each of the three clusters of services in the volume-variety model. She then introduces the use of the model as a diagnostic tool by which different aspects of design and control can be distinguished for the three different service clusters. She emphasises that this is the same role that the equivalent model (product-process) has in manufacturing context. Silvestro argues the same function for the diagonal of the model as what Schmenner argues for the SPM. According to her, services that separate from the diagonal are either in danger of losing standardisation opportunities or are over-standardising the processes. From here and accordingly, Silvestro goes to a detailed discussion with support of cases from the business world to explain three functions for the model. These are evaluating possible strategic moves, analysing a company's service as compared to the competitors and analysing internal processes in order to isolate micro-operations with different positions in the model. For the latter function Silvestro changes the definition of the Volume dimension to "the number of customers processed per customer processing operation". Silvestro introduces the model as analogous for the product-process matrix in manufacturing. However she does agree that all the above needs empirical studies for verification.

In presenting a further application of the Volume-Variety model, Silvestro conducts an empirical study (based on case studies in four service organisations) to demonstrate (based on mainly qualitative analysis of the collected data) the use of the model for implementation of TQM. Silvestro presents a comprehensive table to compare the differences between the three types of services in a variety of aspects of TQM implementation (Silvestro, 2001b).

In yet another paper, Silvestro with Claudio Silvestro presents a report of another application of the volume-variety model this time in the area of new service design in NHS Direct (call centre service). The implementation of the first three years of NHS Direct is evaluated and gaps and opportunities for improvement are discussed based on the position of NHS Direct on the volume-variety model (Silvestro & Silvestro, 2003).

COMMENT:

The origins of the Silvestro's work can be traced back to 1988, when a report of a research work was presented in the Operations and Management Association, UK Annual International Conference by Johnston et al. (Johnston et al. 1988). The paper presented the Volume-Variety model. It seems that the paper was a report of a work in progress as (compared to the 1992 final report) there were some minor differences between the measurements of the service dimensions as well as the volume for some of the studied services. The work is then used in Fitzgerald et al. research on performance measurement in service businesses (Fitzgerald et al., 1991). This is perhaps the first illustration of the model before further extended studies by Silvestro in 2001. Fitzgerald et al. use the model to discuss features of performance measure for different types of services.

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Silvestro's et al. work is an interesting and unique one in that it attempts to have an overall look at the then far proposed service dimensions and relates them to one factor rather than adding to the list. In effect it is not difficult to see that Silvestro's et al. model is an adopted version of the product-process matrix in manufacturing in which volume of product is replaced with volume of customer and variety is replaced with six related service dimensions. In fact the term Variety (that can also be seen as a rather similar concept as customisation) is adapted for the model by Silvestro and other co-authors in their later works (see for instance, Silvestro, 2001b; Johnston and Clark, 2001: 11; Silvestro & Silvestro, 2003).

It is interesting that Silvestro supports her arguments about the applicability of the Volume-Variety matrix in further empirical studies. This is an advantage of the model when compared to many other similar models that remain theoretical in terms of implications.

One concern that could be raised is that by integrating the six service dimensions, the model in fact adopts an overall view of the six of them, which means it ignores the differences between services in terms of different measurements for each of the six service dimensions. This means, while the model is powerful in that it has integrated the six dimensions over one factor, it might be less sensitive and precise compared to some other two-by-two models (like Schmenner's SPM and Maister and Lovelock model for facilitating services) in which services are classified based on low and high degrees of two or three of these service dimensions separately. For instance, in the Volume-Variety model, the service shop cluster has 6 services as examples and all are positioned in the medium degree for the axis associated with the six dimensions. According to the presentation of data by Silvestro et al., not all these services have medium measurements for all the six dimensions this is while the argument is that they are all associated with the same sort of managerial challenges as discussed in Silvestro's paper. Another example is for Mass services in the volume-variety model where transport and transport terminus are all positioned at a low degree of the axis associated with the six dimensions. However, both of them have a high customer contact when looking back at the datasheet provided in the paper. In the same cluster, we have news retailers with people focused operations and front value-added operations but product focus and low in other degrees. The question will be how accurate is it to assume that the managerial challenges for terminus and news retailers are the same on the basis that 'overall' their degree of the six dimensions is low.

Another point is about the definition of volume and how operationalised it is (i.e. how easy it is to measure a volume for a service) and also how significant it can be in differentiating services and associating them with different managerial challenges (a concern that was raised by Collier and Meyer, 1998). These are issues that will be further discussed in chapter 7.

Kellogg and Nie, 1995:

Kellogg and Nie developed their model (called SP/SP, i.e. service package/service process) to address unique strategic issues in service businesses. The main idea of SP/SP

is to link service processes with service packages in operation. The model is a two-by-two matrix in which the vertical axis represents the service process structure (expert service – service shop – service factory) and the horizontal axis represents service package structure (unique – selective – restricted – generic). Like SPM and Volume-Variety matrix, there is a meaning for the diagonal in SP/SP model. However unlike the two mentioned models, the authors here do not suggest that being on the diagonal is the best place for services. They argue that most of the services are on the diagonal or in fact are found to be more efficient if remaining on the diagonal but then they also point out that as an effect of technology there are also services that are off the diagonal but still successful. Authors then offer a number of propositions to explain the implications of the model for services based on the position of the service. These cover issues like design, the type of technology, capacity strategies, knowledge of staff, and general strategy of the service organisation. Authors also link the model to Porter's concept of competitive strategies (Porter, 1980) by arguing that differentiation strategy suits better expert services with unique service packages (top of the diagonal) while cost leadership strategy suits better service factories with generic service packages (bottom of the diagonal).

Kellogg and Nie consider the SP/SP model to be one that is similar to the product-process model in manufacturing. In comparison with the Chase's CC model, the authors argue that their model is looking into CC in terms of the influence of customers rather than plain contact. The criticism of the SPM by these authors has been discussed before.

COMMENT:

In effect it is possible to say that what Kellogg and Nie have done is to separate the concept of customisation (or customisation resulting from customer interaction and involvement) for process and product. In the models so far, where customisation was used as a dimension, it was taken into account only from the process point of view (e.g. SPM). The SP/SP model looks at customisation from two separate (and not necessarily related) views of process and product. They have provided examples to illustrate the possibility of services being low in one of these customisation aspects while being high in the other aspect.

On the other hand, as Collier and Meyer also point out (Collier and Meyer 1998), the fact that customer can influence both product and process makes the interpretation of the model a bit difficult and complicated. In fact, in some services (in particular those with

high front value added or high process focused) it might not be a straightforward task to distinguish between product and process. On the other hand, SP/SP seems to be a good tool to bring to the attention of academics and managers the differences between customisation of product and customisation of process.

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Summary of this category of service classifications:

In this category classifications were based on CC and one or more operational dimensions of services. Some of the most significant contributions were discussed in this section. Compared to most of the classifications that were reviewed in the previous sections, some of those in this section underwent attempts to have a more empirical approach in developing the models. One interesting point about this category is that often the authors develop their model after criticising the previous works and in an attempt to improve the models. The results are however, in many cases very similar to the other works with the same perspectives and while the critical points raised by the author/s might have been improved, the new models have been criticised by newer authors based on other considerations. This point will be followed up at the end of this chapter.

Browsing through the classification models in this chapter, there are significant attentions to the importance of empirical approaches in terms of testing validity of the models and their implications. However, none of the proposed classifications have derived the bases of classification (i.e. service dimensions) empirically. Also, no particular tool has been introduced for the purpose of measuring service dimensions.

3.2.5 "Marketing, economics or organisational" & "Customer Contact" perspectives

In this section the classifications that have used customer contact dimension with one or more dimensions related to the first category (section 3.2.1) are discussed. Being out of the Operations Management category, the variety of proposed service dimensions in this category are much more than in the last two sections, overall these classifications are enjoying less popularity as compared to the last two categories. They are therefore presented in less detail, comparing to the last two sections.

Bell, 1981:

Bell argues that no service product is completely separate from goods and argues that although there are separate classifications for goods and services, to gain marketing insights there is a need for classification schemes that contain both goods and services in one model. Accordingly they propose a two-by-two model with the dimensions of Customer Involvement (that can be seen as a specific type of customer contact) and Tangibility (the same concept that was brought up by Shostack and others). Each dimension divides the matrix into three zones, leading to a nine zone classification as a whole. In terms of tangibility the zones are Product – Bundle and Service. In terms of customer involvement the zones are Industrialised, Differentiated and Customised (differentiated meaning that some adjustment of product or service has been made to make it better fit the customer's perceived need). Bell then provides some explanations (although very brief) about the features of each zone and the implications in particular in terms of product vs. service from marketing perspective (Bell, 1981).

Dilworth, 1983:

Dilworth first argues that like manufacturing goods, services too can be classified based on their degree of standardisation of output and/or processes they perform (referring to the product-process matrix). He however, explains that to have useful insights into management issues it is helpful to have another classification for services. They then offer almost the same classification that was proposed by Bell, using Intangibility and Customer Contact as dimensions. This however is limited only in providing a table with examples without any significant discussions on managerial implications (Dilworth, 1983, 1993).

Grove & Fisk 1983:

Grove & Fisk offered a rather innovative idea in the area of service classification by comparing service systems with dramaturgy. Accordingly they proposed two service dimensions based on precepts of dramaturgy. These are audience size and customer contact (Grove & Fisk 1983).

Stiff and Polack, 1983:

Stiff and Pollack look at the issue of consumerism in service sector. Consumerism is defined as "an organised movement of consumers whose aim is to improve the rights and

powers of buyers in relation to sellers" (Kotler et.al, 1998). This is one of the important concepts that affects managerial decisions in the market place (Quazi, 2002). Stiff and Pollack argue that it is possible to say that consumerism has reached its maturity in consumer products, but the same is not true for consumer services. They explain that because of the unique characteristics of services, the consumerism issues in services are different from those of manufacturing. They also say that even among different types of services these issues are different. They therefore introduce their classification model as a tool to differentiate and investigate consumerism issues in different service types. They use two dimensions of customer contact and economic concentration in the model. The position of service sectors in terms of economic concentration is derived from economic censuses. The authors then discuss the consumerism issues in each of the four zones of the matrix.

COMMENT:

Looking at the matrix and the examples in this paper, it seems that there are more available services in the two extremes of the zones (i.e. both dimensions being high or low) while there are only a few examples given in the other two zones.

Bowen and Bowers (1986):

Bowen and Bowers argue that organisational effectiveness very much depends on whether the organisation's structure matches with the environment (Bowen & Bowers, 1986). Accordingly they propose looking at Customer Contact and Intangibility at the same time. This is in fact a similar classification to those of Dilworth (1983) and Bell (1981).

Larson and Bowen (1989):

With the aim of classifying service design types, Larson and Bowen proposed a classification model based on the two dimensions of Diversity of Demand and Customer Participation (Larson and Bowen, 1989).

Summary of this category of service classifications:

The classifications in this category used customer contact as a dimension in addition to another dimension from the marketing or economies perspective. In three of the above classifications, the second dimension was intangibility. There was a dimension in this

category that can be assumed is measured easily (size of audience, economic concentration) but apart from this there were no measurement tools or proposals for some complicated and not straightforward dimensions like intangibility and customer involvement. There were no empirical studies either to derive from the dimensions or to explore or test their implications.

3.2.6 "Marketing, economic or organisational" & "Operations Oriented – Other" perspectives

This category of service classifications includes two interesting models in terms of managerial implications and/or extent of study of the other classification models by the authors. In this category the classification models that take benefit of both "operations oriented – other" and marketing perspective are presented.

Tinnila and Vepsalainen (1995):

Being from a logistics department, Tinnila and Vepsalainen bring a rather new element to service classification. Tinnila and Vepsalainen criticise the previous models of service classifications for being limited to in-store and in-office activities and therefore not being able to find operational measurements and normative bases for assessing the efficiency of services (Tinnila and Vepsalainen, 1995). They propose that their model is not limited to internal operations. They look at the trade off between production costs (associated with internal operations) and transaction costs (associated with external customer relationship) and suggest an efficient match between services and channels. The result is named Service Process Analysis (SPA). The authors argue that the model facilitates a graphical representation of service positioning as well as appraisal of different repositioning strategies like what the product-process matrix is doing in manufacturing operations (Hayes and Wheelwright 1979a,b). It is worth of mentioning that according to Tinnila and Vepsalainen, it is some of the specific characteristics of services that do not allow a straightforward application of the manufacturing product-process matrix in services. They recognise these characteristics to be 1. interorganisational nature of service processes, 2. measuring volume and variety in services being less concrete, 3. difficulty in identification of the type of service process and its capacity because of lack of inventories and batch sizing strategies in services and 4. the irrelevance of the analogy of mass production in services due to the fact that in many services there are distributed networks that are delivering mass services like service sites (Tinnila and Vepsalainen 1995: 54).

Tinnila and Vepsalainen use two dimensions for their model. The dimension used in the horizontal axis is Type of Service based on the degree of contingency and complexity. This is in effect the same as the notion of customisation, as referred to earlier. The vertical axis is what the authors argue to be going beyond internal operations. This is the Type of (delivery) Channel. Based on the definition of Williamson, the authors define the different types of channels based on the number of different units and interorganisational linkages constituting the channel (Williamson 1985). Accordingly, a model is developed (called Service Process Analysis - SPA matrix) that suggests that the optimum position of services in terms of the above two dimensions is along a diagonal that associates high customisation (first dimension) with a long channel of delivery (second dimension), and low customisation with a short channel of delivery. According to the authors the services on this diagonal enjoy a reasonable trade off between production and transaction costs. From here, the authors introduce four efficient service processes along the diagonal.

Tinnila and Vepsalainen compare their model with two popular classification models of SPM (Schmenner,1986) and Volume-Variety model (Silvestro et al., 1992). By applying the SPA model to the same examples that are used in each of SPM and Volume-Variety model they argue (with schematic illustration) that SPA can provide a better and more justified differentiation and classification for the same examples, as compared to the other two models. The authors re-emphasis the advantages of their model, that are resulted due to inclusion of the type of delivering channels as a differentiating dimension. At the end of their paper, Tinnila and Vepsalainen discuss and analyse the trends of service industries using their model.

COMMENT:

No doubt the newly proposed dimension of type of channel in the SPA model opens a new insight into classification of services, although positioning services on this dimension might not be a straightforward task. The point that the authors raise about comparing the SPA model with the SPM and the Volume-Variety models can only be true if the aims of the authors of these three models could be seen to be the same. This is an assumption that does not seem to be true as the intended scope of usage of the models is not the same.

Collier & Meyer, 1998:

Collier and Meyer mainly focus on what they call positioning matrices (to be distinguished from classification schemes). As discussed before, by positioning matrix they mean the classification models that offer a pathway on which superior performance is assumed and a direction of causation is implied between the dimensions used. The authors review a number of positioning matrices (Schmenner, 1986; Silvestro et. al, 1992; Kellogg and Nie, 1995; Tinnila and Vepsalainen, 1995) and criticise them on the basis that the argued superior performance has not been tested empirically and that in some of them the direction of causation between the dimensions are vague (Collier and Meyer, 1998: 1229).

The authors developed a positioning matrix aiming to provide a tool for determining appropriate service design. The model is based on the concept of service encounters in its very broad term that can include encountering of customer with non-humans (facilities, equipment, building, etc.) during the service (Shostack 1985). The matrix is based on what the customer expects from the service encounter (the horizontal axis) and accordingly what is the recommended service design (the vertical axis). The horizontal axis is titled "customer's service encounter activity" and is based on two dependant sub-dimensions of "customer's desire for freedom" and "repeatability of service encounter activity sequence". The vertical axis is titled "number of pathways built into the service system design by management" and is based on two dependant sub-dimensions of a "number of customer's pathways" and "the designed degree of control into the service system". Pathway here means a unique route through the service system that is used to fulfil certain customer wants and needs (Collier and Meyer, 1998: 1232). Being a positioning matrix, there is a diagonal in the model that connects "limited pathways, high degree of control - low freedom, high repeatability" to "many pathways, low degree of control-high freedom, un-repeatability". The diagonal forms three types of services. Provider-routed, Co-routed and Customer-routed.

The authors assume that the two axes are conceptually independent. They argue that superior performance results from staying on the diagonal. Like Kellogg and Nie (1995) and Silvestro (1992), they too consider the model to be analogous to the product-process matrix in manufacturing. They argue that the model can be used both for designing new services (where managers know customer expectations) and for controlling the current services for customer discretion and freedom during service delivery. Collier and Meyer

also argue that unlike the product-process matrix in which use of technology is more common for the lower part of the diagonal (high volume, low variety), in this service positioning matrix, technology is applicable all along the diagonal. This is based on the argument that technology can both improve and lower standardisation in services (Collier, 1983).

Collier and Meyer tested their theoretical model by conducting a survey among 64 MBA students. The questionnaire asks the students to position 26 services on the developed model. The aim was to test the significance of the relationship between the two dimensions (or in other words, the reliability of the diagonal). The statistical tests confirmed that the relationship is significant.

COMMENT:

The interesting point about Collier's and Meyer's work is the clear appreciation and attempt to link customers' expectations with design. Differentiating positioning matrices from classification models is also very helpful. One of the criticisms of the authors of the previous works is that their definition of the dimensions is vague. It seems that the same criticism can be done on both dimensions introduced by Collier and Meyer, in particular when considering that each dimension has two sub-dimensions in its definition. The empirical test that was done is definitely an advantage for the model compared to many previous models. However it is possible to argue that MBA students (assumingly of the same schools where authors are based in) might not be the best source of reference for positioning services in the model. It is possible to argue that the sub-dimensions that are based on customers' perception can be estimated reasonably by routine customers of services, but the same cannot be argued for the sub-dimensions that are based on design in the system as many facts might be hidden from a routine customer. Even for the former sub-dimensions it is difficult to imagine how an MBA student can be familiar with some services that he/she is asked about (e.g. tax and estate planning for a millionaire, Kidney transplant surgery, legal services to set up simple will, flying a major airline). Accordingly, the assumption of correlation between the two sub-dimensions might be under question.

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Collier and Meyer provide a significant contribution to the service classification models with a work they presented later. In their follow up study the authors compared the three

models of Volume-Variety (Silvestro et al. 1992), Kellogg and Nie (1995) and their proposed model. By significant contribution, the author of the present research does not refer to the results of the Collier and Meyer study but refers to the idea and the process of the study:

Collier and Meyer's work is not simply comparing the models but establishing some criteria to find which one is a more effective tool. This seems to be the first kind of study and can be seen as beginning a new era in service classifications in which not only some models are tested empirically for reliability (like Verma's work on Schmenner's SPM) but there are also works in which models are compared to each other which aim to find the best. Collier and Meyer make it clear that there are no agreed upon criteria for evaluating service positioning matrices. They therefore propose five measures as separate guidelines for evaluation. These are:

- Clear construct definitions and indicators on each axis.
- Conceptual independence of criteria on each axes
- Clarity in specifying the direction of causation from one axis to the other axis
- Axis unidimensionality (i.e. the criteria in defining an axis should be highly inter-correlated to represent a unidimensional concept. If there is only one criterion in defining the axis, unidimensionality does not apply.)
- Correlation between the axis of each matrix.

According to the authors, the results reveal that overall Collier and Meyer's model satisfies all the criteria while the two other models fail to satisfy most of the criteria (Collier and Meyer, 2000).

COMMENT:

It is possible to say that some of the comments made by this author on the previous pages are addressed in Collier and Meyer's follow up work. Ironically, similar comments that were made about the degree of reliability of the empirical study can be made here about the Collier and Meyer's work. It is interesting to see what was the distribution of services for which the service dimensions were measured in this comparative study. Also the fact should be taken into consideration that the questions associated with measuring Silvestro's et al. and Kellogg and Nie's dimensions were designed and phrased by Collier and Meyer. It would be interesting to find out if opinions of the developers of these two models agree with the wording of the questions corresponding to their proposed service dimensions.

Collier and Meyer state at the end of their work that a much greater empirical analysis is needed to further support the results.

Summary of this category of service classifications:

In this category some interesting contributions were presented. Interestingly, not necessarily with respect to the models themselves but with respect to bringing a new challenge to the literature that is comparing and evaluating previously developed models. There were also examples of researchers who were interested to develop a model in service operations that can be seen as an analogous to the product-process model in manufacturing. The category also contains service dimensions that look quite complicated to be understood and difficult to be measured.

3.2.7 All Three Perspectives

As the title indicates, this category looks at classifications with numerous dimensions in a way that they cover all three perspectives of the presented categories. This will be the last category of service classifications model, as presented in this chapter.

Lovelock 1980:

Lovelock has presented a number of researches in service classifications, mostly to gain marketing insights. His work with Yip was presented in section 3.2.1. In this section another two classification schemes by Lovelock are presented. Both the classification schemes attempt to collect a number of previous service dimensions to develop a number of classification models, while proposing some new dimensions as well. In 1980, Lovelock proposed three categories of classification of services while emphasising the importance of "object served". The three categories of classification are based on 1. Basic demand characteristics, 2. Service content and benefits and 3. Service delivery procedures. Each category contains a number of service dimensions. Many of these service dimensions are categorical dimensions (e.g. object served: person or property, single or bundle of services, multisite or single site delivery). The second classification model is quite similar to the one proposed in 1980:

Lovelock, 1983:

In his more recent classification, Lovelock summarises an edited version of his last classifications with some changes and additions to develop 5 two-by-two classification models aiming to gain strategic marketing insights. The 5 models are based on Nature of the service act, Relationships with customer, Customisation and judgement in service delivery, Nature of demand relative to supply and Method of service delivery. Lovelock discusses the managerial insights that can be derived from each of the above two-by-two models in terms of marketing. Lovelock argues that managers can obtain a better understanding about the nature of their service and relations with the customer after positioning their services in the above models. The second benefit (as proposed by Lovelock) is that managers can look beyond their own sector and recognise services that share the same characteristics with them in order to learn new ideas.

Kotler, 1983:

Kotler classifies service industries based on four different dimensions/categories. These are "people-based or equipment-based" (same as Thomas's proposal), "client's presence being necessary to the service" (similar as Chase's concept of customer contact), "client having personal need or business need" and "service provider's motive being profit/non-profit also service provider's form being private or public". Kotler does not provide any significant insights into the differences between services falling in different categories (as above) in terms of managerial or marketing issues (Kotler, 1983).

Bowen 1990:

Bowen classified ten services on the basis of number of service dimensions. These include Customer Contact (categorised as high, medium and low), Customisation (categorised as customised, semi customised and standardised), tangibility versus intangibility, importance of people from the point of view of customer and the categorical dimension of Personal or non-personal level. The main aim of the classification model is to gain marketing insights. A cluster analysis technique is used to test the classification model empirically. The data for this analysis was based on customer's perception of the service based on the above dimensions.

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COMMENT:

Bowen's work is different from many other classification works in that it has defined service dimension in a way that they could be measured by customers. Although the choice of dimensions for classification and the managerial implications are not empirically derived but the classification model is tested based on empirical work.

Dotchin & Oakland, 1994a, b:

In a rather extensive literature review, Dotchin and Oakland review a number of the classification models starting from Copeland's classification of convenience, shopping and speciality goods and ending with Silvestro's model. The authors take 6 of the proposed dimensions in the literature (labour intensity, customer contact, customer interaction, customisation, nature of act, recipient of act) and apply them to 30 service industries. They derive 5 groups of services by this. These are Personal Services, Service Shops, Professional Services, Mass Services and Factory Services. The latter four are the same that were proposed by Schmenner. The first group is distinguished from professional services in personal services. In personal services the act of service is directed to people and customer contact is very high, while in professional services the act is directed to things and customer contact is not as high as in personal services. Examples of personal services (according to the authors) are driving schools, beauticians and hairdressers.

Dotchin and Oakland also make a slight change in the definition of labour intensity (as originally defined by Schmenner in 1986). Dotchin and Oakland define labour intensity as "labour used to deliver the service compared to mechanisation". The distinction is replacing "mechanisation" with "equipment and plant". As a result, hotels in Dotchin and Oakland's work are categorised as high in labour intensity while Schmenner has categorised them as low. As Dotchin and Oakland point out, "this highlights the problem of subjective, opinion-based classification and the need for objective measures" (Dotchin, Oakland, 1994a: 23).

Dotchin and Oakland in the third part of their research intend to examine the effects of the chosen service dimensions on services in terms of quality aspects. The authors examine whether the 5 dimensions of quality in Servqual model have different importance ratings for different services in their proposed classification. The five dimensions of quality are tangibles, reliability, responsiveness, assurance and empathy as proposed by Parasuraman et al. (Parasuraman et al., 1985, 1988). After a pilot study, Servqual instrument (a questionnaire) is completed by 3 to 4 customers from each of the 30 services that were

looked at for classification. The authors assume that the expectation questions lead to reasonable indicators of the importance of each dimension of quality. Authors do not present any significant statistical analysis. However, with the use of charts they demonstrate that different measurements for each of the service dimensions (and selection of pairs of service dimensions) lead to different rankings (given by customers) for the 5 quality dimensions (Dotchin and Oakland, 1994a, b).

COMMENT:

Dotchin and Oakland's work has the advantage of investigating a service classification model based on empirical research rather than theoretically. There could be concerns about the work in terms of size of the data and the subjectivity of Servqual model as the authors point out at the end. Also it should be noted that the effects of service dimensions on important aspects of quality are investigated only for individual or pairs of service dimensions and not for the clusters of services in the classification model. In a way, a question might be asked about what was the aim of typology of services in the first part of research if these typologies are not going to be used at the empirical study.

The above criticism does not undermine the fact that Dotchin and Oakland are among the very few authors who derived the implications of a service classification model based on an empirical study.

Summary of this category of service classifications:

Each classification model in this category was based on numerous service dimensions, being capable of looking at services from different perspectives, although the authors did not necessarily intend a multi-perspective classification. Bowen's as well as Dotchin and Oakland's classification is an outstanding ones for being partially based on empirical study. None of them however have included the selection of service dimension in the empirical stage of the work.

The next section summarises the findings of this literature review.

3.3 Summary of the criticism discussions (answering the questions aimed in the literature survey)

The main objective of this literature review was to gain an insight into the area of service classifications and into their implications for managerial issues. For the sheer reason of better presentation, the classifications were categorised into three perspectives and the classifications that could fall into each perspective (or combination of perspectives) were reviewed.

By browsing over the summary of each category of classifications, the main observations of this author can be captured.

The classification of services was first made by authors in economics and marketing, initially to be able to differentiate between goods and services. These include most of the models in the first category (Marketing, economic or organisational perspective). One of the main service dimensions that was subject to discussions in this category, was Intangibility.

Gradually the operations management perspective started to contribute towards service classification models. Customer Contact was one of the most popular and controversial service dimensions that was proposed in this era. Other important dimensions were Labour intensity and Customisation.

As the number of proposed service classifications in the literature became increasingly high, the attention of researchers (in particular in the area of operations management) was focused on giving more weight to the practical use of service classification, more specifically, looking for models that could have reliable managerial implications. Attempts were made to develop models analogous to the product-process matrix.

Broadly speaking, two types of classifications were developed in this era. The first type was looking at internal processes in an attempt to classify services from the point of view of the customer as well as the service provider. The second type was interested in looking beyond internal processes, offering classifications that cover broader aspects of organisations' operations.

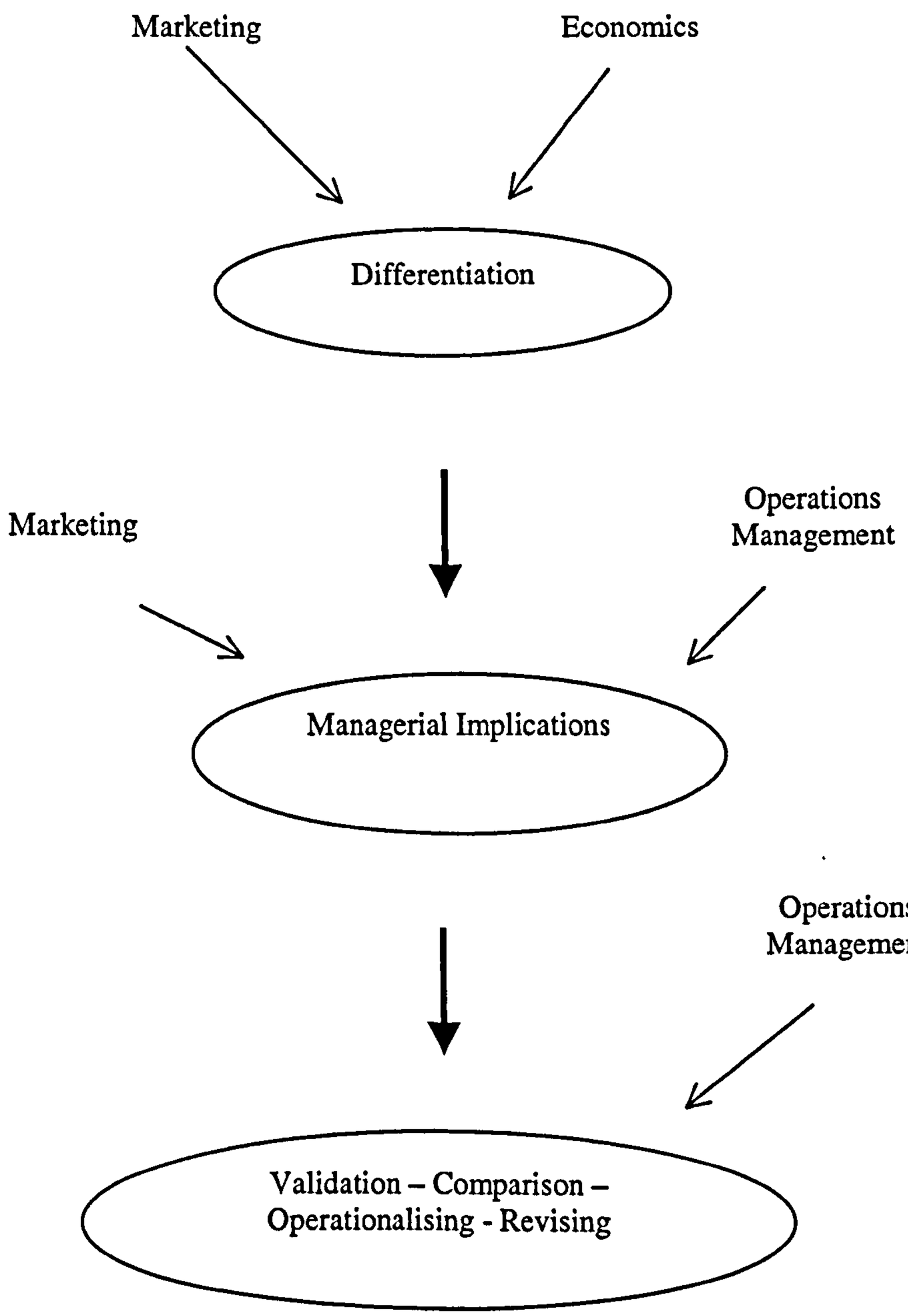
Gradually more empirical oriented classifications emerged and more attention was given to the importance of verifying theories based on empirical tests. Also authors started

looking at the difficulties of definition in some of the service dimensions as well as relations between service dimensions. A number of authors started comparing a number of service classifications on a theoretical or empirical basis. Some other authors revised their old classification models.

The area of service classification seems less busy in recent years. The most recent classification (as cited by the author) was the one by Schmenner in 2003, which in fact was only a revision of an older classification. It seems like researchers are now more interested in elaborating and testing the previous classification models rather than developing new ones. This is not surprising as almost all of the researchers who developed a service classification model in the last decade have indicated at the end that the classification needs to be verified and tested empirically.

The above summary can be presented in the following figure. The oval shapes are the main aims of classifications; the titles leading to oval shapes are the main contributors.

Figure 3.2. The Trend of the aims of classifications



It can be concluded from the above review that three points are considered to be the strength of a classification model:

These are:

1. Discussion and illustration of managerial implications
2. Empirically measured dimensions (that in effect also indicate that the dimensions are feasible to be measured)
3. Testing and verifying the discussed managerial implications

The review in this chapter revealed that many of the later models of classifications were proposed along with some discussions of the managerial implications. When it comes to measuring service dimensions only a few works can be singled out. Yet even in these the measurement instrument is not discussed in detail and the measurement is mostly done by non-experts (Silvestro et al. 1992; Collier and Meyer, 1998). The development of measurement tools for the different aspects of customer contact by Kellogg and Chase (1995) is an exception in this regard. It should be noted however that a small number of service dimensions proposed by authors are in fact categorical dimensions and are not in need of measurement (like many of the Lovelock's classification schemes). When it comes to testing and verifying the discussed managerial implications, only a couple of names can be singled out: Dotchin and Oakland (1994a, b), Silvestro (2001b).

Accordingly it is possible to argue that the above the three strong points of service classifications are in a correct order in terms of applicability to the research in classification models so far. The applicability falls very sharply when coming from the first point to the second and then third.

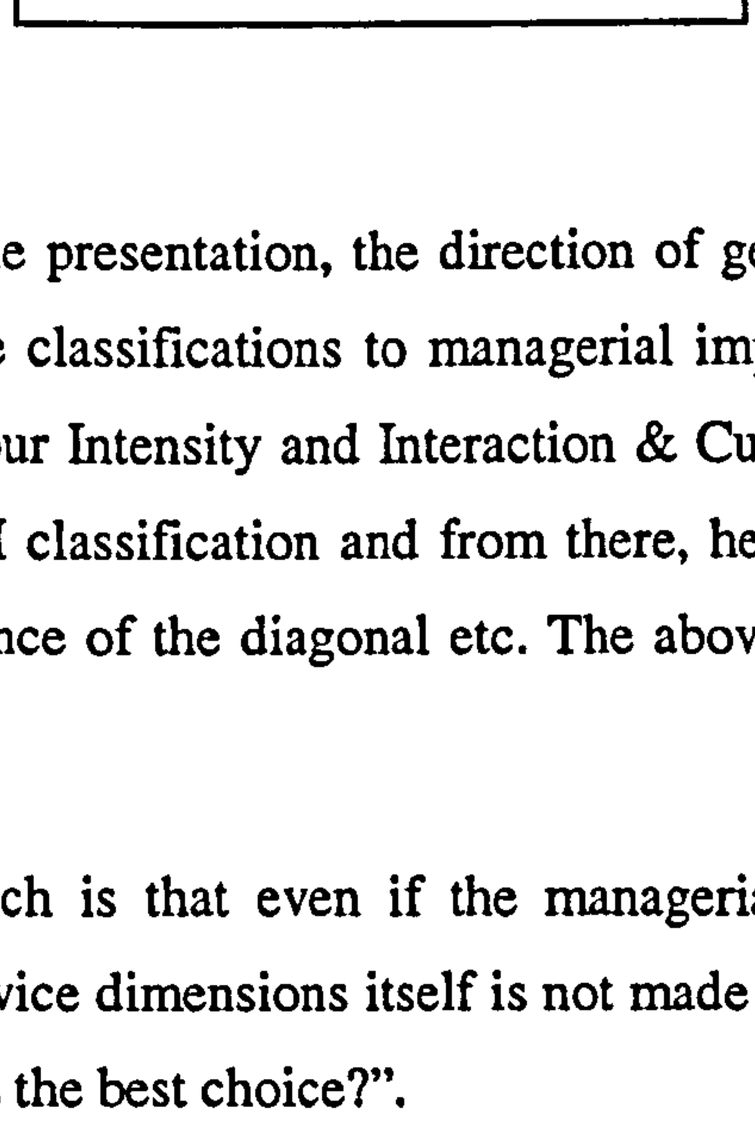
It seems that the very common approach of developing service classifications leads naturally to the above trend. Most of the authors propose service dimensions and accordingly, service classifications based on their extensive experience in the area of service research and from there they proceed to discuss managerial implications of the classification, leaving the job of operationalising and validation to younger researchers (Verma's verification of Schmenner's work is a typical example) or leaving it for their follow up studies (Silvestro is a typical example).

Another point is that since the choice of service dimensions is primarily theoretical, there will be less room to seek more detailed and micro relationships between each service

dimension and different subjects of managerial challenges. Dotchin and Oakland's work indicates that it is possible to find relationships at the micro level (i.e. between each service dimension and each quality dimension in the context of their work).

It is possible to summarise the overall approach taken in service classifications by the following schematic representation:

Figure 3.3. Traditional Approach to Service Classification

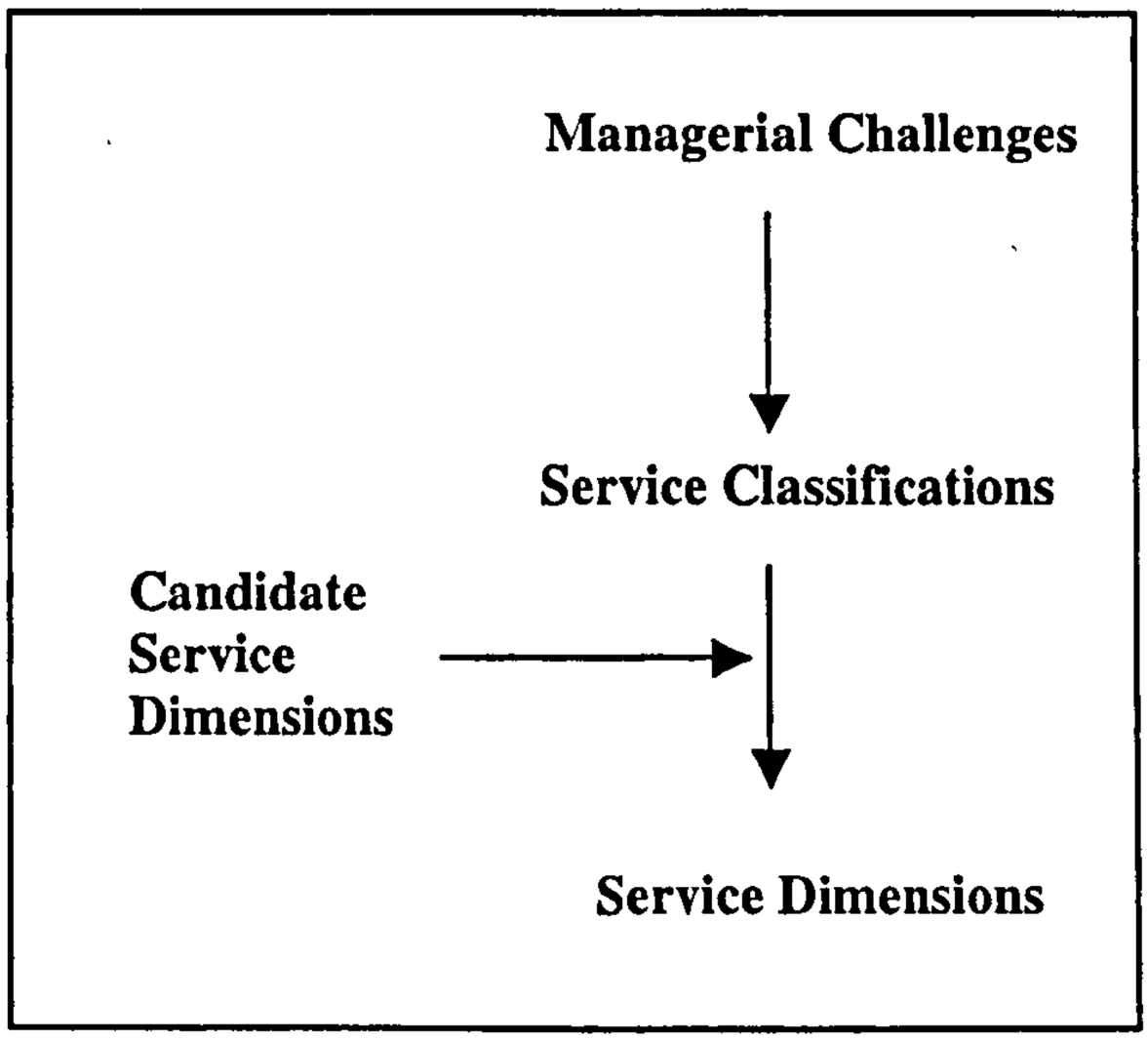


As shown in the above simple presentation, the direction of generating the idea is from service dimensions to service classifications to managerial implications. Schmenner for instance first introduces Labour Intensity and Interaction & Customisation. He then uses these two to present his SPM classification and from there, he discusses the managerial implications like the importance of the diagonal etc. The above approach is initiated on theoretical grounds.

The point about this approach is that even if the managerial implications are tested empirically, the choice of service dimensions itself is not made empirically. There will be always the question of "is this the best choice?".

In this dissertation the author suggests adding another merit to the list of the three strong points in classification of services. This is to analytically select the most appropriate service dimensions from a list of candidate service dimensions based on an empirical study. This is in fact a proposal for a new approach that can be seen as one that is initiated on empirical grounds. The approach is totally opposite to the above approach, as demonstrated in the following:

Figure 3.4. Approach of the present Research in Classification of Services



In this approach, first a number of services will be studied empirically, aiming to find their similarities and differences in a particular managerial subject. From here the classifications will be empirically derived. An analysis will be made to find which service dimensions (from the list of the candidate service dimensions) can be seen as basis for these classifications. By following the above approach, aforementioned three strong points for service classifications will be automatically fulfilled (this will be elaborated in the next chapter).

While the first approach (being based on theory) usually leads to robust and well structured classification models, the second approach could lead to several classifications, each related to certain service dimensions and certain managerial challenges. While both approaches need extensive tests for verification, it is obvious that the second approach is at least one step ahead of the first approach. The second approach also leads to more detailed discussions on the managerial implications and provides more flexibility in terms of choosing service dimensions.

This approach can be particularly very helpful when it comes to studying a subject as difficult and as debatable as productivity management in services (as discussed in the previous chapter). The empirical nature of the work can lead to a better insight into the area of service productivity as well as a stronger link with service dimensions and better use of resulted service classifications. The detail about the approach and the way it accommodates productivity management issues are discussed in the next chapter.

It is fair to note that from the above service classifications, one work (as mentioned before) does not totally fit with the first approach. This is the work by Periera and Catini (2001). Periera and Catini have conducted a selection procedure for choosing the best dimensions from a number of candidate dimensions. This can be seen as half way between the first and the second approach as they did not select the service dimensions based on managerial implications.

It should also be noted that it is not accurate to say that the service classifications that were reviewed are purely theoretical. Many of these classifications are based on extensive researches and in fact a life long empirical case studies by the authors. However, the aim of these case studies was not originally to reach the service dimensions for the purpose of classification. The dimensions were in fact indirectly derived from the extensive experience of the authors based on their extensive researches in services. This however (technically) cannot be termed as empirically derived result, rather, a theoretical result that is based on perceptions based on extensive empirical researches.

At this point, it is appropriate to repeat what Rohit Verma said after he proves some of the Schmenner's propositions to be not entirely accurate:

> *This is not to suggest that conceptual models and typologies are not valued. Instead, such typologies serve to focus our thoughts and provide an easily understood description of complex relationships. The role of empirical analysis is to test the extent to which such typologies fully represent reality and to suggest shortcomings, which lead to further research and refinement.*
>
> (Rohit Verma, 2000: 23)

The above is a correct and accurate presentation of the thoughts and intentions of the author of this work.

The answers to the questions that were raised at the beginning of this chapter have already been given in the above discussion. These are summarised as follows:

1. **To what extent have classification models based on the SDs been used for generic researches in services?**

All the service dimensions and classification models that were reviewed in this chapter and (where applied) discussion of challenges that authors had in developing the models, were presented primarily to address the above question. The subjects of study were different (design, marketing, efficiency, etc.). However, the fact that authors believe in the possibility of generic studying of services by the use of the classification models remains the same.

2. **What (if any) are the gaps in the research on using classification models based on SDs for service research?**

These were summarised in the beginning of this section, and the discussion that followed. In one words, it is possible to say that the overall gap is lack of enough empirical work. The results of this can be summarised as detailed gaps as follows:

- Not all the models enjoy a reasonable discussion about managerial implications.
- Service dimensions are rarely measured.
- The managerial implications are rarely validated.
- The service dimensions are not selected analytically and based on empirical work.

3. **Based on the answer to the above, what can be learned about an appropriate contribution in using SDs and classifications in this research?**

This was explained by the use of a schematic presentation. It seems that it is possible to propose a new approach to classification of services that is literally opposite to the routine approach, aiming to find results that are more based on empirical research. This approach first explores the managerial challenges in a specific context of operations, then reaches to a number of service classification schemes and from there finds the best service dimensions that are appropriate in that specific context (the service dimensions are selected from a list of candidate service dimensions).

4. **What are the SDs that are appropriate for studying in this particular research?**

This is explained in the following section.

3.4 Choosing the SDs to be examined

The reason for nominating service dimensions for the present research can be understood from the above discussions on the new approach and it will be further elaborated in the next chapter. In brief, what is needed is a list of service dimensions that can be seen as candidates for establishing service classification model/s. These service dimensions will be studied and from among them, the ones that are proved to have a relationship with one or more of the specific managerial challenges in service productivity will be selected as bases for service classification (in the area of productivity management).

Aiming at a productivity management study, it is obvious that the candidate service dimensions should be from an operations-management perspective. Labour intensity, Customer Contact and Customisation are obvious candidates (being so popular in service classifications as discussed).

Although, the latter work of Chase did consider the aspects of interaction in the definition of customer contact (Kellogg and Chase, 1995), given the assertion of Schmenner on interaction (Schmenner, 1986), it seems reasonable to separate this concept from the definition of customer contact to have customer contact with its original definition and adding customer interaction as a separate candidate. This can be particularly useful for services in which not both of the customer contact and customer interaction is high or low.

Intangibility was primarily used from the marketing perspective but it is widely accepted among authors on service operations management that this is a very influential and determining factor in service operations (as it was evident in the reviewed classification models). Intangibility will be another candidate for this study.

Apart from the above, there are three other dimensions suggested by authors that bring new views to service operations and are counted in the list of the most popular dimensions by Silvestro et al. (1992: 63). These are Front/back Value Added (Maister, 1983), Personnel Judgement (Lovelock, 1983) and Product/Process Focused (Johnston and Morris, 1985).

It was also interesting to examine the possibility of proposing a new service dimension to the list: "Customer's Inability to Evaluate Service Quality". The idea of this dimension

has been derived from works like those of John Kay (1993) and Andreassen and Lindestad (1998) were the authors discuss different degrees of customer's expertise and understanding of the service quality. The service dimension measures how difficult it is for customer to evaluate the quality of the delivered service.

The total number of the candidate dimensions is therefore 9 as below:

1. Labour Intensity (LI)
2. Customer Contact (CC)
3. Customer Interaction (CI)
4. Front/Back Value Added (FVD)
5. Customisation (CUS)
6. Personnel Judgement (PJ)
7. Product/Process Focus (PF)
8. Intangibility (INT)
9. Customer's Ability to Evaluate Service Quality (CIV)

Summary

The chapter started by raising four questions about research into service classifications. Overall trend of service classifications and overall criticisms by researchers on the classification works were first discussed. At the next stage, an extensive number of service classification models were reviewed in 7 categories. Gaps in literature in terms of approach and applicability were discussed. A new approach was briefly proposed, to be detailed and discussed in the next chapter. The questions were answered and a list of service dimensions was introduced. This is the list of service dimensions that are going to be studied in the present research. The aim is to see which one/s are the most appropriate one/s for making classification models in the context of productivity management in services and therefore becoming reasonable indicators to the nature of service operations in this particular context. The next chapter elaborates on the research context and the research methodology.

Chapter 4. Methods and Methodology

Introduction

It is generally agreed among PhD research students in Social Science that the chapter on the methodology of a research is one of the most difficult pieces of a research report to be written. It seems it is also one of the most difficult parts of a research report to read and digest. This, partially, could be because of the fact that often the stages of research design do not happen exactly in the same logical sequence that they are written in a research methodology chapter. In this chapter, as the one in which the main methodological discussions take place, the author decided to use a Question and Answer structure in an attempt to overcome the difficulty of both writing and reading the written work.

It is therefore reasonable to begin this part of the work with a list of the questions that are addressed in this chapter. These are as follows:

1. What **gaps** were found in the relevant literature?
2. Looking at the gaps, what were the **research questions**?
3. How was this research **different** from similar works?
4. Based on the differences with other similar works, what was the **contribution** of this research to the body of knowledge?
5. What **approach** was taken to make the contribution?
6. What **data** was needed for this approach?
7. What are the **boundaries** of the problem that were observed in this approach?
8. What were the **sources of data** (sample and sample size) based on the approach and the problem boundaries?
9. What **data collection** methods were used and suited for the research approach and sources of data?
10. Based on the data collection method, what was the **content of interviews**?
11. What is the outline of the **research process**?
12. What **measurement tool** was used for the Service Dimensions?
13. What measures were taken to increase the **usefulness of data**?
14. What do the **research findings** look like?
15. What are the research **assumptions and limitations**?
16. What are the considerations about **reliability and validity** of the research?

17. Overall, where can this research be positioned among the recognised **research methodologies?**

The author hopes that by addressing the above questions, the methodological issues of the research are all covered in a reasonably structured way. It should be noted that the above questions follow a logical sequence and are all inter-related. It is therefore only natural that in addressing some of these questions, the answers to some of the preceding ones might be further elaborated. The bold words/phrases in the above list are the core subjects that are to be discussed in answering each question.

4.1 What *gaps* were found in the relevant literature?

The gaps in the literature were pointed out in chapters 2 and 3. The content of this research can be introduced and justified by reviewing the literature gaps in the area of concern. To make it brief, these gaps can be summarized as follows:

"The body knowledge of Service Operations can benefit from contributions in finding relationships between analytically selected service dimensions and certain managerial challenges based on empirical studies and with appropriate measurement of service dimensions throughout a number of service sectors. Among the managerial challenges in service operations, productivity management and its interaction with quality concerns is one of the major interesting subjects"

The above descriptive, overall summary of the observed gap in the literature (references of which have been given in chapters 2 and 3) is clarified in more detail by explaining the underlined words:

Relationship: It was shown in chapter 3 that in the area of service operations (in particular when it comes to a comparison between services, reasons for differences and similarities and studying the managerial challenges in services) one of the popular approaches of researchers to the research questions is to find a relationship between service classifications/dimensions and managerial challenges and to use this as a basis for comparing the services and for discussing the differences and similarities (e.g. Chase 1978, Lovelock 1983, Maister 1983, Schmenner 1986, Silvestro et al, 1992). This research uses the same approach for the same aim. In this approach the point of focus is on the "relationship" between two concepts (services and managerial challenges). This refers to one of the merits of this approach. Being concentrated on "relationship", gives a generic

nature to the potential results of this approach. This means no matter how the service industries might change and no matter what new services might emerge in future, the results (of a research based on service classifications) remain relevant. This is because these results are explored based on the "relationship" between the concepts and not based on the concepts per se.

Analytically Selected: It was shown in chapter 3 that all the service dimensions that were suggested by the researchers were defined or selected on a theoretical basis. Although in many cases these were based on the extensive and invaluable experience of the researchers, there was however no analytical proof to support these selections (e.g. Chase 1978, Schmenner 1986). To improve the approach, this research selects the appropriate service dimensions from the list of popular service dimensions based on quantitative data analysis. In other words, the process of introducing service dimensions in this work is an analytical process rather than a judgmental one.

Certain: Researchers have different approaches when they are discussing the relationship between service dimensions and managerial challenges. Many of them have not defined a certain scope for the managerial challenges they are looking at (like Schmenner 1986) while some others have defined a very broad scope (for instance 'Marketing' in the case of Lovelock 1983) and a few have defined a very specific scope (like 'Efficiency' in the case of Chase 1978 or TQM implementation in the case of Silvestro 2001b). These are discussed in detail in chapter 3. Reviewing the literature, the author concluded that without specifying the scope of managerial challenges, it is impossible to conduct an analytical approach in selecting the service dimensions. This research therefore restricts the scope of managerial challenges (that are looked at) to the area of productivity management and even in this area the subjects that are looked at are defined and listed specifically and are referred to as 'Productivity Aspects'. These will be introduced later.

Empirical: The relationship between the managerial challenges and a selection of Service Dimensions is the core interest of the researchers in this field. Yet the literature review revealed that in most of the cases this relationship has not been explored through any empirical study. Most of the discussion on the relationship is based on the researchers' own perspective. This is while some of the empirical studies that are aiming to verify these relationships have proved them to be not that accurate (Verma 2000). In this research the relationship between the selected service dimensions and specific managerial challenges in the area of productivity will be analysed based on empirical study. In fact,

the very process of selecting the appropriate service dimensions (as referred to above) is based on exploring such a relationship through an empirical study. This will be discussed later in chapter 5.

Measurement: As discussed in chapter 3, the literature indicates the difficulty of measuring most of the service dimensions. In most cases researchers have not measured their chosen service dimension, in some other cases the measurement has been done by non-experts and not enough attention appears to be given to developing a measurement tool (e.g. Silvestro et al., 1992, Collier and Meyer, 1998). There is of course also an example of a very detailed empirical work in developing a measurement instrument. This is Kellogg and Chase's research on operationalising the concept of customer contact. In this study while it is appreciated that measuring some of the service dimensions is not an easy job, special attention has been given to developing a less subjective measurement tool and to use the experts in service operations to measure service dimensions for their respective service sector.

Productivity Management: Being interested in differences and similarities across the service industries in terms of productivity issues, this work looks at productivity as an area which has to be managed (Prokopenko, 1987). The author approached productivity from a strategic, general perspective; a perspective that can be referred to by the term "productivity management". The work is therefore concentrated in areas that could provide a feasible ground for cross-examination of different service sectors. These include factors that affect productivity and general productivity approaches and problems, etc. as opposed to more technical aspects of productivity that could be very subjective to the needs and conditions of each organization. In the area of measurement for instance the point of focus is on general problems and concerns that are raised when it comes to productivity measurement rather than being interested in the particular techniques that are used for measurement or productivity measurement figures.

Interaction with Quality Concerns: In chapter 2 the importance of quality in productivity management, in particular in the area of services, was referred to through a literature review. It was revealed that some researchers go as far as including quality in the definition of productivity or even considering them to be the same concept, while others maintain that any productivity challenges should take into consideration the effects on/of

quality aspects and that the two concepts should be looked at simultaneously (Giarini 1991, Gronroos 1998,Van Looy et al. 1998, Gummesson 1992, 1993, 1994a, 1998b). This research avoided concentrating merely on the technical definition of productivity (output per input) lest the subject of the research becoming a concept that is less important, acceptable and applicable in service industries. To avoid any confusion, the definition of productivity remained the same as its traditional definition of output per input; however, quality was noticed and raised as "the" main concern in productivity management. The concept of quality in particular was taken into consideration in terms of interaction with productivity. The research however did not go into much in-depth study of quality in services per se as this would bias the focal point of research. In sections 4.10.1.7-9 the areas in which the concerns on quality were studied are discussed.

The purpose of elaborating on the above phrases/words was to clarify the aim and the context of this research and its differences with similar researches. This research intends to explore insights into the area of *productivity management in services* as well as proposing and illustrating a new approach to developing and using *service classifications* for studying services. As briefly discussed above (and mentioned in the previous chapters) these two topics are linked together by studying service dimension as tools or indicators for a study on productivity management.

Appreciating the gaps that this research intends to contribute in filling, it is now logical to list the research questions:

4.2 Looking at the gaps, what were the *research questions*?

Derived from the above-elaborated lines on the gaps on literature, the main research question for this work can be formed as follows (this was referred to without any explanation in the introduction):

<u>The Main Research Question:</u>

"What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?"

In attempting to answer this question, the following questions were also addressed (as referred to in the introduction). It should be noted that these questions are all interrelated and no particular order is taken into consideration in this list:

1. In terms of Productivity Management, how are the service industries similar/different and how can they be classified?
2. How can the service industries be classified with regard to Service Dimensions?
3. What are the measurements of the studied service sectors for each of the service dimensions?
4. What are the relationships between the popular service dimensions?
5. (Within the scope of the present research) What are the key factors and issues in productivity management in service industries?
6. Is there anything like productivity friendly services? If yes, what are the conditions of these services?
7. What is the interaction between productivity and quality in service operations?

A reasonable attempt to answer the above questions should contribute to filling the gaps that were discussed in the last section.

In the list of research questions, two types of questions can be distinguished: Questions 2, 3 and 4 are heavily based on a fixed measurement, while questions 1, 5, 6, and 7 are more open-ended questions. The main research question has aspects of the two types as will be discussed later.

It should also be noted that answering the main research question will lead to classification schemes based on one or a number of relevant service dimensions to gain insights into productivity management in services. This means providing a more advanced and useful answer to both research questions 1 and 2. To explain this further, each of these two questions seeks service classifications purely based on (respectively) productivity management and service dimensions. The main research question is an attempt to link these two areas (productivity management and service dimensions) together and to provide classification schemes that put services in clusters based on both service dimensions and productivity management aspects.

Based on the above research questions, it is now possible to establish the initial research idea for this work:

The *research idea* or anecdote (Johns and Lee-Ross, 1998) is to compare and contrast a number of different service operations in terms of 'productivity management with quality

considerations' and to investigate the relationship between the results and measurements of a selected list of service dimensions, to explore relationships.

The above is only the idea of the research and is obviously needed to be further defined and bounded. This is done in the following sections.

4.3 How was this research *different* from similar works?

The above section should have clarified the difference between this research and similar researchers and subsequently the contribution of this research to the body knowledge. These can be rephrased and summarised as follows:

- The research is different with similar works in that it uses an analytical approach based on empirical study to find the relevant service dimensions and their relationship with productivity managerial challenges. In other works, a number of service dimensions are introduced without any empirically based analytical justification and then their relationship with managerial challenges are discussed.

- Unlike most of the other works, in this work service dimensions are used to study a specific managerial challenge in services, that is, "productivity management".

- There are only few works in which an attempt has been made to measure service dimensions. In most of these cases no measurement tools has been used and the respondents are not experts in the service they are doing the measurement for. Here a measurement tool has been used (mostly) by experts in their respective service sector for measuring service dimensions.

- Since the dimensions have been measured and since they were empirically selected, their use as indicators for productivity managerial challenges has been operationalised by specifying boundaries for intervals of these measurements,

with different intervals indicating different types of productivity managerial challenges. Full explanation is given in section 5.3.2.

- There are not many works in which the relation between quality and productivity and their interaction are empirically studied.

From the above, the first bullet point is very important as it describes a major difference in the approach of this work as compared to the other similar works. Figure 4.1 summarises and demonstrates this difference. A version of this figure was also presented in chapter 3:

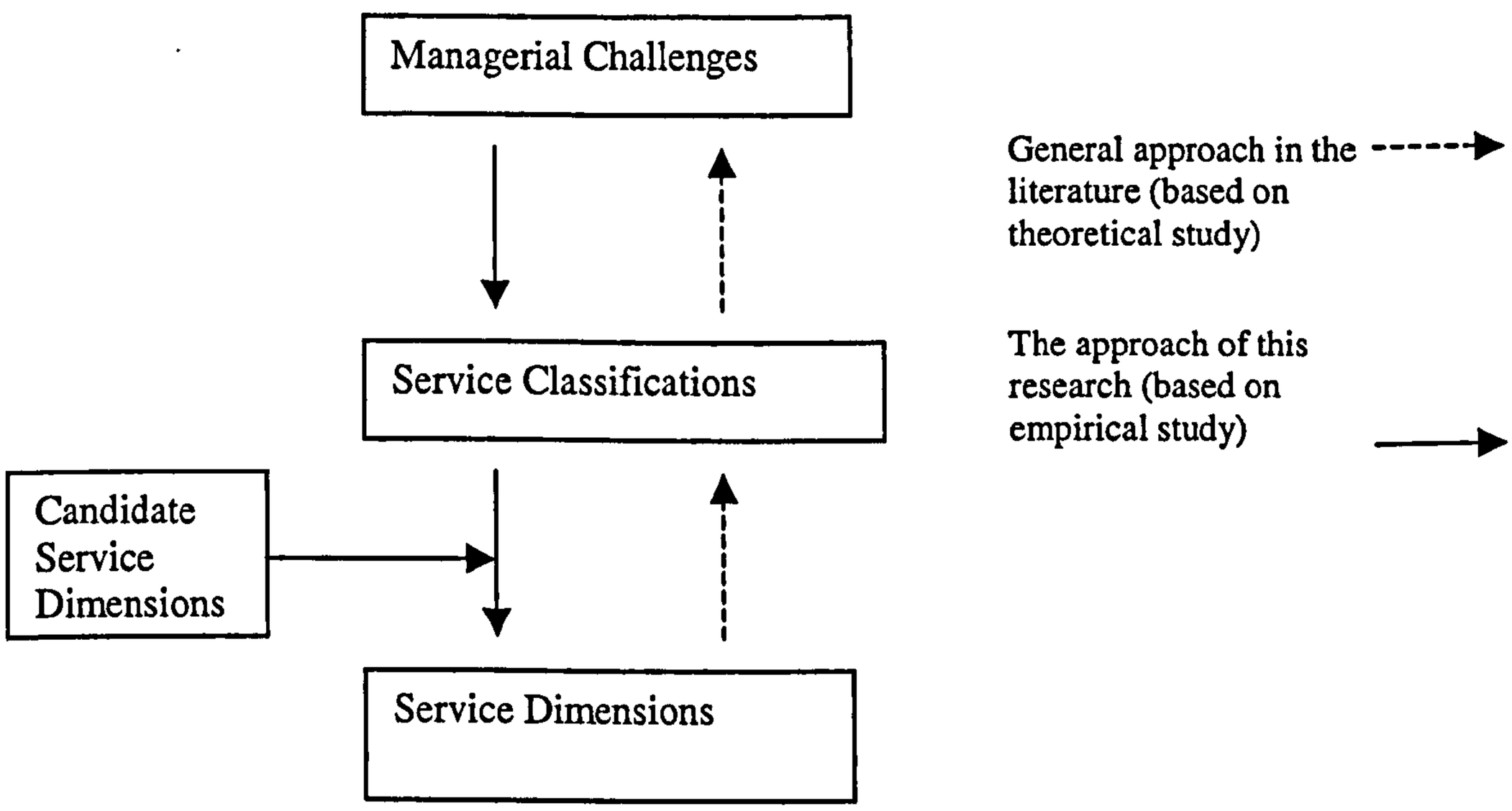


Figure 4.1. The approach of the present research, comparing to the common approach

As figure 4.1 demonstrates, in studying the relationship between the service industries and service dimensions, the approach that can be found in the literature is based on a methodological direction that moves from Service Dimensions to Service Classifications and from there to Managerial Challenges. In other words, the researchers introduce one or more service dimensions, classify services based on these dimensions and from there they move on to discuss the Managerial challenges that are related to each cluster of services. In this research, however, the methodological direction is literally vice versa. Here, first

the managerial challenges (specific to productivity management with quality concerns) are studied. From there the services are classified and are put in different clusters and this finally results in identifying and introducing service dimensions (from a list of candidate service dimensions) that are relevant to the managerial challenges. It should be emphasised that (as illustrated in figure 4.1) in this research the service dimensions are analytically selected from a list of candidate service dimensions that are chosen (based on relevance to operations management and popularity) from the literature. The finding of service dimensions therefore cannot be termed as fully explorative. Such fully explorative method could be carried out by approaches like Grounded Theory. These approaches (that are based on heavily focused case studies) are not appropriate for the present research, due to the broad perspective of this work, aiming at a wide range of service industries. This will be further discussed in section 4.5.

As referred to in Chapter 3, the approach that is illustrated in figure 4.1 will automatically fulfil the concerns of critics of past service classifications in terms of "empirically measured service dimensions", "discussing and illustrating the implications of classification models" and "empirical test of implications". The difference in the methodology is mainly because of the empirical nature of this work as opposed to the basically theoretical nature of other works, as discussed above. It is in fact the empirical nature of the work that suggests choosing this approach. This is discussed in more detail in the following two sections. It is worth mentioning that in a recent service operations research workshop that was run by Richard Chase in the London Business School, following a discussion on service classifications, Chase proposed that to have an effective classification model for services, the study should start from managerial aspects of operations leading to classification of services accordingly and finding relevant service dimensions (Chase, 2004). This was exactly what was done in this research.

4.4 Based on the differences with other similar works, what was the *contribution* of this research to the body knowledge?

The contribution of the research to the body knowledge can be derived from the gaps that were discussed and the research questions as follows:

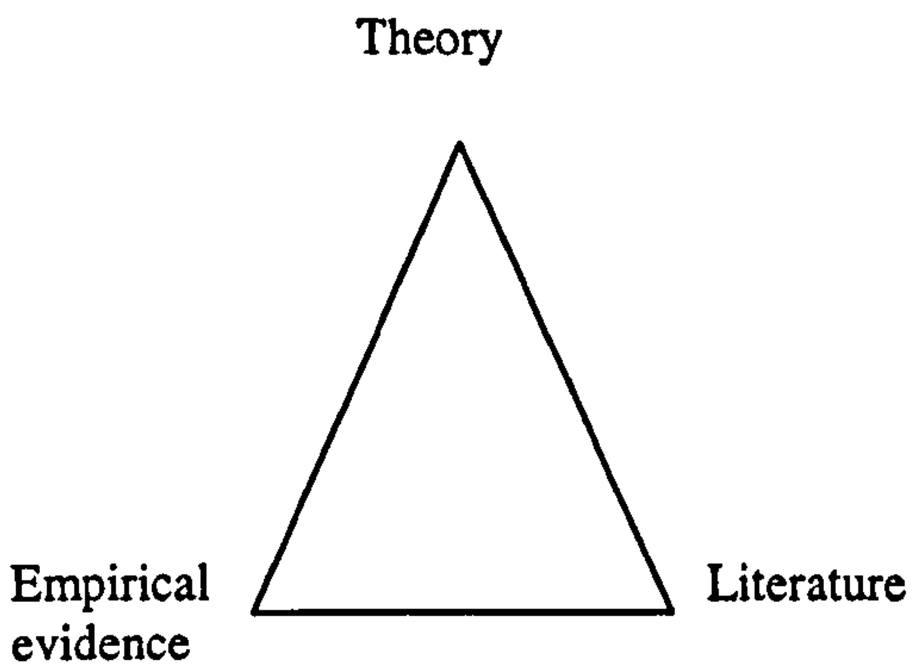
- Empirical measurement of a number of service dimensions for different service sectors

- Analysing the relationship between a number of service dimensions based on empirically derived data.
- Proposing and illustrating a new and advantageous empirical approach in using service dimensions and classifications for service operations' studies.
- Introducing service dimensions that are good for productivity management studies based on an empirical approach.
- Exploring differences and similarities between service sectors in terms of productivity management and identifying common trends for the purpose of theory building.
- Looking at the relationship between productivity and quality in services based on empirically derived data.

From the above, the first four are the areas that, to the knowledge of the author, have not been addressed in the literature. The other two gaps are the ones that have been less discussed in an analytical way in the literature.

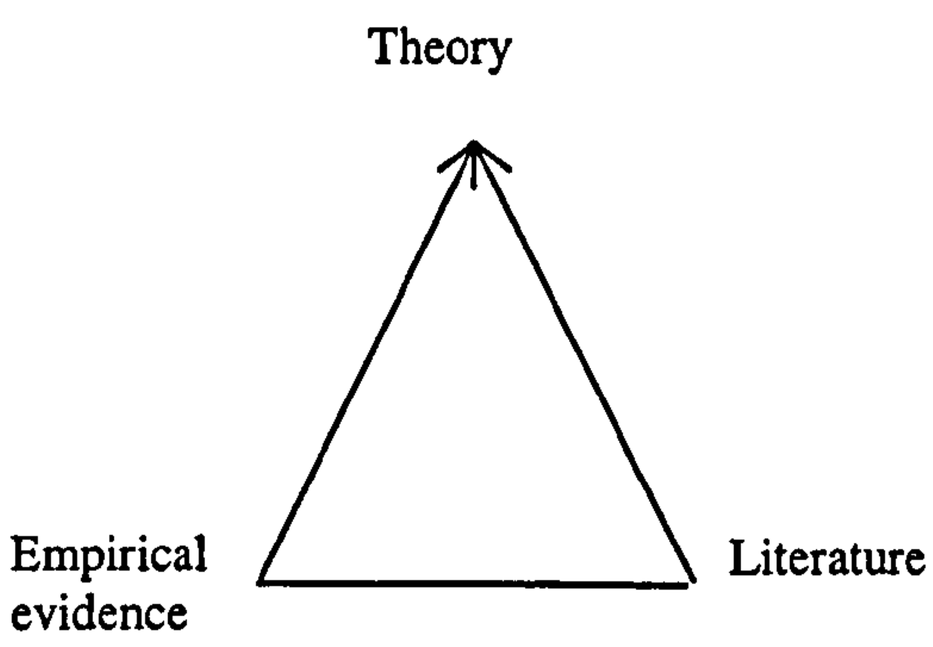
The third bullet point can also be seen as phrasing the contribution of this research from a more general (strategic) perspective. It is possible to argue that this research, as a whole, contributes to the relevant body knowledge by "introducing a new approach in using service dimensions and classifications for studying service operations".

From an overall view, Eden's methodological triangle (1997) can be used to illustrate the type of contribution in this research:

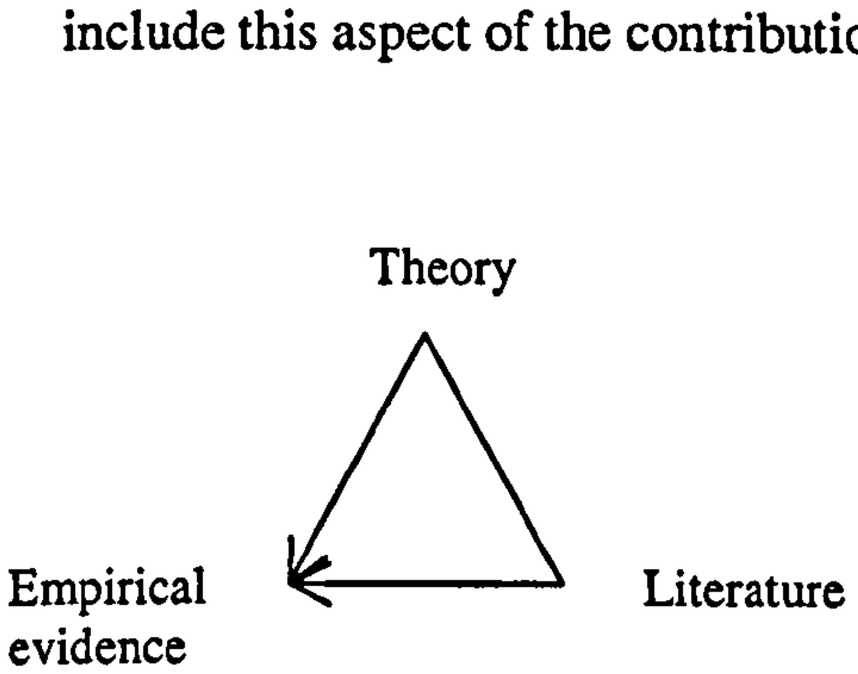


According to Eden, social researches' contribution to the body knowledge can be divided into two categories. Category one is a type of research that applies an already available

Theory (with the use of literature) to a new set of Data in order to test the theory or to improve or develop the theory (thus the contribution). This is mainly applied with a deductive approach. Category two is when Data is used to generate and develop a new theory (with the support of literature). This is mainly applied with an inductive approach. Looking at this research from Eden's point of view, it is appropriate to argue that in this research, Literature and Data are used to generate a Theory (as demonstrated below):



In the process of doing the above, relevant data will become available to make another type of contribution by investigating some of the popular (and relevant) theories in the field of study (mostly taking place in chapter 7). The rationale for including this part to the research is explained in brief in section 4.11and in detail in chapter 7. Accordingly, it is possible to add another "small" triangle to the above main "contribution triangle" to include this aspect of the contribution as well:



After explaining the contribution of this work, it is now possible to explain what approach was taken to make such a contribution and why, in the following section:

4.5 What *approach* was taken to make the contribution?

The overall approach of the work was unintentionally revealed in answering question number 3. Here however a more detailed level of discussion is provided. From the beginning of the work, the author realised that to carry out an empirical study, the

methodology of the work should be different from similar works. The author came to the conclusion that the reason in other works, when applying the service dimensions, everything started from service dimensions and ended with relevant managerial challenges, was because of the fact that these works were not intending an empirical research. The author realised that an empirical study in the context of this work should follow the notion of 'first find what is to be indicated then find the proper indicator.'

To find "what is to be indicated", an open ended and explorative approach is needed. Presumptions and an inflexible framework are features of a verification approach rather than an explorative approach (Ibert et al., 2001). The primary purpose of this research, in broad terms, is to explore the differences and similarities of services in terms of productivity management and to use this exploration to find the relevant service dimensions, and also to explore the other issues related to productivity management in services (as referred to in the list of research questions above). The author is 'basically' interested in exploring and developing a set of empirically derived results rather than 'merely' testing and verifying already constructed theories (the expressions 'basically' and 'merely' are used because the approach taken also results in verifying some of the theories constructed in this regard – referring to chapter 7 - but this is not the primary objective of this work).

In an ideal world, this explorative approach could be carried out by conducting in-depth interviews with a large number of data sources. Obviously in practice, and in the scope and limitations of a doctorate research, this is rarely the case. However, the fact remains the same in terms of the necessity of carrying out research that is open ended and is willing to accommodate and take into account new ideas and unpredicted responses. In other words, the data has to be derived from research that is reasonably grounded in the area of study.

The above also rules out another optional approach that is, carrying out a simple questionnaire survey across a large number of service operations. This would not provide the in-depth insight that was needed to attempt the research questions. The other problem is that, no matter how huge the number of respondents, the answers that would be received might be totally irrelevant or unreliable. This is because of the nature of the questions that need to be asked and because of the complexity of the context (productivity management) as discussed in chapter 2. Furthermore, the questions involve terminologies that can have different meanings for different people. Measuring service dimensions too, is not a very

straightforward task, even when using appropriate instruments. This point will be further discussed in section 4.12.

Based on the above, the author came to the conclusion that an inductive approach, heavily based on qualitative data, was an appropriate approach for this research. The data gathered, the points of focus in the context of the research and even the analysis of the data (to some extent) were heavily (but not wholly) based on what was explored in the stages of data collection. The inductive qualitative nature of the research was not applied equally to all parts of this research. Research questions 3 and 4 needed a more straightforward, rather defined and predetermined approach. However, in general, the whole research experience had features that placed the work among inductive rather than deductive researches (this is elaborated further in section 4.17). In this inductive research the intention is to generate or discover a theory through a rather large number of interviews. The interviews are conducted with individuals to saturate the categories of interest and to detail the theory. Coding has been used as one of the vital tools in analysing the qualitative data. These elements are referred to as some of the features of "Grounded Theory" by Creswell (Creswell, 1997, Strauss and Corbin, 1990). These however can be seen as the only similar features between this research and a Grounded Theory research. The author did not find that the qualitative aspects of this research required a methodological scope as detailed and as expertly determined as Grounded Theory. Also the grounded theory approach does not fit the requirements and limitations of this research.

The above is also in line with the advice of Professor Gummesson in his e-mail to the author response to the author's inquiry about an appropriate approach for such research that was made at the very early stages of this work. In his own words:

"It is not an easy thing you are trying to do ... I believe you have to make it heavily based on empirical data from a limited number of industries in order to reach any interesting conclusions. I think that the classifications have to be built up indirectly from your field studies, just like in grounded theory."

(Gummesson 1998a)

An inductive approach to answer the research questions suggests an in-depth study on a variety of aspects of productivity management in a number of different service operations in an attempt to compare and contrast the differences. This led to a data set that provided

relevant grounds for answering research questions 1, 5, 6 and 7. To be able to attempt the main research question and questions 2, 3, and 4, another set of data is needed and that is measurements of service dimensions for the service operations that were studied. Analysing this set of data led to answering questions 3, and from there questions 2 and 4. By investigating the relationship between the answers to questions 1 and 3 (i.e. "differences between productivity management aspects in services" and "service dimensions measurements"), the main research question was answered.

The above can be seen as the general outlook of the research design and is demonstrated here:

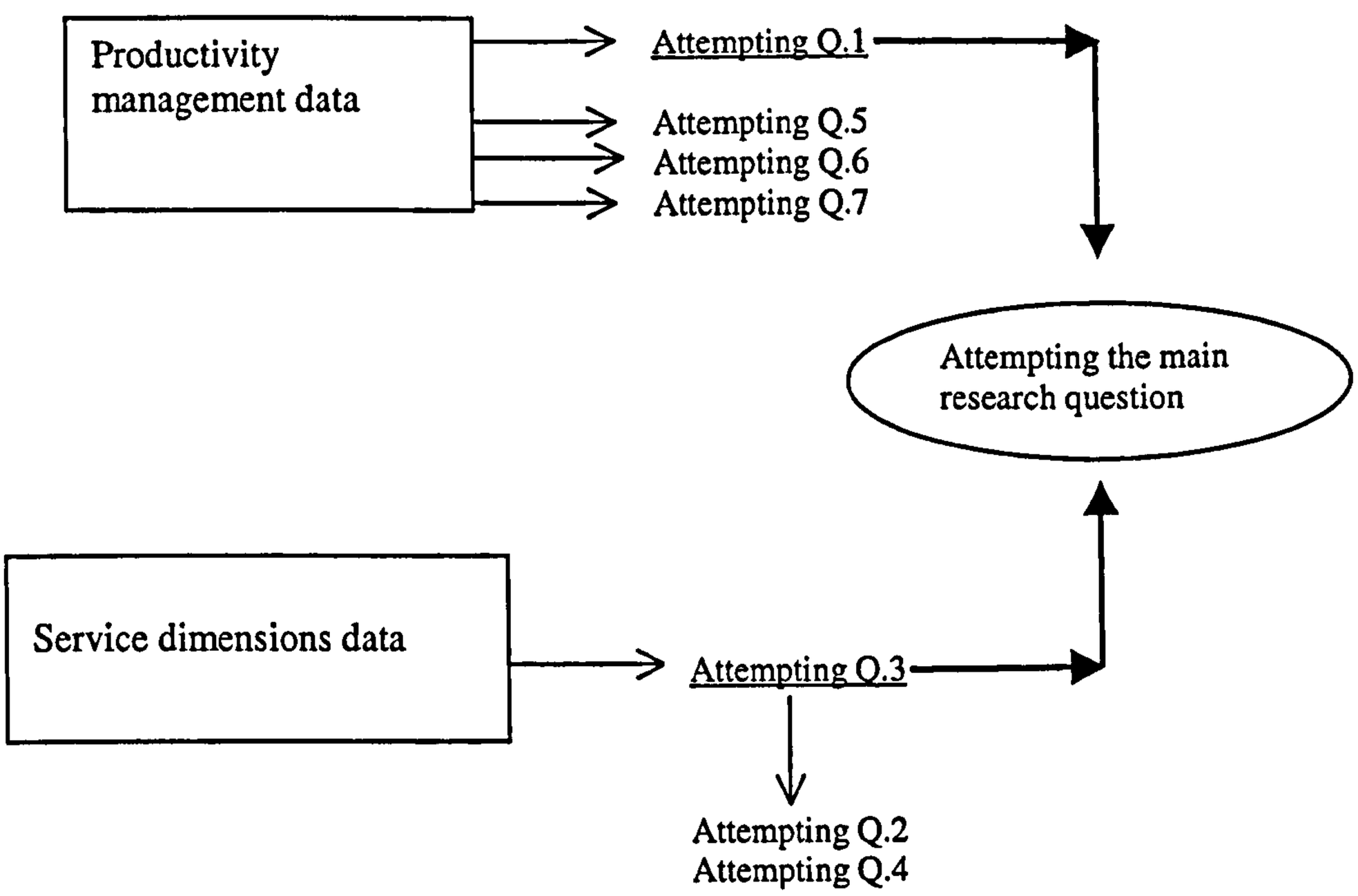


Figure 4.2. An illustration of the approach of the present research

A more detailed explanation of the research design is given in section 4.11.

By applying an inductive approach (as explained above) the research is taking into the account all the relevant data that are delivered by the data sources and adapts an open

mind to be able to freely but analytically draw conclusions from the data. This is more applied in attempting to answer questions 1, 2, 5, 6, and 7. As for the rest of the questions, there are elements in the parts of research related solely to these questions that shows some similarities between these parts of research and the deductive approach. This leads to a discussion about integrated approaches in this research that will follow later on in this chapter.

The reason the discussion cannot be raised at this point is that the nature of data and the nature of data analysis have to be discussed before in order to prepare proper grounds for raising the issue of integration.

4.6 What *data* was needed for this approach?

As explained before, two sets of data are needed for this research. These are:

1. Data related to measurement of service dimensions

2. Data related to productivity management aspects

- Data related to measurement of service dimensions:

As referred to in the last section, this set of data is needed to attempt research question number 3. The answer to this research question also serves as data for the main research question and research question numbers 2 and 4. The main purpose of this category of data is measurement and studying the relationships. To fulfil the purpose, the data has to be quantitative (directly derived from qualitative data). Obviously not all of the proposed service dimensions can be taken into consideration; therefore, a number of service dimensions have been chosen from the list of available ones (as given in Chapter 3) mainly based on their popularity and relevance to the operations management discipline. The data is not originally of a quantitative nature because the definition of most of the service dimensions do not lead to any robust quantitative measure. It was therefore decided to measure all the service dimensions with a qualitative measurement tool that could be easily interpreted to quantitative data. This will be explained in sections 4.9 and 4.10.

The data has to be derived by measuring service dimensions for a number of service operations to assure a reasonable variety of services are investigated.

- Data related to productivity management aspects:

Unlike the first set of data, this is a set of data that has to be derived from a heavily explorative study. This is needed to be able to provide answers for the open-ended questions in the list of research questions. These are questions 1, 5, 6, and 7. Question 1 is a vast question that can be attempted from different perspectives. Part of the data derived for question number 1 has to be directly transferable to quantitative data for quantitative analysis. This data (related to question 1) is also needed to attempt the main research question. Question number 1 also takes benefit of qualitative analysis. It is therefore appropriate to seek enriched qualitative data for questions 1 (partially), 5, 6, and 7 as well as directly quantifiable qualitative data for question 1 (partially). The derived quantitative data for question 1 is in the form of ranking. Same service operations (as for the data related to service dimensions) are used for this purpose.

According to the above, the required qualitative data can therefore be divided in two categories:

- Qualitative data that will be used in qualitative analysis (related to questions 5, 6, 7 and partially 1).

- Qualitative data that is transferable to quantitative data for quantitative analysis (related to questions 2, 3, 4 and partially 1).

The summary of the relationship between the research questions and the nature of data is given below:

Main Question:

- Quantitative data derived by answering questions 1 and 3.

Questions 1:

- Qualitative data on productivity aspects that (where needed) is directly transferable to quantitative data in the form of rankings

Question 3:

- Qualitative data on selected service dimensions that is directly transferable to quantitative data

Questions 5, 6, 7:

- Qualitative data on productivity aspects

Questions 2, 4:

- Quantitative data derived by answering question 3

To be able to proceed to a more detailed level of explaining the research work, it is now necessary to discuss the boundaries of the research problem.

4.7 What are the *boundaries* of the problem that were observed in this approach?

So far only the research *idea* has been introduced. This idea was introduced as follows:

> *"... compare and contrast a number of different service operations in terms of productivity management with quality considerations and to investigate the relationship between the results and the measurements of a selected list of service dimensions, to explore relationships."*

The research problem now needs to be narrowed down before being tackled. It is helpful to start narrowing down the research based on the four narrowing down perspectives as presented by Johns and Lee-Ross (1998).

Johns and Lee-Ross argue that narrowing down a research may be achieved from four perspectives:

1. identifying and adding terms to restrict the area of interest
2. narrowing the area of interest vertically, i.e. reducing the organisational/social scope
3. narrowing the area of interest horizontally, i.e. reducing the geographical, topical or numerical scope
4. intensifying the methodological focus

These are applied to the research idea as follows (not following the same order):

4.7.1 Narrowing the area of interest vertically

Johns and Lee-Ross introduce six vertical levels that can be used as the basis of narrowing down a research. These are:

- International level
- Social/national level
- Industrial level
- Organisational level
- Group level
- Individual level

This research is restricted to the industrial level (as underlined above). Obviously as the research is in the context of organisational performance, the national level is not appropriate.

There are two reasons for deciding to choose the industrial level rather than the organisational level. Firstly, this research is intended to be generic with results that could be argued to be relevant to all organisations. Being as down as the organisational level carries a high risk of receiving biased and subjective data due to the specific organisational circumstances. Remaining in the industrial level can reduce the noise of data in this sense. It is worth noting that most of the works in applying service dimensions in studying service operations were also in the industrial level (Lovelock 1983, Schmenner 1986, Silvestro 1992). The other reason is that the research is going to cover many areas in productivity management and quality considerations. This certainly

includes areas of weaknesses and shortcomings. This could form another basis for subjective and biased replies because of diplomatic considerations that are deemed to be to the benefit of an organisation.

Being in the industrial level means that the researcher was not interested in the "behaviour" of organisations in terms of productivity. The point of interest was on the behaviour of the industry as a whole. This way the sources of data were also more relaxed and free in expressing themselves. One important point to note, however, is that as the industry is in fact the total body of the respective organisations, the data is collected in the context of a typical organisation that could be seen to be representative of the whole industry. This typical organisation is not any specific real world organisation.

It is clear from the above that the research is not focused on any particular processes within an organisation. On contrary, organisations are looked at as one whole body (system) that includes all aspects of the organisation, including processes, managerial issues, human resource, customer and other factors. This has been done by looking at general trends and overall conditions of a typical organisation in each of the selected industries (as explained in section 4.7.3). Looking at particular processes has its own advantages in terms of reaching more detailed and technical outcomes. In particular it is possible to argue that measuring service dimensions for service processes (rather than service organisations) can be done easier and more accurately. Answering questions on productivity challenges in managing processes (rather than managing organisations) can also be easier. The disadvantage however would be that important factors like effect of customers and managerial issues as well as overall performance of organisation and its interaction with quality might be overlooked. This is perhaps one of the reasons why most of the authors in service classification researches have chosen the same scope, that is looking at organisational level rather than process level (examples are Lovelock 1983, Johnston and Morris 1985, Schmenner 1986, Dotchin and Oakland 1994a, Collier and Meyer 1998). Even Silvestro et al. (1992), despite of emphasising on the importance of "processes" in their work, have eventually carried their research on organisational level. The issues with regard to potential difficulties of measuring service dimensions and collecting data on productivity management in organisational level are addressed and discussed in section 4.13.

4.7.2 Narrowing the area of interest horizontally

Johns and Lee-Ross introduce three horizontal levels that can be used as the basis of narrowing down a research. These are:

- Geographical level
- Market segment grouping
- Specific subject

This research is based on a specific subject level (as underlined). Although all except one of the data sources were local (within the UK) there was no intention of keeping the research in the context of the UK. The research is also not restricted to any market segment as market specifications were not directly related to the study. Having said that, for some of the service sectors that had a variety of totally different services a specific type of service was chosen, which can also translated as choosing a specific market segment.

The research being restricted to a specific subject here means that only specific service industries have been chosen. Obviously not all the available service industries could be chosen for the research and the author had to choose only a number of them. For this purpose it was decided to choose service organisations that were making profit, even if the utilisation of profit was highly regulated.

Looking at the scope of a PhD dissertation and the demands of the research methodology it was decided to study anything between 10 to 15 service sectors. It was thought that less than 10 might not provide enough room for comparison and that more than 15 will not fit the scope of a PhD research; moreover, it might result in studying less popular and dominant services. The exact number of studied services was pragmatically determined by the availability of contacts for collecting data.

In choosing services, apart from the condition of being profit (or partially profit) making, three points were considered:

- Service being a popular one
- Availability of contacts
- Diversity (having a wide range of different services)

Accordingly 12 service sectors were chosen. These are:

1. Airlines (excluding no-frills)
2. Banks (retail)
3. Consultancy Services
4. Department Stores
5. Fast Food
6. Hotel (4 star)
7. Life Insurance
8. Legal Services (small size organisations)
9. Power Utility (network and supply)
10. Auto-Repair (highly standard)
11. Telecommunications
12. Universities (old)

The measurement of the above services for the service dimensions are not yet known in this chapter but it can be seen that the above makes a reasonably wide range of services. If these services were to positioned in the SPM (Schmenner, 1986) they would cover all the four zones of the matrix (the exact position of these services in the SPM is presented in chapter 7).

The point that was made earlier about choosing a specific type of service for some of the chosen service sectors (as clear from the above list) applies to Airlines, Banks, Hotels, Legal services, Power Utilities, Auto-repair services and Universities. The question about the necessity of limiting the scope of services provided to a specific type of service when answering the questions was raised by the author and approved (to be a necessary measure) by the respondents of these seven services. The same question was raised with the respondents in other service sectors but the response in these services was that there was no need to limit the scope of the study in those services and that answers can be given to cover the overall picture of the service sector.

4.7.3 Identifying and adding terms to restrict the area of interest

There are a number of new terms that were identified and added to the research idea to narrow it down and therefore make it restricted, clearer and more feasible. Each term with its restrictive defining function is discussed here:

- Overall/Average
- Normal
- Strategic Level
- Environmental Factors

Overall/Average: Obviously there are many different tasks and functions that go on in a typical organisation. The answer to some of the questions could depend on what task or function is the matter of concern. When it comes to open-ended questions for the research questions that need an in-depth insight to the problem, this does not matter and data can be collected in relation to any specific task or function or level of organisation that is deemed as important by the respondents. However when it comes to more fixed questions that need quantitative data or qualitative data that can be transferred to quantitative data, it will be too complicated (and practically useless) to consider all the possible answers for the different levels and functions of an organisation. Here is the place where the terms "Overall" or "Average" are useful. In situations like this, the data is collected only from an overall point of view or where applies considering the average situation. A good example for this is when measuring service dimensions for operations in a specific industry. For example, if the degree of customisation is going to be measured for the airline industry, different measurements could be considered for different tasks (checking in, within flight, collecting baggage, etc.). To make it simpler as well as relevant to the research questions, the average degree of customisation for the airline industry will be measured. It should be noted that this is the same approach taken by many researchers when using service dimensions for studying services (e.g. Schmenner, 1986; Silvestro et al, 1992; Dotchin and Oakland 1994a ; Lovelock, 1983).

Normal: All the questions that were asked considered the normal situation of the industry. Temporary situations in the whole industry or some of the organisations within the industry (like economic crisis, temporary conflicts, etc.) were ignored by the experts when making their comments (although off the record these were referred to where appropriate).

Strategic Level: Being interested in Productivity Management, the research tends to stay at a more strategic level than operational or technical levels. This also allows for the preparation of a better foundation for the purpose of comparison between the service industries. Too much operational level is also not appropriate for the aim of the research to remain as less subjective as possible.

Environmental Factors: The research has tried to distinguish between issues that emerge as a result of the nature of the industry and issues that emerge because of specific social or economic conditions. The term "distinction" rather than "refrain" is used because taking the external factors into consideration is also interesting and in fact without this, the results of the work might be very far from the real world. Also, it is arguable that the type and the extent of effect on a service industry from external factors are not completely independent to the service dimensions. For example, shortage of the human resource market can have less effect on less labour intensive services. Likewise, an improved standard of living of a nation can have less effect on the services with lower customisation in comparison with services with higher customisation.

It was, however, important to be aware of the fact that certain "organisational behaviour" is a direct result of an environmental factor rather than an organisational factor. Therefore, the distinction was important and the respondents were asked to consider this distinction and express it where it applied.

4.7.4 Intensifying the methodological focus

This is about defining what methodology is used for the research or for each part of the research. This has been discussed partially in section 4.5. In brief, a vast amount of focus is given to an inductive approach using interviews as the main tool, while part of the work includes elements of a deductive approach in analysing quantitative data. This will be elaborated more in section 4.9 and is revisited again from a more strategic perspective in section 4.17.

4.8 What were the *sources of data* (sample and sample size) based on the approach and the problem boundaries?

In general there are two types of sampling for data collection. These are random sampling and purposeful sampling (Miles and Huberman, 1994). While random sampling is appropriate for quantitative research where the main purpose is to test a hypothesis,

purposeful sampling is more appropriate for qualitative research where the main purpose is to explore relationships and build theories.

Patton says that the purpose of probability-based random sampling is generalisation from the sample to a population and control of selection bias. He then argues that what would be bias in statistical sampling and therefore a weakness becomes intended focus in qualitative sampling and therefore strength. Patton uses the term "information-rich cases" for samples in qualitative analysis and argues that information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry, thus the term purposeful (Patton, 2002).

It is already established in this chapter that the general nature of this research was of an explorative type and that it was heavily based on qualitative data while it also took benefit of quantitative analysis. This explains why purposeful sampling was the best choice for this research. Although some researchers have distinguished between this and what is called Judgmental sampling and what is called theoretical sampling (Walliman, 2001; Patton, 2002), it seems these three are very much of the same nature and all opposite to what is called Random sampling. Judgmental sampling seems to be a general term for samplings that are not random or pseudo random (Royer and Zarlowski, 2001a, b) but are based on a researcher's judgement about where best to find the data source. As Bernard puts it, in judgemental sampling the researcher decides the purpose he/she wants the respondents to serve and the researcher simply goes out to find those who can serve that purpose (Bernard, 2000). It is possible to argue that theoretical sampling and purposeful sampling are both judgmental sampling but with a slightly different focus. In theoretical sampling the researcher selects a sample that he/she thinks knows most about a subject. In purposeful sampling the researcher selects what he/she thinks is a typical sample (Walliman, 2001). In this research having a typical sample was not relevant. What was relevant was to have a sample that knows enough about typical features (i.e. productivity management issues in the respective service sector). It is therefore more appropriate to argue that the sampling method in this research was based on theoretical sampling where the most important criteria was to find a sample that knows enough about the subject in his/her respective industry.

As discussed in the last section the level of data collection will be on the industry level rather than the organisational level. Therefore, to have information-rich cases, it was essential and vital to have people as respondents that could be deemed as the "experts in

their respective service sector". This means people with an extensive professional working experience in the top managerial levels of the service sector preferably with a background of working in different organisations within the sector. It was decided that this criterion should be kept as definite and that time restrictions should not become a source of compromising this.

In terms of sample size, no doubt the more respondents used in the research the better. Perhaps, in an ideal situation, the best way of collecting data was to have workshops for each service sector, each workshop including a significant number of experts from that sector. This however (if at all possible) does not fit with the time limits and the scope of a PhD research. It is indeed usually infeasible to get a vast sample in a research that is qualitative (Miles and Huberman, 1994; Patton, 2002).

Given that the required data in this research was about typical features of service sectors in terms of productivity management and considering that the level of inquiry is at a general and strategic level, it was decided that instead of being interested in having a larger number of respondents, the focus should be on having the correct number of respondents to achieve what Patton calls information-richness cases.

Patton argues that there are no rules for sample size in qualitative inquiry. He says:

> "The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size."
>
> (Patton, 2002: 245)

Glaser and Strauss argue that adequate sample size (in qualitative research) is determined by theoretical saturation and that theoretical saturation is reached when no more information will enrich the theory. (Glaser and Strauss, 1967).

The above comment might be seen to be a neutral comment for the simple reason that in principle (and in particular in qualitative research) it seems it is not possible at any point to argue that no more qualitative data can add to the richness of the theory. To the author's

understanding, however, the above comment can be slightly edited to become more helpful for this research:

"adequate sample size (in qualitative research) is determined by theoretical saturation, and theoretical saturation is reached when no more information will result in the theory being changed."

What the author means by the above is that what is practically and theoretically important in a qualitative research is that the researcher wants to make sure that having another interview (for instance) will not result in any significant change in the already developed theory. Until the time this assurance is not yet reached, collecting of data should proceed.

The researcher found that as the subjects of data were very general and as they were about typical features of the service sector, at least for the qualitative analysis part of the research, even one carefully chosen expert in each service sector could be enough to provide the needed answers and reach the point that it could be argued that no more data could significantly change the developed theory. This was evident because it was decided to interview two experts from each service sector. It was very clear at the very beginning of data collection that the answers were overlapped a great deal, while there was also a good number of complementary data being collected. The author can argue that the qualitative part of data could lead to similar results even if only one expert had been chosen from each service sector. This however does not deny the assurance and more richness of data that was provided as the result of having two experts in each service sector (except one as will be discussed). The sample size therefore was 2 experts in each service sector. Both experts should fulfil the mentioned criterion about level of experience and knowledge to be deemed as information-rich cases.

Twenty three experts from top managerial levels of 12 service sectors construct the data sources of this research, two experts for each service sector. Unfortunately despite extensive attempts no more than one expert in Auto-Repair was available for this research therefore data collection in this particular sector remained on the basis of only one data source. The good point about the source of data in the Auto-Repair industry was that the source included a manager accompanied by a senior technician from the operations level, therefore adding more reliability to the data.

As discussed earlier, this research also includes quantitative data that is directly derived from qualitative data. All that was discussed above in principle also applies to the derived

quantitative data because this data was based on qualitative data. However, the quantitative data has undergone some statistical analysis and therefore the issue of sample size needs to be discussed for this particular part of analysis in the research.

While a number of technical measures (as discussed later in this chapter) have been taken to make sure the results of quantitative analysis are as reliable as possible, it is also appreciated throughout the work that these results need further support by follow up works. It should also be noted that as the quantitative data is heavily based on qualitative research, using information-rich cases, it is not correct to compare the size of the data with the numerically equal size of data that is obtained on a random basis. It might be needed to collect a piece of data from a number of different randomly selected sources to reach a data that is as accurate as the one that can be obtained from one highly qualified "purposefully" selected source of data. Therefore, it is possible to argue that from a purely statistical point of view the significance of results will be under question (because of the small sample size of data). However, from the perspective that belongs to the methodology of this research (that is a qualitative, inductive perspective) the results of the statistical analysis are adequate to "indicate" to the sought answers.

From another perspective, this work can also be seen as a pilot study with a limited number of data sources that (if deemed successful) can be taken forward by expanding the scope and sources in future research.

4.9 What *data collection* methods were suitable for the research approach and sources of data?

What was referred to in section 4.5 as an inductive approach and the discussion on the data sources in the last section reveals that among the two widely used approaches to data collection (i.e. Questionnaires and Interviews) (Nachmias and Nachmias 1976), the latter is the most appropriate one for this research.

Questionnaire survey is a typical method of data collection for deductive research (Moser and Kalton, 1971; Creswell, 1994; Ibert et al., 2001). A questionnaire is a tool for collecting primary data that allows the researcher to work with large samples and to establish statistical relationships or numerical comparisons (Ibert et al., 2001; 173). Broadly speaking there are two methods of conducting a questionnaire survey, which are

"in person" and "by post" (Walliman, 2001). As Ibert et al. puts it, one of the major shortcomings of questionnaires is that the answers will be perfunctory (Ibert et al., 2001). This can be interpreted to refer to both the depth of response and the accuracy of response. Features that can be rectified (in terms of accuracy) when having a large sample for data collection and can be ignored (in terms of depth) when a deductive approach is taken to test a hypothesis. Obviously neither of these two is applied in the case of this research.

Hussey and Hussey defined the interview to be "a method of collecting data in which selected participants are asked questions in order to find out what they do, think or feel" (Hussey & Hussey, 1997: 156). Among the other methods of data collection for an inductive research (Observation and Documents as referred to by Johns and Lee-Ross, 1998), the interview (by the above definition) is the most relevant to this work.

In terms of the degree of freedom of the interviewee, researchers have classified interviews into different categories. Among them are Non-directive/open or directive (Easterby-Smith et al., 1991), Heuristic or Systematic (Ibert et al., 2001), Unstructured or semi-structured or structured (May 1997; Johns and Lee-Ross, 1998; Walliman, 2001), Exploratory or standardised (Oppenheim, 2000), In-depth or open-ended or highly structured (Hartman and Hedblom, 1979).

Looking at the above list, it is obvious that all these categorisations are follow the same idea, that is, to what extent the interview procedure is flexible in terms of both questions and answers. As it seems that many authors have used the terminology of unstructured, semi-structured, and structured, the same terminology will be used here.

A brief description of the above three categories of interviewing is given before discussing which one/s has/have been used in this research:

- Unstructured interview is the most popular type of interview in qualitative research (Johns and Lee-Ross, 1998). Only the area to be covered will be defined by the interviewer and the interviewer is free to ask any relevant questions he/she deems to be helpful in the course of the interview, just as the interviewee will have freedom to cover any subjects that to him/her are relevant and important within that area. Unstructured interview is the best way to explore a situation that is not predictable (Walliman, 2001).

In a semi-structured interview (equivalent to what is called the Interview Guide approach, Patton, 2002), questions or precise topics to be covered are normally specified but the interviewer has the freedom to explore, probe and ask questions that will "elucidate and illuminate that particular subject" (Patton, 2002: 343). Moreover, as well, the interviewee has the freedom to cover any subjects that he/she feels are relevant and important within the subject of questions or topics. Another way to put this is that the semi-structured interview achieves defined answers to defined questions while leaving time for development of those answers and including more open-ended questions (Walliman, 2001).

Structured interview is very similar to questionnaires in that certain (often short) answers are sought for certain questions, with no room for any further questions from the interviewer or extra explanations from the interviewee. Structured interviews can be deemed to be very similar to non-postal (face-to-face or phone-based) questionnaires (Easter-By Smith et al., 1991; Johns and Lee-Ross, 1998). Given one of the advantages of interviewing comparing to using questionnaires (avoiding perfunctory responses, Ibert et al., 2001), it is possible to argue that what can differentiate between structured interview and non-postal questionnaire is that in structured interviews the interviewer is there to clarify any misunderstandings and vague areas and to make sure that the interviewee has understood the question and is answering accordingly, also when responses form the interviewee might need clarification. In non-postal questionnaire surveys this does not seem to be a major case. According to Walliman, the structured interview (among the other types of interview) is best for conducting quantitative and statistical analysis (Walliman, 2001).

Reviewing the three types of interviewing it is now possible to define what types of interview were needed for this research:

For collecting data related to questions that were more open -ended exploratory ones and needed qualitative analysis (i.e. Questions 5, 6, 7 and partially 1) a semi-structured interview was chosen. This was because while being interested to hear any important and relevant information about the subjects (thus semi-structured), the topics of inquiry were defined-based on the research questions they were related to (thus not unstructured).

Questions 2, 3, 4 and partially 1 are of a more close ended, definite nature in terms of expected answers and can be answered after quantitative analysis of the related data and therefore, structured interview was considered best for this part of the work. The structured interview ensured that the respondents have understood the questions correctly and that they were answered after thorough thought (that is the case of collecting quantifiable data of the productivity aspects as will be discussed later in this chapter).

The main research question is derived by analysing the answers given to questions 1 and 3. It is therefore correct to say that the main research question is based on the results of both structured and semi-structured interviews.

The above can be summarised in figure 4.3 that is in fact a more completed version of figure 4.2.

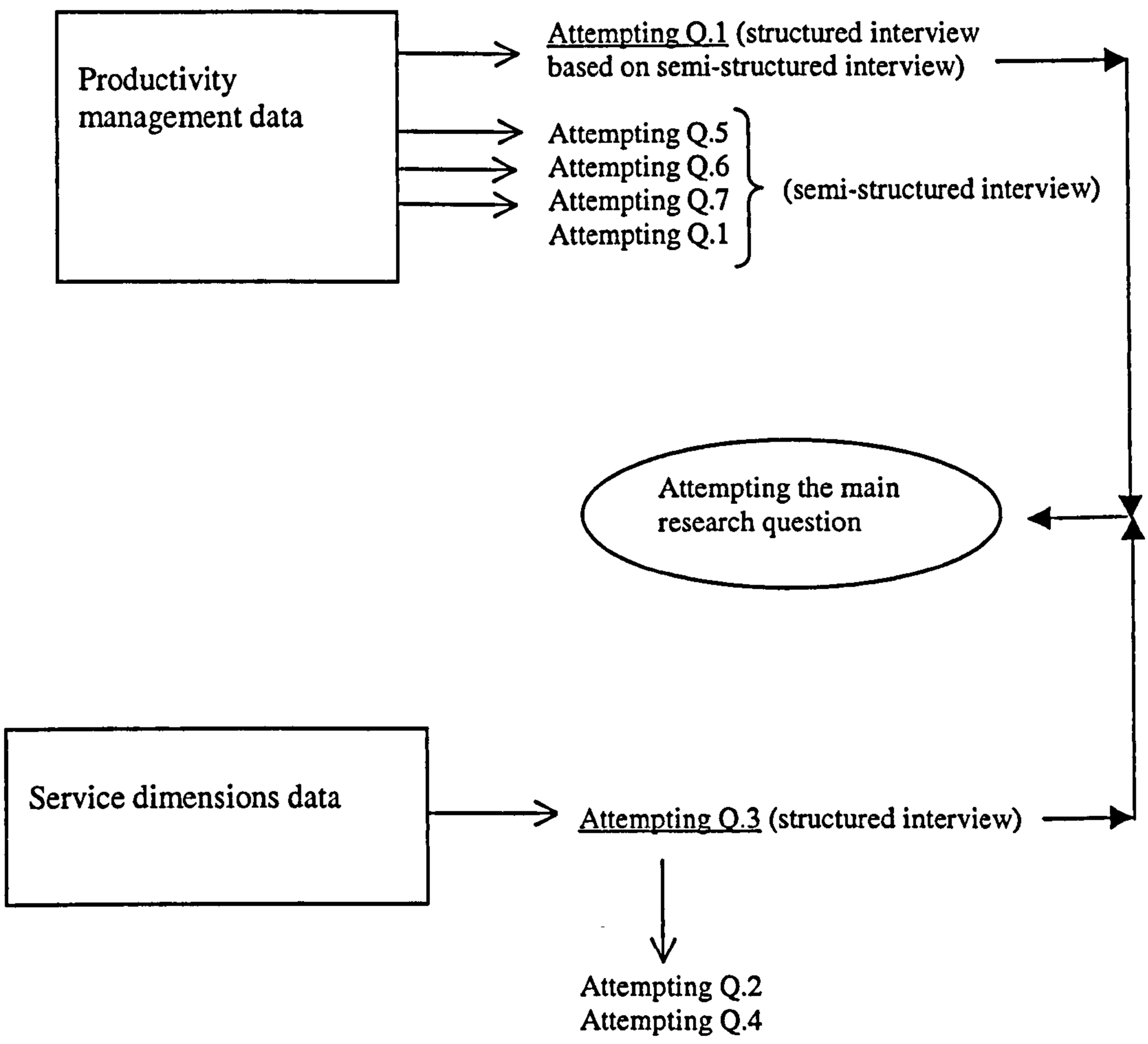


Figure 4.3. The research approach and data collection methods

The discussion about interviews will be continued in the next section where the content of the interview will be presented in detail:

4.10 Based on the data collection method, what was the *content of the interviews*?

As explained in the last session the interviews had two parts, the structured part and the semi-structured part. In this section these will be explained in detail and in the same order that they took place in the interviews, outlining the sources from where the content of interviews was adapted and the changes and editions that were made on them before finalising them. Broadly speaking, the interviews include three phases. These were:

- Semi structured interview to collect qualitative data on productivity management aspects

- Structured interview for collecting qualitative data on ranking of the subjects of managerial aspects

- Structured interview for measurement of service dimensions

- Structured interview to collect qualitative data on Schmenner's managerial challenges (1986)

These are discussed in the following sections:

4.10.1 Semi-structured Interview: Qualitative data on productivity management aspects

The service dimensions needed to be chosen based on some criteria simply because in the end the relevant ones were supposed to serve as managerial tools. This was not an issue for productivity management aspects of the work. Given that no firmly established and agreed upon theoretical frameworks was available in the area of productivity in services and given the explorative nature of the work in this area and the fact that the work compares a number of service sectors in a very general level, no need was recognised to seek analytically chosen questions or entry points for this part of the interview. Instead of being specific to any particular theory or concept, rather general and open ended questions

or entry points were needed. The sole criteria for choosing entry points of this part of interview were clarity and the generic nature of the concept as well as consistency across the interviews to be able to have a firm ground for comparison.

Based on the literature review in chapter 2 and general knowledge about the issues surrounding productivity particularly in terms of the relationship with quality, a number of issues were identified in productivity management in services. These are:

1. Productivity and Quality Trade Off
2. "Broad Productivity" Improvement Policies
3. Productivity Factors
4. Productivity Problems in Practice
5. Productivity Improvement Approaches
6. Productivity Measurement Problems
7. Quality Characteristics
8. Quality Improvement Gaps
9. Quality Costs

It was decided to find general entry points for the subjects within each of the above Categories of productivity management. Where available, these productivity aspects were adapted from literature, otherwise they were developed based on the general knowledge from the literature. These are explained in turn:

4.10.1.1 Productivity and Quality Trade-Off

As discussed in chapter 3, there are controversial discussions about the relationship between productivity and quality, and the extent to which there could be trade offs between the two concepts. It was decided that one question should be allocated for this aspect of productivity management to directly and explicitly ask the core question from the experts with regard to the relationship between productivity and quality.

The questions were made as follows:

1 - Productivity and Quality Trade Off:

- Which one is more important to organisational effectiveness: productivity or quality? *(it was explained for the experts that organisational effectiveness here means the overall success of organisational in meeting the strategic objectives).*

- What is the relationship between productivity and quality?

1. Productivity and quality improvement are completely fit together.

2. Productivity and quality improvement may have some negative interactions in short term but in long term the interactions are highly positive.

3. Productivity and quality improvement have considerable negative interactions in short term with some positive interactions in long term.

4. Productivity and quality improvement are completely against each other.

Overall this question was not found to be a very useful one when it comes to ranking the options. This is because the author could observe throughout the interviews that overall respondents chose options in this question with caution and hesitation as many of them felt that one option cannot represent all that was going on in their respective service sectors. However, when it comes to qualitative data (analysis) this question proved to be an extremely helpful one as it led to interesting results as will be presented in chapter 6.

4.10.1.2 "Broad Productivity" Improvement Policies

It was discussed in chapter 2 that some researchers directly include the notion of quality in the top line of the output per input definition of productivity (Vuorinen et al. 1998, Heap 1995, Jones and Hall 1996, Gupta 1995). Without any intention to suggest that the author

agrees with this modified version of productivity definition it was decided to include this modified version as one of the topics of interview in a further attempt to explore relationships between productivity and quality and to explore the dynamics of managerial strategic decisions about how to improve productivity. To avoid any confusion, the modified version was called "Broad Productivity". The definition that was used is derived from the works by Vuorinen et al. and Heap. The entry point therefore was as follows:

2 - "Broad Productivity" Improvement Policies:

Broad Productivity = (volume of the service) x (Quality of the service) / (Cost of the service)

1. Increasing the Volume without increasing the Cost or decreasing the Quality

2. Increasing the Quality without increasing the Cost or decreasing the Volume

3. Decreasing the Cost without decreasing the Volume or Quality

The experts were asked to comment on the applicability of each of the above policies. The next section explains that they were also asked to rank the above three options in terms of applicability.

The above entry point proved to be a very helpful and relevant topic in terms of contribution to the research (as will be illustrated in chapter 6 and discussed in chapter 8).

4.10.1.3 Productivity Factors

Prokopenko has suggested four general factors that are important in productivity management and are very influential. These are Input (including resources), Process (that is transformation of resources into products and services), Output (that is products and services sold) and Feedback (that is measurement of results either internally or through customer survey) (Prokopenko, 1996).

The author found the above categorisation of productivity factors general enough and very relevant to the study, therefore it was decided to include this in the list of the topics for

interview. As many researchers consider Customer to have an important role in productivity as a whole (Lovelock and Young, 1979; Chase, 1978; Anderson et al.1997; Ojasalo, 1999, Adam, 1994, Mills and Turk, 1986) it was decided to add Customer as an additional productivity factor in services. The final interview Guide for this part of the interview is thus as follows:

3 - Productivity Factors:

- Input (resource related)
- Process (transformation of resources into products and services)
- Output (products and services sold)
- Feedback (measurement of results)
- Customer (multiple customer type, involvement of customer in service delivery, etc.)

The above topic did not prove to be of a significant help in the research and the contributions it made were minute. It seemed the question was too general and the author could almost always see that the experts did not look comfortable ranking the above (the ranking process will be discussed in the next section). Moreover, the addition of Customer to the list proved to be less useful as only a few experts considered it a major factor in their service.

4.10.1.4 *Productivity Problems in Practice*

This was one of the most important topics of the interview as it was expected that one of the major areas for services to show their similarities and differences will be in this area (i.e. problems). Following the same strategy to decide which productivity management aspects were to be included in interview, the author found Prokopenko's categorisation of productivity problems reasonably general and at the same time clear and thorough. Prokopenko described productivity problems to be covered under one of the following titles:

- Technology
- Methodology/Systems
- Competence of People
- Operational Climate

These made the 4th item of the Interview Guide:

<u>4 - Productivity Problems in Practice:</u>

- Technology

- Methodology/Systems

- Competence of People

- Operational Climate

The experts were asked to comment on the applicability of each of the above potential problems. It is explained in section 4.11 that they were also asked to rank the above potential problems in terms of applicability.

As was expected the topic proved to be a very important part of the interview, providing opportunity for the experts to go through all the relevant problems related to

productivity in their respective industry starting from the above general guideline. Data gathered for this topic had a major contribution in the research findings.

4.10.1.5 Productivity Improvement Approaches

All that was mentioned about the expectation from the last topic (Productivity Problems) and the results were also true about this topic. Along with the last topic on Problems these two areas occupied a significant amount of time during the interviews and generated enriched qualitative data and fruitful contributions towards the research findings.

Like the other cases, here too the author was looking for a broad categorisation of productivity improvement approaches and found that Sumanth's well-known categorisation can be adapted to suit the purpose very well.

Sumanth categorises the productivity improvement approaches into 5 categories (Sumanth, 1984). These are:

- Technology – based techniques
- Employee – based techniques
- Product – based techniques
- Task – based techniques
- Material – based techniques

Although Sumanth calls these "techniques", the author used the word "approach" to keep the strategic level of discussion high enough (as discussed in section 4.7.3.).

It was felt that a small adaptation is needed to make this general categorisation of productivity improvement approaches more suitable for service industries. The title Product was replaced with Product/Service. The title Task was replaced with Task/Delivery. The title Material was replaced with Material/Capacity (it was expected to see less relevance for material based approaches in services and more references to capacity based approaches, therefore the two approaches were integrated together). Also given the important role of the customer in productivity improvement in services (as discussed in chapter 2), another entry was added for Customer – based approaches.

During the pilot studies it was felt that adding some examples to these categories would help the respondents to grasp the meaning of the categories easier. Sumanth has also given examples for each of the above categories; however, it was felt that the majority of examples are very much manufacturing oriented, also the author was keen to integrate these categories with another perspective perhaps more from the service operations point of view. For providing examples, it was therefore decided to remain heavily on productivity improvement approaches that were proposed by Schmenner to be specifically for service operations (Schmenner, 1995). Schmenner's proposed approaches for improving productivity in services are as follows:

Schmenner (1995):

- Substitution
    - capital for labour
    - capital for capital
    - labour for labour
    - customer for labour
- Waste removal
    - methods improvement
    - quality improvement
    - time-based means
    - modularity
- Reducing variance and variety
    - Standardisation
    - Less interaction (with customer)

- Managing demand

- Economies of scales and of density

Schmenner also mentions "improving service encounter" as a general means of improvement in services (Schmenner, 1995).

Apart from the above, given the link between employee satisfaction and loyalty and productivity (as described by Heskett et al., 1997) these two items were also added under

the employee – based approaches. Other items that were added as examples were Training (for employee based approaches), Advertisement (for product/service based approaches, also included as an example for product based approaches by Sumanth) and Customer Perception Survey (under customer based approaches). Material management was also taken from Sumanth to be included in the category of Capacity/ Material because it was relevant to some of the services.

This led to the final version of the Interview Guide for this aspect of productivity, as presented in the next page:

5- Productivity Improvement Approaches:

- Technology – based e.g.
    - Substitution of capital for labour
    - Substitution of modern capital for the old capital

- Employee – based e.g.
    - Substitution of low cost labour for some parts of the work of high cost labour
    - Training
    - Increasing employees satisfaction and loyalty

- Product/Service – based e.g.
    - Standardisation
    - Advertisement

- Task/Delivery – based e.g.
    - Methods improvement
    - Time based means
    - Modularity (self – contained work)
    - Less interaction with customer
    - Improving the encounter (front office)

- Capacity/ Material – based e.g.
    - Managing demand (e.g. yield management)
    - Material management
    - Economies of scales and of density

- Customer – based e.g.
    - Substitution of customer for labour
    - Customer perception survey

These examples proved to be useful as they correctly pointed all the interviewees (in a consistent way) to a meaning for each category without causing them to remain limited to the given examples in their responses. The experts all appreciated that these examples are only for the purpose of better illustration of the titles of productivity aspects and they all went beyond these examples or even ignored them altogether after they were led to the areas that were meant for each productivity aspect. In particular however, the items of employee satisfaction and employee loyalty led to interesting and fruitful discussions (the result of which is illustrated in chapter 6).

4.10.1.6 Productivity Measurement Problems

In section 2 a number of concerns about the issue of productivity measurement in services were discussed. Blois' categorisation of productivity measurement problems has been adapted as another productivity management aspect to be raised with the experts (Blois, 1984). Blois counts three main problems for productivity measurement and then describes problems specific to services in each of these categories. These problems are:

- Input related: different categories of input. In services, input for employees interacting with customers.

- Output related: different categories of output, in services intangible aspects of output.

- Relationship between input and output. In services the effects of perishability of service.

Based on the above, five categories of productivity measurement problems were put into a structure as a productivity aspect in the Interview Guide:

6 – Productivity Measurement Problems:

- Different categories of inputs
- Different categories of output
- Relationship between input and output
- Input measurement for employees facing customers
- Measuring outputs and their validity considering intangible outputs

The above entry point proved to be useful in the research in terms of contribution in answering the research questions, although it seemed that overall the answers were skewed over a few of the above options (as will be discussed in chapter 5). This entry point also led to interesting and helpful discussions by the experts.

4.10.1.7 (Quality Characteristics)

The author does appreciate that this entry point might not directly relate to the overall subject of interview. This entry point was included to provide an appropriate basis for entering the quality related questions. Questions 8 and 9 were directly about quality. It seemed appropriate to enter this area of interview by first clarifying what quality means in a service sector.

It was also interesting and helpful to investigate whether experts in service industries perceive and approach the different aspects of quality in the same way that academia perceives and approach it (that is identifying different dimensions for quality and distinguishing different aspects of the quality of a service accordingly).

Accordingly, it was decided to make a list of quality characteristics based on Parasuraman et al. model of Servqual (1988) and Edosomwan's proposal of quality characteristics (1987). Servqual is a well known quality measurement instrument specifically designed for services in which 5 dimensions have been distinguished for quality. These are:

- Reliability (the ability to perform the promised service both dependably and accurately)
- Responsiveness (the willingness to help customers and to provide prompt service)
- Assurance (the knowledge and courtesy of employees as well as their ability to convey trust and confidence)
- Empathy (the provision of caring, individualised attention to customers)
- Tangibles (the appearance of physical facilities, equipment, personnel and communication materials).

Looking at the list it is easy to understand some concerns that have been raised by a number of researchers about the above dimensions (e.g. Asubonteng, 1996 ; Francis, 1996 ; Newman, 2001), in particular in terms of robustness (each dimension being about only one aspect and no overlaps between dimensions) and in terms of thoroughness (no attention to the final product/service).

Here are Edosomwan's proposals for quality characteristics in general:

- Time – oriented
- Sensory
- Structural
- Commercial
- Behavioural or ethical

The author found that adding the Servqual dimensions to the above quality characteristics proposed by Edosomwan, removing the overlaps between the two proposals and adapting the result can lead to a rather 'easily understood and answered' question on quality characteristics. The outcome formed the 7th piece of the Interview Guide as follows:

10 - Quality Characteristics and trade offs:

- Speedy service
- Flexible service
- Reliability of the service
- Willingness to help individual customers if needed
- Sensory (appearance)
- Structural (quality of the final core service per se)
- Commercial (warranty)
- Behavioural or ethical

The term trade off was included in the title to encourage the respondents to discuss any trade offs between the above quality characteristics. The data collected based on the above question was not included in the main analysis part of this research (i.e. the analysis relevant to the main research question) as the author did not perceive the question to be directly related to productivity management. It was also irrelevant to find a service dimension as an indicator to quality characteristics of a service.

Despite being a supplementary question, this question proved to be a successful one for a number of reasons:

- It provided a reasonable entry point and introduction to the area of quality for the rest of the interview
- The experts seemed comfortable applying the above list to their respective service (although not quite comfortable in ranking them).
- Although the results are not directly relevant to the main research questions, they are however interesting and worthy of notice for future research.

4.10.1.8 Quality Improvement Gaps

Parasuraman's quality gap model (Zeithaml, Berry, Parasuraman, 1988) is based on the idea that the overall gap between customer expectation and customer perception of quality (known as Gap 5) results from four internal quality gaps as follows:

- Gap 1: Gap between customer's expectation and managers' understanding of customer's expectation
- Gap 2: Gap between managers' understanding of customer expectation and the way these understood expectations are translated into quality specifications
- Gap 3: Gap between the quality specifications and the way service is delivered
- Gap 4: Gap between information given in external communications and the way service is delivered

The above internal gaps rely heavily on the internal operations and procedures of organisations and subsequently can be affected (positively or negatively) by productivity related issues.

The model of service quality gap was shown to the experts and they were told to comment on each gap as well as ranking them in terms of importance (to be discussed in the next section).

Quite expectedly many comments made by the experts were purely on quality aspects of the service but the discussion on the model (as intended) did lead to more insights into the relationship between productivity and quality in services, particularly in the internal processes.

4.10.1.9 Quality Costs

One of the main reasons that the question of trade off between productivity is raised is because of the cost involved in controlling and improving quality. The popular argument is that increasing (and even maintaining) quality means expending more and this means reducing productivity. (As referred to in chapter 2) not all researchers agree that this is necessarily the case, nevertheless the cost of quality seemed to be a very relevant subject to the question of productivity and quality relationships. Accordingly, the very popular

and well established categorisation of quality costs, originally proposed by Juran (Juran and Gryna, 1988) was used for this purpose:

9 – Quality Costs:

- Prevention costs (designing, implementing, maintaining a quality system)
- Appraisal costs (measuring, evaluating and auditing)
- Internal failure costs (wrong service discovered prior to delivery)
- External failure costs (wrong service delivered to customer)

The above entry point proved to be useful in the research in terms of contribution in answering the research questions.

NOTE:

As referred to in the Introduction chapter, there will be frequent references to the above entry points and the items included in each of them throughout this report. To avoid confusion and to remain consistent throughout also to make the referencing easier, the titles "PA" and "PA Subjects" will be used to refer to the content of interviews. The titles are used as follows:

PA (Productivity aspects): refers to each of the above 9 category of entry points (questions) in the interview.

PA Subjects: refers to the items included in each of the above 9 categories.

For instance, Productivity Factors will be referred to as a PA and each of Input, Process, Output and Feedback are referred to as a PA Subject.

4.10.2 Structured Interview: Qualitative data on ranking of the subjects of managerial aspects

As discussed in previous sections, the structured interview regarding the productivity management aspects took place immediately after discussions in a semi-structured interview for each productivity aspect (PA). This was done to make sure that as the result of the expert's elaboration and discussion on the productivity aspect, his thoughts were then tight, collected and structured to conclude the discussion by going through the structured section. It will be discussed in section 4.1.4 that this was one of the lessons that the author learned during the pilot study. The structured section of the interview was for the purpose of ranking the productivity aspect subjects (PA Subjects). Specific terms that were referred to in section 4.7.3 regarding restricting the area of interest were used to facilitate the ranking process. The ranking method was revised and finalised after a pilot study, which will be discussed in section 4.1.4.

For the PAs 2 to 9 (above section) the expert was asked to rank the PA Subjects in terms of importance. Importance here means in terms of already being an issue and not of theoretical, general importance. For example, if an expert reports that in his respective service sector, human being is a very important concept, this will not be necessarily counted as "important" by the expert when it comes to ranking. However, if the expert reports that in his service sector human resource is an important issue for instance as a productivity improvement problem or that there is an important use of human resource for instance as a productivity improvement approach then it will be counted as "important" in ranking. It was ensured that the experts understood and appreciated this point before ranking. The definition of each level of ranking was explained to the expert beforehand. The ranking was in three levels as follows:

- Major Issue/use Level: The expert would rank a PA subject with this title if he/she thought that the subject he/she ranked on this level is usually a crucial issue/use in managing productivity in his/her respective service sector.
- Important Issue/use Level: The expert would rank a PA subject with this title if he/she thought that the subject he/she ranked on this level is often a significant issue/use in managing productivity in his/her respective service sector.
- Less Important Issue/use Level: The expert would rank a PA subject with this title if he/she thinks that the subject he/she is ranked on this level is normally

insignificant issue/application in managing productivity in his/her respective service sector.

In the above definitions, "issue" relates to PAs that are about a problem, these are PAs number 4, 6, 8 and 9 (referring to the above section). The word "use" refers to the PAs that are about applying a tool or resource; these are PAs 2, 3, 5 and 7.

Based on the point that was explained above about the definition of "important", if a subject is ranked as Less Important, this does not mean that it is generally unimportant. This was particularly very helpful as experts could put a low rank for subjects like Customer or People without worrying that they are implying these subjects are not important.

As for PA number 1, the ranking was simply based on choosing either Productivity or Quality for the first part of the question and ticking one of the four options for the second part of the question (refer to the above section).

4.10.3 Structured Interview: Measurement of Service dimensions

As mentioned, the main structured part of the interview is for measuring 9 service dimensions. The details about these service dimensions and criteria for choosing them were given in chapter 3. These were:

- Degree of Labour Intensity (LI)
- Degree of Front Value Added (FV)
- Degree of Customer Contact (CC)
- Degree of Customer Interaction (CI)
- Degree of Customisation (CUS)
- Degree of Personnel Judgement (PJ)
- Degree of Intangibility (INT)
- Degree of Customer Inability to Evaluate the service quality (CIV)
- Degree of Process Focus (PF)

At the early stages of interviews (during interviewing with one of the experts in Universities) a point was raised by an expert that the degrees of some of these dimensions

are not stable and are in fact changing gradually. This appeared to be a very interesting concept that could add to the value of the results and could lead to future research as it was very much in line with what Schmenner suggests about moving up the diagonal in the SPM (Schmenner, 1986). It was therefore decided to add this piece of information to the data collection for service dimensions. After measuring a service dimension the expert was asked to point out if the dimension is changing or if it appears to be stable. As a few experts, whose interviews had been done before making this decision, a complementary questionnaire was sent to them asking them to provide an answer to the question about chaining of degrees of service dimensions. For the reason that will be explained in section 4.13, this was only done for the first 6 dimensions in the above list.

NOTE:

As referred to in the Introduction chapter, there will be frequent references to the above service dimensions. To avoid confusion and to remain consistent throughout and also to make the referencing easier, the title SDs is used to refer to Service Dimensions. Although it was attempted to refer to each of the service dimensions with a complete title (e.g. Labour Intensity) however, in some parts of the report, and in particular in chapter 5 where there are regular references to each of the service dimensions, the above abbreviations (e.g. LI) have been used to keep the flow of the discussion.

4.10.4 Structured Interview: Qualitative data on Schmenner's managerial challenges

As discussed in chapter 3, from the theoretical point of view (and ignoring the approach taken), Schmenner's SPM model (Schmenner 1986) is very similar to what this research intends to do. Using the opportunity of availability of the professional experts the author added a brief data collection at the end of the interviews in which the experts would see the list of managerial challenges used in the SPM and would mark those of them that were significantly applied to their service sector. This was very similar to what Verma did to test the model (Verma, 2000). The advantage of Verma's work is the large size of data in his research. The advantage of this work is that the model has been tested with no presumptions and therefore from different angles. Testing the model (even with a small size data) can reveal interesting insights into the difference between a theoretical based

model and an empirical based model in terms of application and reliability. This will be further discussed in chapter 7.

***

In this section, the different stages of interview were explained in detail to give an overall picture of an interview. The following model can be seen as a rough guide:

Interview Schedule:

- Introduction (a brief about the research, purpose of the interview, boundaries of the research that are relevant to the interview, terminologies, any clarifications needed to be done).
  [about 10 minutes]

- Semi structured interview for PA number 1

- Structured interview for ranking PA number 1

(same routine for all the other PAs)

[overall and an average the above process: 2.5 hours]

- Structured interview for measuring service dimensions and for pointing to the direction of change if applicable.
  [20 minutes]

- Structured interview for completing the sheet about managerial challenges in the SPM model.[5 minutes]

In many cases the interviews were completed in two sessions rather than one long session. The interviews were recorded with audiotape while notes were also taken. As referred to in section 4.7, in the auto-repairing service a second expert was not available (although the interview with the first expert took benefit from the presence of an operations level manager as well). In the fast food sector although the two experts were available for the productivity management part of the interview, one of the interview sessions ran out of the time and the expert advised that she would send the author the completed service dimension scales in her own time. Despite a number of follow up contacts this never

happened and the author had no option but to consider the second set of service dimension measurements in fast food as missed data. Therefore, there are only 11 pairs of data for the productivity management section and 10 pairs of data for the service dimensions section (including data on Schmenner's SPM).

It is worth pointing out that in many cases at the end of the interviews the experts expressed their appreciation of the fact that the interview had helped them structure their minds and have a better picture of what is going on in their respective industries.

Knowing the content of the interview in this section and the nature of data from the previous sections it is now possible to present an overall picture of the analytical approach that was used in this research:

4.11 What is the outline of the *research process*?

Based on what has been explained so far, the outline of the analytical approach used in this research is given in the following figure:

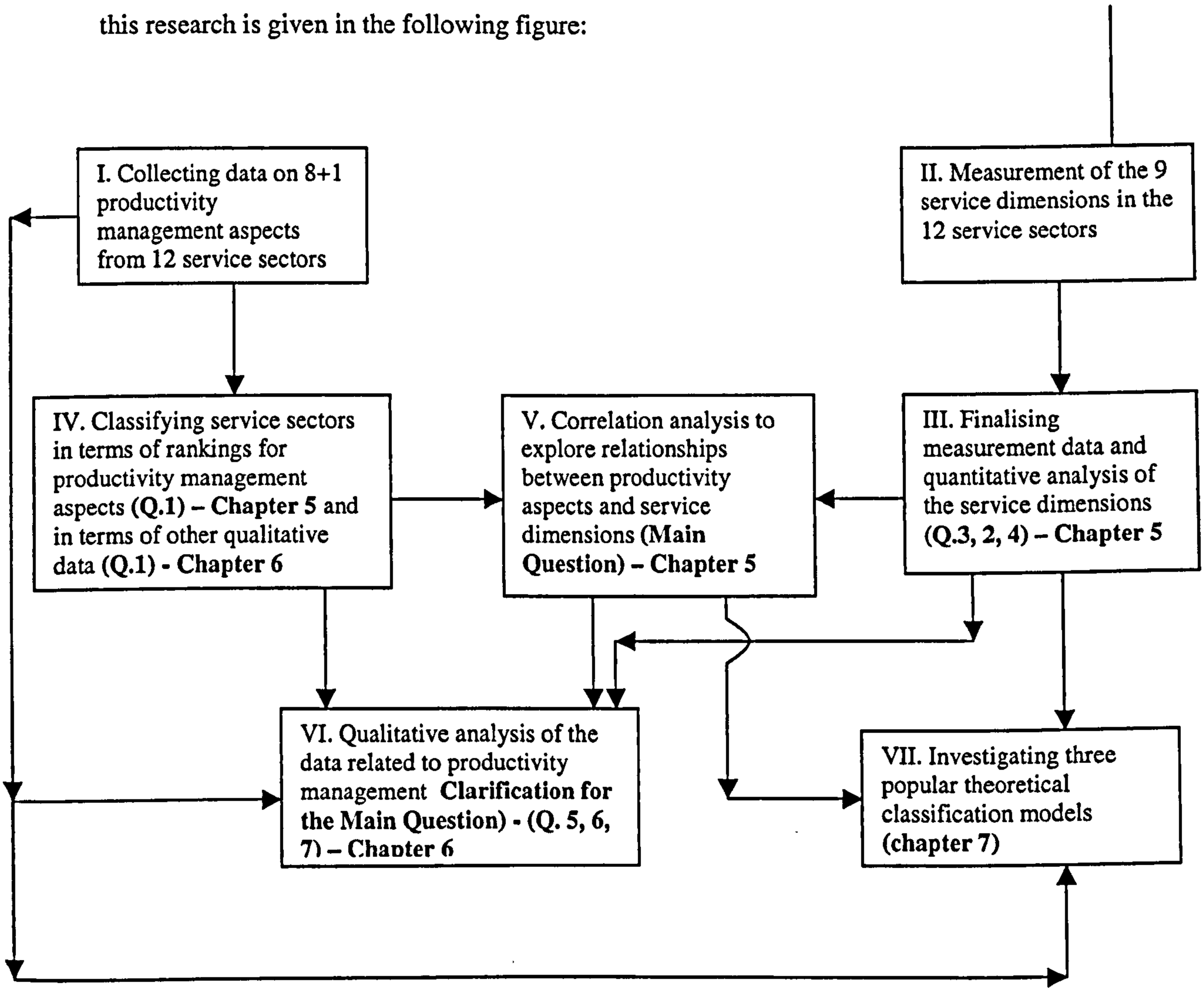


Figure 4.4. Outline of the analytical approach

- Box I refers to the data collection related to productivity management aspects. This part was discussed in detail in sections 4.10.1 and 4.10.2.

Box I includes:

I.I. The expert comments on each of the nine categories of productivity management aspects in detail.

I.II. The expert ranks the subjects of productivity aspects (PA subjects) for each of the nine productivity aspects (PAs) after finishing the discussion on that PA.

- Box II refers to the data collection related to service dimensions. This part was discussed in detail in section 4.10.3.

Box II includes:

II.I. The expert measures each of the service dimensions (SDs)

II.II. The expert comments if the measurement of any of the service dimensions (SDs) is changing

- Box III is needed first to finalise the measurement for service dimensions. As in each service sector (except two of them because of missed data) where two experts are measuring the service dimensions, a finalising method is needed to first recover any significant disagreements and then to find the finalised (overall) measurement for each service dimension. This will provide the answer to research question number 3. The answer to research question number 2 is provided by conducting descriptive analysis on the SDs measurements, and research question number 4 is answered by conducting correlation analysis between the measurements of SDs.

Box III includes:

III.I. The measurements for SDs are finalised by tracing any significant disagreements between the pair of experts in each service sector and recovering it by exploring the reasons and then finding the median of the two measurements done by them.

III.II Descriptive analysis and a number of correlation analyses are done on the SDs measurement data.

- Like the case of SDs, here too there are two sets of rankings for each of the PA Subjects. Two approaches have been used to finalise the rankings and the final rankings are the one that are correct based on both approaches. Conducting a descriptive analysis on the final rankings provides answers to research question number 1.

Box IV includes:

IV.I. Finalising the rankings of the PA subjects based on two different approaches using the rankings of each pair of experts in a service sector.

IV.I. A descriptive analysis of rankings for the PAs.

- Box V results in answering the main research question. A number of statistical tests and correlation analysis have been done between the two sets of data that are SDs data and PAs data. The raw results were looked at from a practical (operationalising) perspective, and following some analytical discussions the raw results were finalised with a view that they should be modified in a way that becomes practically applicable in the real world.

Box V includes:

V.I. Conducting a number of correlation analyses between the finalised data related to SDs and finalised data related to PAs to reach to some raw results.

V.II. Processing the raw results from a practical perspective to reach the final results.

- Box VI includes all the processes for the qualitative analysis of the research. Based on the definition of qualitative analysis by Miles and Huberman (1994) the data was first reduced using a coding system and it was then presented using a number of presenting tools like tables and maps. The final results were derived accordingly to answer questions number 5, 6 and 7. This also clarifies the answer to the main research question.

Box VI includes:

VI.I. Applying a coding system for the reduction of qualitative data.

VI.II. Within case and cross case data presentations (Miles & Huberman, 1994)

VI.III. Conclusion drawing and finalising the qualitative analysis

- There are three popular models of service classifications (as listed below), and each of which is particularly relevant (and to some degree similar) to this research (as explained in chapter 7). Investigating these three models by applying them to the relevant data in this research concludes the analysis part of this research. This investigation was deemed necessary first to see to what degree these models could provide satisfactory answers to the main research question. Second, to examine how these works respond when they are applied to empirical data, as this could be seen as a complementary part of the work with regard to different nature of this research and its contribution. These three models are so relevant and similar in many respects to the present research that a chapter of this thesis (chapter 7) is devoted to analysis of these models.

Box VII includes:

VII.I. Investigating Chase's Customer Contact model based on the results of the research.

VII.II. Investigating Schmenner's (1986) SPM model based on the results of the research.

VII.III. Investigating Silvestro et al. (1992) Volume-Variety model based on the results of the research.

The details of analysis methods used in each part of the research is given in detail in the relevant chapters.

One of the issues with regard to data collection was about service dimensions measurement. The work revealed that the processes of developing a measurement tool as well as the measurement process itself were not straightforward procedures. These are discussed in the next section before addressing the question of the accuracy of data. In section 4.13.

4.12 What *measurement tool* was used for the Service Dimensions?

"Measurement is the process by which we translate from the theoretical realm to the empirical." (Angot and Milano, 2001: 140). In terms of service dimensions in this research, measurement means translating the conditions of service sectors for each of the service dimensions to a quantifiable data.

Looking back to chapter 3, it is possible to conclude that the question of measuring service dimensions (SD) proposed by the researchers was addressed in one of the following ways:

- Developing a specific measurement tool. As far as the author found in the literature, the only significant example for this is the work by Kellogg and Chase (1995).

- Using organisations/industrial records to derive the measurements. Examples are the way Schmenner measured Labour Intensity (1986) and the way Silvestro et al. (1992) measured Customer Contact time.

- Directly assigning (or asking respondents to assign) low, (medium) and high for the service dimensions. This is how most researchers have positioned service sectors in their classification models.

- No need for a measurement tool as the dimension has a binary measure (e.g. Yes or No). Examples are Lovelock's dimensions of customer membership vs. non-membership or continuous delivery vs. discrete delivery (Lovelock, 1983).

In measuring the 9 service dimensions chosen for this research a number of concerns were held:

1. For the sake of consistency and easiness to respond by the experts, one type of measurement tool was sought for all the dimensions.
2. None of the dimensions were limited to binary measures, they were all continuous measures.
3. The measures were sought for the average of the service sector rather than one particular organisation.
4. Most of the dimensions had a qualitative nature (Silvestro et al. 1992: 68).

5. The interview time was limited and it was not possible to conduct a significantly time consuming measurement.
6. For the same reason as above, the measurement instrument needed to be fairly straightforward to be understood.

All the above concerns led the author to the point that he found his position to be the same as described by Angot and Milano in the following words:

> *"When the literature does not furnish satisfactory measurement instruments to measure a given concept, researchers are faced with two possibilities. They can either make significant modifications to available measurement instruments, ... or, if none are available at all, they can innovate by constructing their own measurements."*
>
> (Angot and Milano, 2001; 142)

Obviously there were no instruments developed to measure all these 9 dimensions with a specific measurement instrument. Therefore, an instrument had to be developed by the author. Taking into the account the above 5 concerns, particularly concern numbers 4, 5 and 6, two rather conflicting points were concluded:

- It was good to have something as simple as asking respondents to assign Low, Medium and High for each dimension in their service sector, just like most of the researchers have done.

- The difficulty of measurement is caused by the vagueness of many of these titles among the service dimensions and the fact that if they are observed from different perspectives, different answers might be concluded.

It was decided that to the best of capability, a measurement tool should be developed that could satisfy both of the above concerns to a reasonable degree. As a result a scaling measurement tool was made that was a vertical scale (marked as **1** in the figure in the next page) with arrows to top and bottom (marked as **2**) to indicate that the scale was a continuum with open ends. The scale starts from Low degree at the bottom (marked as **3**) to High degree at the top of the scale (marked as **4**). Horizontal dashes were used on the scale to give a perception of degree measurement to the respondent. There were minor

dashes (marked as **5**) and major dashes served as signposts in four places along the scale, giving a summary of the condition of a service that is located in that place on the scale (marked as **6**). This is illustrated for one of the service dimensions (Personnel Judgement) on the following page. Obviously the yellow callout signs are only for the sake of explanation in this section and are not part of the measurement (all the rest of the measurement scales for the service dimensions are in appendix 4.1:

Degree of Personnel Judgement:

Definition:
"A very high degree of Personnel judgment is where front office personnel can exercise judgment in altering the service package or process without referring to superiors. A very low degree of personal judgment is where changes to service provision can be made only with authorization from superiors."

- Please put a mark at the appropriate place on the scale. Also if the degree of the service dimension is changing please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are perceived

(All the following explanations are based on the normal situation, average measures and the core service.)

High Degree of Personnel Judgment

Front office staff exercise a very *high number of important* personal judgments or a *few very vital* personal judgments during the service process; e.g **Management Consultancy**

Front office staff exercise *a moderately high number* of personal judgments or *a few important* personal judgments during the service process; e.g. **Beautician**

Front office staff exercise *a low number* of personal judgments that could *considerably* alter the service package during the service process; e.g.**Coach Service**

Front office staff exercise *minor or no* personal judgments that could *considerably* alter the service package during the service process; e.g. **Museum**

Low Degree of Personnel Judgment

The explanations of the signposts were derived from the definitions provided for the 8 service dimensions in the literature (Silvestro et al., 1992; Lovelock, 1983, Schmenner 1986). The service dimension of Customer Inability to Evaluate was defined based on the concept that the dimension is delivered (as discussed in chapter 3). The wording of these explanations were decided after extensive academic discussions with a number of academic members of the Department of Management Science of the University of Strathclyde

A definition of the service dimension (marked as **7** on the figure in the previous page) was also given at the beginning of each scaling question (as above). For 6 service dimensions the definitions provided by Silvestro et al. (1992) were used (given that the authors have refined the definitions to make them more operationalised). For the other three service dimensions (INT – CIV – CI) the definitions are based on the explanations provided by the authors (respectively: Lovelock, 1983; Kay, 1993; Schmenner, 1986). It was thought that these definitions would help the experts to grasp an overall picture of the service dimension before looking at the scale. During the interviews it was evident that this measure was not necessary for the simple reason that most of the experts found it easier to go directly to the scale and read the signposts rather than looking at the provided definition.

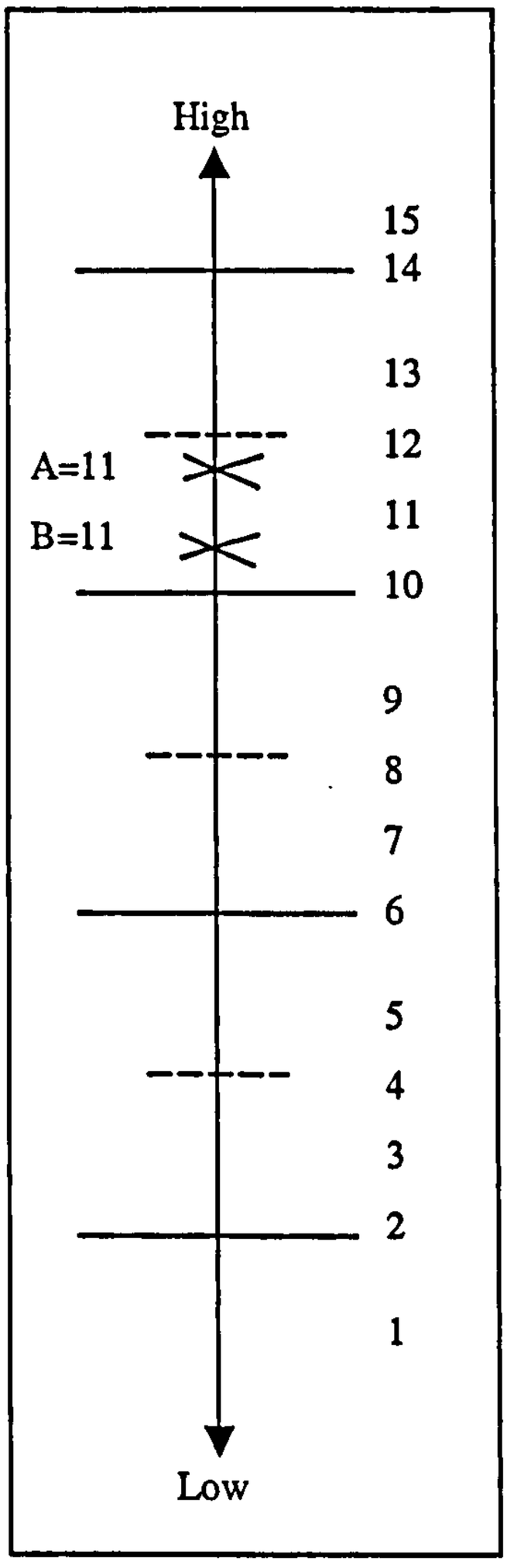
A simple guiding note was given after the definition of the service dimension, asking the expert to first mark the position of his/her respective service sector on the scale and then to point out if the service dimension is changing (marked as **8**). However, the guiding note was not a necessary part of the measurement tool because of the presence of the interviewer. Referring to section 4.7.3., the restricting words of Normal, Average and Core was used to avoid any subjective answers (marked as **9**).

At the beginning there was no intention to provide any examples with each of the signposts; however, after the pilot studies (as will be explained in the next section) it was decided to include examples in front of the sign posts. Finding examples that could be seen as definite ones was not an easy task to do and after extensive discussions with a number of academic members of the Department of Management Science of the University of Strathclyde the final decisions about examples were made (marked as **10**). The author does agree that these examples might not be 100% correct for the signpost they are positioned in, however, the main fact is that these examples were used for all the experts who completed the measuring scales, and this provided a consistent perception of

the measuring scales among all of them which was the main point for comparison purposes•.

Experts had the freedom to mark their service sector anywhere along the scale on the service dimensions scaling questions. The marks were either on one of the dashes or in between them (or below or above the lowest or the highest signposts respectively). It was assumed that there were no meaningful differences between two marks in between the same two dashes. This assumption is defendable in the sense that no efforts were observed from the experts to decide upon putting a mark a bit higher or lower in between two dashes. This is while it was clearly observed that the experts maintained a meaningful difference in between placing a mark on a dash or higher or lower than that. Therefore, it was reasonable to consider the dashes and "any where" on the spaces in between them to be a meaningful and unique indicator of the measurement of the dimensions. Subsequently, unique numbers were allocated to each dash and the spaces in between them (or below or above the lowest or the highest signposts respectively). To be able to cover all the marks and convert them to numbers, number 1 was assigned to the lowest possible mark. The next possible mark in the higher position got number 2 and the numbering went up to the highest possible mark that was 15. This way even numbers were assigned to the dashes and odd numbers were assigned to the areas between two dashes (or below or above the lowest or highest signposts). The higher the number, the higher the degree of the service dimension. The following figure illustrates the association of numbers to the possible areas for the marks, given by experts. Points A and B are used as an example to illustrate what was explained earlier. No differences are assumed between marks A and B.

• As it is seen in the scale, one of the examples is Management Consultancy. This example was used only for 2 of the nine service dimensions. At the time of preparing these measurement scales it was not yet known what other service sectors would become available for the other interviews. Management consultancy was one of the last interviews that became available. Therefore, the example of Management Consultancy stayed in the measurement scales to keep the consistency of the tool. The author had a concern that the example might bias the responses of the experts in the Management Consultancy sector. Interestingly enough this was not the case as the responses of the experts were made disregard of the example and they positioned the service sector in places other than where the examples were put, although rather close.



The above scaling tool was used for each of the service dimensions to be measured by experts. Given that the average time of interview was anticipated to be between 2 to 3 hours (in reality it sometimes took 4 hours in two sessions) every measure was taken to reduce the time to the benefit of having more effective and active interview sessions. Accordingly, it was decided that three of the service dimensions that could be defined from the customer's (and not provider's) perspective could be measured by a group of academics in the Department of Management Science, University of Strathclyde to save some time in the interviews and also to avoid the experts becoming frustrated (they were measuring service dimensions at the end of the interview sessions, usually after about 2 hours talking and it was felt that answering measurement scales for nine service dimensions at this stage, which often involved some side discussions, could be exhausting

for them). These three dimensions in the author's opinion were also the most difficult ones to be measured due to their multi dimensional aspects, and this could add much more to the time of interviews.

The three service dimensions of Intangibility, Customer Inability to Evaluate and Product/Process focus by definition were capable of being understood by customers as well. The definitions of these dimensions and the relevant signposts were designed from the customer's point of view so that the customer could also measure these dimensions. Seven members of the academic staff of the department were used as expert customers and they were asked to measure these three service dimensions for the twelve service sectors. A Delphi approach was adapted to bring the answers as close as possible and at the end the median of the answers were taken (as illustrated in chapter 5). These three dimensions were excluded from the question of change in degrees. For the ease of reference, these dimensions are called "internally measured" SDs (as opposed to "externally measured" SDs) throughout this report.

In the process of designing the measurement scales for the service dimensions the problems relating the vagueness of some of the definitions and multi-dimensionality or different aspects of a service dimension were the main obstacles. The measurement scale for the dimension of Personnel Judgement illustrates an example. As can be seen by noticing the first two highest signposts in the measurement scale, two aspects have been recognised in the degree of personnel judgement. These are 1. frequency of judging and 2. Importance of the judgement. Looking at this dimension only from one of the aspects could result in a wrong measurement; for instance, service sector X might be considered to be lower than service sector Y in terms of personnel judgement simply because the number of judgements done by the front line staff in A is less than those made by the front line staff in B. This is while the judgements made by staff in B could be a vital part of the service while judgements made by staff in A could be only ones. In fact, despite all the care that was taken, it was felt that the presence of the interviewer was a great help to avoid any misunderstandings. The author took note from these difficulties for each service dimension for future improvement of measurement scales.

4.13 What measures were put to increase the *usefulness of data*?

Usefulness of data here means in terms of measurement. A number of measures were put in place to make sure the data is as reliable as possible:

- As discussed before, strict conditions were taken into consideration for choosing interviewees.

- A pilot study was conducted with two of the departmental contacts who could be seen as experts in their industry. One of these contacts was also included among the experts in the real main interviews. Many decisions like the type of measurement for service dimensions, the wording of the service dimensions scaling questions and items included in the entry points for productivity management aspects were finalised after these pilot studies. Significant changes were made to the number of entry points in the main part of the interview, as the original interview guide had 12 entry points (instead of 9). The 3 general questions were removed to assure enough time was available to discuss the main questions.

- In terms of measuring service dimensions, it was obvious from the beginning that the measurements of two experts in a service sector will not match 100%. From an analytical point of view the obvious solution was to find the average between the two measurements as will be discussed in chapter 5. However, it was decided to determine an acceptable maximum degree of difference between the measurements of a same service dimension by the two experts. Looking at the scale, the four signposts represent levels of (from the bottom of the scales) Very Low – Moderate Low – Moderate High – Very High. These signposts can be considered as points that determine the level of service dimensions. It was decided that a difference of no more than precisely one level (that is from one signpost to the one immediately above or below) can be accepted but any difference grater than this will not be accepted. This allowable difference was used as a basis for accepting or rejecting the differences of opinion on any area of the scale. Looking at the service dimensions measurement scales, a difference of only one level means 4 degrees (distance between each two dashes are 2 degrees based on applying 15 degrees to the scale as explained in section 4.12). Accordingly, for any difference of data of more than 4 degrees for service

dimensions in a service sector, the author would refer back to the two experts (in most cases by e-mail) and would ask the experts for their revised measurement. On the whole this was necessary only for 3 cases (i.e. three SDs that were measured by a pair of experts in a service).

- In terms of answers to productivity management aspects no significant differences of opinion was noticed. This was due to the semi-structured interview being used for this part. The fact that the two interviews took place in sequence was also helpful as any apparent disagreements apparent in the second interview could be clarified and explained at the time.

- It was ensured that the experts reported their observations and perceptions of their respective service sector rather than their personal opinion that could not be backed by any observed or perceived evidence.

- The fact that the interviews were about the normal, overall/average strategic level of the service sectors helped to avoid subjective comments.

- In determining the final rank of each PA Subject, two approaches were applied and final rankings were determined in a way that could be true based on both the approaches. This is further explained in chapter 5.

4.14 What do the *research findings* look like?

It helps to give a generic answer to each of the research questions in order to make it clearer what the objectives that this research is trying to reach are.

The research questions and the outlook of their possible answers:

The main question: "What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management with concerns for quality?"

Outline of possible answer: "Service dimensions X and Y are good for indicating to 'this' group of productivity management aspects while service dimensions Z and T are good for indicating to 'that' group of productivity management aspects. The indication here is based on correlation analysis."

The rest of the questions and an outline of possible answers:

1. In terms of Productivity management (with quality concerns), how are the service industries similar/different ...

-(This will be a table of quantitative data showing the different importance ranks for each of the PA Subjects across the 12 service sectors in a way that comparison between the service sector is possible.)

... and how can they be classified?

- "In 'this/these' aspect/s of productivity management services A, B and C can be clustered together (being similar) and services D, E and F can make their own cluster (similar to each other but different from the other cluster)."

2. How can the service industries be classified with regard to Service Dimensions?

- "With regard to 'this/these' service dimensions services G, H and I can be clustered together (being similar) and services J, K and L can make their own cluster (similar to each other but different from the other cluster)."

3. What are the measurements of the studied service sectors for each of the service dimensions?

- (This will be a table of quantitative data for the measurements of service dimensions for each of the 12 service sectors.)

4. What are the relationships between the popular service dimensions?

- "Service dimensions A, B, C and D are highly correlated and the same is the case for the rest of the service dimensions."

5. What are the key factors and issues in productivity management in service industries?

- "Overall, 'these' are the common influential factors in terms of productivity management in services and "this" is how they (or each one of them) affect/s services.

6. Is there anything like productivity friendly services and if the answer is positive, what are the conditions of these services?

- "The data reveals that services with 'such' and 'such' conditions are easier to be managed from a productivity point of view.

7. What is the interaction between productivity and quality in service operations?

    - "In services A, B and C there is a high trade off between productivity and quality because of 'these' reasons, while in services D, E and F there is no trade off between productivity and quality because of 'those' reasons.

4.15 What are the research *assumptions and limitations*?

Like any other research activity, this research was also limited to a number of factors and was based on a number of assumptions:

Limitations:

- Strict conditions were taken into consideration for choosing interviewees to make sure they are qualified enough. Not all the chosen experts were available and not all the available experts could allocate enough time for interview.

Assumptions:

- Taking into consideration all the care that was taken in choosing interviewees, it is assumed that the chosen interviewees were reliable data sources.

- Based on the literature review in chapter 3, it was assumed that service dimensions are representative of the nature of each type of service.

- It was assumed (as well as practically proven in the process of the research) that it was possible to find overall measurements of service dimensions and overall conditions of productivity aspects in a service sector.

4.16 What are the considerations about *reliability and validity* of the research?

"Every way of seeing is also a way of not seeing"

(Silverman, 2000; 825)

This section is mainly addressed in chapter 8 of this report. The mere reason the title is put here is to avoid the impression that the concerns about validity and reliability of the research (meanings as explained in chapter 8) have only been taken into consideration in the concluding stages of the research. All the measures and concerns that were discussed in this chapter including the process of developing a measurement tool for service dimensions, revising of data by the experts, using different approaches to finalise results, appreciating the complexity of some terminologies, usage of some terms for bounding the limits of the research, pilot studies, choice of data collection, etc. were in fact measures that were not only necessary for conducting the research but were also specifically aimed at addressing the concepts of validity and reliability.

Given the two types of analytical approaches in this research, finding appropriate criteria to evaluate the research as a whole needs to be done carefully. In chapter 8 the choice of evaluating criteria for this research and the results of evaluation are discussed in detail.

4.17 Overall where can this research be positioned among the recognised *research methodologies?*

At the end of this chapter and after discussing the research design and approach through a number of questions, it is appropriate (as promised in section 4.5) to attempt positioning the methodology of this research among the recognised research methodologies.

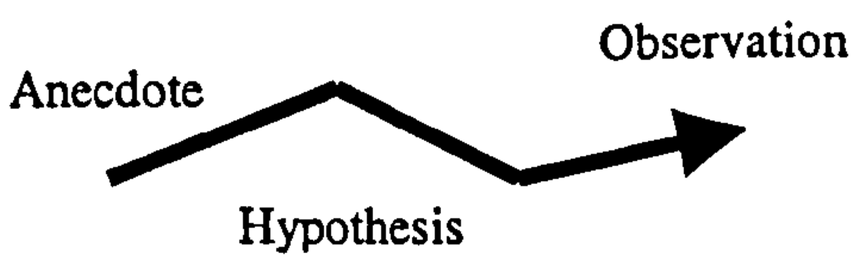
Looking at the philosophy of research methods, it is possible to classify the research methods (in broad terms) into two categories of the Positivism and Phenomenology

schools of thought. The positivism approach is based on the assumption that the social world exists externally and its properties should be measured through objective methods. Based on this perspective (or paradigm, as being termed by Thomas Kuhn to describe the progress of scientific discoveries in practice, -cited in , the researcher should focus on facts, reduce phenomena to simplest elements, formulate hypotheses, take large and measurable samples and then test them (Easterby-Smith et al., 1991).

It was just before the 1950s that a new paradigm was raised in reaction to the application of the positivism approach in social sciences. In this view (known as the phenomenology paradigm) the world and reality are not considered objective and exterior. As a result, from the phenomenology point of view, the researcher should focus on meanings rather than facts, try to understand what is happening, look at the totality of each situation and develop ideas through induction from data derived from small samples that are investigated in-depth (Easterby-Smith et al., 1991).

Johns and Lee-Ross have developed a helpful model to compare the researches that come from the two paradigms:

Inductive Model (Phenomenology Paradigm)



deductive Model (Positivism Paradigm)

(adapted from Johns and Lee-Ross, 1998)

The "anecdote" in Johns and Lee-Ross's word is the same concept that was referred to as an "idea" or a "research idea". "Observation" refers to any fact learned during the detailed study of a problem or situation. The figures show quite clearly that in the phenomenology paradigm a "Hypothesis" is an attempt to explain observations.

The above two models clearly indicate that in research based on the positivism paradigm observations are for the purpose of testing the hypotheses. This is while in research based on the phenomenology paradigm, it is only after the observation that hypotheses are made.

In a way, the above model is very much inline with the Eden's model (as presented in section 4.4), only here, the two approaches are schematically separated.

If looking from the above perspective, this research can be defined as one that heavily relies on the phenomenology paradigm. All the research questions need an in-depth study in the field and questions 1, 5, 6, and 7 are clearly aiming at defendable theories (hypotheses) after in-depth observations.

It is however possible to argue that the main research question and questions 2, 3, and 4 have some aspects that are linked with the positivism paradigm. This will be more evident when going through chapters 5 and 7 of this report where (in chapter 5) the work is heavily based on quantitative analysis and where (in chapter 7) some of the theories in the literature will be tested by applying them to the research data. It should be noted that although testing the relationship between service dimensions and productivity aspects clearly has aspects of deduction, because of the general approach of the research (in-depth study of a small number of industries through interviews with experts in each industry) and the fact that the quantitative data was transferred from inductively derived qualitative data, this "snap shot" positivism style is heavily reliant on a phenomenology paradigm. All the questions of the research, as discussed before, are answered during extensive interviews with the experts, and the researcher acted as a facilitator for the experts to arrive at the most accurate answers possible.

The above description of the methodology of this research is very much similar to what Creswell introduces as dominant-less dominant design in research.

According to Creswell (1994), a combined research design can be of three types:

1. Two phase design: In which the researcher conducts one phase of the work based on one paradigm and then the other phase of the work based on the other paradigm in a separate way.

2. Mixed methodology design: In this case the researcher mixes aspects of the two paradigms at all or many methodological steps of the design.

3. Dominant – less dominant design: Here the researcher presents the study within a single dominant paradigm with one component of the overall study drawn from the alternative paradigm. According to Creswell, the advantage of this approach is that it presents a consistent paradigm picture in the study and still gathers limited information to probe in detail one aspect of the study. Creswell further comments that the main disadvantage of this approach is that qualitative purists and/or quantitative purists might see the approach as an inconsistent one.

The dominant-less dominant design title is the one that can be used for this research, in which the phenomenology paradigm dominates the positivism paradigm elements and accordingly the qualitative approach dominates the quantitative approach (This should not taken as concluding that the quantitative approach and qualitative approach are necessarily the characteristics of positivism and phenomenology, although in most cases they are).

In line with the above, Morse asserts that in any combined research the two paradigms cannot be equally weighted. She used capital and lower case letters to represent this (i.e. QUAL + quan or QUAN +qual). She also distinguished between what she calls simultaneous triangulation and sequential triangulation. In simultaneous triangulation the researcher conducts the research questions involving quantitative analysis and qualitative analysis at the same time while the results are not necessarily related. In sequential triangulation results of one type of analysis is needed to start analysis of another type. Accordingly, based on Morse's categorisation this research can be seen to be closer to QUAL+quan Simultaneous Triangulation (Morse, 1991). It is also worth mentioning that in chapter 6, parts of the results of the qualitative analysis are analysed using some of the results of the quantitative analysis to reach final conclusions. Therefore the two parts of research in this work are not totally isolated.

This approach is also what is known as methodological triangulation (Todd, 1979). Discussing methodological triangulation, Easterby-Smith et al. argue that there are always philosophical problems when mixing approaches from two paradigms but they advise researchers to take advantage of the mixed method while being careful (Easter-Smith et al., 1991; 134). Advice that this author has tried to observe throughout this research.

Summary

In this chapter 17 questions were raised about the methods and methodology of the research. The whole chapter was constructed and structured based on these questions. The questions covered a wide range of methodological issues, from research questions and research contribution to issues related to data, data sources and measurement tools as well as more strategic aspects of research like the research methodology. After reviewing the literature on service productivity and service dimensions, and answering questions on methodological issues, it can be argued now that enough information is given so far to be able to start presenting the results of the study. This begins with presenting the results of the quantitative analysis in chapter 5, which is followed by presenting the results of qualitative analysis in chapter 6.

Chapter 5: Quantitative Analysis and the Results

Introduction:

As discussed in Chapter 4, to attempt the research questions in this work, both quantitative and qualitative treatment of the data is needed. The overall methodology of the present work and its integrated features were discussed in Chapter 4. It was discussed that the research methodology in this work is close to what Creswell describes as "Dominant-less Dominant" methodology (Creswell, 1994) or (from another point of view) what Morse describes as QUAL+quan Simultaneous Triangulation (Morse, 1991). The quantitative aspect of the present research is presented in this chapter. As discussed in chapter 4, the data used for quantitative analysis is heavily based on the interviews with the sources of data (experts in the twelve chosen service sectors). This chapter presents the analyses that were done to address the main research question of the present research as well as questions 1 (partially), 2, 3 and 4. A reminder of these questions follows:

Reminder of the research questions that are addressed in this chapter:

<u>The main research question:</u>

"What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?"

Question 1: In terms of Productivity Management, how are the service industries similar/different and how can they be classified?

Question 2: How can the service industries be classified with regard to Service Dimensions?

Question 3: What are the measurements of the studied service sectors for each of the service dimensions?

Question 4: What are the relationships between the popular service dimensions?

This chapter consists of four main sections. Each section analyses the quantitative data from a specific point of view. The first section covers the Service Dimensions View. This section attempts to answer the research questions 2, 3 and 4. This is also a prerequisite section for the rest of the analysis. Section 5.2 covers the Productivity Aspects view. This section can be seen as a first attempt to answer question number 1. This section is also a necessary part of the present study before answering the main research question. The first two sections of this chapter, therefore, tackle the problem from the two perspectives of Service Dimensions and Productivity Aspects. The results of these two sections come together in section 3, which is entitled as the main view. In this section the measurements of the Service Dimensions and Productivity Aspects and some of the other results in the preceding chapters are used to attempt the main research question. By the end of this section, the relevant service dimensions for productivity improvement management are analytically selected and introduced. The chapter ends with a final view, entitled as The Measurement View. In this section the reliability of the data, collected for the quantitative analysis is examined.

To maintain the flow of discussion and avoid repeating terms and titles, this chapter uses a list of generated abbreviations. To make it easier to be referred to, this list has been placed in two places in this dissertation: the end of chapter 5 and the beginning of the dissertation (after the Table of Contents). The most frequently used abbreviations are SD for Service Dimensions and PA for Productivity Aspects.

To illustrate the structure and the flow of this rather long chapter, the series of figures coming under the title 5.1 are introduced. Each figure in this series of figures is relevant to one of the four "views" (that have made the structure of this chapter). These are:

- Figure 5.1.1, The Service Dimensions View, to be discussed in section 5.1: Basically attempts research questions 2, 3 and 4.
- Figure 5.1.2, The Productivity Aspects View, to be discussed in section 5.2: Basically attempts research question 1.
- Figure 5.1.3, The Main View, to be discussed in section 5.3: Basically attempts the main research question.

- Figure 5.1.4, The Measurement View, to be discussed in section 5.4: Basically addresses the concerns in terms of the reliability of data used for quantitative analysis.

The subject of each section illustrated in figure 5.1 is noted with codes P, Q, M or C. Code P refers to the prerequisite procedures for preparing the data for quantitative analysis. Code Q refers to the research questions (refer to chapter 4) with the number associated with each question coming in front of the label Q (Q.Main refers to the main research question). Code M refers to issues related to the accuracy of measurement. Code C stands for Clarification and refers to studies that have been conducted, basically to better clarify the results. This way the reason and the objective for applying each of the techniques are clarified. The string number at the beginning of each box is the Section number in which the discussion takes place. Each of the figures is introduced at the beginning of the associated section.

Figure 5.1: The Structure of chapter 5

Figure 5.1.1 – The structure of section '5.1. The Service Dimensions View'.

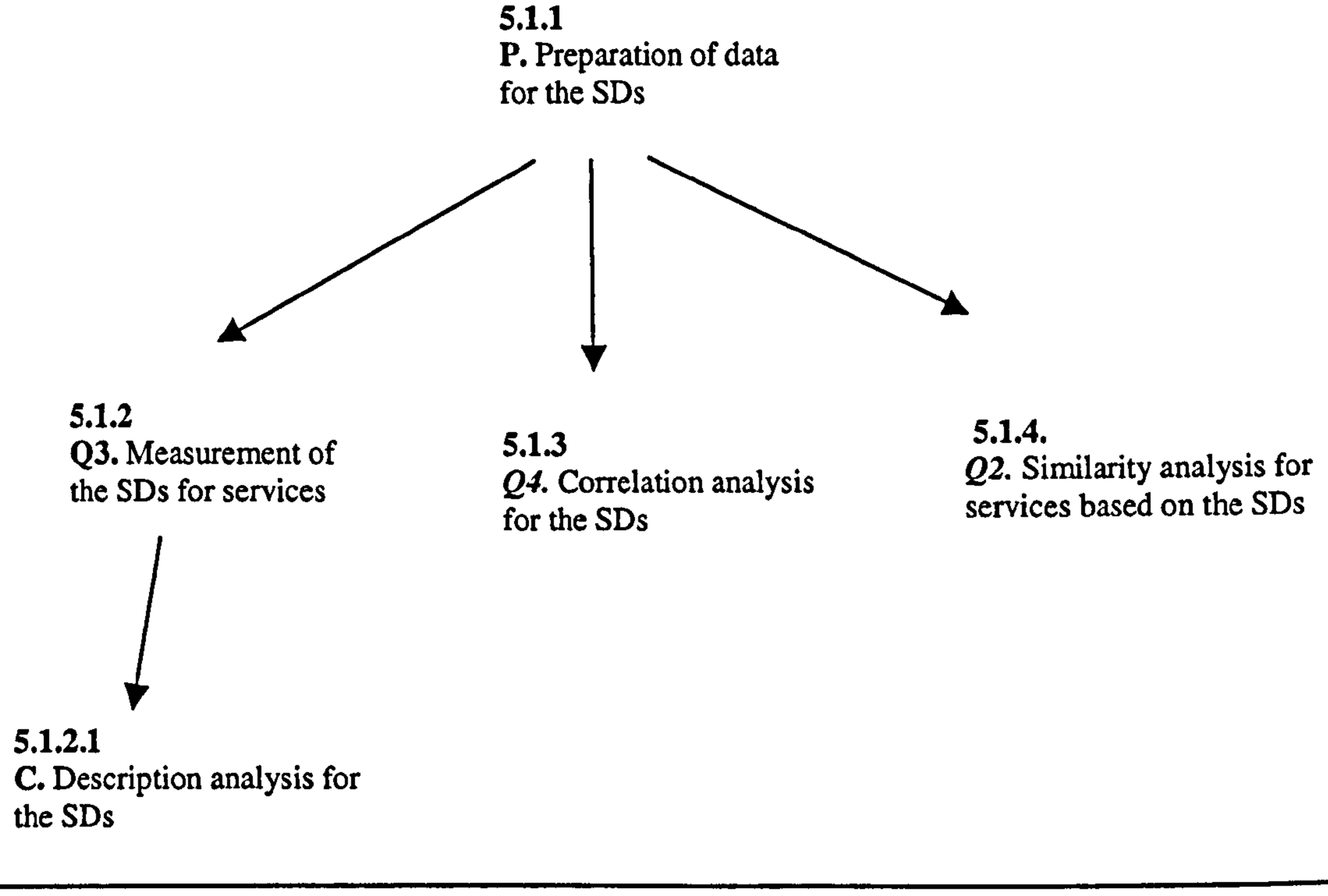


Figure 5.1.2. The structure of section 5.2. 'The Productivity Aspects View'

5.2.1
P. Preparation of Data for the PAs

↓

5.2.2
Q1. Measurement of the PAs for Services and descriptive analysis

→

5.2.3
Q1. Classification of services based on the measurement for the PAs

Figure 5.1.3. The structure of section '5.3. The Main View'

5.3.1
Q MAIN. Correlation analysis between the SDs and the PAs

↓

5.3.2
Q MAIN, C. Exploring the association in between the significantly correlated SDs and the PAs

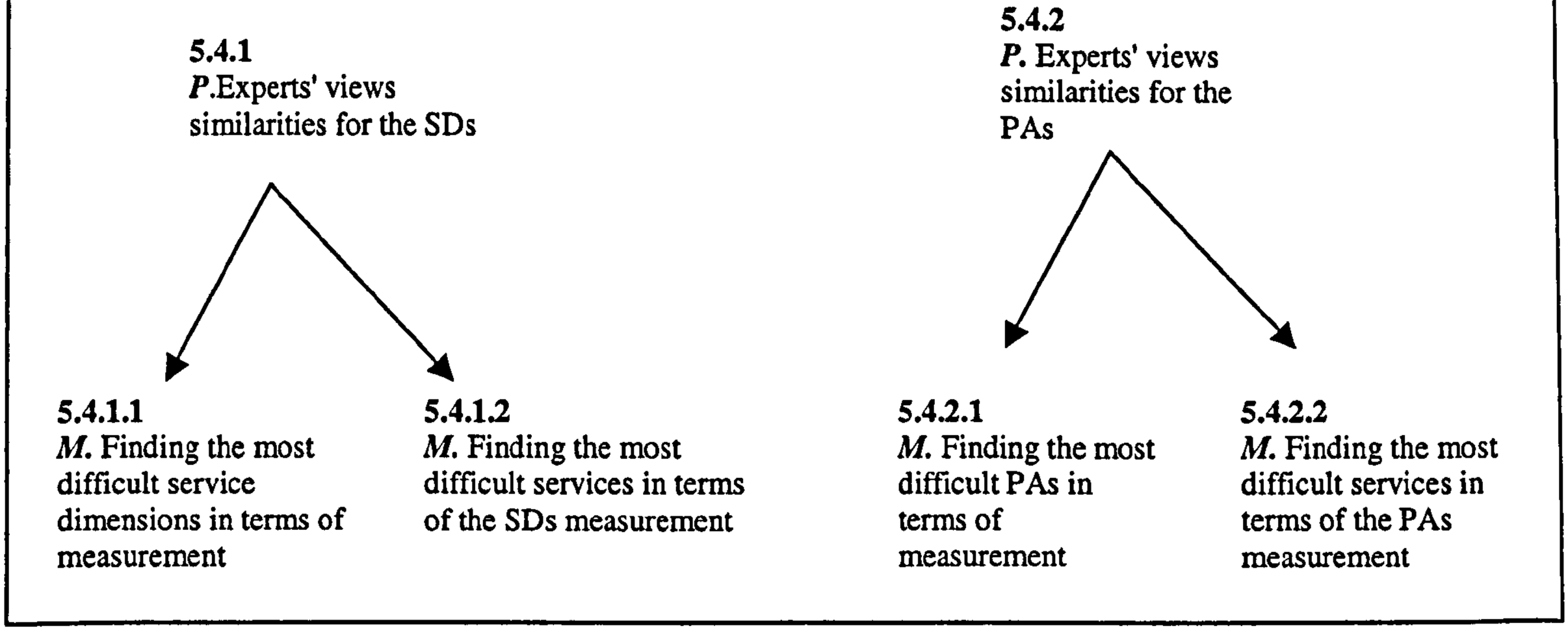
↓

5.3.3
Q MAIN. Analysis for selecting the most appropriate SDs for the PAs

↓

5.3.4
Q MAIN Adopting a Pragmatic View

Figure 5.4 The structure of section '5.4 The Measurement View'



5.1 The Service Dimensions View

Service Dimensions in a way have initiated this research. The author was motivated to look for them before learning about their popularity in the service literature, and upon finding the research based on them the initial design of the research was formed as explained in Chapters 1, 3 and 4. As discussed before, SDs are going to be studied to investigate their appropriateness in being indicators for services in terms of "productivity management". Nine popular service dimensions being analysed in this chapter to examine which one/s is/are the most relevant in comparing and studying services in terms of productivity management. This will lead to an answer for the main research question. This section attempts research question numbers 2, 3 and 4, and also provides useful results that are needed when attempting the main research question in section 5.3. Starting from the top entry in figure 5.1.1, as a prerequisite stage this section begins with a short discussion on the preparation of data related to the SDs (section 5.1.1). Research question number 3 is then attempted by discussing the measurements of services for the SDs (section 5.1.2). This is followed by some basic description analysis to provide an overall view to the SDs measurements in the studied services (section 5.1.2.1). Research question number 4 is attempted next by conducting a correlation analysis for the

SDs. This is followed by some clarification attempts, including the SDs relationship map and classification of the SDs (section 5.1.3). In section 5.1.4 a similarity analysis is done for services based on their measurements for SDs. This is to address research question number 2. The results of section 5.1.4 are then summarized and presented by a relationship map for better clarification.

5.1.1. Preparation of Data for the SDs

As described in chapter 4, two sets of quantitative data were needed to attempt the relevant research questions. These were data for Service Dimensions (SDs) and data for Productivity Aspects (PAs). To make the collected data ready for analysis certain procedures needed to be done. The preparation stages for the SDs are described in this section. Section 5.2.1 describes the preparation stages for the PAs:

The measurement tool for measuring the SDs and the way it was used were discussed in section 4.12. The issue that remains to be discussed here is about arriving at one piece of data when collecting data from two sources (two experts) for each service sector. Obviously in each service sector and for each SD, more than one piece of data was available. In the case of 'Labour Intensity', 'Front Value Added', 'Customer Contact', 'Customer Interaction', 'Customisation' and 'Personnel Judgment', data was collected from two experts in each service sector (with the exception of missed data in the two service sectors of Fast-food and Auto-Repairing). As for the so called 'Internally Measured' SDs that are 'Intangibility', 'Customer's Inability to Evaluate' and 'Process Focus', for the reasons that were given in section 4.12, data was collected from a group of 7 experts. To get one number as the measurement of each service sector in each SD, the median of the final numbers proposed by each of the two or group of experts was used. Median is an alternative to mean when the data is ordinal and not interval (Walsh, 1990; Gibbons, 1993). Obviously in the case of the SDs where only two experts were measuring a service against a dimension, median and mean are equal. Even in the case of the 'Internally Measured' SDs the Median and the Mean were quite close to each other. Defining a tolerable difference between responses of pairs in a single service sector and the way the intolerable differences were dealt with were discussed in section 4.13.

5.1.2. Measurement of the SDs for services

In order to attempt the main research question and research questions 2, 3 and 4, first the measurement of the SDs for each service sector must be obtained. This section in particular provides the answer to research question number 3:

Research Question number 3: "What are the measurements of the studied service sectors for each of the service dimensions?"

As discussed in 4.12, the data gathered from the experts were transferred to numbers with the range of 1 to 15, the bigger the number the higher the degree of a service dimension. Appendix 5.1 shows these numbers for the Externally Measured SDs and the Internally Measured SDs. As discussed in section 5.1.1, median was used to find a final measurement for the data related to a SD in a service sector. In the tables in appendix 5.1 the rows in bold contain the median of the data gathered from two experts (in case of externally measured SDs) and seven experts (in terms of internally measured SDs). The final data for the SDs is illustrated here in the set of figures under the title Figure 5.2. As there are a number of services with the same measurements for a service dimension, presenting all the SDs in one graph is confusing and far from helpful. Appendix 5.1 and figure 5.2 provide direct answers to research question number 3.

Figure5.2. Graphical Presentation of the Finalised Data for the SDs

Figure 5.2.1 Labour Intensity

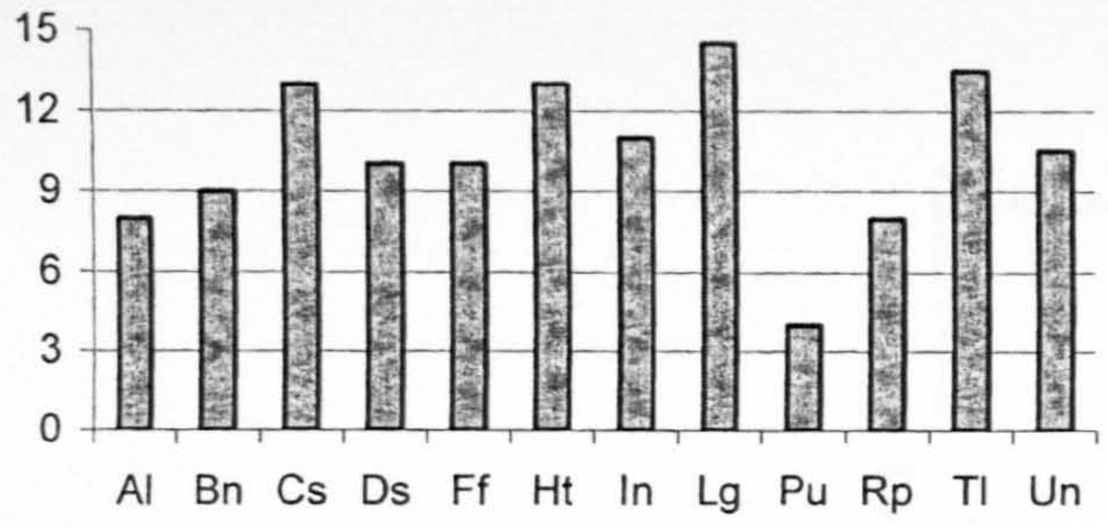


Figure 5.2.2 Front Value Added

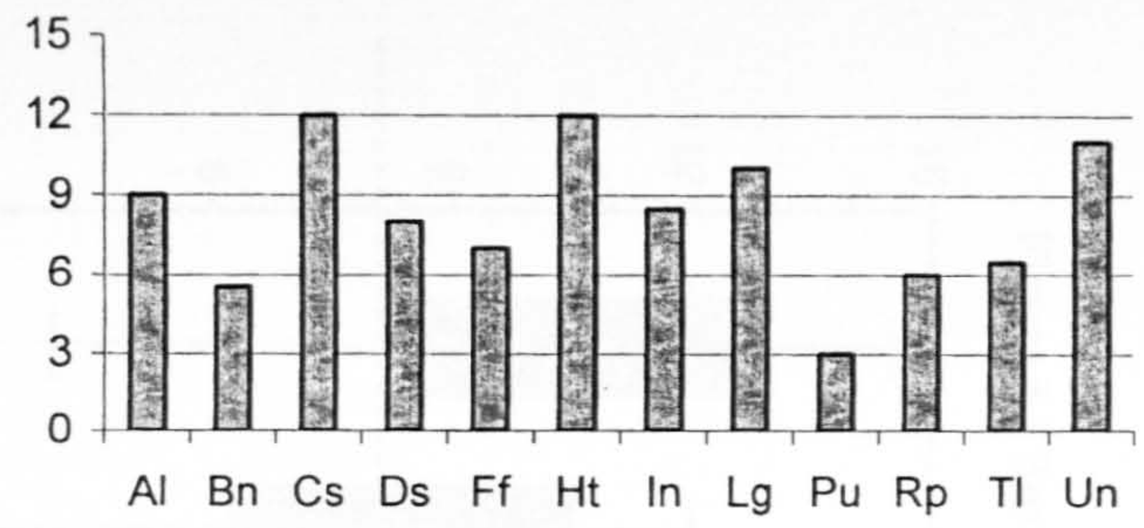


Figure 5.2.3 Customer Contact

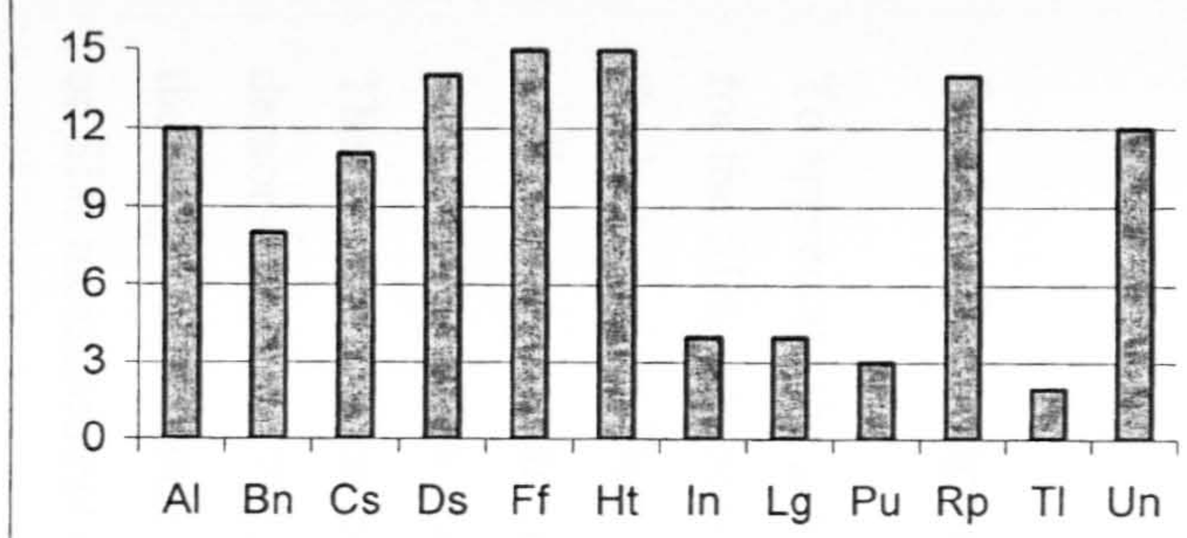


Figure 5.2.4 Customer Interaction

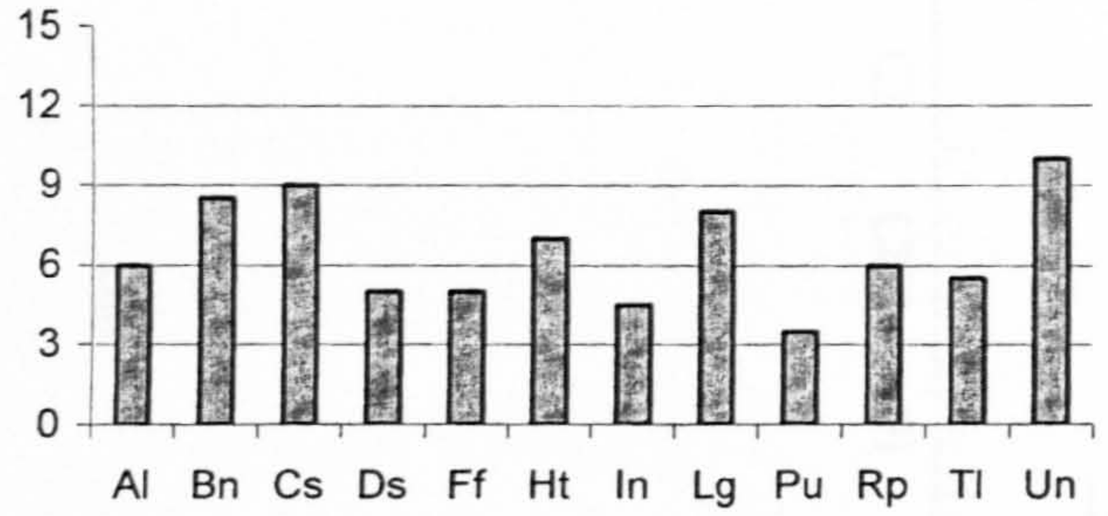


Figure 5.2.5 Customisation

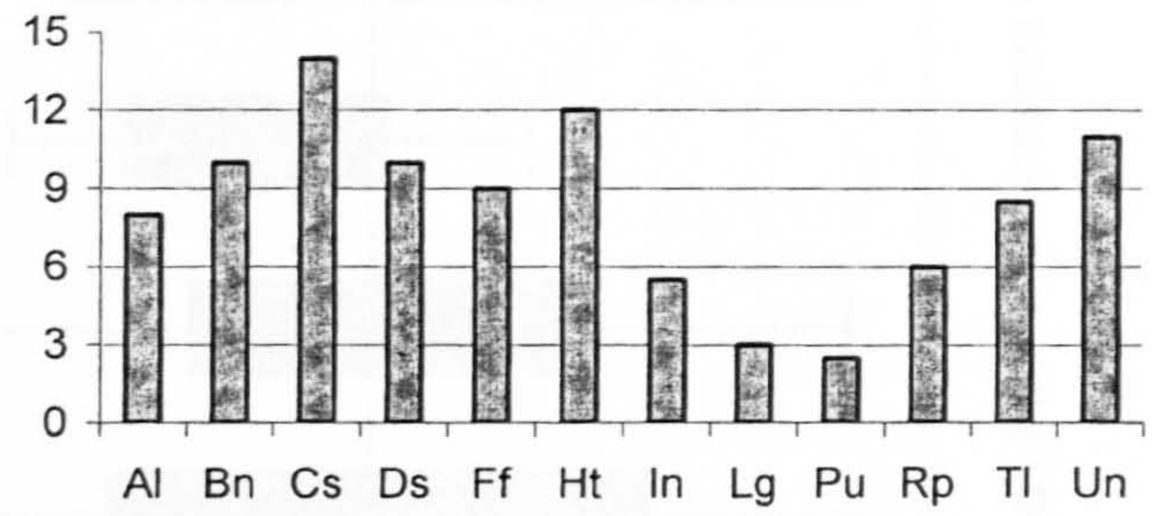


Figure 5.2.6 Personal Judgement

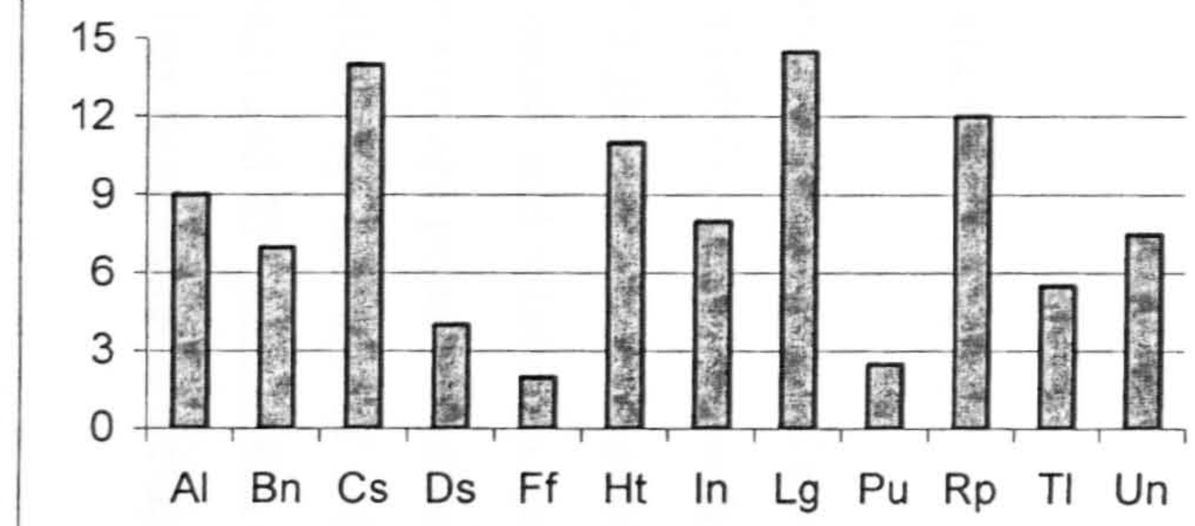


Figure 5.2.7 Intangibility

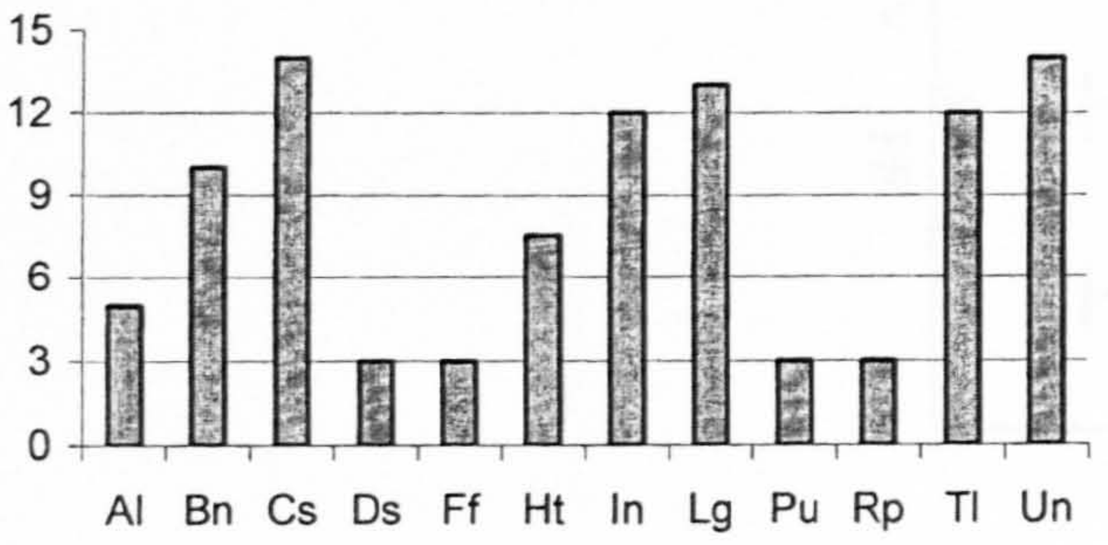


Figure 5.2.8 Customer Inability to Evaluate

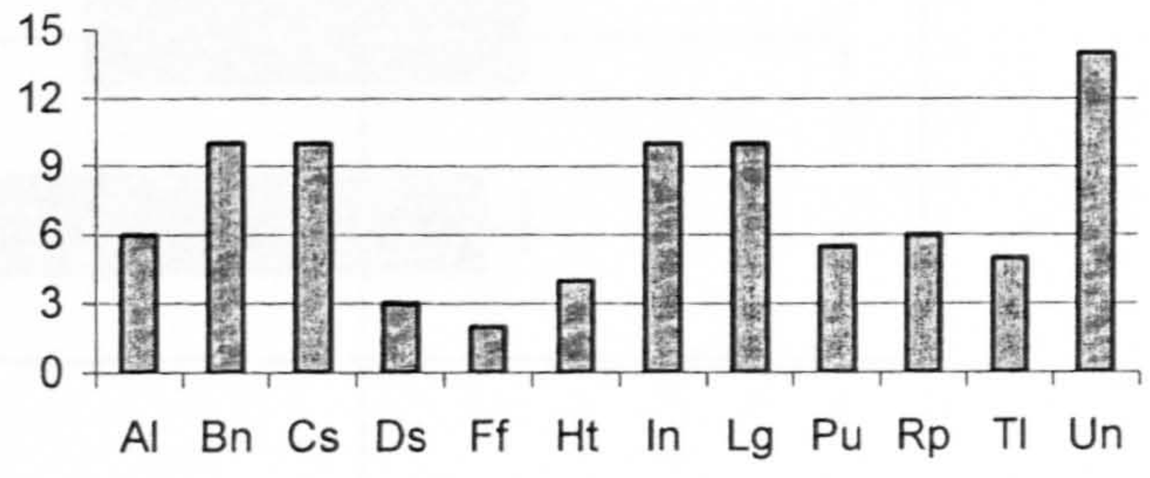
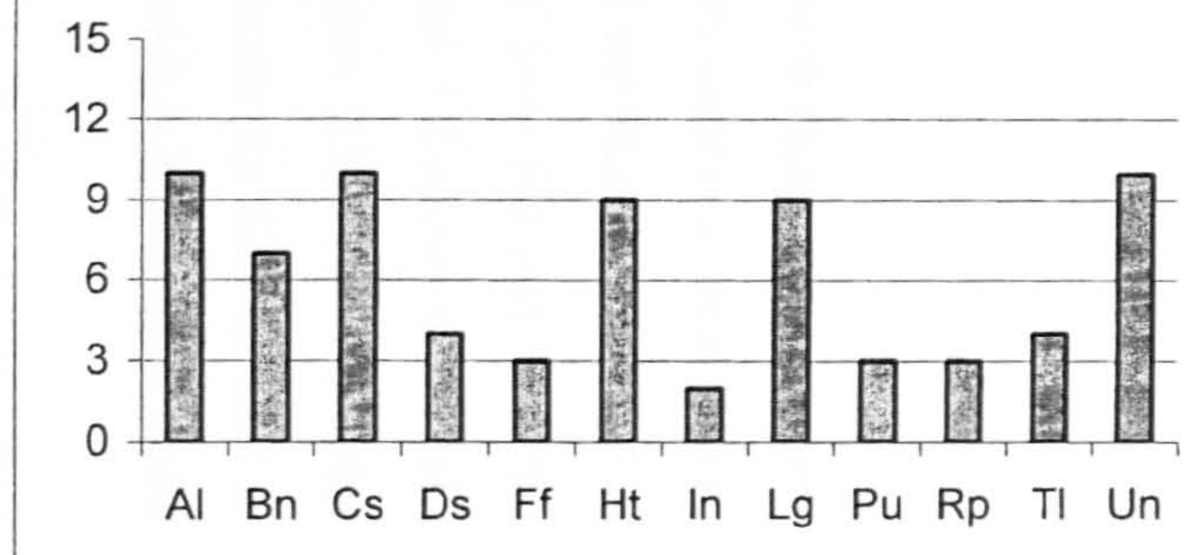


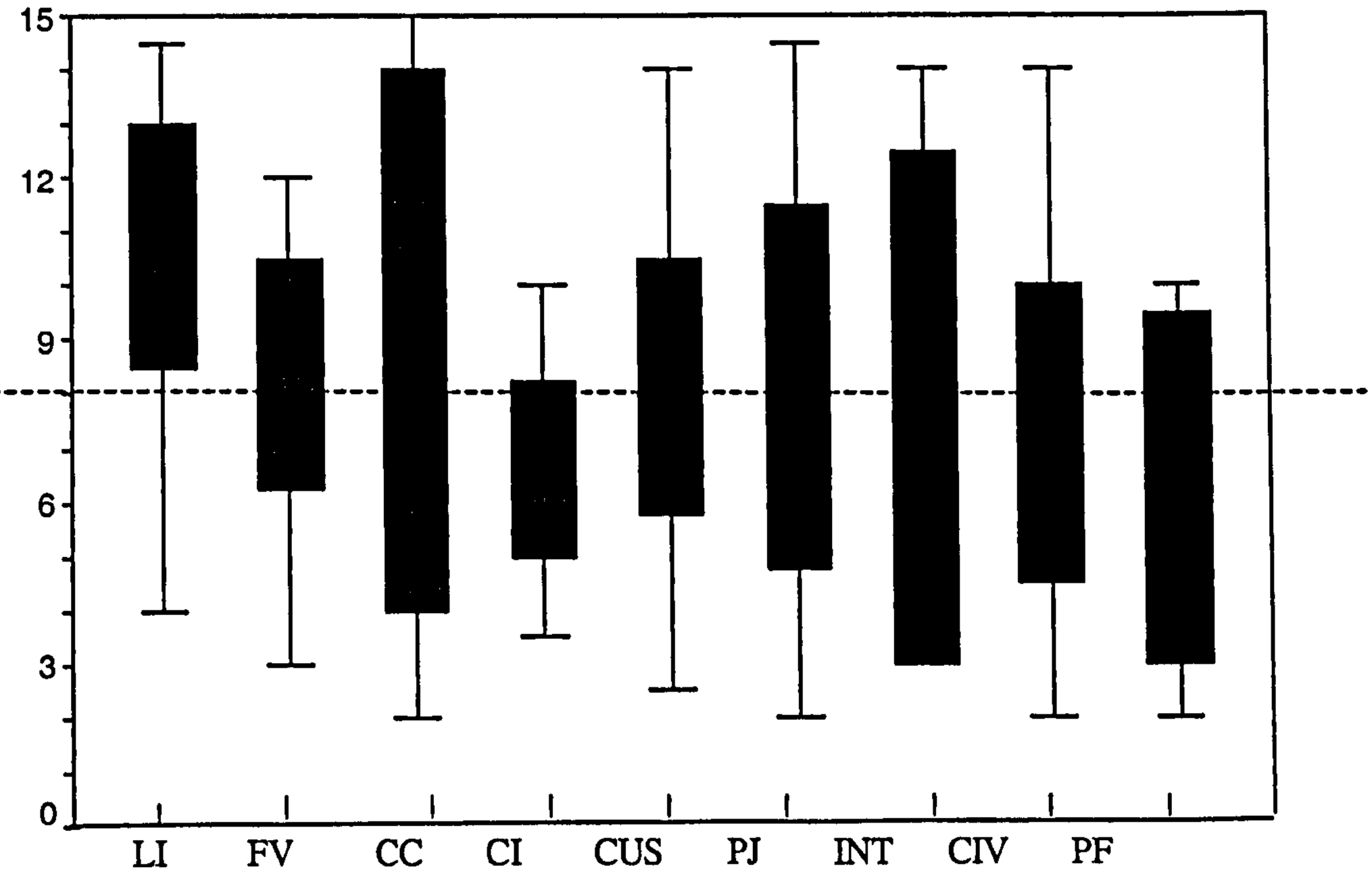
Figure 5.2.9 Process Focus



5.1.2.1. Description Analysis for the SDs

To appreciate the general trend and overall picture of services in terms of their measurements for the SDs, it is helpful to have a brief description analysis of the SDs' results as provided in the last section. This includes the highest and lowest measurements of services for each SD as well as the median, range, maximum and minimum, percentiles for each SD and also the percentages above and below the average point for each SD. Appendix 5.2 shows the result. The results can be best summarized by the use of a box plot (figure 5.3). The box plot demonstrates the 75th, 50th (median) and 25th percentiles of measurements for SDs as well as the range. The dotted line on the box demonstrates the degree of 8, which is the average point on SDs measurement scales:

Figure 5.3 Box plot for the measurements of the SDs



The table in appendix 5.2 and the box plot (figure 5.3) are made by the SPSS Descriptive Statistics function and Chart function. SPSS takes the rounded up figures of the data to produce the tables. It is interesting that for all the SDs except Customer Contact and Customisation, the two services of Consultancy and Legal are always among the highest degree services. As for Customisation, only Consultancy Services are among the highest and not Legal Services. Consultancy services can be seen as the one that has most of the features of a professional service (Schmenner, 1986; Silvestro et al., 1992). In the list of the lowest degrees of SDs, the popular services are Power Utilities, Auto-Repairing and Fast Food. These are in fact the services that have the most features of manufacturing operations (in comparison to the rest of the services that were studied in this work).

Looking at the box plot, the lowest median belongs to Personnel Judgement, Customer Inability to Evaluate, Customer Interaction and Process Focus. The latter two SDs also have the lowest maximum measurements among the SDs (10). These four SDs are the only ones for which the percentages of the lower than average measurements is higher than the percentage of the higher than average measurements. With 67% measurements below the average Customer Interaction has the lowest measurement. Customer Contact and Labour Intensity have the highest medians. For Labour Intensity the minimum measurement is the highest among the other SDs (4). Labour Intensity also has the lowest percentage of the measurements below the average (8%). As for the range of the measurements for SDs, services have split farther for Customer Contact, Personnel Judgement and Customer Inability to Evaluate. The tightest ranges are for Customer Interaction and Process Focus.

Two of the most obvious overall conclusions from the above observations are:

- Overall, the 12-selected service sectors show higher degrees of Customer Contact and Labour Intensity and lower degrees of Personnel Judgement, Customer Inability to Evaluate, Customer Interaction and Process Focus. This can be seen as an overall trend of services if the 12 selected service sectors can be considered as a reasonable representation of present day's service industries. If this assumption is not true then the above observation will have a different benefit. In the case that a complementary study is going to take place, services with lower

- degrees of labour intensity and customer contact and higher degrees of other SDs should be chosen to provide a wider picture of service industries as a whole.
- The above observation also indicates that the studied service sectors are not widely different in terms of the SDs of Customer Interaction and Process Focus. They are however very different when it comes to Customer Contact, Personnel Judgement and Customer Inability to Evaluate.

To have a summary picture of the comparison between the 12 service sectors in terms of the SDs, the accumulated measurements of SDs for each service is provided in figure 5.4.

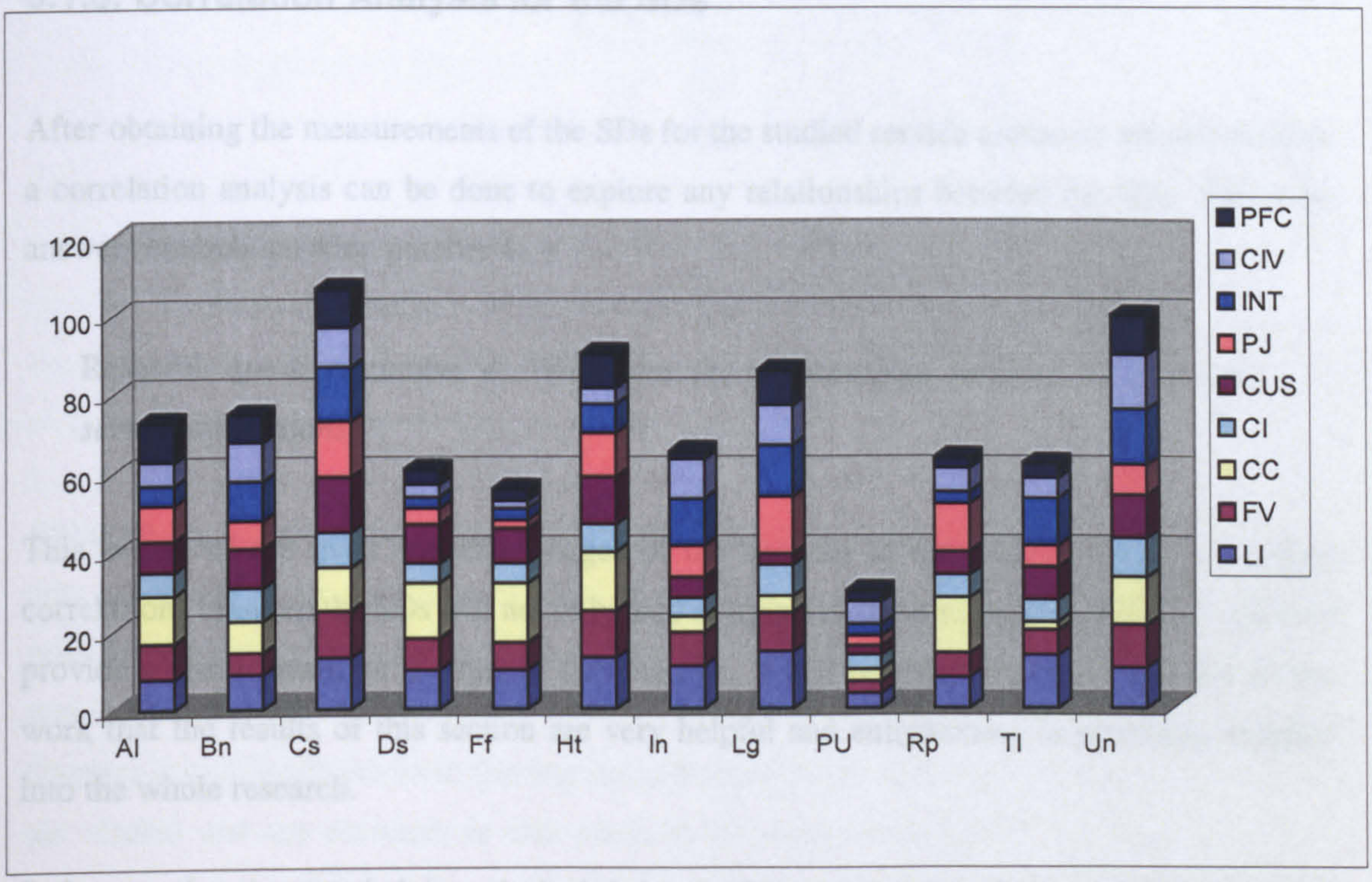


Figure 5.4 Stacked Columns of SDs for each Service

It should be noted that due to the ordinal nature of the data and due to the fact that it is still not known which dimensions are better indicators for the PAs, it is not possible to draw any conclusions from the above figure at this stage. Technically speaking accumulating all the SDs in one scale is wrong as the data is not interval. For instance it is of no meaning to add a

degree of 5 for Customer Contact to the degree of 10 to Labour intensity or to say Labour Intensity is higher than Customer Contact. The only interpretation that can be done at this stage is to say that Consultancy and Universities have the highest degrees in SDs as a whole, also that Department Stores, Fast Foods and Power Utilities have the lowest degrees in SDs as a whole. It is therefore possible to argue that overall among the 12 selected service sectors, Consultancy and Universities have more of the features of a pure service while Department Stores, Fast Foods and Power Utilities are more similar to the features of manufacturing operations.

5.1.3. Correlation Analysis for the SDs

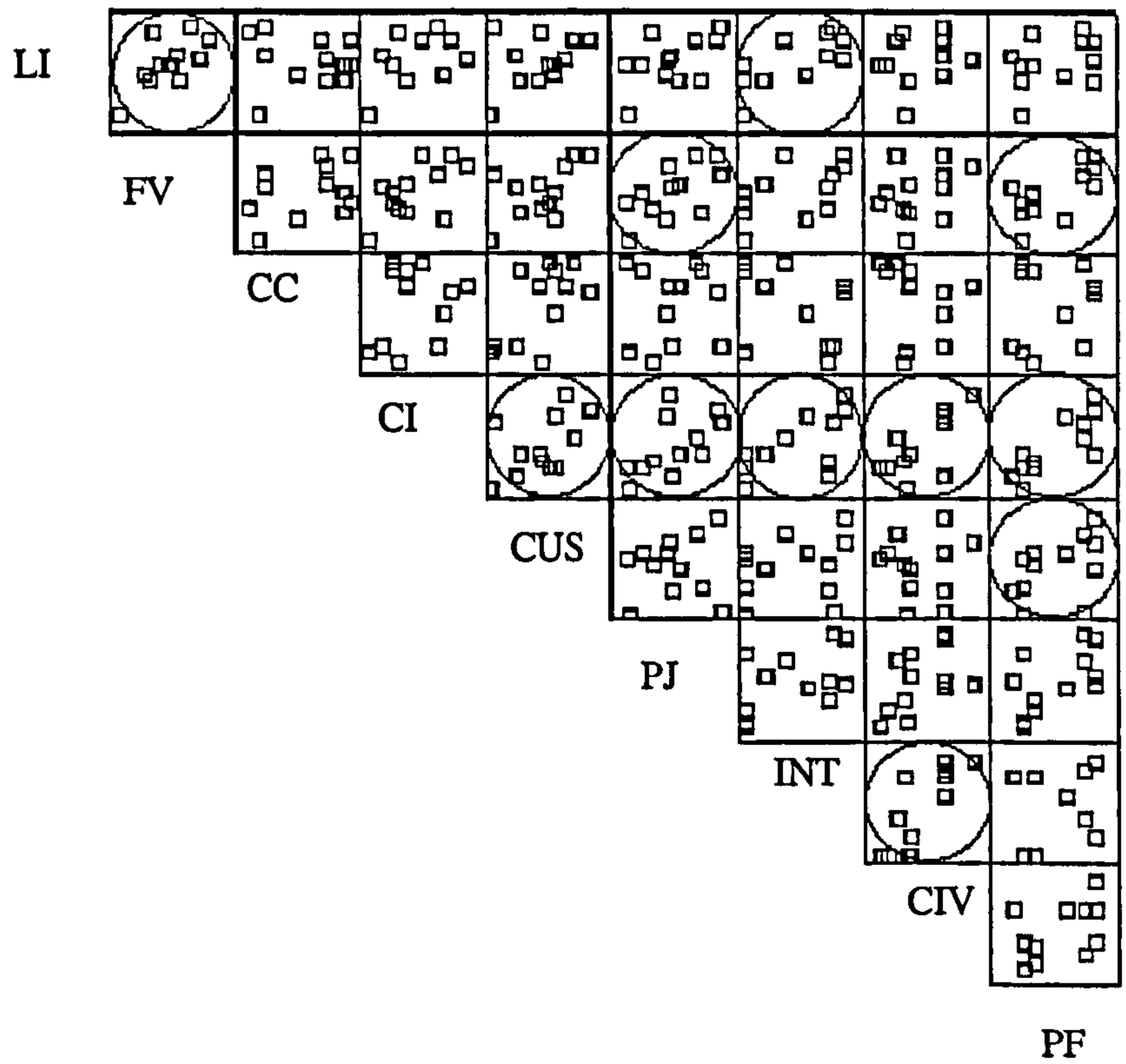
After obtaining the measurements of the SDs for the studied service sectors in the last section, a correlation analysis can be done to explore any relationships between the SDs. This is to answer research question number 4:

> Research question number 4: *"What are the relationships between the popular service dimensions?"*.

This is one of the most important stages of the analysis in the present research. Finding correlations between the SDs will not only help in trying to answer question four, but will also provide a useful basis for the rest of the analysis. It will be seen throughout the rest of the work that the results of this section are very helpful and enlightening in providing insights into the whole research.

Before starting the correlation analysis, it is interesting to use scatter diagrams to illustrate the relationships between different pairs of the SDs. This is presented in figure 5.5:

Figure5.5 0 Scatter Diagrams for Service Dimensions



Although no definite conclusion could be made from these diagrams, an ascending trend of dots can be seen for a number of pairs of the SDs. It is therefore expected to see mostly positive correlations between the SDs as a whole. It is also apparent that there are some strong correlations between some of the service dimensions. Of course finding these from the diagram is highly subjective to the way an individual looks at the scatter plots. The ones that are circled are the correlations that seem to be rather strong, visually. One interesting argument that can be put forward at this stage of the analysis is that the dimension of Customer Interaction (proposed as an alternative to Chase's dimension of Customer Contact by Schmenner; Chase, 1981; Schmenner, 1986) appears to have a strong correlation with many other dimensions. This is while Chase's dimension of Customer Contact does not show any strong correlations with any of the other dimensions. This is from one perspective to the benefit of the Customer Contact dimension as it can be argued that the other SDs might be used as a substitute for the dimension of Customer Interaction, while the dimension of Customer Contact can be considered as a unique dimension (at least among the SDs that are

studied in the present research). Of course a more important factor in comparing these two dimensions is to see which one has a better correlation with the PAs. This comparative discussion will be explored and elaborated in more detail later in this chapter. Another use of the graph is to look for any nonlinear trends that might not become clear through linear analysis. The author has noticed nothing particular in this regard. The size of the data provides little room for the emergence of such a trend.

The scatter graph is a starting point to move on to more accurate statistical correlation analysis methods. The first step for such analysis is to decide on the type of correlation analysis method to be used. Pearson's *r* (Product Moment Correlation Coefficient) is a popular technique for correlation analysis. Its popularity however ends when it comes to categorical data. Drawing conclusions from applying Pearson's *r* to categorical data is difficult as usually the distribution of categorical data (being nominal or ordinal) is not known (Conover, 1999). This brings us to the use of non-parametric statistics and specifically rank correlation techniques for the data in this chapter, which is of an ordinal type. When it comes to rank correlation, there are a number of techniques that can be used. Conover has listed some of these (Conover, 1999). Two of the techniques that are usually used for rank correlation analysis and are widely available in statistical softwares like SPSS, are Spearman's *p* and Kendall's Tau (Conover, 1999; McGhee, 1985; Walsh, 1990; Field, 2000). A brief description of these two techniques is given in appendix 5.3.

When considering the use of these two techniques for the data in this chapter, overall the results from Kendall's Tau can be argued to be more reliable as compared to the results from Spearman's *p*. This is because the size of the data is not large and also a large number of ties exists in the data for both the SDs and the PAs. Accordingly while both the techniques are applied to the data, when it comes to different results, the results from the Kendall's Tau are preferred over the results from Spearman's *p*. Having said that, it should also be mentioned that overall there is a minor difference between the results (and not the coefficient numbers themselves) derived from the two techniques. Even when Pearson's *r* is applied to the data, the results are not that different.

The correlation between the SDs is shown in appendix 5.4. The tables in this appendix show the Pearson's *r*, Spearman's *p* and the Kendall's Tau coefficients respectively. SPSS

Correlation analysis function has been used to calculate the coefficient correlations. The significant correlations with 0.05% and 0.01% significance are flagged up (respectively with * and **).

Table 5.1 compares the results of the three correlation coefficients. As noted before, with few exceptions the results of the three techniques are consistent, and where they are different, the results of Kendall's Tau are taken into consideration. Another interesting piece of information presented in table 5.1 is the direction of correlation for Kendall's Tau. In the table, sign "+" represents a positive correlation while sign "–" represents a negative correlation.

0: No Significant Correlation
1: Correlation Significant at 0.05% Level
2: Correlation Significant at 0.01% Level

P: Pearson's *r*
S: Spearman's' *p*
K: Kendall's Tau

	Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Customis.	Pers. Jud.	Intang.	Cus. Inab. Ev.
Front Value Added	P: 1 S: 1 K: 1 +							
Customer Contact	P: 0 S: 0 K: 0 -	P: 0 S: 0 K: 0 +						
Customer Interaction	P: 0 S: 0 K: 0 +	P: 1 S: 0 K: 0 +	P: 0 S: 0 K: 0 +					
Customisation	P: 0 S: 0 K: 0 +	P: 1 S: 0 K: 0 +	P: 1 S: 0 K: 0 +	P: 0 S: 1 K: 0 +				
Personnel Judgement	P: 0 S: 0 K: 0 +	P: 1 S: 1 K: 1 +	P: 0 S: 0 K: 0 +	P: 1 S: 1 K: 1 +	P: 0 S: 0 K: 0 +			
Intangibility	P: 1 S: 1 K: 1 +	P: 0 S: 1 K: 1 +	P: 0 S: 0 K: 0 -	P: 1 S: 1 K: 1 +	P: 0 S: 0 K: 0 +	P: 0 S: 0 K: 0 +		
Customer Inability to Evaluate	P: 0 S: 0 K: 0 +	P: 0 S: 0 K: 0 +	P: 0 S: 0 K: 0 -	P: 1 S: 1 K: 1 +	P: 0 S: 0 K: 0 -	P: 0 S: 0 K: 0 +	P: 2 S: 2 K: 2 +	
Process Focus	P: 0 S: 0 K: 0 +	P: 2 S: 1 K: 1 +	P: 0 S: 0 K: 0 +	P: 2 S: 2 K: 2 +	P: 0 S: 0 K: 1 +	P: 1 S: 0 K: 0 +	P: 0 S: 0 K: 0 +	P: 0 S: 0 K:0 +

Table 5.1 Comparison of the Results of the Three Correlation Analysis Techniques for SDs and the Direction of correlations for Kendall's Tau.

A number of statistically significant and highly significant correlations are found between pairs of Service Dimensions:

- Labour Intensity, Front Value Added and Intangibility are significantly correlated to each other. This suggests that the more intangible services are in more need of labour and that the value in these kinds of services is mostly added in the front office rather than the back office.
- Customer Interaction, Intangibility and Customer's Inability to Evaluate are significantly correlated to each other. For the latter two, the significance is less than 0.01%. The very high correlation between Customer's Inability to Evaluate the service and Intangibility suggests that the more intangible a service is the more difficult it is for customer to evaluate it in terms of quality.
- Process focus is significantly correlated to each of the Front Value Added, Customisation and Customer Interaction. The significance with the latter is less than 0.01%.
- Personnel Judgement is significantly correlated to each of the Front Value Added and Customer Interaction. It is possible to argue that a highly front value added service has more interaction with the customer and therefore is in more need of personnel judgement.
- Customer interaction and Customisation do not have a significant relationship based on Kendall's Tau. This is very much relevant to the service process matrix and the validity of one of its integrated dimensions (interaction and customisation). This will be further studied and discussed in detail in chapter 7.
- The results show no significant relationship between Customer Contact and any of the other service dimensions. This means while Customer Interaction is associated with other features of services (like Intangibility, Process Focus and Personnel Judgement) Customer Contact is not associated with any of these features.

As for the direction of correlations (positive or negative), the first interesting finding is that there are no significant negative correlations between the SDs. The strongest negative correlation is -0.283 with the P value of 22.8% which is a very weak and unreliable link (this is between Customer Contact and Intangibility). All the links ended to the SDs of Front Value Added, Customer Interaction, Personnel Judgement and Process Focus are positively

correlated (disregarding of the significance of correlations). Customer Contact has the highest number of links with negative correlation. These negative correlations are with Labour Intensity, Intangibility and Customer Inability to Evaluate. Customer Contact is again showing itself as a unique SD with different relationships with the other SDs.

Altogether the results of this section provide an answer for research question number 4. It was found that overall and with the exception of the dimension of Customer Contact, the other studied service dimensions have positive correlations with each other. This is very much in line with the Silvestro et al. Volume-Variety matrix, in which a number of service dimensions are put into one dimension because of being positively correlated to each other (Silvestro et al., 1992). The Volume-Variety matrix will be discussed further in chapter 7.

The correlation between the SDs will be referred to in various places in the rest of the work. It is therefore helpful to use simple schematic presentations as quick references for the SDs' correlations. Two schematic representations are illustrated in this section: Relationship map and Clusters map:

Figure 5.6 presents a relationship map. This figure is based on the results derived by Kendall's Tau. The thin lines represent correlations that are significant at 5% level and the thick lines represent the correlations that are significant at 1% level.

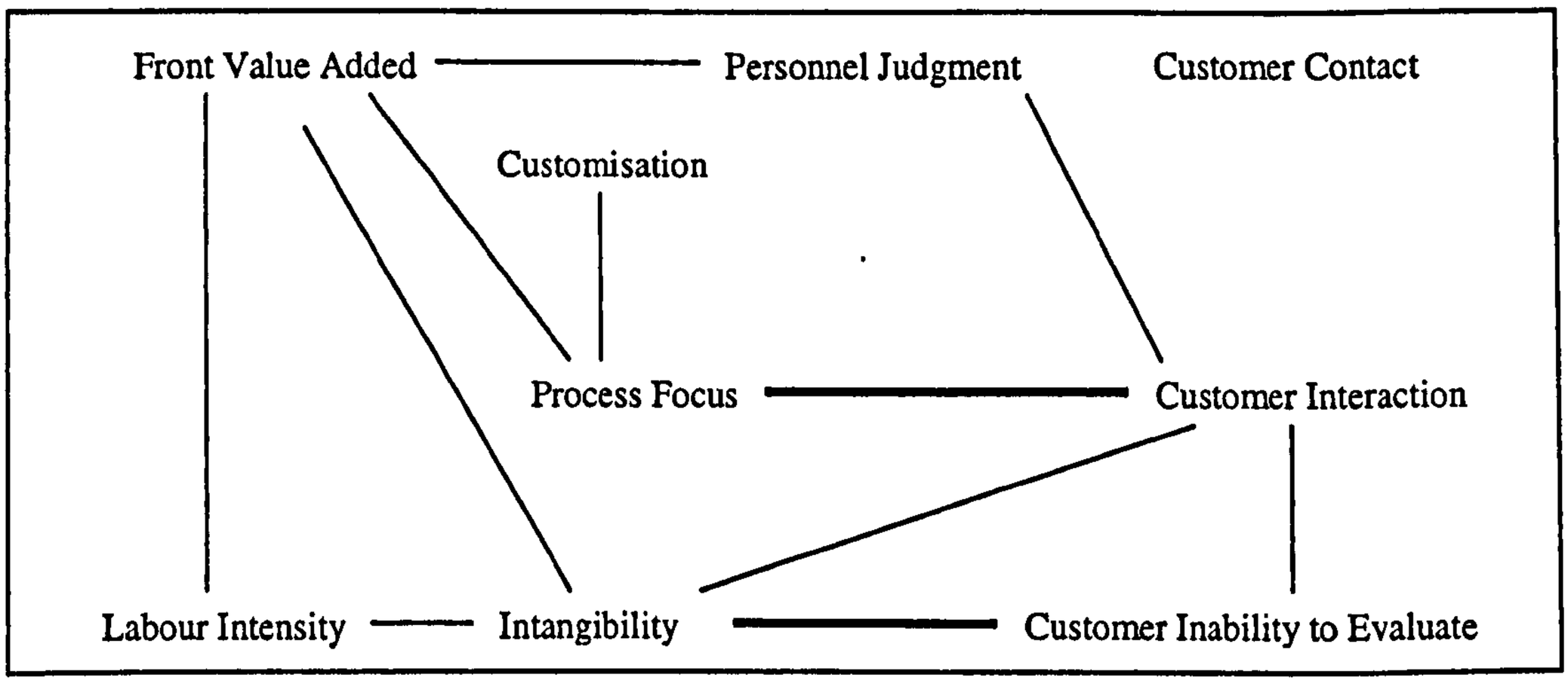


Figure 5.6. Relationship Map for the Service Dimensions, Based on Kendall's Tau Results

The above map shows that there are a number of "chains" of relationships between most of the service dimensions. Customer Interaction, Front Value Added and Intangibility, each with four relationship links have the highest number of links with other dimensions. Customisation has only one link with other dimensions (ignoring its possible link with Customer Interaction, which is only based on Spearman's r). Customer Contact is the only dimension with no significant links with other dimensions. Some of the implications of the above relationships are discussed in chapter 7, in particular with regard to the relationship between Customer Interaction and Customisation.

According to the above illustration, not all the service dimensions are significantly correlated to each other. Maister (1997) argues that Front Value Added services are also those that have high Customer Contact while Back Value Added services are associated with low Customer Contact services. According to the results of the present study, Front Value Added services are only associated with features like high Personnel Judgement and high Process Focus and high Labour Intensity. They are however not associated with Customer Contact.

The next section uses the SDs data to begin an initial attempt in answering research question number 2.

5.1.4. Similarity Analysis for Services based on the SDs

In this section the second research question is raised. It is interesting at this stage to look at the similarities and differences between services in terms of their measurements for SDs as a whole without any intention of proposing a definite classification scheme for the studied services. This will help to appreciate the differences of services with regard to their basic operational characteristics as reflected in their measurements for the SDs.

Research question number 2: *How can the service industries be classified with regard to Service Dimensions?*

To be able to compare the 12 studied service sectors in terms of their measurements for the SDs, a simple comparison table is developed. The table contains total difference of the SDs measurements between each pair of services. This is presented in appendix 5.5.

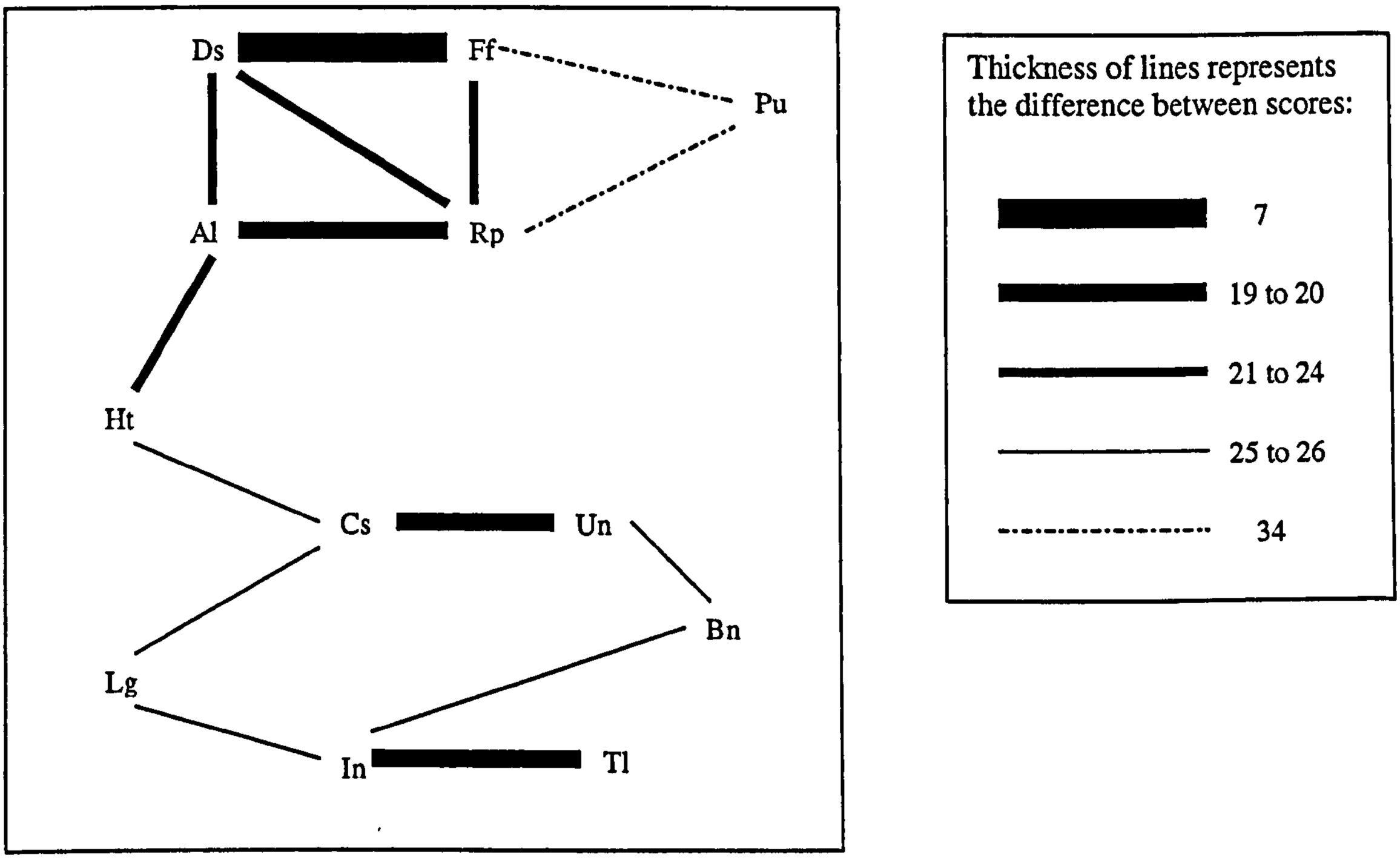
It is helpful to draw a relationship map between services (based on the table in appendix 5.5) to illustrate the similarities and differences in a way that could grasp mind better. This is given in figure 5.7. In developing this figure, the aim was to have all the services included and linked in the map and at the same time avoid making the map too crowded. After including the difference scores of no more than 26, it was found that all of the services except Power Utilities were included and linked and clear clusters of services had been reached. 26 here means an average of 2.9 degrees of difference (of services) for each SD (26 is total differences of scores among 9 SDs, that is 26/9 = 2.9). However, the Power Utilities is an exception as its least difference score with another service is no less than 34. Therefore, it was decided to include Power Utilities with a semi-attached link (dot lines) to the most similar service.

In using the map, it is interesting to see that basically three clusters of services can be recognized among the twelve service sectors in this study. The cluster with the biggest number of members is the one that includes Department Stores, Fast Foods, Auto- Repairing, Hotels and Airlines. Then there are two smaller clusters of 'Consultancy and University' and 'Insurance and Telecommunications'. It will be seen in section 5.2 how these results compare with the results of the clusters of services in terms of the PAs.

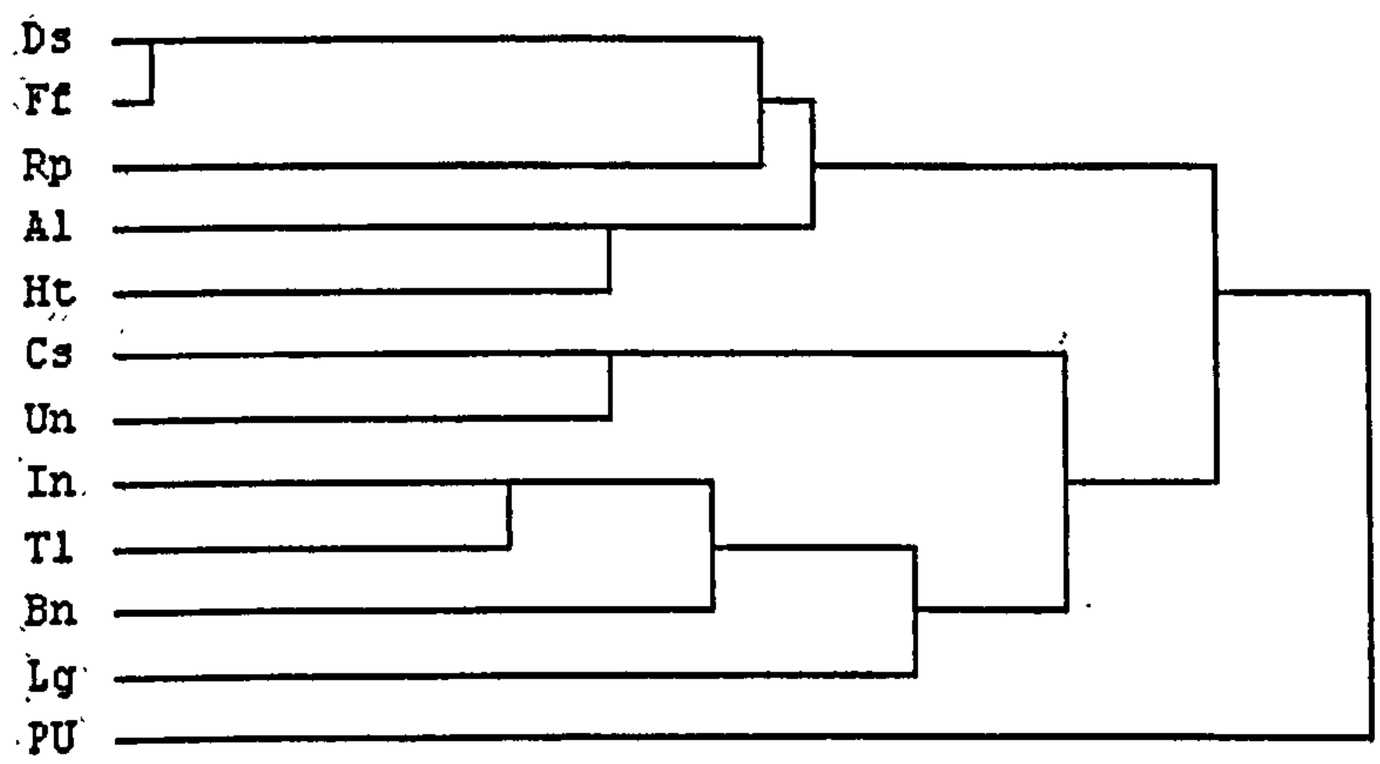
The most similar services are Department Store and Fast Food with a total difference of 7 degrees for SDs measurements (referring to the table in appendix 5.5). This means an average of $^{7}/_{9}$ (i.e. 0.78) differences in the measurement scale for the SDs.

In terms of differences, the most differences appear between services that have aspects of professional services (high interaction and/or high customization: Consultancy, legal services, Universities, Hotels) and those that have more similarities to manufacturing operations (auto-repair, fast food, power utility, department stores). In the table in appendix 5.5 the total difference between these two groups of services appears in the last 12 rows (i.e. the 12 most different pairs of services).

Figure 5.7 Map of Similarities in Between the Services in Terms of Service Dimensions



It is also interesting to try a cluster analysis method on the services based on their measurements for the SDs. This has been done by the SPSS Hierarchical Cluster Analysis function, based on Euclidean Distance that is the square root of the sum of the squared differences between values (here the SDs) for the items (here the 12 services). The results are illustrated in the following dendogram:



The above is in line with the relationship map that was illustrated earlier in this section. Some differences can be seen that occur due to the clustering procedure. Altogether the above dendogram and the relationship map are two tools that illustrate the overall similarity (and differences) of the 12 service sectors in terms of the 9 SDs.

In this section research question number 2 was answered. However, as stated in section 4.2, after answering the main research question a more advanced and helpful answer to this question can be reached.

This is the end of the analysis from the Service Dimensions View. In this view research questions 2, 3 and 4 attempted. Studying this view was also a necessary step towards answering the main research question of the present research. The next view belongs to the Productivity Aspects (PA). This view is presented in the next section as another step towards answering the main research question. Also in the study from the PA view, research question number 1 will be partially attempted.

5.2. The Productivity Aspects View

The SDs and the PAs are the two sides of this research. In section 5.1, the SDs and their relationship were studied to provide answers to research questions number 2, 3 and 4. In answering research question number 2, services were put in clusters purely based on their similarities in terms of the SDs measurement as a whole. In this section another classification scheme is presented for the studied services, this time based on their similarities in terms of the PAs. This is to "partially" attempt research question number one:

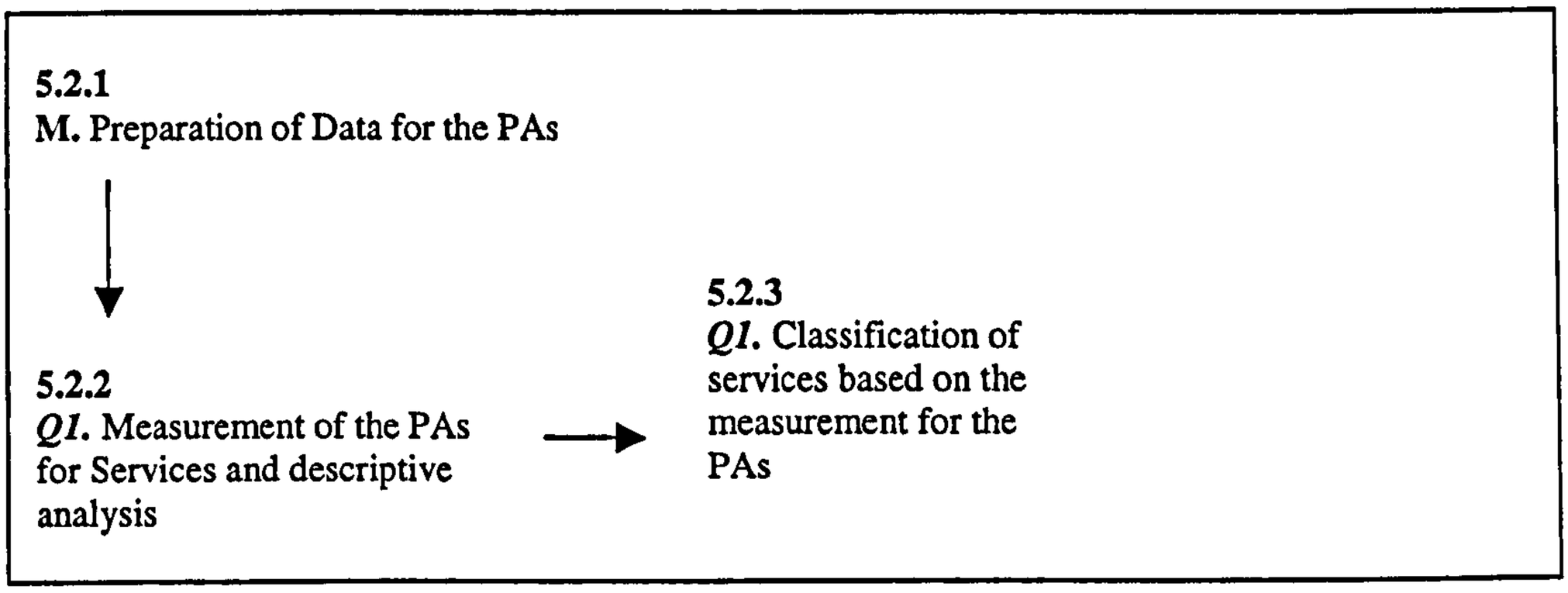
Research question number 1:

> *"In terms of Productivity management, how are the service industries similar/different and how can they be classified."*

As stated in the last section, a more advanced and useful answer to this research question can be reached after answering the main research question, where the association between the PAs and the SDs is explored. It should also be noted that this question will be answered again, but from another perspective, in chapter 6. This is the reason for emphasising the word "partially"

in the above paragraph. Besides answering research question one, this section is also another necessary step towards answering the main research question.

As discussed in Chapter 4, the PAs are derived from the literature in an attempt to provide a reasonable ground or framework for the field studies (i.e. Interviews). Figure 5.1.2 is repeated here for convenience:



To gain more insight into the PAs, particularly in an attempt to answer research question one, first the measurements of services for the PAs are given (5.2.2). The measurement of the PAs was only possible after data preparation (5.2.1). The measurements for the PAs are then studied by a descriptive analysis. The answer to research question number one will become clearer by developing classifications of services based on their measurements for the PAs (5.2.5).

5.2.1 Preparation of data for the PAs

Preparing the 'Productivity Aspects' data required more effort as compared to preparation of the SDs data (section 5.1.1). The first step towards preparing the data was to assign numbers to the importance levels of the Subjects (as discussed in Section 4.10.2). As the data is ordinal, any descending (ascending) numbers could do the job. To make it simple and reasonable the ranks are assigned as follows:

- Major Issue/use Level: Rank 2

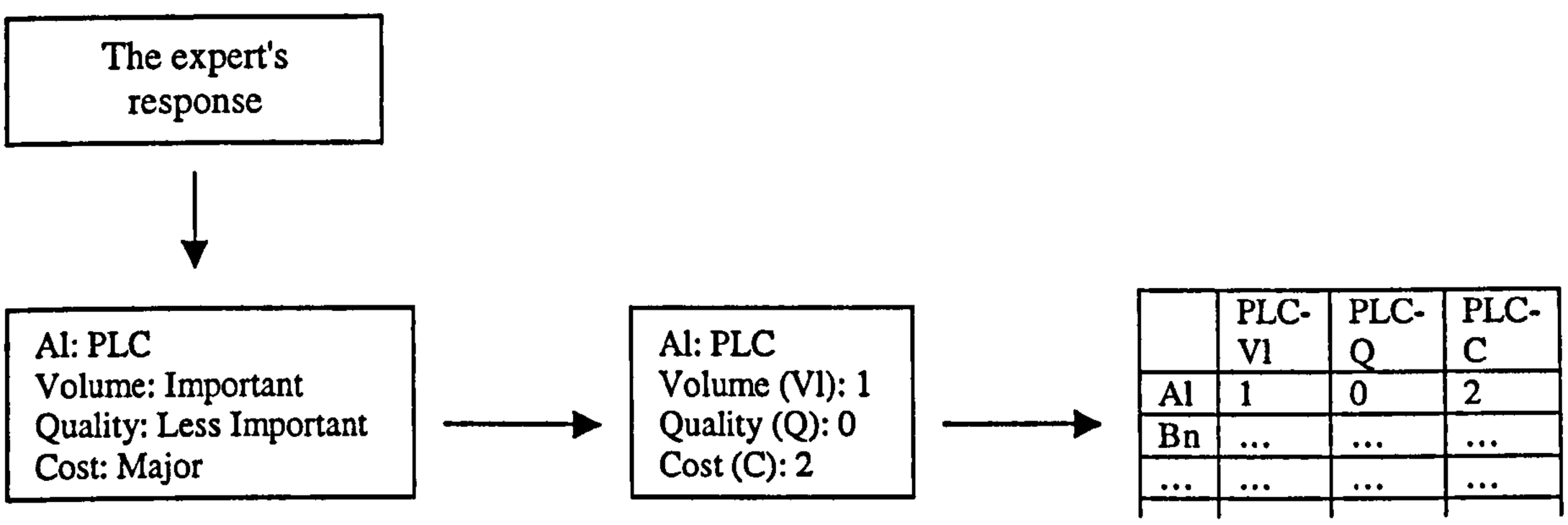
- Important Issue/use Level: Rank 1

- Less Important Issue/use Level: Rank 0

For the definition of the levels refer to Section 4.10.2.

It was necessary to arrange the data in a way that it could be analysed for correlation analysis. To make the data ready for correlation analysis it was necessary to arrange it in a way that it could be processed by ordinal correlation analysis methods available statistical software (SPSS). To do so, for each PA a table was developed with the Subjects within that PA forming the title of the columns and their level of importance being the data in the columns.

For instance this is the procedure for preparing the data received from one of the experts in Airlines for the PA of "Productivity Improvement Policies (PLC)":



The other necessary step towards preparing the data was to compromise between the answers of the two experts in each service sector. Except for the missed data (Auto-Repair), there was a pair of measures for each data related to Subjects within PAs. Each piece of data is provided by one of the two experts for a service sector. For the purpose of the main analysis, for each PA, only one set of data related to the Subjects was needed. This should be the best representation of the overall comment on the two experts' responses. In doing so, there are some considerations:

a) As discussed in Section 4.8, all the experts were chosen carefully to provide the most possible sources of data. Therefore, the experts were trusted in the responses they

gave. There were no grounds for giving different weights to the two experts in each service sector.

b) Each expert naturally had his/her own individual professional experience in the associated service sector. As such any piece of information, even if delivered only from one of the two experts could be considered important and could not be ignored.

c) Finding the most relevant PA Subjects was one of the essential steps in the process of analysis. Correlation analysis was to take place between the relevant PA Subjects and the SDs. It is arguable that a Subject that was emphasized by both of the experts deserved more attention in the analysis than a Subject that was emphasized by only one of the experts. From one point of view, the Subjects that were emphasised by only one of the two experts could be argued to be less reliable and therefore ignorable.

Arguments (b) and (c) are two apparently conflicting assumptions.

Looking at the above considerations, two approaches were found appropriate to reach one set of data for each service sector. The two following titles are given to each of these approaches:

I. Democratic Approach: The term 'Democratic' is used to represent a mathematically reasonable approach. There are two sets of ordinal data and only one set is needed to represent the situation. Calculating the median is an obvious approach here. For example, let us assume that expert number one has recognized the Subject of 'Competence of People' in the PA of 'Productivity Problems' as a major issue (which will be assigned rank 2). Expert number two has recognized the same Subject of the same PA to be an 'Important' issue and not a major one (which will be assigned rank 1). The democratic approach will give rank 1.5 (which is the median or mean of the two ranks) to this Subject. The benefit of this approach is that the responses of both the experts are taken into consideration equally. This approach is more to the favour of argument (b) above.

II. Conservative Approach: Here more emphasis is given to the 'common responses' in order to increase the degree of caution in assigning the ranks. In other words, the ranks are given only to the degree that the two experts both agree. This is like a Majority Vote System. For instance in the above example, as

both the experts agree that the Subject 'Competence of People' is at least 'Important' (i.e. 1), number 1 will be assigned to this Subject disregarding to the fact that one of the experts considered the Subject to be even more than 'Important' (i.e. Major). The benefit of this approach is that the ranking goes higher as long as the two experts agree with each other and will stop at the point of dispute. This is more to the favour of point (c) above.

The author found no grounds to consider any overall advantages for one of these approaches as compared to the other one. Therefore, the analysis has been done based on both approaches aiming to accept only the results that are common between the two of them. This way both arguments (b) and (c) are taken into consideration and more reliable results will be derived from the data. Accordingly, preparation of the data for the PAs involves finding the agreed data based on the above two mentioned approaches.

5.2.2. Measurement of the PAs for Services and descriptive analysis

As discussed in chapter 4, the PAs' data gathered from the experts were transferred to numbers with the range of 0 to 3. The table in appendix 5.6 shows the results, based on the "Democratic Approach" and the "Conservative Approach".

The maximum, minimum and the range of the data are obvious for the PAs. It is however interesting to find the median levels for the data derived from each of the two approaches. This is shown in table 5.2. In this table the categories of the PAs are distinguished by tick borders and for each category, the PAs data for the Subjects are given. This data is based on the two approaches and is sorted in descending order based on the Democratic approach. This also makes the data of the Conservative approach sorted•. As discussed in section 5.2.1, the rankings given for the PAs are:

- Major Issue/use Level: Rank 2

- Important Issue/use Level: Rank 1

• Because of the equal figures in the Conservative approach, sorting based on the Conservative data would not result in sorted figures for the data of Democratic approach.

- Less Important Issue/use Level: Rank 0

Table 5.2 is useful when the order of data is taken into consideration for each category.

PAs Categories	Democratic	Conservative
PQ-q	2	2
PQ-p	0	0
TRDOF	1.75	1.5
PLC-Vl	1.75	1.5
PLC-Ct	1.5	1.5
PLC-q	0	0
FCT-Pr	1.5	1
FCT-In	1.5	1
FCT-Ot	1	0.5
FCT-Fb	0.5	0
FCT-Cus	0	0
PRB-pp	2	2
PRB-mt	1.5	1
PRB-cl	0.75	0.5
PRB-Tc	0.5	0
APP-tc	1.75	1.5
APP-pp	1.25	1
APP-sr	1.25	1
APP-tk	1	1
APP-cus	0.25	0
APP-cp	0	0
MES-rl	1.5	1
MES-int	1	0.5
MES-ot	0.25	0
MES-in	0	0
MES-fc	0	0
QGP-1	1.5	1

QGP-4	1	1
QGP-3	0.75	0
QGP-2	0.5	0
QCT-pv	1.75	1.5
QCT-int	1	0.5
QCT-ext	1	0.5
QCT-app	0.5	0

Table 5.2 Sorted medians of the PA subjects.

It is possible to discuss and argue for a general trend on the services (in the present research) based on these results:

- It is evident that according to the experts, quality is more of the concern in these services as a whole as compared to productivity.

- Overall, productivity and quality have a short term trade off in between

- It is possible to argue that overall increasing productivity relies on increasing the volume.

- People and then methodology are the main sources of problems for productivity improvement and overall there are fewer problems from technology sources.

- Technology based approaches are most applicable followed by people based and service based.

- In terms of productivity measurement, the relationship between input and output is the most difficult aspect. Intangibility of output comes next.

- Understanding customer expectation and then external communication gaps are the two most important gaps in meeting customer expectations based on Parasuraman's gap model (Parasuraman, 1988).

- As for the quality costs, prevention costs are highest and the appraisal costs are the lowest.

It is important to know what types of issues are included in each of the PAs. For instance, what are the types of the human resource problems that are referred to by the PA of "Productivity Problem" (PRB-P). These will be explored in chapter 6 through qualitative analysis.

5.2.3. Classification of Services Based on the Measurements for the PAs

In this section the research question number one is attempted. As was mentioned before, this question will be attempted again, from another perspective, in chapter 6.

Reminder - Research question number 1:

> *"In terms of Productivity management, how are the service industries similar/different and how can they be classified."*

Looking at the table in appendix 5.6, in many of the categories clear classification of the studied services can be seen, while in a few of the categories this is not quite clear. The possible classifications for each category are described below, based on the highest levels of importance (major issues) in each category, as suggested by both the Democratic and Conservative approaches.

- <u>Productivity Vs. Quality and Trade Off:</u>

According to the experts in each of the twelve studied services:

Services that give priory to Productivity rather than Quality:

- Department Stores
- Fast Foods
- Hotels
- Power Utilities

Services that give priority to Quality rather than Productivity:

- Airlines
- Banks
- Consultancies
- Insurances
- Legal Services
- Auto-Repairing
- Telecommunications
- Universities

Services in which Productivity and Quality improvement completely fit together:

- Banks
- Consultancies
- Fast Foods
- Power Utilities
- Telecommunications

Services in which Productivity and Quality improvement may have some negative interactions in the short term but highly positive interactions in the long term:

- Airlines
- Department Stores
- Hotels
- Insurances

- Legal Services
- Auto-Repairing

Services in which Productivity and Quality improvement have considerable negative interactions in the short term with some positive interactions in the long term:

- Universities

It is important to note that the responses to this question do not imply that one of the Productivity or Quality is completely disregarded in certain services. None of the experts suggested such a statement. It is only in comparison to each other that these responses are valid.

It should also be noted that (as mentioned in section 4.10.1.1) overall the question about Productivity versus Quality and the Trade Off proved to lead to less reliable results in terms of categorising the options by the respondents. However, the question proved to be very useful in collecting interesting qualitative data (as presented in chapter 6).

- <u>Productivity Improvement Policy</u>

  Services in which increasing the Volume is a major policy for productivity improvement:

  - Banks (Decreasing cost is another major policy)
  - Fast Foods
  - Hotels
  - Legal Services
  - Power Utilities (Quality policy comes immediately after)
  - Auto-Repairing

  Services in which decreasing the Cost is a major policy for productivity improvement:

  - Airlines (Volume Policy comes immediately after)

- Banks (Volume policy is another major policy)
- Consultancies
- Department Stores (Quality Policy comes immediately after)
- Telecommunications (Volume Policy comes immediately after)
- Universities

Services in which increasing the Quality is one of the applicable policies for productivity improvement:

- Insurance Services
- Department Stores
- Power Utilities

As it is clear from the above, experts in most of the studied services did not identify improving quality as one of the major policies to increase productivity (with Insurance Services as the only exception). This is while increasing quality in most of them does have a positive effect on productivity. On the other hand, increasing Volume seems to be the most popular policy among the services. The reason why quality is not considered as major policy for improving productivity and the way it does contribute to improving productivity will be explored in the chapter 6.

- <u>Productivity Factors</u>

It was not surprising to see that the replies to this question were mostly concentrated around Input, Output and Process (which are the three key factors of any operation (Slack et al., 2001). There were however services that along with their "default" attention to the three mentioned factors, also give special attention to Feedback and Customer in terms of

productivity. Therefore for this category of productivity aspects, the classifications were made according to answers with regard to the importance of the Feedback and Customer factors.

Services in which Feedback and Customer are not as important as the main three factors in terms of productivity:

- Airlines
- Banks
- Consultancies
- Insurances
- Legal Services
- Power Utilities

Services in which along with other possible factors, Feedback or Customer are also the important factors:

- Fast Foods (Both)
- Telecommunications (Both)
- Hotels (Both)
- Department Stores (Feedback not Customer)
- Auto-Repairing (Feedback not customer)
- Universities (Customer not Feedback)

It is worth mentioning that (as will be explored in chapter 6) although originally Feedback was meant to be both internal and external feedback, in most of the interviews the experts were interested in discussing the external feedback; therefore, it is reasonable to argue that Feedback in this classification tends to be more external than internal.

- Productivity Problems

Services in which Competency of People is the major problem for productivity improvement:

- Airlines
- Consultancy (Methodology comes immediately after)
- Hotels (Methodology comes immediately after)
- Auto-Repairing
- Universities (Methodology comes immediately after)
- Fast Foods (Climate is also a major issue, Methodology comes immediately after)
- Banks (Climate is also a major issue)
- Department Stores (Technology is also a major issue)

Services in which Methodology and Systems is the Major problem for productivity improvement:

- Insurances (Technology comes immediately after)
- Legal Services (People comes immediately after)
- Power Utilities (Climate comes immediately after)
- Telecommunications

The above classification suggests that another basis can be used for classification:

Services in which Climate is an important problem for productivity improvement:

- Banks
- Fast Foods
- Insurances
- Power Utilities

Services in which Climate as a problem is not nearly as important as the other factors for productivity improvement:

- Airlines
- Consultancies

- Department Stores
- Hotels
- Legal Services
- Auto-Repairing
- Telecommunications
- Universities

It is interesting that most of the services have not considered Technology to be their main problem in improving productivity. On the contrary, Human Resource is introduced in many of the services as the major problem in improving productivity.

- <u>Productivity Approaches</u>

Services in which Technology based approaches are major tools for improving productivity:

- Airlines (All other options come immediately after)
- Banks
- Department Stores (Task based comes immediately after)
- Fast Foods
- Power Utility
- Telecommunications

Services which People based approaches are major tools for improving productivity:

- Consultancies
- Hotels (Capacity based is also a major tool)
- Universities (All other options come immediately after except technology based approaches)

Services which Service based approaches are major tools for improving productivity:

- Insurances
- Legal Services (People based comes immediately after)
- Power Utilities (Technology based also a major tool)
- Auto-Repairing

Obviously the Customer based approach that was added to the original list by the author (Refer to Chapter 4) was not a very relevant option as not many experts have ranked it high. This addition however provides beneficial grounds for relevant discussions in the interview, which led to interesting qualitative data. It is also necessary to take note that two main items coming under the title of Service based approaches were Standardisation and Advertising. In the qualitative section it will be pointed out in the Service based approach list (above) whether standardization or advertising is the major issue.

- Productivity Measurement Problems

Services in which different categories of Output is a major problem in productivity measurement:

- Consultancies (Intangible aspects of output comes immediately next)
- Hotels (Different Categories of Input is also a major problem)

Services in which the Relation between output and input is a major problem in productivity measurement:

- Banks
- Department Stores
- Fast Foods
- Power Utilities (Intangible aspects of output is also very important)
- Auto-Repairing
- Telecommunications (Different categories of output comes immediately after)
- Universities (Different Categories of Input is also very important)

Services in which the Intangible aspects of output is the major problem in productivity measurement:

- Airlines

- Insurances
- Legal Services (Measuring the input for employees facing customers comes immediately after)

It is clear from the above that the relation between input and output is the most common problem in measuring productivity. In contrast, "different categories of Input" is not a major issue for productivity measurement. This will be further explored in chapter 6.

- Quality Characteristics

As discussed in chapter 4, this category of PAs was only included to gain more insight into the concept of quality in the studied services and to provide grounds for more effective discussions in the interviews. This category of the PA is not included in answering the main research question. The inclusion of this category in the list of the PAs however provided some interesting insights into the way the managers look at quality in their respective service. Here only the main results are presented:

Services in which Reliability is the major quality characteristic:

- Airlines (Willingness to Help is another major characteristic)
- Consultancies (Flexibility is another major characteristic)
- Power Utilities (Flexibility is another major characteristic)
- Auto-Repairing (Willingness to Help is another major characteristic)
- Telecommunications (Speed comes immediately after)
- Insurance (Speed is also a major characteristic)

Services in which Speed is the major quality characteristic:

- Banks (Reliability and Willingness to Help come immediately after)
- Fast Food (Structural and Willingness to Help come immediately after)

Services in which the Structural quality is the major quality characteristic:

- Department Stores
- Hotels (Willingness to Help is another major characteristic)
- Legal Services (Reliability is another major characteristic)
- University (Reliability is another major characteristic)

It is suggested from the above that among the long list of quality characteristics in the present research, Reliability is the most popular one.

- Quality Gaps

Services in which Gap 1 (Zeithaml et al., 1988) is a major quality gap:

- Banks (Gap 4 is another major gap)
- Consultancies (Gap 2 is another major gap)
- Department Stores
- Hotels (Gap 3 comes immediately after)
- Insurance Services

Services in which Gap 3 is a major quality gap comparing to the other internal quality gaps:

- Airlines (Gap 1 is another major gap)
- Legal Services
- Power Utility (Gap1 and Gap 4 come immediately after)

Services in which Gap 4 is a major quality gap:

- Banks (Gap 1 is also a major gap)
- Fast Foods
- Auto-Repairing

- Telecommunications
- Universities

It is interesting that Gap 2 has been given very low ranks by the experts (this is the gap in between the understanding of the managers of the customer's expectation and standardisation of this understanding). The dynamics that could lead to such responses will be investigated in chapter 6. Another important point is the considerable number of responses that give Gap 4 a high rank. This as well will be explored further in the qualitative analysis.

- Quality Costs

Services in which Prevention costs are the major cost for quality:

- Department Stores (External costs are another major cost)
- Fast Foods
- Hotels (Appraisal costs come immediately after)
- Insurances (Appraisal costs are another major cost)
- Power Utilities (Appraisal costs come next)
- Auto-Repairing (Appraisal cost is another major cost)
- Universities (Internal costs immediately come next)
- Telecommunications (Internal costs is another major cost)

Services in which External costs are a major costs for quality:

- Airlines (Internal costs comes immediately after)
- Banks (Prevention costs come immediately next)
- Consultancy (Internal costs are another major cost)
- Legal Services (Internal costs come immediately after)

As was expected, Internal costs are mostly associated with External costs while Prevention costs are mostly associated with Appraisal costs. It is interesting that overall Internal costs have not received a high rank. This will be discussed further in the qualitative analysis.

(Internal costs were ranked higher than Prevention costs for Telecommunications. It was however decided to include it on the list of Prevention costs to have a more robust classification.)

The above observations are further looked at and explored in chapter 6. The classification of services based on productivity management aspects is attempted again in the next section where the classification schemes are take into account both SDs and the PAs. The next section attempts the main research question by studying the relationship between the PAs' data and the SDs' data.

5.3. The Main View

So far the research questions 1, 2, 3 and 4 have been answered. The measurements for the SDs and the PAs are found and the premises needed to attempt the main research question are ready. This section is the main section of the quantitative analysis as the main research question is attempted here.

The main research question:

> *"What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?"*

Using the specific terminology of this research, the above implies finding the SDs that are effectively Correlated with different Categories/Subjects of the PAs.

In this section, first the SDs with reasonable correlations with the Categories/Subjects of the PAs are found via correlation analysis; second, a variety of criteria are considered in order to choose the best SDs among the ones that were found to be significantly correlated with the PAs. Third, stage, a more pragmatic view will be adopted to provide a more practical applicable answer to the main research question. As a natural result, a classification scheme for services based on the relevant and chosen SDs is developed. As discussed in section 4.2

this classification scheme can also been seen as a more advanced and useful answer to research questions 1 and 2 (classification of services based on, respectively, PAs and SDs).

Here the flow chart of the sections coming under the Main View (section 5.3) is repeated for convenience:

Section 5.3 Main View (Q.Main)

5.3.1 ***Q MAIN.*** Correlation analysis between the SDs and the PAs

↓

5.3.2 ***Q MAIN, C.*** Exploring the association between the significantly correlated SDs and the PAs

↓

5.3.3 ***Q MAIN.*** Analysis for choosing the most appropriate SDs for the PAs

↓

5.3.4 ***Q MAIN,*** Adopting a Pragmatic Practical View

5.3.1. Correlation Analysis between the SDs and the PAs

On the grounds of the same technical discussion about the application of Kendall's Tau correlation analysis, as referred to in section5.1.3, the same method is used to find correlations between:

1. The SDs and the Democratic version of the PAs
2. The SDs and the Conservative version of the PAs.

As discussed before the rule is to accept the results that are common between the two sets of correlation analyses. Table 5.3 summarises the significant (equal or less than 0.05% confidence level) correlations. Signs "+" or "-" are used to represent (respectively) high or low significant correlations. Sign "." is used to represent the correlations that are high based on only one of the two approaches (i.e. Democratic and Conservative). To avoid being too restrictive in accepting the correlations, there is also sign ".r" to represent the correlations that are only high in one of the approaches but are also high with the other approach if using Spearman's *r* instead of Kendall's Tau. The blank cells are the PAs for which no significant correlations with any of the SDs were found. The categories are distinguished by tick border lines. As explained in chapter 4, the PA of Quality Characteristics is excluded from this analysis. It is worth mentioning that in this particular study the Conservative approach in most cases acted as the limiting factor for the Democratic approach.

Productivity management aspect	Subject	Labour intensity	Front value added	Customer contact	Customer interaction	Customisation	Personnel judgement	Intangibility	Customer inability to evaluate the service	Process focus
Productivity and quality trade off	Importance of prod. v qual.							-	-	
	Strength of trade off									
Productivity factors	Input						+			
	Process					.			.	
	Output									
	Feedback								-	
	Customer									
Productivity improvement policies	Increasing volume									
	Increasing quality				-					-
	Decreasing cost					+				.
Productivity improvement problems	Technology									
	Competence of people			+		+				
	Methodology / systems	.		.r						
	Operational climate	.	-		.		-	-		-

Table 5.3 Correlation Analysis Results for SDs and PAs, Using Kendall's Tau

\+ : Significantly and positively correlated by Kendall's Tau based on the two approaches.

\- : Significantly and negatively correlated by Kendall's Tau based on the two approaches.

.r : Significantly correlated by Kendall's Tau based on one of the approaches and by Spearman's *r* based on the other approach.

. : Significantly correlated by Kendall's Tau based on one of the approaches only.

Productivity management aspect	Subject	Labour intensity	Front value added	Customer contact	Customer interaction	Customisation	Personnel judgement	Intangibility	Customer inability to evaluate the service	Process focus
Productivity improvement approaches	Technology based						-		.r	
	Employee based		.r		+	.				+
	Product / service based					-				
	Task based									
	Capacity based		+							.r
	Customer based									
Productivity measurement problems	Input differences					.				
	Output differences									-
	Input / output relationship		-				-			
	Intangible outputs									
	Staff facing customers									
Internal quality gaps	Gap 1									
	Gap 2		.			.				
	Gap 3									
	Gap 4		-				-			
Quality costs	Prevention									-
	Appraisal									-
	Internal failure			.						
	External failure									

Table 5.3 (continued) Correlation Analysis Results for SDs and PAs, Using Kendall's Tau

\+ : Significantly and positively correlated by Kendall's Tau based on the two approaches.

\- : Significantly and negatively correlated by Kendall's Tau based on the two approaches.

.r : Significantly correlated by Kendall's Tau based on one of the approaches and by Spearman's *r* based on the other approach.

. : Significantly correlated by Kendall's Tau based on one of the approaches only.

As can be seen in the above table, fortunately there are a few PAs that have correlations with SDs and this means it is arguable that certain SDs can be used as indicators for some PAs, thus answering the main research question. It is however unfortunate that not all the PAs are significantly correlated with the SDs, which means for some of the PAs no SDs can be introduced as indicators (at least not based on this research). The other interesting overall result is that quite expectedly it is not the case that all the subjects in one category have the same SD. This means the answer to the main research question is not going to lead to 'neat' and 'robust' classifications (like what can be seen in theoretically derived classifications, e.g. the Service Process Matrix -Schmenner, 1986 - or the Volume-Variety matrix - Silvestro et al., 1992). The classification that is to be proposed based on this study will therefore be expected to be a complex one and not a simple (say) two by two matrix.

At this stage it is interesting to review the use of SDs in indicating for the PAs as a whole. The following summarises the extent of the use of each of the SDs as an indicator. Table 5.3 is used as the reference for this table and the correlations marked as "r " are also included.

LI: 0 PAs
FVD: 5 PAs
CC: 2 PAs
CI: 2 PAs
CUS: 3 PAs
PJ: 5 PAs
INT: 2 PAs
CIV: 3 PAs
PF: 6 PAs

Labour Intensity has been found to be of no use for indicating a productivity aspect. This is an interesting result as talking about productivity, labour intensity is usually thought of as an important factor. In fact it might be important, but not in terms of acting as an indicator. On the other hand, Process Focus, Front Value Added and Personnel Judgment are found to be the most useful indicators for productivity aspects. Customer Contact that has received a lot of attention in the literature seems not to be a particularly useful SD in indicating the productivity aspects (only two PA subjects). This is the same for Customer Interaction. These

results will be compared with the comments of the people who proposed these SDs later in chapter 6.

It is apparent that there are a few PAs that are correlated with more than one service dimension. Obviously, where possible it is wise to use all the candidate SDs for a PA to increase the reliability of the results. However as usually less time and energy consuming measurement tools are preferred, it is helpful to find the best SD for each PA among the candidate SDs. To do this, it is necessary to establish some criteria. This calls for another step before deciding which SDs are good indicators for the PAs.

However before starting the procedure of choosing the most appropriate SDs, it is important to further explore the way the PAs are associated with the SDs. This is particularly necessary for two reasons:

- The ultimate benefit in answering the main research question is to be able to define "Low" and "High" values for the SDs as indicators for the condition of services in terms of the associated PAs. It should be noted that what was referred to as average in section 5.1.2.1 was only on the basis of the measurement scales (8 being the middle of a scale of 1 to 15). When it comes to practical use of the SDs as indicators there is a need to find an average point on the basis of associations between the SDs and the PAs. Therefore, it is important to define a "borderline" for High and Low zones in the relevant SDs. A broader line will serve as a switching point in terms of a SD indication. For better classification it is helpful to illustrate this by looking at an example. Taking into account the correlation between Customer Interaction and the PA of People-based approach for productivity improvement: the correlation suggests a higher customer interaction indicates a higher applicability of people-based approaches for productivity improvement. A borderline refers to a point on the scale of customer interaction that can serve as a point above which services can be considered to have high applicability of people-based approaches, and a point below which services can be considered to have low applicability of people-based approaches. So, for instance, if this point was found to be (say) 5 in the scale of 1 to 15, this means (according to the present research) services with a degree of customer interaction of above or below 5 (on the measurement scale) have respectively high or low applicability of people-based approaches to productivity improvement. This is in fact

what was referred to (in section 4.3.) as one of the differences and advantages of this research as compared to similar works on service classifications.

- After defining the borderlines, it is interesting and helpful to investigate for each relevant SD that which side of the borderline (High or Low) indicates the associated PA better. For instance, in the case of the significantly correlated pair of Customer Interaction and people-based approaches, it is interesting to see if both low and high values of CI provide equally reliable information about the applicability of people-based approaches or if the values in one of these zones provide more reliable information.

The above is done through conditional probability analysis and is discussed in the next section.

5.3.2. Exploring the Associations Between the Significantly Correlated SDs and the PAs

The aim of this section is to further explore the correlation between the PAs and SDs by first finding what was referred to as 'border lines' in the last section, and second investigating (for each SD) which side of the borderline indicates the associated PA better. Before doing this a slight alteration is made to the PAs data:

As discussed in 5.2.1 the PA data was ranked into three levels labeled as 0, 1 and 2. Now having the results of the correlations analysis, particularly because of the small size of data and also to make it practically more beneficial and operationalised, it is more appropriate to apply a higher level of categorization to the PAs. Therefore the levels of "Major Issue" (2), "Important Issue" (1) and "Less Important Issue" (0) are re-categorised to "≥ 1" that can be called "Critical" and "<1" that can be called "Less Critical". This recategorisation is quite simple and with a tiny exception that is explained at the end of this section, can be easily applied to the PA data.

Conditional probability is used to first identify the best position for the borderline in each of the correlations between an SD and a PA and second to compare the reliability of indication in the low and high zones of each SD for each relevant PA. In other words, conditional

probability has been used merely as a tool to facilitate better illustration of the results in the forthcoming sections in this chapter. Due to the limited size of data, no further results were sought through conditional probability analysis. Appendix 5.7 presents all the relevant graphs and calculations. It should be noted that due to the size of data, no additional results were sought in carrying out conditional probability analysis on the data. The analysis

To clarify the process, one of the significant correlations is explained here as an example. The same procedure is used for the rest of the significant correlations as presented in appendix 5.7.

Example:

Correlation of "CIV" and "FCT-Fb"

The above association suggests that there is a negative correlation between Customer Inability to Evaluate Quality (CIV) and Applicability of Feedback as a factor in productivity management (FCT-Fb). The question to be answered is: "what is the borderline on the scale of 1 to 15 for the Service Dimension of CIV that can be seen as a switching point in terms of the importance of FCT-Fb?". Services with measurements of CIV above this border line should have feedback as a less critical factor while those below the borderline have feedback as a critical factor (the correlation is negative).

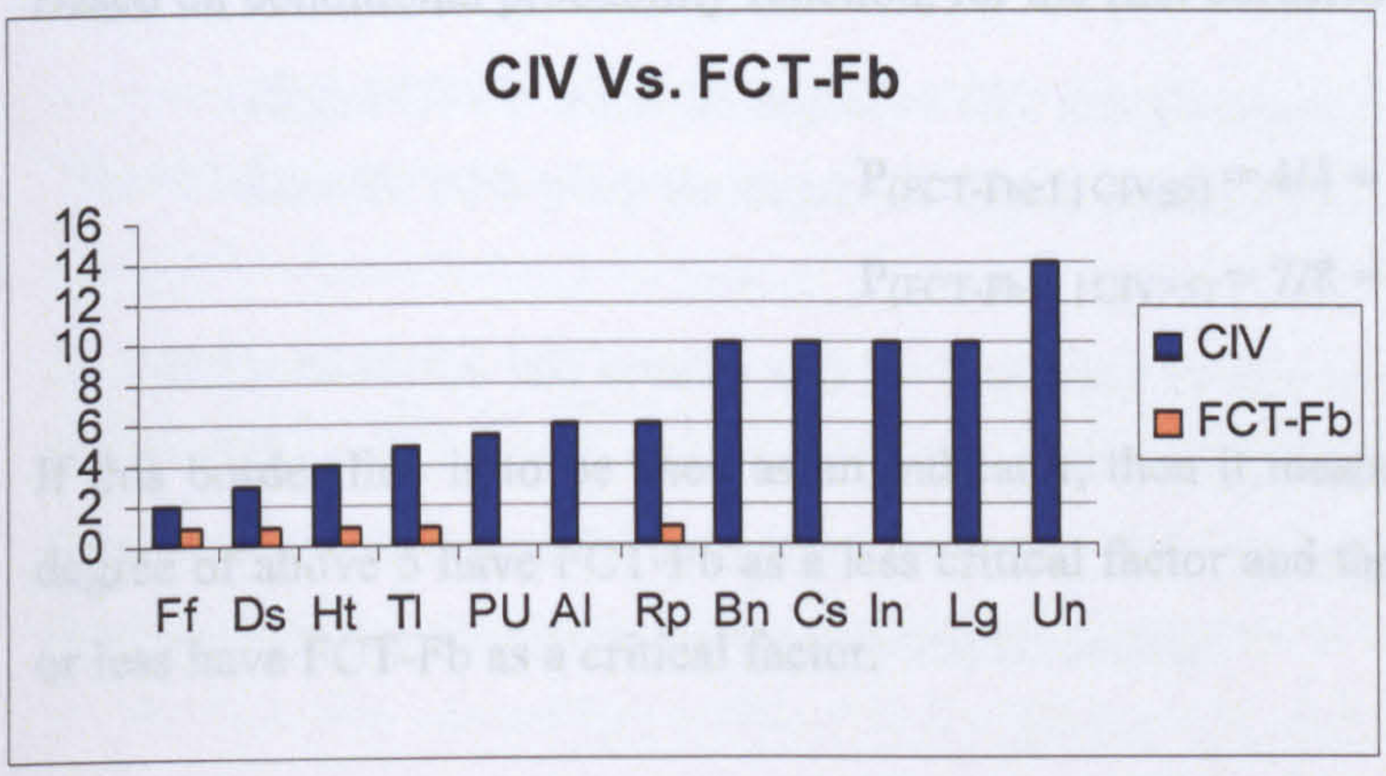
Conditional probability is used to find a reasonable borderline on the scale of 1 to 15 for the SD of CIV. The process is illustrated as follows:

1. The data for CIV and FCT-Fb are sorted in ascending order based on the values for CIV (the rankings for the FCT-Fb are recategorised into two levels)

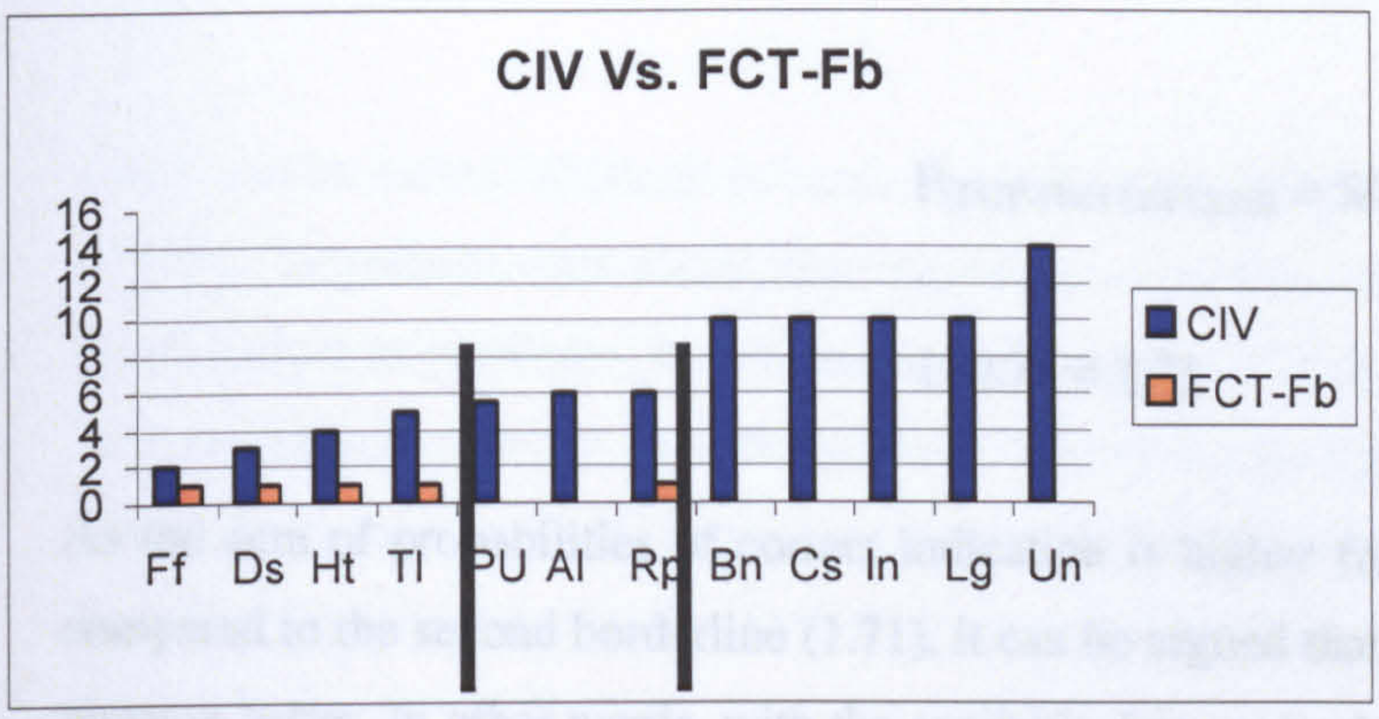
SERVICE	CIV	FCT-Fb
Ff	2	1
Ds	3	1
Ht	4	1
TI	5	1
PU	5.5	0

Al	6	0
Rp	6	1
Bn	10	0
Cs	10	0
In	10	0
Lg	10	0
Un	14	0

2. A bar chart is made to demonstrate the association between the two variables, the vertical axis is associated with the CIV measurements and the horizontal axis is associated with Fct-Fb measurements:



3. By observing the flow chart, possible borderlines are taken into consideration for a trail and error process. These borderlines are the ones that can be (literally) seen to separate low and high ranks of FCT-Fb:



4. Conditional probability is used to find which borderline can predict the ranking of the Fct-Fb:

Based on conditional probability function, for the first borderline (from left):

$$P_{(FCT\text{-}Fb\geq 1 \mid CIV\leq 5)} = 4/4 = 1$$

$$P_{(FCT\text{-}Fb< 1 \mid CIV> 5)} = 7/8 = 0.88$$

If this border line is to be used as an indicator, then it means that services with the CIV degree of above 5 have FCT-Fb as a less critical factor and those with the CIV degree of 5 or less have FCT-Fb as a critical factor.

Using the above probabilities it can be examined that based on the available data in the present research, what the strength of this indication (or prediction) is. This can be done by adding the above two probabilities. The sum of the two probabilities can be used as a proxy for the strength of indication (prediction):

$$1+0.88 = \underline{1.88}$$

The same procedure is repeated for the second borderline (from left):

For the second borderline (from left):

$$P_{(FCT\text{-}Fb\geq 1 \mid CIV\leq 6)} = 5/7 = 0.71$$

$$P_{(FCT\text{-}Fb<1 \mid CIV\geq 10)} = 5/5 = 1$$

$$1+0.71 = \underline{1.71}$$

As the sum of probabilities of correct indication is higher for the first borderline (1.88) as compared to the second borderline (1.71), it can be argued that the first border line serves the purpose better. In other words, with the available data, point 5 on the CIV scale separates the different levels of the FCT-Fb better comparing to point 6.

Accordingly, the High and Low zones for CIV with respect to FCT-Fb (only) are recognized to be:

- High FCT-Fb when the degree of CIV is higher than 5
- Low FCT-Fb when the degree of CIV is equal or less than 5

As mentioned in the last section and the beginning of this section, another insight into the results of the correlation analysis is to find (for each relevant SD) which side of the borderline (High or Low) indicates the associated PA better. This can be investigated by comparing the two conditional probabilities for the selected borderline:

The probability of FCT-Fb≥1 in the Low zone of the CIV scale (i.e. 1) is more than the probability of FCT-Fb<1 in the High zone of the CIV scale (i.e. 0.88). This means that with the available data, CIV is a better indicator for the low degrees of CIV as compared to high degrees of CIV.

It should be noted that none of the above results could be derived from the correlation studies per se.

Two important points need to be clarified here:

First, for a few of the PAs, most of the ranks were in the levels of 1 or 2 with none or a few levels of 0. For these particular PAs, instead of the categorization of Critical (≥1) and Less Critical (<1), the categorization of "=2" (which can be called "Highly Critical") and "<2"

which can be called "Critical" is used. These PAs are FCT-In, PRB-P, PRB-M, APP-Tc and APP-Pp. In practice, this means that overall in all of the services (with a few exceptions), Input, People as problems, People based approaches and Technology and Methodology based approaches are important from the point of view of productivity. The relevant SDs for these PAs indicate their level of importance rather than their being important or less important. This is also supported by the median of these PAs for the services, as in table 5.2.

Second, in most of the cases, no matter the PA data derived from either of the two approaches (Democratic or Conservative) is used, the borderline is the same. Subsequently, in most of the cases it does not make any difference what set of data is used; therefore, for the convenience of conditional probability calculations, the data derived from the Conservative approach was used, which has integer values only.

The calculations for the rest of the correlations are in appendix 5.7. The appendix is in fact an insight into the indicating function of the service dimensions.

5.3.3. Analysis for Choosing the Most Appropriate SDs for the PAs

As discussed in 5.3.2, some criteria are needed to choose the best possible SDs when it comes to the PAs that (according to table 5.3) are significantly correlated with more than one SD. Five factors have been taken into consideration to choose the best SDs for the relevant PAs. The present research uses these factors as reasonable criteria for the purpose of choosing the best SDs, without claiming that these are the only possible ones:

1. Strength of Correlation: It is important to make sure that the correlation (based on the calculated Kendall's Tau) is strong enough to introduce an SD as an indicator for a PA. This is particularly important for the small size of data in this research. A simple rule here should be: the bigger the Tau coefficient the better.

2. Strength of Prediction: As the ultimate aim of this study is to be able to predict the nature of services with regard to productivity management by the use of relevant service dimensions as indicators, it is helpful to apply a measure of predictability for the data. Somer's d is used for this purpose.

3. Test of Independence: Applying appropriate tests of independence is another method to investigate the possibility of being deceived by the results because of the significant existence of the factor of chance in the observations (technically speaking, accepting the null Hypothesis that is: the populations are homogeneous with respect to the variable of classification (McGhee, 1985). Having a small set of data, it brings more assurance to test the association between the data by different methods.

4. Coverage of the Subjects in a Category of PA: An ideal SD is the one that could be used as an indicator for all the subjects within a category of a PA. This might not be possible as evident from the results of the correlation analysis, but it can be used as a criteria: the more Subjects covered by an SD, the simpler and more practical the final proposal will be. Therefore one of the criteria for choosing appropriate SDs is to see which one covers more of the subjects in a Category.

5. Coverage of the SD Scale: Looking at appendix 5.7, it is evident that perhaps because of the lack of enough data, for some of the SDs no measurement has been recorded in a particular zone. This per se is not a problem, however, when this particular zone is around the area in which a border line is sought, a problem arises. The problem is, in such a situation, it is not possible to identify a definite border line as the best because there is not enough data to examine all possibilities. For instance, in the correlation of INT Vs. PQ-P (appendix 5.7) there is a gap of SD data between the degrees of 8 to 9. This zone is included in the area in which a border line is sought. It is not clear from data that for services with SD degrees of 8 to 9 what the rank of applicability of the PA of PQ-P would be. What might be the features of services in the borderline. It was not shown directly through the data what the indication for a PA is in these gaps as no observation was recorded in the gaps. This brings another criterion to the decision process. Between an SD that has a gap in the borderline (like INT and PQ-P) and the one that covers the scale with no gap in the borderline (like CIV and PQ-P), certainly (ignoring other criteria) the latter is preferred.

It is now possible to develop a comparison table for the PAs that have more than one SD as an indicator. The five criteria for choosing the most appropriate SD form the row of this table.

The table in appendix 5.8 presents the results. The table covers all the significant correlations that suggest more than one SD for a PA. No priority was given to the criteria and the overall condition was taken into consideration when deciding what SD is the best among the possible ones. The criteria that influenced the decision making for each category and the chosen SD are underlined. The data derived from the democratic approach is used for the Somer's d and the Test of Independence. For the Kendall's Tau, the results of the conservative approach are taken into consideration only when they can influence the decision differently (as compared to the results of the democratic approach).

The results of the above selection of SDs based on the defined criteria can be summarised in table 5.4. In this table dots represent the significant correlations between service dimensions and Subjects within different categories of the PAs. Big dots show correlations that were selected based on the defined criteria.

	LI	FV	CC	CI	CUS	PJ	INT	CIV	PF
P or Q prioritisation							•	●	
P vs. Q trade off									
P policies				●	●				•
P factors						●		●	
P problems		●	●		•	•	•		•
P approaches		●		•	●	●		•	●
P measurement		●				•			
Q gaps		●				•			
Q costs									●

P: Productivity Q: Quality • *: Association* ● *: Chosen association*

Table 5.4 Prioritising the associated SDs based on the criteria

The above table revises the number of indicating SDs when they are compared to each other. The following therefore shows the usefulness of the SDs in indicating the studied productivity management aspects in services based on the preferred criteria:

LI: 0 PAs

FVD: 4 PAs

CC: 2 PAs

CI: 1 PA

CUS: 2 PAs

PJ: 2 PAs

INT: 0 PAs

CIV: 2 PAs

PF: 3 PAs

The most noticeable results are the reduction of indicating functions for PJ (from 5 to 2) and for INT (from 2 to 0).

Below is a summary of the preferred SDs that (according to the present research) can be used as indicators for the PAs. The borderlines are derived from the calculations in appendix 5.7:

Note: PA=0 I.e. The PA is less Important Issue

PA=1 I.e. The PA is Important Issue

PA=2 I.e. The PA is a Major Issue

CIV
- P/Q-P (CIV<5: P/Q-P≥1 ; CIV≥5 : P/Q-P<1)
- FCT-Fb (CIV≤5: FCT-Fb≥1 ; CIV>5: FCT-Fb<1)

CI
- PLC-Q (CI<5: PLC-Q≥1 ; CI≥5: PLC-Q<1)

CUS
- PLC-C (CUS<6: PLC-C<1 ; CUS≥6: PLC-C≥1)
- APP-Sr (CUS≤8: APP-Sr≥1 ; CUS>8: APP-Sr<1)

CC
- PRB-M (CC≤6: PRB-M=2 ; CC>6: PRB-M<2)
- PRB-P (CC≤4: PRB-P<2 ; CC≥8: PRB-P=2)

FVD
- PRB-Cl (FVD<9: PRB-Cl ≥1 ; FVD≥9: PRB-Cl <1)
- APP-Cp (FVD<9: APP-Cp<1 ; FVD≥9: APP-Cp≥1)
- MES-Rl (FVD≤8: MES-Rl ≥1 ; FVD>8: MES-Rl <1)
- QGP-Four (FVD≤8: QGP-Four ≥1 ; FVD>8: QGP-Four <1)

PJ
- APP-Tc (PJ≤7: APP-Tc=2 ; PJ>7: APP-Tc<2)
- FCT-I (PJ≤10: FCT-I<2 ; PJ>10: FCT-I=2)

PF
- APP-P (PF≤7: APP-P<2 ; PF≥9: APP-P=2)
- QCT-Pv (PF≤8: QCT-Pv≥1 ; PF>8: QCT-Pv<1)
- QCT-Ap (PF≤3: QCT-Ap≥1 ; PF>3: QCT-Ap<1)

In this section the SDs with a significant correlation to the PAs were reviewed, aiming to select the best SDs that could be used for the same PA. The next section adopts a pragmatic view aiming to make the results closer to practical use.

5.3.4. Adopting a pragmatic view

In the previous sections, the best SDs were found purely based on the results taken from analyses. This section attempts to adopt a more pragmatic view to the results to achieve a more thorough, robust and practically useful answer to the main research question. It is important to investigate what is exactly meant by SDs' "indication" for PAs when it comes to real use of them in practice.

To make this clear an example is taken into consideration:

It was found that the dimension of Front Value Added (FVD) is an indicator for Organisational Climate being a less important problem in the way of productivity management (PRB-Cl). PRB-Cl in a way that for a service with lower values for FVD, Climate should be an important problem in terms of productivity improvement. The question is: "Does this mean that Climate is the important problem or that it is amongst the important problems?". There are three other Subjects in the list of PRB however FVD only indicates for 'Climate' and remains silent for the other three Subjects. Therefore technically speaking when an SD indicates the importance or less importance of a Subject in a PA Category, it does not mean that other Subjects are less important or important. The indication is isolated for the only Subject that is correlated to the SD•.

Moving from a purely technical solution to a pragmatic one, in this section all the categories of PAs and their corresponding SDs are investigated in turn in an attempt to take the most out of the chosen SDs from the Practical point of view:

1. Category of P/Q: For this category there are no problems as P and Q are ranked opposite each other (i.e. only one of them has to be chosen). The subjects of TRDOF

• It is worth mentioning that the author tried a variety of methods (like correlation analysis based on clusters of services for each Category, Test of Independence between SDs and the order of ranks of the Subjects in each Category, etc.) to attempt finding correlations between SDs and the Subjects in each Category as one set of data, however because of the small size of data no helpful results were found and in fact the required assumptions/conditions for these methods could not be met by this size of data. It was therefore more practical to attempt to find correlations between SDs and each PA Subject independently and then investigate if in practice an indication could be extended to all the Subjects in the relevant Category.

are not relevant to P/Q and in any case no SD has been found for this subject. Therefore, it is possible to argue that:

"The SD of CIV can thoroughly cover the Category of P/Q (except for TRDOF)."

2. Category of PLC: This category consists of three Subjects of V, Q and C. CUS is positively correlated with C and CI is negatively correlated with Q and no good SDs have been found as an indicator for V. This means CI and CUS together can cover all but one of the Subjects of this Category. The table in appendix 5.4 shows the correlation between CUS and CI is 0.419 (Tau Coefficient) with the P value of 0.062. Although this cannot be considered as a (generally accepted) significant correlation, it can however suggest that these two SDs tend to be positively correlated to each other. This means that the expectation is that in most of the cases when Q is ranked high, C should be ranked low and vice versa. Looking at the table in appendix 5.6, this is certainly true for the services that were studied in this research. Among the 12 services, only two (Department Stores and Legal Services) have a high/low rank for both Q and C. In all the other cases, if one of the two is ranked high, the other one is ranked low. It may be possible that in practice only one of the two SDs can be used to indicate both Q and C. It should be noted that in practical use, each SD only has two degrees of high and low and each subject of PA only has two ranks of Critical or Less Critical. To test whether in practice one SD can be used to indicate both C and Q, the values of CI and CUS are recategorised to the two categories of High and Low (based on the results of the probability analysis in section 5.3.2). Also the PA subjects of PLC-Q and PLC-C are recategorised to "<1" and "≥1" (as explained at the beginning of section 5.3.2). Next Kendal's Tau correlation analysis is applied between the two recategorised sets of data. The result indicates a significant correlation between the recategorised CI and recategorised PLC-C (Tau coefficient of -0.775 with the P value of 0.010). As for V, although it is possible to argue that in most of the studied services (9 out of 12) V is ranked high, it is not reasonable to claim any general rule based on this observation. The PA of V therefore remains without indicators, although in the qualitative section the reasons for having high ranked V for most of the services

will be investigated in an attempt to find a possible general rule. As a result, it is possible to argue that in practice:

"CI can be used as an indicator for both C and Q in the Category of PLC. There are however no SDs to indicate for the Subject of V".

3. Category of FCT: Firstly, as noted in 4.10.1.3 this category of PA proved to be less useful, perhaps for being too general a question. The deliberations here, therefore, are only useful after appreciating the overall weakness of this category of the PAs. There are 5 Subjects in this Category: two of them (Fb and I) are respectively correlated with CIV (positive) and PJ (negative). CIV is used as an indicator to suggest Feedback being At Least Important or Less Important. PJ however indicates whether Input is "Very Critical" or "Critical or Less Critical". Two points should be noted here in order to get the most benefit from the two SDs. Firstly as noted in 4.10.1.3, it was found that adding the new Subject of "Customer" to Prokopenko's Productivity Factors (Prokopenko, 1996) was not a helpful or at least a necessary decision for the research. Out of the 12 services only for two of them (University, Fast Food) can this subject be ranked as "Important". The other point is that table 5.2 reveals that Input and Process both with the median of 1.5 across all services are introduced as two important factors in most of the services. The table in appendix 5.6 shows that out of the 12 services, only two of them have low ranks for one or two of these factors. Yet a closer look at these two cases reveals that for one of them (Department Stores) the rank is low only from the point of view of one of the approaches. For the second one (Hotels) only Process is ranked low. Considering the above two points, it is possible to conclude that the data suggests that for most of the services the factors of Input and Process are high and CIV is in fact an indicator to suggest whether the factor of Feedback is <u>also</u> high in the studied services. It should be noted though that there are no indicating SDs for the factor of Output and this factor will remain uncovered. To summaries, it is possible to argue that in practice:

"CIV indicates whether the factor of Feedback is an important factor (in most of the cases) along with the factors of Input and Process. The

factor of Output has no indicators (in this study) and the factor of Customer can be ignored."

4. Category of PRB: There are four Subjects of Tc, Pp, M and Cl in this category. No SD has been found for the Subject of Tc. Based on tables 5.3. , CC is an appropriate indicator for the Subjects of Pp and M and FVD can be used for Cl. Therefore it is possible to argue that all but one of the Subjects in this category are covered by two SDs.:

"Except for the Subject of Tc, the Category of PRB is thoroughly covered by two SDs. CC is an indicator for M and P while FVD is an indicator for Cl."

5. Category of APP:

There are six Subjects of Tc, Pp, Sr, Cp, Tk and Cm in this Category and the SDs of PJ, PF, CUS, FVD cover the first four respectively. This Category seems to be a difficult one as two of the Subjects remain without indicators and for the rest, four SDs need to cover them independently. Figure 5.6 suggests there is a positive correlation between FVD and each of PF and PJ. The correlation between FVD and PF can be taken into consideration as table 5.3 suggests that there is a significant correlation between FVD and the PA that was originally associated with PF (that is Pp). Despite a significant correlation between FVD and PJ, no correlation was found between FVD and Tc, even after recategorisation was made. It seems (after reducing the corresponding SDs to three) no further improvement can be made. Therefore, the summary of using the SDs in this category in practice is:

"Category of APP, has two Subjects (Tk, Cm) for which no SDs have been found as indicators. FVD can be used to cover both Pp and Cp, while CUS and PJ respectively covering Sr and Tc."

6. Category of MES:

There are five Subjects in this Category, i.e. "I", O, Rl, Fc, Int. Only Rl is covered by a SD, i.e. FVD. The condition of this Category with respect to relations with SDs looks quite disappointing. A closer look however proves that in practice the condition is not that bad. Table 5.2 reveals that the median for "I" and "Fc" is 0. In fact, out of the 12 studied services, only two (Hotels and Universities) have a high rank for "I" based on the two approaches (refer to the table in appendix 5.6). Likewise for Fc too there are only two services with high ranks (Department Stores and Legal Services). This suggests that not having an SD for these two PAs might not be a gap in practice. Recategorisation of data for FVD and Int (based on 5.3.2) reveals a significant correlation between the two (0.667 Tau with a P value of 0.027). This means in practice the dimension of FVD can also be used as an indicator for Int. The only remaining Subject with no room for negotiation in this Category is O. Therefore, it is possible to suggest that in practice:

> ***"The Category of MES can be mostly covered only by FVD. This is possible because the Subjects of "I" and "Fc" can be ignored because of their low ranks in most of the services and both Subjects of Rl and Int can be indicated by FVD. The Subject of O however remains without any indicators."***

7. Category of QGP:

This Category has four Subjects of QGO-1, QGP-2, QGP-3, QGP-4 and only the latter is covered by FVD. The only possible improvement for this Category is the fact that QGP-2 with a median of 0.5 by the Democratic approach and 0 by the Conservative approach (as in the table in appendix 5.6) can be ignored. In the list of the 12 services, only the Consultancy service is the one for which this Subject is ranked high by the two approaches. No further improvement can be made as even applying a correlation analysis to the re-categorised data reveals no interesting results. The final practical statement for this category is no better than the following:

> ***"The Category of QGP is very much in need of indicators as only the Subject of QGP-4 is covered by FVD. Being***

lowly ranked for most of the services the Subject of QGP-2 can be ignored."

8. Category of QCT:

There are four Subjects of Pv, Ap, "In" and Ex in this Category. The first two are covered by one SD that is PF. Correlation analysis of the re-categorised data reveals no further interesting results. The practical use of the only SD in this Category can be summarised as follow:

PF can be used as indicator for two of the Subjects in the Category of QCT. These are Pv and Ap. There are no indications for the Subject of "In".

In sections 5.3.2 and 5.3.3 the studied SDs were compared together in terms of their usefulness in indicating aspects of productivity management. These comparisons were based on a purely theoretical perspective. At this stage, after adopting a pragmatic perspective it is interesting to make this comparison again:

LI: 0 PAs

FVD: 6 PAs

CC: 2 PAs

CI: 2 PAs

CUS: 1 PA

PJ: 1 PA

INT: 0 PAs

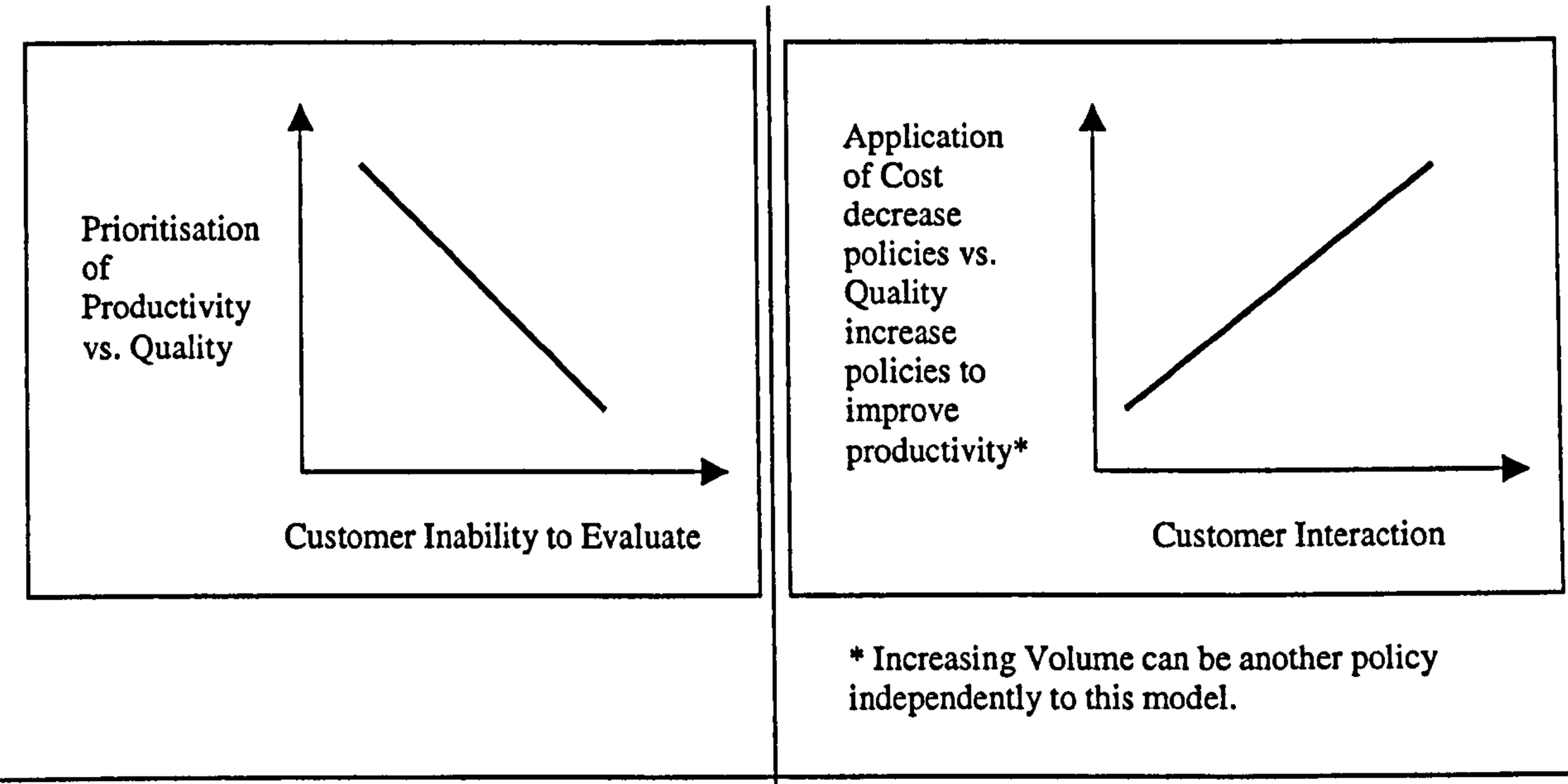
CIV: 1 PAs

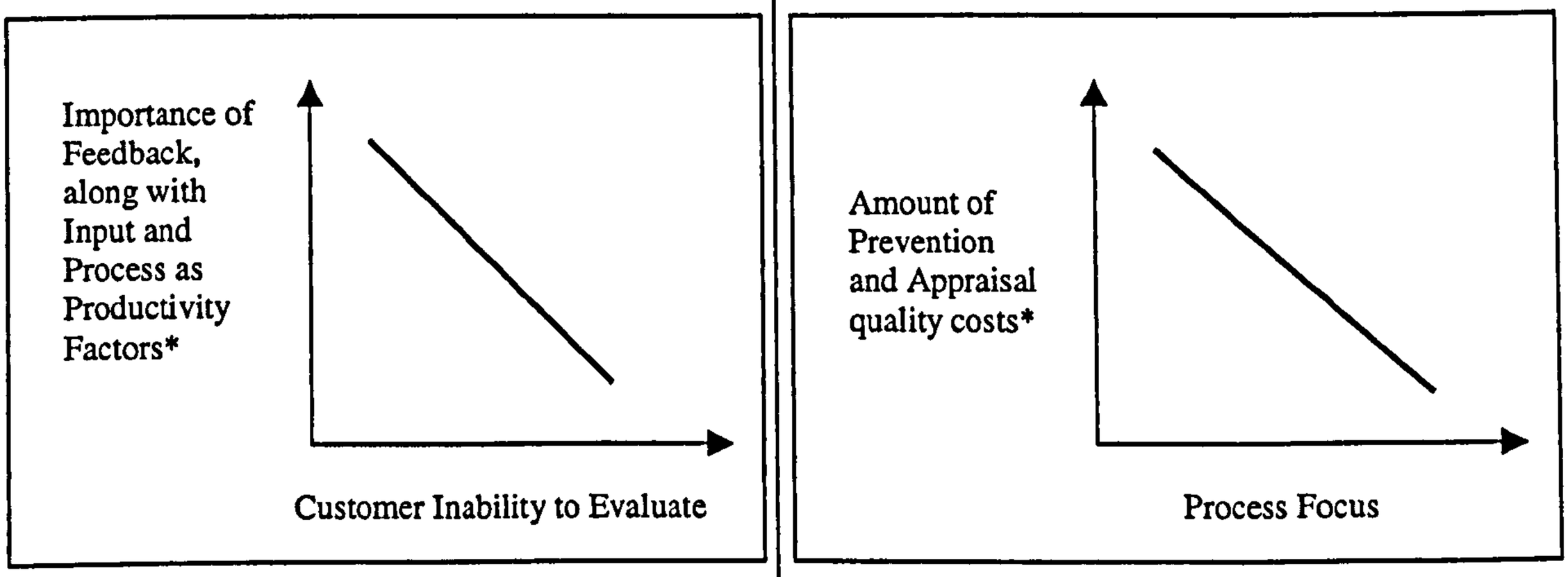
PF: 2 PAs

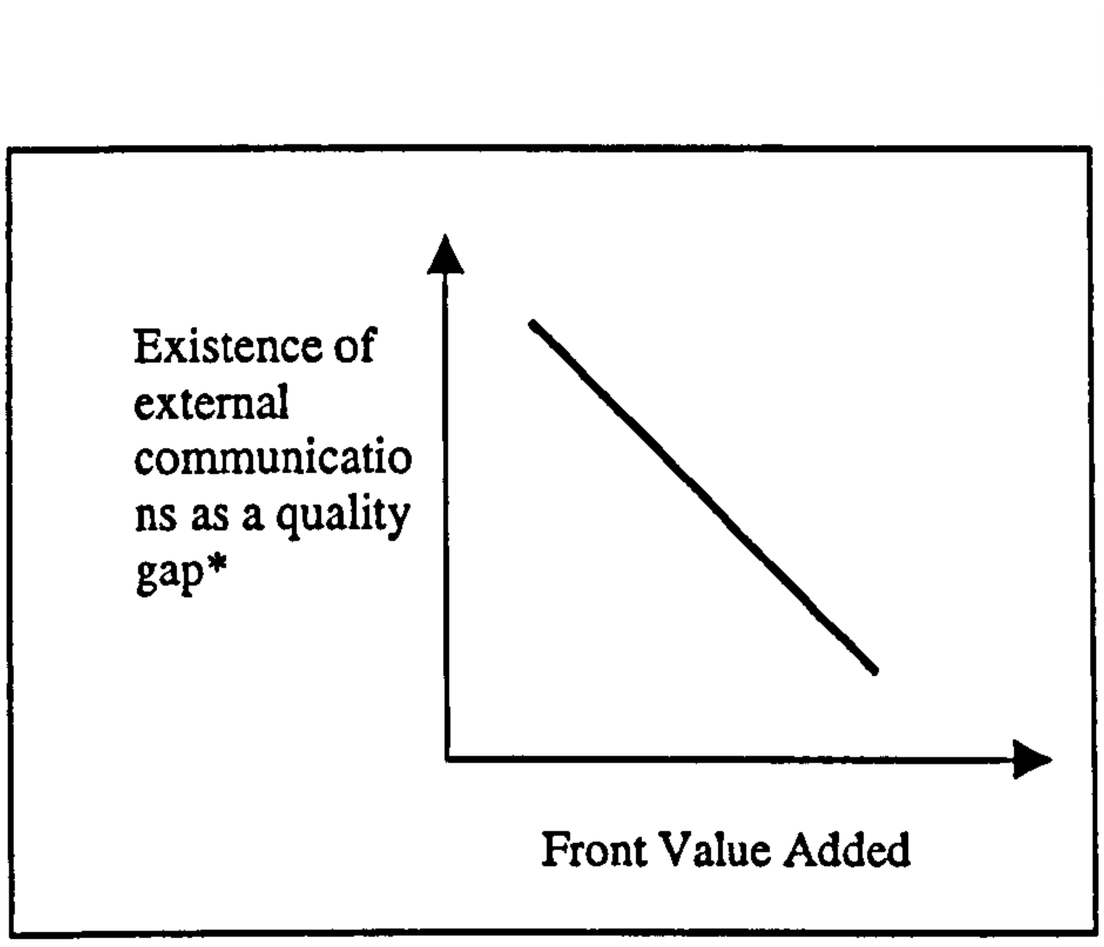
Based on the above it is reasonable to argue that among all the SDs, from a pragmatic view, the Service Dimension of Front Value Added (Maister, 1983) is the most useful one in indicating the studied productivity management aspects.

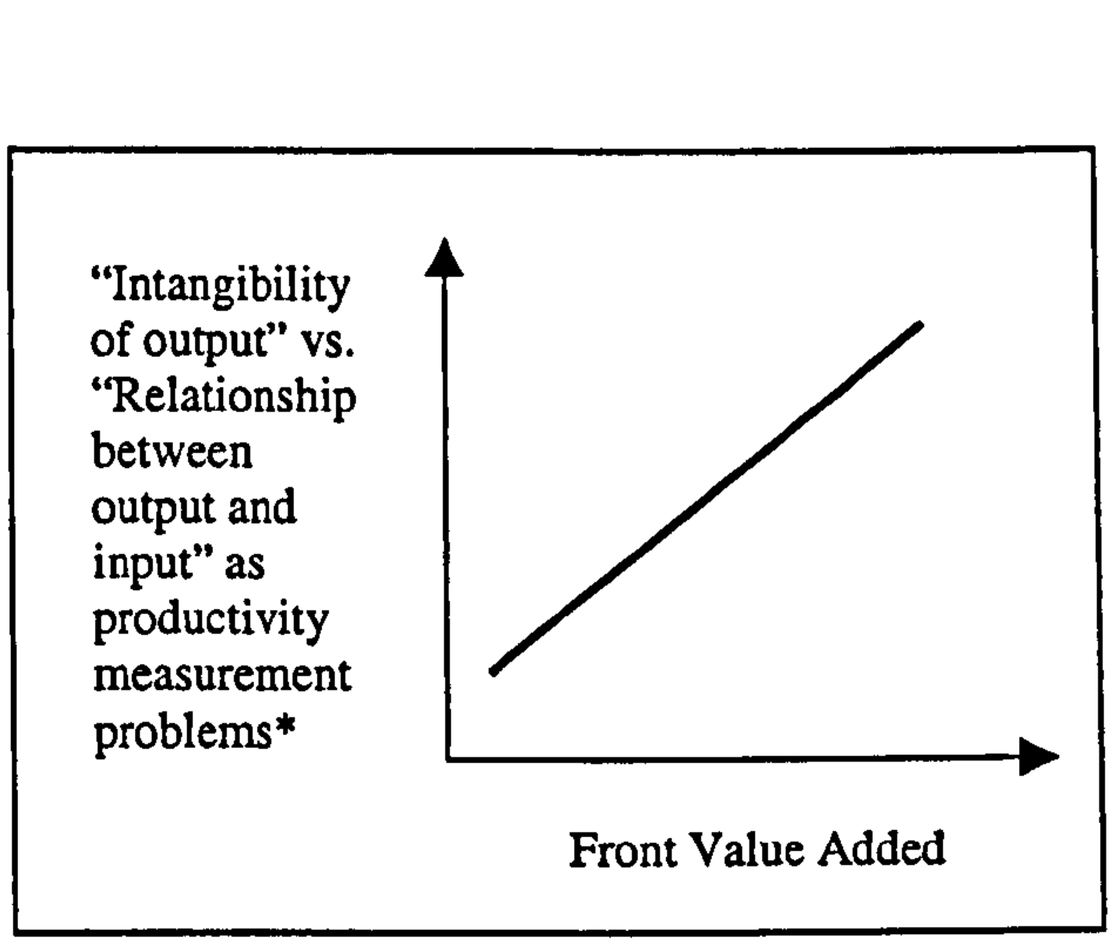
In this section it was attempted to move from the theoretical perspective of the results to a more practical perspective. The practical use of the relevant SDs in each Category was investigated and the results were summarised in statements for each Category. The results are transformed into schematic models in the set of figures coming under the title of Figures 5.8, 5.9.1, 5.9.2 and 5.10. The format of figures 5.9.1 and 5.9.2 is based on the Schmenner's Service Process Matrix (Schmenner, 1986). Also as FVD covers many of the Categories of PAs, the last figure (figure 5.10) summarises all the PAs that are indicated by FVD.

Figure 5-8 Modelling the results of the association between the SDs and the PAs





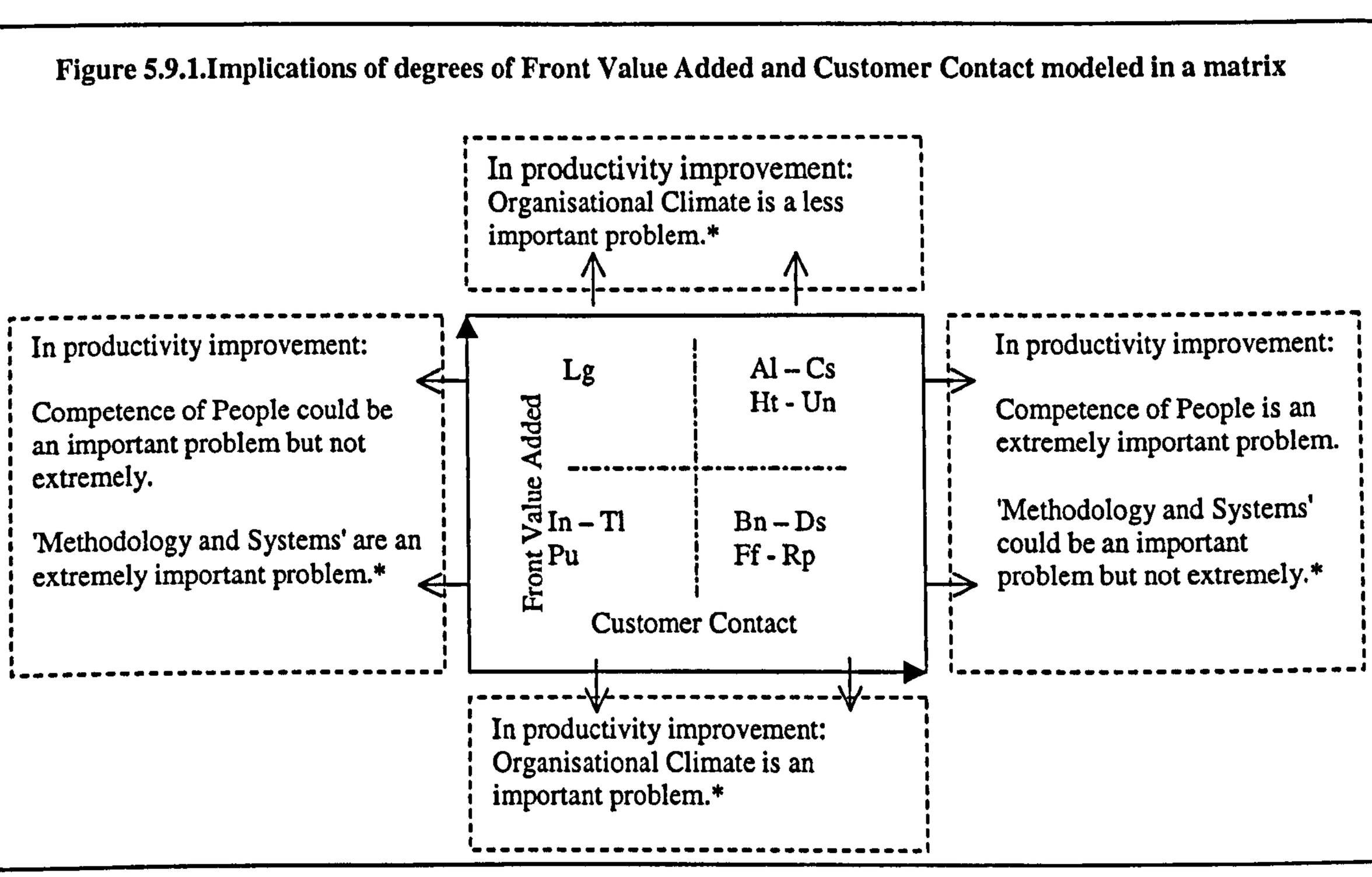




* Other quality gaps in the Quality Gap Model can be other factors, independently to this model.

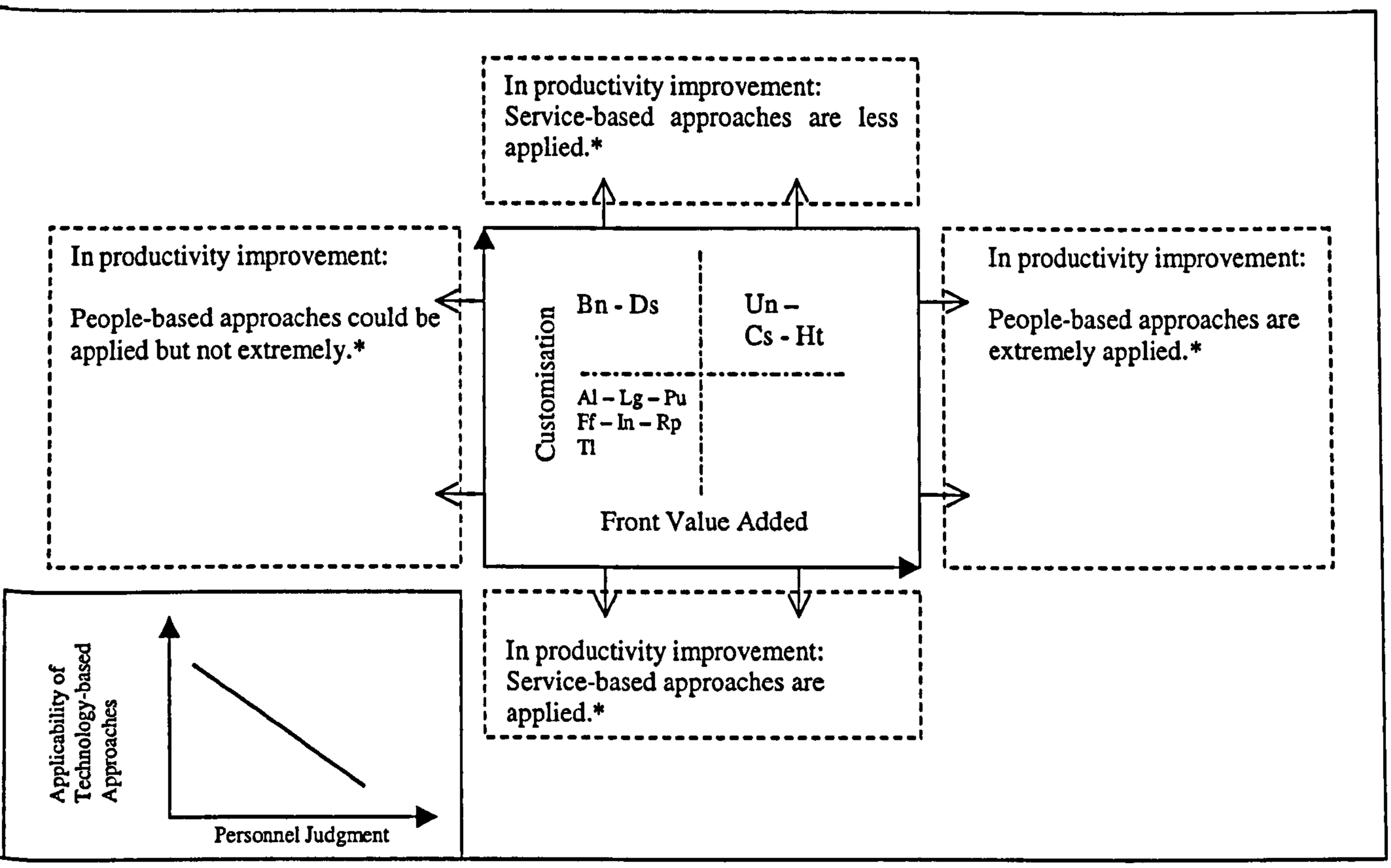
* "Different categories of output" can be another productivity measurement problem, independently to this model.

Figure 5.9.1.Implications of degrees of Front Value Added and Customer Contact modeled in a matrix



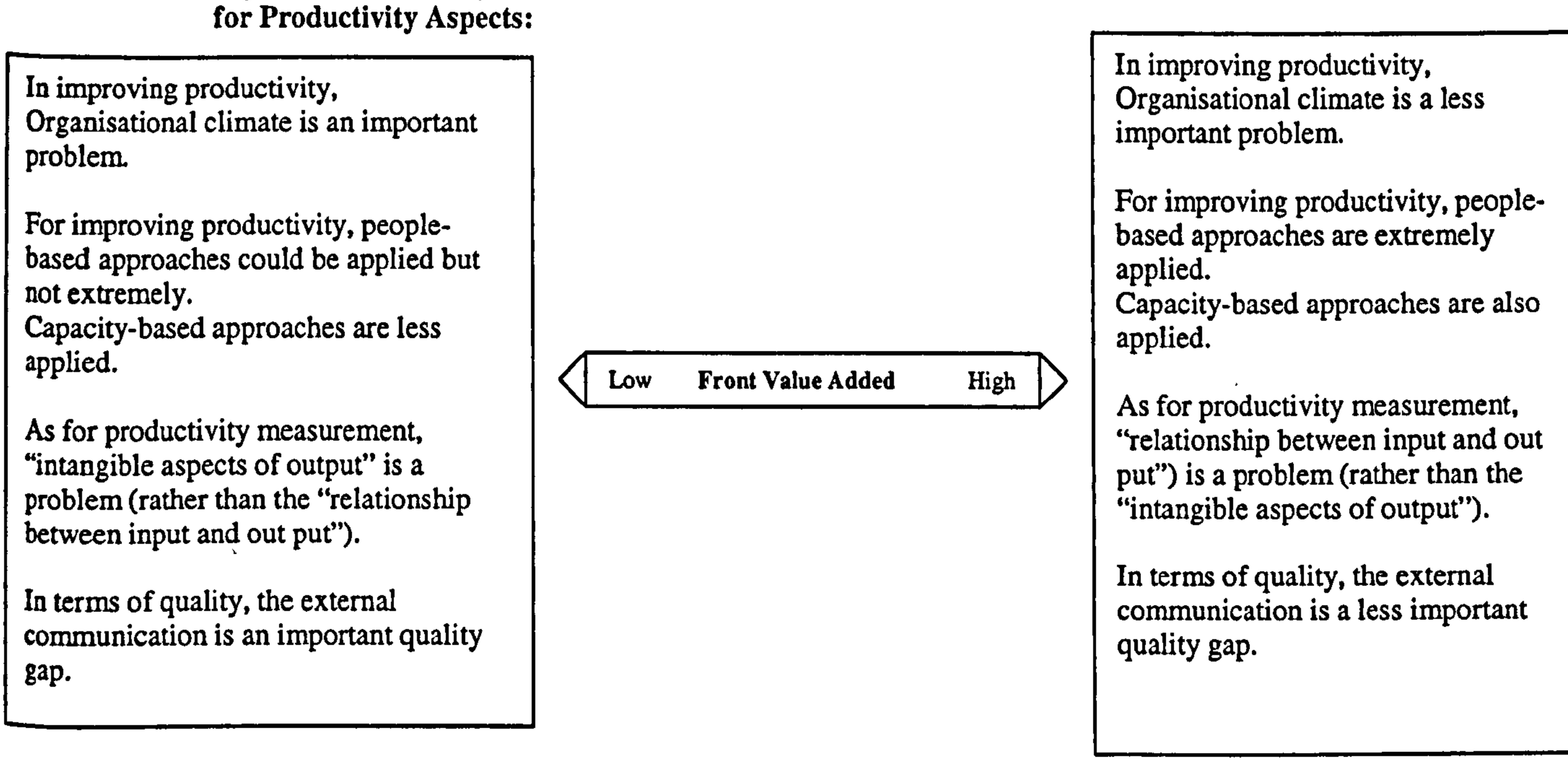
* Technology can be another problem independently to the model.

Figure 5.9.2 Implications of degrees of Front Value Added and Customisation in a matrix



* For Technology-based approaches refer to the figure at the left hand corner. Task-based, Capacity-based and Customer-based approaches can be applied separately and independently to the model.

Figure 5.10 Summary of the Use of the Service Dimension of Front Value Added as an Indicator for Productivity Aspects:



Figures 5.9.1 and 5.9.2 have the similar format as the Schmenner's Service Process Matrix (1986). However (as discussed in chapter 3 and 4) there are major differences between the two models. Table 5.5 summarises the differences:

The Service Process Matrix (1986)	Models in the present research (5.9.1 & 5.9.2)
Service dimensions are proposed on theoretical basis	Service dimensions are selected analytically based on empirical study
One of the service dimensions is measured using secondary data. No measurement for the other two service dimensions.	Service dimensions are measured by experts in each service based on a measurement scale
Low and High degrees of the SDs are loosely defined	Low and High degrees of the service dimensions are precision defined based on empirically study
The implications of the low and high measurements of the service dimensions are theoretically justified.	The implications of the low and high measurements of the service dimensions are found through analysis, based on empirical study.

Table 5.5 Comparison of the models developed in the present research with the SPM

It was pointed out before, that the classifications that will be developed based on the relevant SDs. are not expected to be as robust and as 'nicely' shaped as other classification schemes. This is the price that has to be paid when basing the work on empirical research, this can also be seen as an indication of the complicated and uncertain situation in the business world.

The positioning of the services on figures 5.9.1 and 5.9.2 is based on the service dimensions measurement data (appendix 1). Developing models based on empirical study and then positioning services on the models based on empirically derived data has its own advantages and disadvantages. One of the disadvantages is that the derived implications are not necessarily applied to all the expected cases. This is only natural as the correlation between the SDs and the PAs were not one hundred percent. In figure 5.9.1 the position of Telecommunication service (that is based on its SDs measurements) suggests that organisational climate is an important issue in productivity management. This is not true as the rank of Climate for this service is 0. Similarly the position of Airline suggests that competence of people is an extremely important issue in productivity management. This is while the rank of People as problem for this service is only 1, indicating that it is an important issue but not an extreme one. Also in Figure 5.9.2 the position of Telecommunication service suggests that the service-based productivity improvement approaches are important tools for productivity management. The data reveals that they are not important. On the other hand, the position of University indicates that service-based approaches for productivity management are less applied while the data reveals that they are in fact important tools.

These are the only conflicting results for the two models. This means the model in figure 5.9.1 makes 34 correct indications out of the 36 possible indications (12 services times 3 PAs). This means 94% of the indications are correct for the present study. Figure 5.9.2 makes 22 correct indications out of the 24 possible indications (12 services times 2 PAs). This means 92% correct indications for the present study.

As mentioned in 4.2, answering the main research question will lead to classification schemes based on one or a number of relevant service dimensions to gain insights into productivity

management in services. The above figures meet this promise. They can also be seen as a more advanced answer to the research questions 1 and 2.

Summary of section 5.3:

This section provided an answer to the main research question on different bases:

1. Technical basis: This was purely based on correlation analysis. Except for the SD of Labour Intensity, all other Service Dimensions proved useful in indicating one or more of the Productivity Management Aspects. In particular the service dimensions of Front Value Added, Personnel Judgment and Process Focus have the highest numbers of significant correlations.

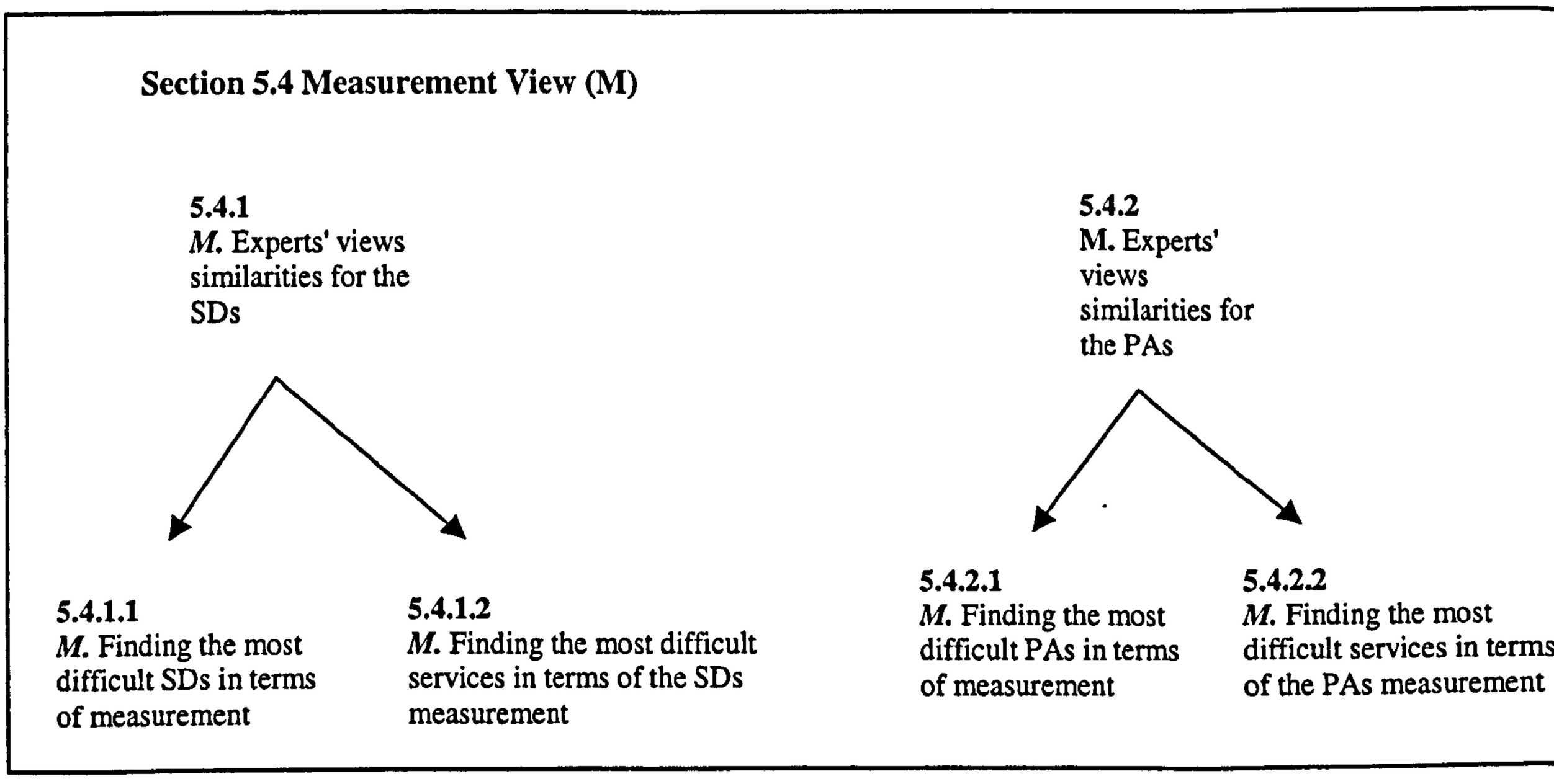
2. Technical basis with a preference view: While still working on a purely technical basis, this time the aim is to select only one service dimension for the PA Subjects that are significantly correlated with more than one service dimension. A set of criteria was set and the best SDs were selected accordingly. The most significant result was that the SD of Personnel Judgment lost its priority for 3 of the PAs to the benefit of the SD of Front Value Added.

3. Pragmatic view: The technically derived results were needed to get 'polished' with a pragmatic view in order to reach to more robust, thorough and practically useful results. This was done by revisiting the correlations among the SDs and between SDs and the PA subjects, where needed, with recategorisation of the degrees and levels of SDs and PAs based on the conditional probabilities. As a result, the SD of Front Value Added (Indicating 6 PAs) was found to be the most helpful SD (among those that were studied) for indicating productivity management issues. The least useful service dimensions are Labour Intensity and then Intangibility. A number of classification schemes were developed and applied to the studied services based on the results of this section. The SPM was compared with some of the developed models in this chapter to illustrate the different features of the present research as opposed to similar works.

The next section examines the reliability of the analysis in this chapter in terms of data measurement considerations.

5.4. Analysis from the Measurement View

After finishing the quantitative analysis, it is helpful to have a review of the measurement tools in this study and to investigate the reliability of the analysis in this regard. This is known as 'precision' of measurement that can be defined as the duplicability of measurement (Johns and Lee-Ross, 1998). It is also interesting to find which SDs and which PAs are more difficult in terms of measurement. It should be noted that the discussions in this section are mostly descriptive rather than judgmental. For convenience, the road map of this section is repeated here:



As illustrated above, first the expert's responses to the SDs questionnaire will be compared and the result will be used as indicator of the most difficult SDs in terms of measurement, as

well as the most difficult services in terms of measuring service dimensions. Likewise the experts' responses to the PAs will be studied to find the most difficult PAs in terms of measurement as well as the most difficult services in terms of measuring PAs. In doing the above the differences between the experts who are measuring the same SD or PA is calculated as a proxy to indicate the precision of the measurement tool.

5.4.1. Experts' Views Similarities for the SDs

There were two groups of SDs from the measurement point of view: the externally measured SDs and the internally measured SDs (refer to 4.12). Obviously these two need to be studied separately in this section 4.12):

- Externally Measured SDs:

There are six SDs that have been measured externally. Except for the missed data, each SD was measured by two experts in each of the twelve services. The aim here is to find the overall difference between the responses of the two experts in the services as a whole. To do this, using the table in appendix 5.1, the total of differences of the responses to the SDs between the two experts in each service is calculated and compared. The results are presented in Table 5.6 and can be taken as a proxy for investigating the precision of data. Fast foods and Auto-Repairing are excluded from this study, as only one set of data for SDs was available for these services. It should be noted that the experts have measured these SDs independently to the other expert in the same service. Only in case of the need for revision (on the basis of the rule "no variation of more than 4 between the two experts" as explained in section 4.13) could an expert could become aware of the comment of the other expert in the same service. As mentioned in section 4.13 this includes only three cases.

	LI	FV	CC	CI	CUS	PJ	Total
Al	2	4	2	2	2	0	12
Bn	4	1	2	1	0	2	10
Cs	0	2	0	4	2	2	10
Ds	2	0	2	4	0	2	10
Ht	0	2	0	0	2	0	4
In	4	1	2	1	3	4	15
Lg	1	2	4	0	2	1	10
Pu	2	0	0	1	1	1	5
Tl	3	1	0	1	1	1	7
Un	3	0	4	2	0	1	10
Total	21	13	16	16	13	14	

Table 5.6, Examining the Degree of Agreement between the Experts in Each Service for the Externally Measured SDs

The biggest total difference of responses is 15 degrees (for Insurances) which is an average of less than 3 levels difference for each SD. Most of the differences are equal to 10 degrees which is an average of less than 2 degrees difference for each SD. The smallest difference is 4 degrees (Hotels) which is less than one level difference for each SD. It is not possible with the available data to investigate the causes of disagreements. It could be the effect of the services or the effect of the experts or a combination of both, as well as other distractive/subjective factors. The important result however from the "Precision" point of view is that all the differences are relatively small and in fact out of 10 services, 8 have a total difference in equal or less than 10 degrees in measuring 6 SDs which sounds quite small. Based on these numbers, it is possible to argue that the measurement tool was a precise one as the difference of responses between the two experts in each service is quite small.

- Internally Measured Service Dimensions:

Seven internal experts were used to measure the services for three SDs of Intangibility, Customer Inability to Evaluate and Process Focus (the reasons for using this approach was discussed in section 4.12). Here as the number of observations is more than the externally measured SDs, it is possible to apply a more comprehensive analysis rather than just adding up the differences. Semi-inter-quartile range is used to analyse the differences of measurement for the three SDs. Semi-inter-quartile range or quartile deviation is a measure of variability for rank order data. If Q_1 is a lower quartile (the middle of the observations below the median)

and Q_3 (the middle of the observations above the median) is an upper quartile, then quartile deviation is $½(Q_3-Q_2)$.

Derived from the table in the appendix 5.1, table 5.7 shows the quartile deviation for each of the three service dimensions as well as the median of the quartile deviations and their total for each SD. In the last column the total of quartile deviation for each service is given.

Intang.	Quartile Deviation for Intangibility	Quartile Deviation for Cus. Inab. Ev.	Quartile Deviation for Proc. Focus	Quartile Deviation, Total
Al	1.5	2	3	6.5
Bn	2	1.5	1.25	4.75
Cs	2	1.25	1.5	4.75
Ds	0.5	1.5	1	3
Ff	0.75	1.5	0.5	2.75
Ht	0.5	2	1	3.5
In	1.5	2	1.25	4.75
Lg	1	1	0.75	2.75
Pu	1.5	2	1.5	5
Rp	1	3.25	2.25	6.5
Tl	1.25	1	1.5	3.75
Un	1.5	2.25	2.5	6.25
Median	1.375	1.75	1.375	
Total	15	21.25	18	

Table 5.7, Examining the Degree of Agreement between the Experts in Each Service for the Internally Measured SDs

The biggest quartile deviation is 3.25. This means that in this case (measuring CIV for Rp), the average variation from the median in the central 50% of the ranked observations (expert's responses) is less than 4 degrees of difference in the measurement scale. Although it is not directly relevant it is interesting to note that this deviation meets the established rule about rejecting the deviations of more than 4 degrees between the two experts for the externally measured SDs (as discussed in chapter 4.12). Furthermore, most of the quartile deviations are less than 2 which can be argued to be a small deviation.

5.4.1.1. Finding the Most Difficult SDs in Terms of Measurement

It is not possible to compare the externally measured SDs with the internally measured ones as the approach of measurement was different (although the tool was the same) therefore there is no way but to compare each group of the SDs independently.

As for the externally measured SDs, as indicated in the last row of table 5.7 it seems Labour Intensity is the most difficult one to measure as the total of difference for this SD is much higher than for the other SDs. All the other SDs are almost the same level in terms of total differences. Front Value Added, Customisation and Personnel Judgment have the smallest total differences.

Looking at table 5.7 from the three SDs that are internally measured it is evident that Customer's Inability to Evaluate has the most controversial opinions among the experts, while intangibility is the most agreed upon. In fact the author received a few questions from the experts who asked for clarification of the definition of Process Focus in the questionnaire. Altogether it seems this SD is a difficult one to be measured.

It is possible to argue that the subjectivity of measurement due to the individual experts was consistent for each SD. In other words, the same degree of subjectivity due to individual bias that applies to an SD also applies to other SDs. Accordingly, it is arguable that subjectivity of measurement here does not significantly affect the results of comparing the total differences of responses for each SD.

It is interesting to see how the above observations affect the results of section 5.3.4 with regard to the selected SDs. As mentioned above the most difficult SDs seems to be Labour Intensity and Customer Inability to Evaluate the Service. Based on the results in section 5.3.4, this does not affect the results significantly as the dimension of Labour Intensity was found to be irrelevant to the study and the dimension of Customer Inability to Evaluate the Service only relates to one of the Subjects of the PAs. According to the last row in table 5.7, the most relevant service dimension (Front Value Added) is among the externally measured service dimensions that have enjoyed the most degree of agreement in measurement (between the two

experts in each service). In other words, the most relevant SD based on the analysis of the present research is among the most reliable ones in terms of measurement according to this section. This can be seen as a 'good news' for the analysis in this chapter.

5.4.1.2. Finding the Most Difficult Services in Terms of the SDs Measurement

In table 5.6, from the total of differences for the externally measured SDs, it seems Airlines and Insurances are the most difficult ones in terms of measurement as the total of differences for these two services is highest among the other services. In contrast, Hotels and Power Utilities seem to be quite easy in measurement of SDs. It is difficult to argue about the underlining reasons for these differences. Power Utility for instance is an organization with a high degree of vertical integration, therefore, it might be expected to see that the measurement in this service is more difficult. However, the results support an opposite argument. It might be reasonable to say that Power Utility is more like a manufacturing organisation and therefore measurement of SDs for this service is easy; however, this argument is rejected when noticing that Hotels (which are far different from manufacturing) have received even less total of difference. The same "not-very-strong" arguments can be made to justify the large total differences for Airlines and Insurances. On the other hand, in contrast to the last section, here the subjectivity of the experts can significantly affect the total of differences as different pairs of experts are measuring SDs for each service. In other words, it is not known how much of the total difference in each service is due to the expert's subjectivity rather than the services conditions. Therefore, the author needs to emphasise that the notion of the most difficult service and the results cannot lead to definite conclusions and the interpretation of the total figures need to be made with extreme caution. It can be argued however that more human error is expected for more difficult services (in terms of measurement). Therefore, the results of this section are not totally useless.

The above argument about the effect of the experts' subjectivity on the total differences is however not applied to the internally measured SDs. This is because these services are measured by the same groups of experts rather than different pairs of experts for each service (as is the case for the externally measured SDs). It is therefore possible to derive more reliable results by comparing the total differences for the internally measured services. From the last

column in Table 5.7 it is evident that overall Airlines and Auto-Repairing and then Universities have the biggest total quartile deviation. This means that the experts had the most controversial opinions in measuring the SDs for these services which could indicate that these services are the most difficult ones among the others in terms of measuring the three internally measured SDs (and not necessarily all the SDs). On the other hand, the smallest total of quartile deviation belongs to Legal Services and then Department Stores. This in turn can be used to indicate that these services are the easiest ones in terms of measuring the internally measured SDs (and not necessarily all the SDs)*.

5.4.2. Experts' Views Similarities for the PAs

Like the process of finding the experts' views similarities on the externally measured SDs, given that the overall approach of measurement for the PAs was the same (collecting data from two experts for each service), a similar calculating procedure is used to find the experts' views similarities for the PAs. The only additional calculation is that as there is a different number of subjects in each category, to be able to compare the total differences between each category, the differences need to be weighted. This has been done by dividing the total difference in each category by the total possible difference in each category based on the number of Subjects in that category. Derived from the table in appendix 5.6, table 5.8 presents the differences in the comments of experts for each PA category as a percentage of the total possible difference in that category. The differences in the question on P/Q and Trade Off have been excluded from this study as the answers to this question between the two experts in each service are the same for almost all the services. Moreover, the structure of this question is different from the other PA questions. Auto-Repairing services are also excluded as only one expert was available for this service.

Table 5.8, Examining the Degree of Agreement between the Experts in Each Service for the PAs

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* It should be noted that similar results are derivable when using Averages or Medians in tables 5.6.

Expert's Response	PLC	FCT	PRB	APP	MES	QGP	QCT	Average
Al	16.67	20	50	41.67	30	50	0	29.76
Bn	16.67	30	12.5	0	40	25	25	21.31
Cs	0	10	12.5	33.33	50	12.5	25	20.48
Ds	16.67	40	0	8.33	0	37.5	37.5	20
Ff	0	20	25	0	0	12.5	62.5	17.14
Ht	0	30	25	8.33	20	37.5	37.5	22.62
In	16.67	10	25	25	40	50	25	27.38
Lg	0	30	12.5	16.67	20	12.5	12.5	14.88
Pu	33.33	40	12.5	16.67	20	25	25	24.64
Tl	33.33	50	12.5	8.33	10	37.5	12.5	23.45
Un	0	20	37.5	33.33	60	37.5	37.5	32.26
Average	12.12	27.27	20.45	17.42	26.36	30.68	27.27	

The average of the last column in table 5.8 is 23. This means on average experts have less than 1/4 of the possible differences of opinion in categorizing the PAs. It is relevant to note that (using two approaches of Conservative and Democratic) a strict condition was applied for accepting the final results with regard to the PAs. Together the above two considerations can be seen as evidence and a measure that can be referred to when arguing for the degree of precision of the PAs data.

5.4.2.1 Finding the Most Difficult PAs in Terms of Measurement

Looking at the last row of Table 5.8, it is evident that the Quality Gaps question generated the most controversy between the two experts in each service, following by Productivity Factors, Quality Costs and Productivity Measurement Problems. The less controversial responses go to Productivity Improvement Policies and then Productivity Improvement Approaches. It is therefore reasonable to argue that PLC and APP are the easiest categories of PA in terms of measurement and QGP, FCT, QCT and MES are the most difficult ones. Like the case of SDs, again it is not known how much of this difficulty is the result of the experts' subjectivity rather than the PAs difficulty to measure. However, it can be assumed that the effect of experts' subjectivity is equally shared among the PAs.

5.4.2.2 Finding the Most Difficult Services in Terms of the PAs Measurement

Looking at the last column, table 5.8 it can be seen that Insurances, Universities and Airlines have generated the biggest total percentage of differences whereas Fast Foods and Legal Services have generated the smallest total percentage of differences. As in the case of 'services and externally measured SDs', it is very difficult to derive any conclusions here as the figures for services in Table 5.8 are significantly subjective to the experts. In other words, it is not clear what proportion of the high (or low) total percentage of differences is the result of human error rather than difficulty of service in terms of measurement. It can be argued however that more human error is expected for more difficult services (in terms of measurement). Therefore, the results of this section are not totally useless.

At the end of this section it should be noted that the use of the word "difficulty" of measurement in this section is in its general use. This means it might be the case that a large total of differences of responses for a service is not because of the service being difficult in terms of measurement per se but because the service has a considerable variety of conditions in the real world and each of the experts respond based on one of the possible conditions for the service.

Summary and conclusions

This chapter presented the quantitative analysis of the data. The main objective of the chapter was to attempt the main research question (analytically selecting the most relevant service dimension to be used as indicators of productivity management issues). The analysis was based on four different views. The first view was the service dimensions view. In this view the SDs were analysed independently to other data. Research Questions 2, 3 and 4 were answered in this section. The analysis in this view was also a necessary step to be taken before attempting the main research question. The second view covered the analysis of the PAs. Research question number one was partially attempted in this section. This section too was a prerequisite section for answering the main research question. The third view was devoted to the main research question. The question was answered from both analytical and pragmatic

point of views. The dimension of Front Value Added was found to be the best SD (among those that are studied in this research) for indicating the productivity management issues in services. The fourth and the last view was from the measurement point of view. This section investigated the precision of the measurement tools in this research for both the SDs and the PAs. The detailed issues associated with the PAs that are indicated by the SDs can be found in the next chapter (chapter 6). Chapter 6 attempts research questions 1, 5, 6 and 7 by applying a qualitative analysis to the data.

Abbreviations:

- Al: Airlines
- Bn: Banks
- Cs: Consultancies
- Ds: Department Stores
- Ff: Fast Foods
- Ht: Hotels
- In: Insurances
- Lg: Legal Services
- Pu: Power Utilities
- Rp: Auto-Repairing
- Tl: Telecommunications
- Un: Universities

- SD: Refers to one of the 12 service dimensions that are studied in this research, often referred to by:
  - LI: Labour Intensity
  - FVD: Front Value Added
  - CC: Customer Contact
  - CI: Customer Interaction
  - CUS: Customisation
  - PJ: Personnel Judgment
  - INT: Intangibility
  - CIV: Customer Inability to Evaluate the Quality
  - PF: Process Focus

- PAs: One of the nine categories of the Productivity Aspects in this research, these are often referred to as:

  - P/Q: Productivity and Quality trade off, including:
    - P/Q-P: Prioritising Productivity Over Quality
    - P/Q-Q: Prioritising Quality Over Productivity
    - P/Q-TRDOF: The Interaction between Productivity and Quality

  - PLC: "Broad Productivity" Improvement Policies, including:
    - PLC-Vl: Increasing Volume (cost and quality constant)
    - PLC-Q: Increasing Quality (volume and cost constant)
    - PLC-C: Decreasing Cost (volume and quality constant)

  - FCT: Productivity Factors, including:
    - FCT-I: Input
    - FCT-P: Process
    - FCT-O: Output
    - FCT-Fb: Feedback
    - FCT-Cm: Customer

- PRB: Productivity Improvement Problems, including:
  - PRB-Tc: Technology
  - PRB-M: Methodology
  - PRB-Pp: Competence of People
  - PRB-Cl: Climate

- APP: Productivity Improvement Approaches, including:
  - APP-Tc: Technology Based
  - APP-Pp: Employee Based
  - APP-Sr: Product/service Based
  - APP-Tk: Task/delivery based
  - APP-Cp: Capacity/material Based
  - APP-Cm: Customer Based

- MES: Productivity Measurement Problems, including:
  - MES-I: Different Categories of Input
  - MES-O: Different Categories of Output
  - MES-Rl: Relationship between Input and Output
  - MES-Fc: Input Measurement for Employees Facing Customers
  - MES-Int: Measuring Output and Their Validity Considering Intangible Outputs

- QCR: Quality Characteristics

- QGP: Quality Gaps, including:
  - QGP-1: Gap 1 in the Parasuraman Quality Gap Model
  - QGP-2: Gap 2 in the Parasuraman Quality Gap Model
  - QGP-3: Gap 3 in the Parasuraman Quality Gap Model
  - QGP-4: Gap 4 in the Parasuraman Quality Gap Model

- QCT: Quality Costs, including:
  - QCT-Pv: Prevention Cost
  - QCT-Ap: Appraisal Cost
  - QCT-In: Internal Cost
  - QCT-Ex: External Cost

- PA Subjects: Refers to one of the above-mentioned issues in the Productivity Aspect Categories.

Chapter 6. Qualitative Analysis of the Data and the Results:

Introduction

As discussed in chapters 4 and 5, to be able to attempt all the research questions in this work, both quantitative and qualitative data is required. The quantitative analysis was used in chapter 5 to attempt answering the main research question (that was finding the most appropriate SDs to be used as indicators for the PAs in the studied service industries). Beside this, the research questions numbers 1 to 4 were also attempted (Classification of services in terms of productivity management, classification of services based on the SDs, the measurement of services for the SDs and the relation between the SDs).

The structure of this chapter is different from the structure of chapter 5. In chapter 5, while a number of questions were answered, all the sections were joining together as series of processes leading to one main goal (that was attempting the main research question). This chapter however is made of a number of sections that are attempting different research questions from different points of views. The sections are not in a form of series of processes, aiming to answer an ultimate question (like chapter 5). Nevertheless, the whole chapter is still one solid piece of work as the sections are arranged based on a defined logic of qualitative analysis.

The objectives of this chapter are as follows:

a) To elaborate on and further attempt the research question number 1.

Research question number 1:
"In terms of Productivity management, how are the service industries similar/different and how can they be classified?"

It was pointed out in chapter 5 that the research question number 1 was only partially attempted in that chapter. Here, the reasons behind the importance or non-importance of the

subjects of some of the main PA categories in different services are elaborated. Also the studied services are classified (again) based on productivity management issues but this time from a different perspective.

b-c-d To attempt the research questions numbers 5, 6 and 7:

Research question number 5:
"(Within the scope of the present research) What are the key factors and issues in productivity management in service industries?"

Research question number 6:
"Is there anything like productivity friendly services and if the answer is positive, what are the conditions of these services?"

Research question number 7:
"What is the interaction like between productivity and quality in service operations?"

In doing the above, where needed, quantitative analysis will be used to complete the qualitative analysis results.

As the phrase "qualitative analysis" could mean different things for people from different backgrounds, this chapter starts with a brief explanation of what is meant by this phrase in this research. This will be followed by the main qualitative analysis sections. As in Chapter 5, a simple map is used to help understand the structure of the chapter and the flow of discussion. The analysis starts with data reduction in section 6.2. This is a necessary step before carrying out the rest of the work. The main discussion in this section is about coding the data. In section 6.3 a number of data display tools are being used as another step towards reaching the final conclusions in qualitative analysis. This section attempts answering research questions 5 and 6, as well as elaborating on the main research question and the research question number 1. Section 6.4 includes the final conclusions from the qualitative analysis. Research question number 1 is attempted from a different perspective in this section. The answer given to the research question number 5 is elaborated in this section and research question number 7 is

attempted. At the end of the chapter, some helpful results on anticipated changes in the service dimensions measurements will be presented.

6.1. What is meant by Qualitative Analysis in this Chapter

"With the complexity of qualitative research, its terms, and its traditions, what common ground exists for qualitative research?" (Creswell, 1998). With this question, Creswell begins a comprehensive discussion in an attempt to find some common elements in between different qualitative research methods. The fact is that there is little agreement about what is the exact procedure of a qualitative research design (Creswell, 1994). The flexibility of the concept becomes even wider when it comes to qualitative analysis itself. The process of data analysis is eclectic; there is no "right way" (Creswell, 1994). In other words, as Patton argues, no formula exists for qualitative analysis, guidance yes! But no recipe (Patton, 2002). Direction can and will be offered, but the final destination remains unique for each inquirer. From the very starting point of reviewing some works on qualitative research, the author realised that he is on his own! "Learning by doing" is perhaps one of the best descriptions of qualitative analysis that the author has come across (Creswell 1998).

In an attempt to receive that "guideline" mentioned by Patton, the author found the framework proposed by Miles and Huberman to be quite useful (Miles and Huberman 1994). The following is a brief version of this framework:

Qualitative Data Analysis
- Data Reduction
- Data Display
- Conclusions and Verification

In the above framework, Data Reduction basically refers to the process of selecting, focusing, simplifying, abstracting and transforming the data that is collected. Coding process is the major part of data reduction. Data Display consists of Within Case Displays and Cross Case Displays. Display is an organised, compressed assembly of information that permits conclusion drawing and action (Miles and Huberman, 1994). Within Case Display displays data based on each of the studied cases. Cross Case Display integrates the relevant parts of

data across the cases and put them in one display unit. Conclusions and Verification is the final stage of analysis in which the results are summarised, structured and verified. As Miles and Huberman put it verification may be as brief as fleeting second thought crossing the analyst's mind during writing, with a short excursion back to the filed notes. The outcome of the qualitative analysis has been verified by continuous double-checking of the results and revisiting the notes throughout the analysis. There is also a discussion specific to the issues related to verification of results (including the results of quantitative analysis) in chapter 8. Moreover in section 4.13 some of the issues that were directly or indirectly related to verification were discussed.

According to Miles and Huberman the above phases are not independent stages, but interactive parts of research that are all interrelated together. This was exactly what the author of the present research experienced, as none of the above aspects of analysis took place in isolation without the need to look at the other aspects. An important point, worth mentioning, is that Miles and Huberman argue that in fact the analysis stage starts with the Data Collection stage, as there is a strong link between the two stages and they can always be used as the feedback sources for each other. Although the limited resources and the scope of this research did not allow continuous contact with the sources of data, this author too found that in the course of data collection, there are significant feedback links between analysis and collection of data. Accordingly some new elements have been added to data analysis as the result of the feedback received in the data collection stage. These elements will be discussed in the latter parts of this chapter (section 6.5).

Based on the above framework, figure 6.1 presents the structure and the logic of the qualitative data analysis in this section. The format of the figure is the same as figure 5.1. As described at the beginning of chapter 5, the relevant research questions for each section are coded in front of the section title in this figure.

6.2
***P*. Data Reduction**

6.3
Data display

6.3.1
QMain,Q1 C - Within case displays

6.3.2
Cross case displays

6.3.2.1
QMain, Q1C - List of the common features for each of the PAs

6.3.2.2
Q5 - Results of the database enquiries

6.3.2.3
Q5, Q6 – Analysis of the counts of data

6.4. Conclusion drawing and verification:

6.4.1
Q7 – Results of the analysis of trade off trends

6.4.2
Q1C – Results of the analysis of productivity policy trends

6.4.3 -
Q1 – Results of the analysis of the general features in the studied services

6.4.4
Q5 – Summary of the data enquiries results

6.5.

Q Main C - Service dimensions movement and other results

Figure 6.1 The Structure of the Qualitative Analysis Sections

6.2. Data Reduction

As Miles and Huberman (1994) put it, "data reduction is not separate from analysis. It is part of analysis. The researcher's decisions –about which data chunks to code and which to pull out, about which patterns best summarise a number of chunks, and which evolving story to tell – are all analytic choices."

It is helpful to note what is meant by "data" in this chapter. In section 4.9 it was explained that there were structured and semi-structured interviews. The data related to the structured interviews was analysed in chapter 5. In this chapter the data derived from the semi-structured interviews are analysed.

The process of data reduction in this research consists of a few stages:

1. Transferring the data (collected in the interviews) to transcripts in the form of maps, in which each concept in the map consists of only one "useful statement".
2. Integrating the relevant informative comments to form one "Unit of Data".
3. Allocating "descriptive" and "paternal" codes to the units of data.
4. Transferring the units of data to a soft ware database.

The following explains the above stages:

1. The author found that it is much easier to make the transcripts in the form of cognitive maps. It is important to note that the technical definition of this tool (cognitive map) is not intended here. Here, cognitive map simply refers to breaking the content of the interview into small phrases/sentences to be able to identify all the subjects that are referred to and then to connecting the phrases/sentences to show they are related to each other in the words of the interviewee. In this process, the useless statements and expressions are deleted or separated. These are the sentences that:
    - are merely giving a rank to the Subjects, (this information was only of use in the quantitative analysis) or
    - are not related to the subject, or
    - are too general to be viewed as a useful piece of information, or
    - are too specific to a single case (an organisation) that cannot be generalised for the industry. As discussed in chapter 4.7.1 the

data was collected for the industries and not any specific organisation.

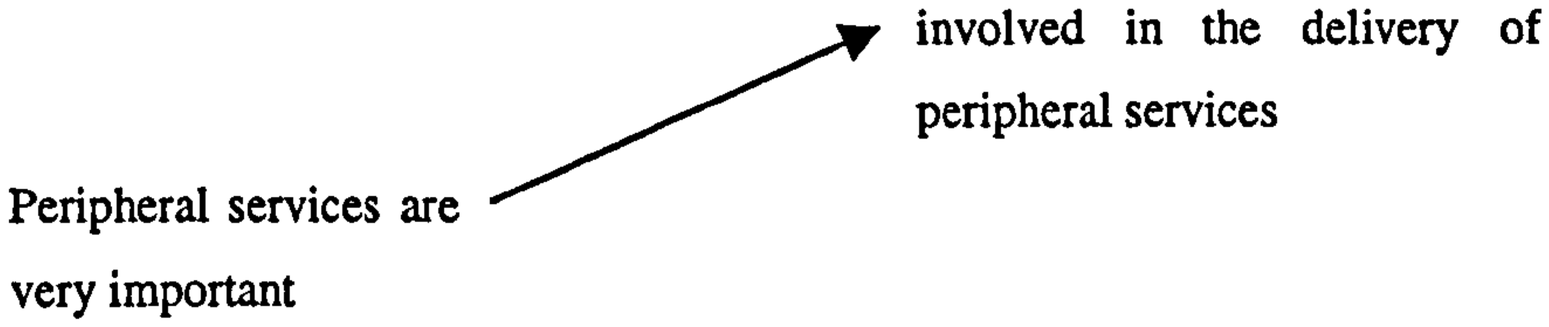
Apart from identifying the extra bits of information at this stage, the only other change that was made to data at this stage was re-arranging the order of words, or putting the subjects in the place of pronouns (showing the context) where appropriate, to make the meaning of the statements clear in the later stages of analysis.

The resulting maps were used as the product of a very initial processing of the raw data that is in need of further processing in order to be of any use. A sample of one piece of these maps is given in Appendix 6.1. To illustrate this stage, two examples from the data are given below:

Example One: Airline Industry, a statement by one of the experts:

"... peripheral services are an important part of many service industries, generally speaking, in the Airlines Peripheral services are very important and Customer is often very much involved in the service delivery for them ... ."

The above statement is transferred to a map as follows:



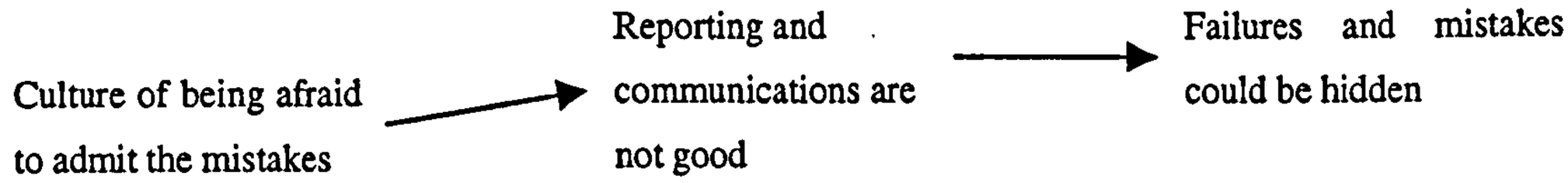
Obviously the arrow in this map does not indicate any causal relations, but only relations in its general term in the sense that the two expressions are related to each other in the interviewee's statement. As clear from the above, the general expression at the beginning of the statement (referring to many service industries) is taken out, also the word "them" at the end of the statement is replaced with the phrase "peripheral services".

Example Two, Hotel Industry, a statement by one of the experts:

"... overall I should say that there is a culture of being afraid to admit the mistakes, I can certainly think of many examples in places we visit ... (the interviewee then describes one of

his personal experiences about this culture) ... reporting and communication are not good and failures and mistakes could be hidden ....”

The above statement is transferred to a map as follows:



As can be seen, a too specific expression has been removed form the data (referring to personal experience) and the statement has been broken down into three separate but related phrases/sentences.

2. Identifying the unit of data was a significant stage in the process of data reduction. A too small unit of data could make the analysis very difficult if not impossible, as the links between the data would be hidden when all the data were put in the database. Also a too big unit of data could result in having useless chunks of data, as many concepts and expressions could be hidden in one unit. Therefore the unit of data had to be defined according to the further analysis methods that were to be taken. As the author found the database Microsoft Access to be a simple and effective analytical tool for this research (as will be discussed in the explanation of stage 4), the data unit was defined in a way that could be used effectively in this software. Accordingly the unit of data was defined as follows:

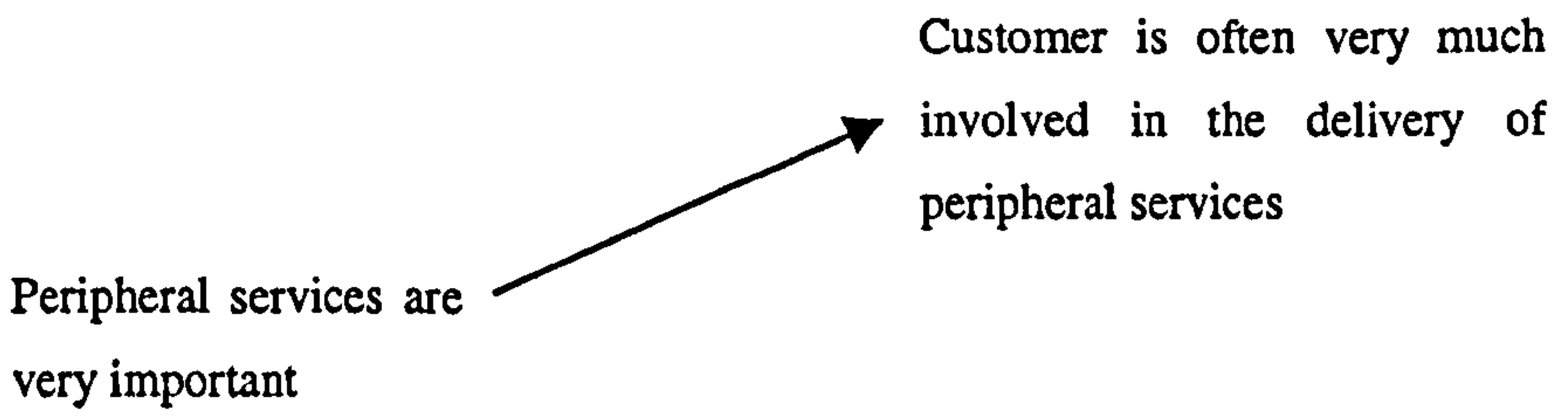
“A unit of data in the present research is a string of phrases that are linked together by the interviewee and are about one feature of one subject.”

“Feature” in the above definition means a single trend, causal effect or pattern or a group of interrelated characteristics. “Subject” in the above definition refers to the list of the Subjects of the Categories of the PAs. Based on this definition, it is possible to have more than one subject in one unit of data, however only one “feature” of one of the subjects is the main theme and the constitution of the unit. By following the above definition of the units of data, no unnecessary separation or integration of the pieces of data would take

place in the process of putting the pieces of data into units. At the same time the unit of data is designed to be "thick" enough for the purpose of the next stages of analysis. "Thick" here refers to the technical use of this word in qualitative analysis meaning that the description is rich enough and includes the required underlined factors (Miles, Huberman, 1994; Patton 2002). Practically speaking this means each unit of data in this analysis can stand on its own for analytical purposes (while naturally it can also be related to the other units of data for further analysis).

To describe better how the above definition works, the two examples in stage one will be further processed here:

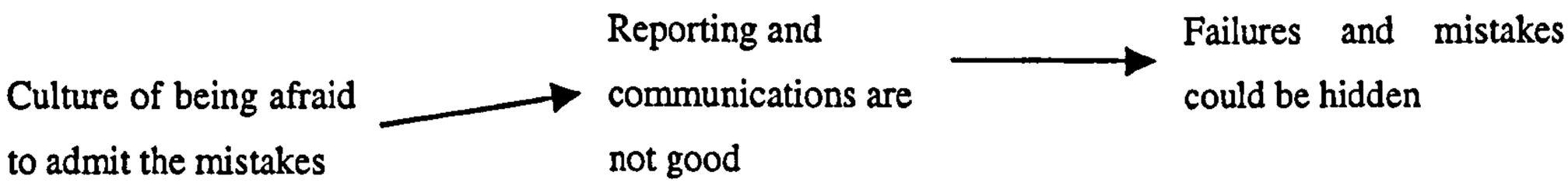
Example One, Airline Industry:



The above chunk of data is clearly about two different features. The first phrase is about "Peripheral Services" (bearing in mind that peripheral services is one of the Subjects of the PA Category of Quality Characteristics) and the feature is its "Importance". The second phrase is about "Customer" and the feature is the "Help" of customer in delivering peripheral services (bearing in mind that the sentence was expressed in addressing the importance of Customer as a productivity factor). Therefore, two units of data can be derived from the above chunk of data:

- *Peripheral services are very important.*
- *Customer is often very much involved in the service delivery for peripheral services.*

Example Two, Hotels:



The above chunk of data is describing one feature of the subject of "Culture" that is "Problematic". Therefore, the three pieces can be integrated in one unit of data as follow:

- *There is a culture of being afraid to admit the mistakes, thus reporting and communication are not good and failures and mistakes could be hidden.*

As can be seen, the only change in the wording of the data is the use of conjunctions to be able to put the pieces of data into one expression.

It should be noted that where the same features were referred to by the two experts of a service industry, they were not integrated together and were entered as separate units of data.

3. Data coding is one of the main stages of any qualitative data analysis. It is an essential stage of analysis that aims to reduce the complexity of the data and makes its retrieval analytically possible. There are many approaches to coding and the one common element across all the approaches is that the coding structure should be customised and developed based on the requirements of every individual qualitative research. While there are different categories of codes for different disciplines within qualitative analysis (Creswell 1998), there is one common categorisation for the codes of all kind and that is the distinction between Descriptive codes and Paternal codes. Descriptive codes are the codes that can be designed at the early stage of data collection and their mere function is to separate the data into the category, subject, source, condition and/or other descriptive information applicable to data. There is no element of interpretation in a descriptive code. Paternal codes however have some elements of description. These codes can only be identified and designed at the later stages of data collection and analysis, when general trends of data are starting to emerge (Miles and Huberman, 1994). There is a wide range of paternal codes, depending on the extent of interpretation.

In this study, the process of coding started from a simple separation of the data into their respective service industry as well as the related Categories and Subjects in the PAs. For this purpose, the same abbreviations that were introduced at the beginning of this work were used. To make referencing to the data easier, also to be able to easily check the number of data for each service industry, a numeric code was also used. Also a code was assigned to data to be able to identify the source of the data (which of the two experts in each of the services).

Based on the above, six types of descriptive codes were developed for each unit of data. These are:

I. A numeric number to represent the service industry that the data belongs to and more importantly to represent a unique and simple reference to each data unit. The order of numbers are as follow:

From 101 for Airlines.

From 201 for Banks

From 301 for Consultancies

From 401 for Department Stores

From 501 for Fast Foods

From 601 for Hotels

From 701 for Insurances

From 801 for Legal Services

From 901 for Auto-Repair Services

From 1001 for Power Utilities

From 1101 for Telecommunications

From 1201 for Universities

Increments of 100 have been used as the number of data units for each service is no less than 10 and no more than 99.

II. The abbreviation that represents the service industry
III. The abbreviation that represents the PA Category
IV. The abbreviation that represents the PA Subject

V. The abbreviation that represents the PA Subject that can be considered as a sub-subject in the unit of data
VI. Number 1 to represent the first interviewed expert of a service industry and number 2 to represent the second interviewed expert of the same service industry.

The codes used for all the above were the same that are used as abbreviations throughout the present research. The sub-subject code was included in the design at the later stages of data coding when it was found that a stronger indication of the subjects in data units could help more in the next stages of the data analysis. Based on this observation, the sub-subject code was only used for the data units that were significantly referring to more than two of the PA Subjects. Obviously the data units that contained significant referencing to only one Subject remained without the sub-subject code.

To illustrate the above, the same examples that were used at the previous stages are used here for descriptive coding:

Example One, Airlines:
Two units of data were identified in this example:

- *Peripheral services are very important.*
- *Customer is often very much involved in the service delivery for peripheral services.*

The first unit will receive a code of: 128-AR-QCR-Sn-2

Code 128 reveals that this data unit belongs to Airlines (being in the 100s). Also that it is the 28th record in the list of Airline's data units•. AR again represents the service industry to

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• One point worth mentioning is that there is no significance and meaning in the order of numbers within each service industry. This is because the data was reviewed over and over by the author and it has been checked numerous times to make sure nothing has been missed and that no illogical unit of data has been made. In this process often new units of data were added to the database or some of the useless units were removed or some of the units were divided or integrated. Therefore while the general

which this piece of information belongs to. It does not add anything to the first numerical code but it can help to quickly recognise the service industry, particularly for an observer other than the author. The author also found that for the purpose of this study, analysing the data using the software (Microsoft Access) is easier when using a string code rather than a numeric one. QCR reveals the PA Category that this data belongs to (i.e. comments were given in response to a question in this Category). Here, this is the Category of "Quality Characteristics". "Sn" reveals that the subject of the data is a Sensory aspect of quality (it was decided to consider peripheral services as a sensory aspect of quality). No code for sub-subject was needed. Number "2" reveals that this piece of information was derived from the second interviewee in the Airline industry.

Likewise the descriptive code for the second data unit for the example of Airlines is:
129-AR-FCT-Cm-Sn-2

FCT refers to the category of Productivity Factors. Cm refers to the subject of Customer in this category. It can be seen that in this case the code of Sn (Sensory) is used for the Sub-Subject of Peripheral Services.

For the second example:
Second Example, hotels:
The data unit is:

- *There is a culture of being afraid to admit the mistakes, thus reporting and communication are not good and failures and mistakes could be hidden.*

With the same logic, this is the assigned descriptive code for this data unit:
643-HT-PRB-Cl-Pp-2

The above codes reveal that this is a comment about Hotels in the category of Productivity Improvement Problems. The subject is about Organisational Climate and it relates to People (as sub-subject). The comment was made by the second expert in the hotel industry.

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trend was to start from the first PA Category (P/Q) and finish with the last one (Quality Cost), in many cases this flow was interrupted by the editions and modifications of data.

There was another piece of indicating code that could be extremely helpful (if not essential) in analysing data. As the whole analysis of data was about finding trends, groups and underlining factors, it was very helpful to be able to feel the "soul or mood" of each data unit by looking at its code. A code was needed to identify what is the general message or mood of a data unit. This of course was outside of the descriptive type of codes and enters the area of paternal codes:

Paternal code was not identified till the later stages of data collection, when the general trend of data and of the statements of the experts, emerged. At this point it was obvious that the comments were generally centred around describing a concept or a condition to be in a way problematic or less problematic. Based on this observation, a more specific review of data was made and as a result, the following general trends of the units of data were identified. Each trend was given a paternal code.

The units of data were stating one of these situations for their main (and not sub-) Subject (the assigned codes are against each title):

Costly: CSTLY

Not Costly: NCSTLY

Difficult: DFCLT

Not Difficult: NDFCLT

Good At: GODT

Not Good At: NGODT

Helpful: HLPFL

Not Helpful: NHLPFL

Important: IMPTN

Not Important: NIMPTN

Like: LIKE

Do Not Like: DNLIKE

Trade Off: TRDOF
No Trade Off: NTRDOF

Quality Has Advantage Over Productivity: ADVQ
Productivity Has Advantage Over Quality: ADVP

It Is Changing: CHNGE

As obvious from the above, all the codes are in pairs explaining two possible conditions of a situation, except for the last one that is only a one sided condition (Changing). These codes will be referred to as "Message Codes" for the rest of this work.

Looking at the two examples again, the codes can now be completed by adding the paternal code (the paternal code is put before the code for the source of data for convenient purposes in data base Access):
Example One:
128-AR-QCR-IMPTN-Sn-2
129-AR-FCT-Cm-Sn-HLPFL-2
Example Two:
643-HT-PRB-Cl-Pp-NGODT-2

One of the benefits of this coding system is that after experiencing a while (as the researcher) with the data and the codes, it will be possible to understand the main story of the comments only by looking at the codes. This is certainly what came true for the author, and the author is confident that the same is true for any other observer after a short practice.

For instance by looking at the code "IN - APP-Cl-Cm-CHNGE" (the other parts of the code are not needed for interpretation), the author can say that this comment is about Insurance Services (IN). It refers to something that could improve productivity (APP), it is about the culture or the climate that dominates the industry (Cl), it is relevant to customer (Cm) and it is about changing that culture (CHNGE). Overall it should be about changing a cultural concept in the industry that also is relevant to customers and will benefit productivity in the insurance industry.

The above estimation of the content of the comment was done without looking at the comment. Looking at the database, the comment with this code reads:

"There are attempts to get away from the process mentality in order to have more connection to the customer."

It can be seen that the interpretation of the code was not very far from the real comment. The ability to understand the overall story of comments based on the codes was of significant benefit in the efficient and quick review of data and when finding the trends and similarities. The other significant benefit of this coding system is its applicability and capability in being operated effectively in Access as will be explained in the next stage.

4. The author was looking for a simple but effective software that could firstly display the data clearly and then be able to process the data by the use of codes and the text in the data units. A software was needed with search facility and the capability of retrieving the data based on different conditional commands. This was all that the author needed for the scope of qualitative analysis in this research. Accordingly no need was felt for advanced qualitative packages like Nudist, Qualpro, Max, etc. A simple data base package with the search, reporting and enquiries facilities could do the job without the trouble of spending time learning a whole new software and trying to do a simple analysis by means of a complicated and advanced analytical tool. Microsoft Access was found to be an appropriate tool for the purpose. It is easy to use, data can be entered very fast, the design of the data base can be flexible, apart from the search facilities it has an effective enquiries tool that matches perfectly with the coding system (in fact while designing the coding system one concern was to make it in a way that could be useful in Access, although the final decision about the choice of software had not yet been made). Another advantage of Access is its compatibility with other Microsoft programmes like Word and Excel. This makes the data base available to other Microsoft programmes.

Using Microsoft Access, a data base was designed with eight fields. These are:

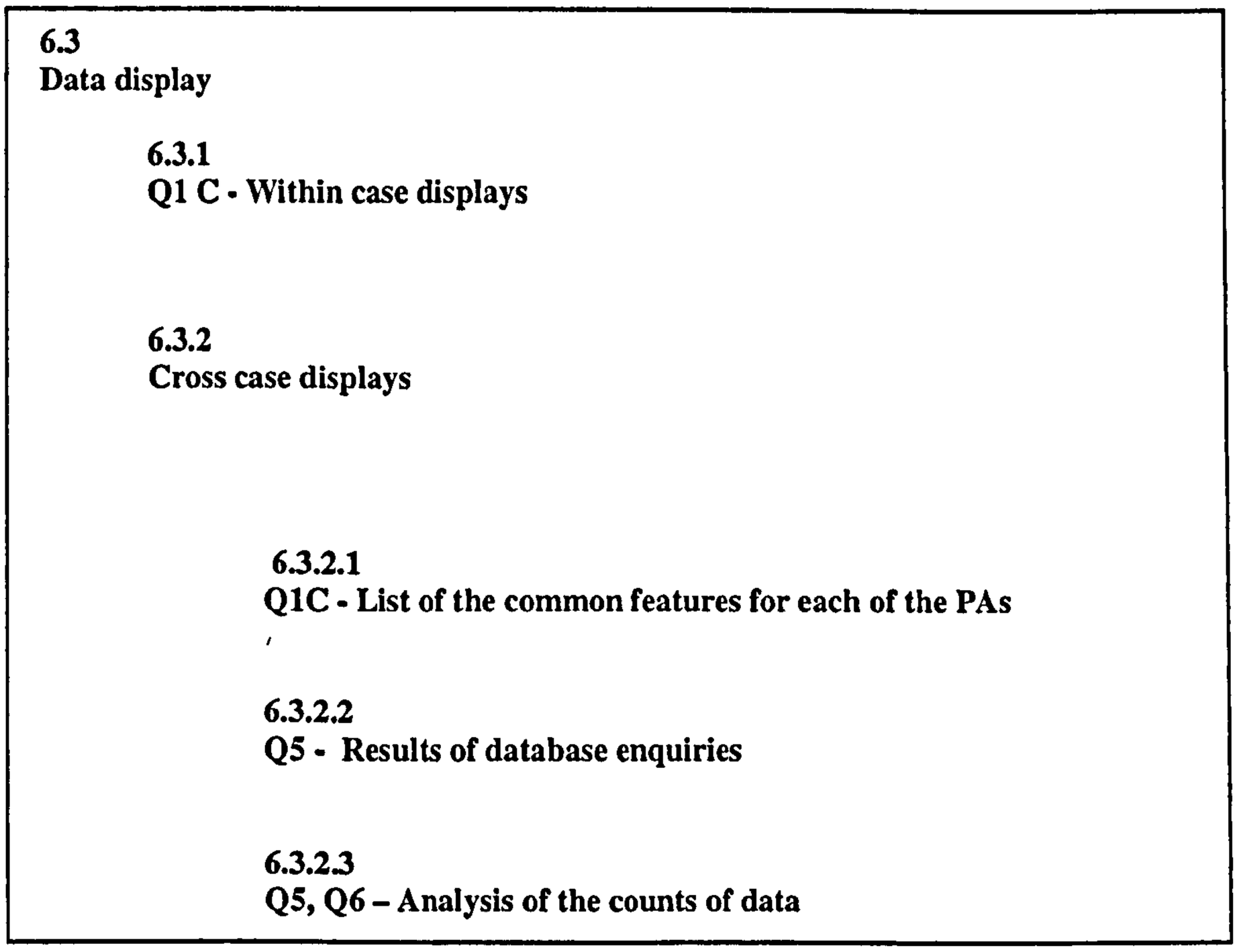
- Numeric Code
- Service Industry Code
- Category Code
- Subject Code
- Sub-Subject Code
- Message Code
- Comment (Data Unit)
- Source

A total of 727 records were made, each containing a unit of data with the codes. The author cannot claim that the rules explained in this section for making data units and allocating codes were applied one hundred percent accurately to the data. Human error as well as subjectivity of judgement is inevitable in such processes. However the data has been reviewed a number of times and a significant effort has been made to make sure this degree of error and/or subjectivity is as low as possible. On the other hand, possible alternatives (in case of subjectivity) or corrections (in case of error) do not affect the results significantly as in many cases (as will be seen later) they can only slow down the speed of analysis and in other cases a variety of double checking processes that are being done during the analysis will reduce the bias. Overall, the above design for qualitative analysis proved to be a very effective and efficient coding system without which the analysis process would have been extremely difficult if not impossible. Any degree of subjectivity in making the units or allocating coding messages might have affected the efficiency of the analysis without significantly affecting the results of the analysis. Appendix 6.2 is a snapshot from the database.

6.3. Data Display

Data display is an organised, compressed assembly of information that permits conclusion drawing and action (Miles and Huberman, 1994). At the first stage the data display takes place for each of the cases (here, each studied service sector). This is referred to as Within Case displays. The second stage is to look across the within case displays in order to integrate the data in a way that benefits the research. This is referred to as Cross Case displays. There are a variety of formats for the displays, starting from a simple text form to tables, matrices, maps,

etc. In this research, tables and maps are used as explained in the next section. The following two sections discuss the method of developing the data display forms and the initial results. At the beginning of each section we are reminded of the research questions that are relevant to that section. For convenient, the map of this section is repeated here:



6.3.1. Within Case Displays

The main objective of this section is to further clarify the answer to the research question number 1. The question was: "In terms of Productivity management, how are the service industries similar/different and how can they be classified."

Here, it is the first part of the question that is addressed. In section 5.2.3 the differences and similarities of services were briefly pointed out by grouping them in different clusters for each category. For instance Insurances, Legal Services, Power Utilities and Telecommunications were clustered as the group of services (among the 12 service industries) in which Methodology and Systems is the major problem for productivity improvement. What this

information fails to transfer is about "what are these methodological and system related items" and "what is so important about them". By means of a case data display, there is an attempt to find appropriate explanations, for these questions.

In order to do this, the Access database was sorted based on the Category Codes for each service industry. This provided the list of data for each category that contained information about "What" are the examples of cases for each of the Subjects that have been ranked as important and "How" are these important. The next step was to choose the units of data that contained the most relevant and rich information. To do this, the following procedure was taken:

- For each Category in each Service Industry, the Subjects that were ranked highly were reviewed
- Find the Subjects in the Category, using the Subject codes
- Read the relevant data
- Choose those that were directly about "What" and "How" features for the Subject
- In case of having overlap pieces of data from the two experts, integrate them together as one piece of data to be displayed

Apart from this, two further notes have been put down on the data display. Firstly if there were any noticeable difference of opinions between the two experts, this was noted at the end of the display tables. Secondly, the author attempted to summarise the productivity management features of each service industry in one short phrase. These phrases are written at the beginning of each display table. These are in fact other types of codes that will be used later.

The within case data display tables are given in the appendix 6.3. Using these tables it is now possible to investigate (for instance) what are the methodology and system related items that are major problems in productivity improvement in Insurance Services and what is the nature of their importance.

To be able to cover the data better in the displays, and bearing in mind that tables are not capable of demonstrating trends and relations, causal maps were also developed to highlight the cause and effect and the patterns of data for each Category. Although there are some

overlaps between the data in the maps and the data in the tables, their use and methods are different. In the tables, only the data related to the ranking of the Subjects are given while in the maps the interest is to gather the causal relations and the trends. A piece of data related to the rankings does not go to the maps if it is not part of a causal relation. On the other hand a piece of data that is not strongly related to the rankings but is part of a causal relationship will be included in the maps. These maps (appendix 6.4) will be used along with the tables as the entry data in the next section. The maps are also of a significant use later in 6.4.•

6.3.2. Cross Case Displays

After presenting the information that could provide insights into the rankings of the Subjects in each Category, it is possible to review across this information. The objective here is to attempt questions 5 and 6 and also further elaborating on the answer given to question number one.

To develop the cross case displays, a variety of approaches were used to be able to answer to the intended research questions. These include deriving integrated lists from the tables, identifying general trends from the tables and the causal maps, performing enquiries on the data base and developing bar charts based on the counting of selected "Message" codes and "Subject" codes of the data. These are discussed further in the following sections.

6.3.2.1. List of the Common Features for Each of the PAs

This section is basically to elaborate on the answer to the first research question as well as providing helpful insights to attempt questions 5, 6 and 7 in the later sections. This aspect of elaboration on the answer to the research question number 1 is also very much helpful for

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• It should be noted that these maps are totally different from the initial maps that were made as the transcript of the tape recorded data. There, the only objective was to cover all that is being said in a clear and easy to understand way. There were no attempts to show cause and effect relations in those early maps and the only relation that was sought was for the phrases to be linked in the saying of the expert. In the case of the causal maps however, basically only cause and effect relations are sought.

better understanding of the answer to the main research question and the models that were developed in this regard. The main research question was: "What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?" This question was answered in Chapter 5 and the relevant SDs were introduced there. To provide some clarifications, it is interesting to be more specific about the exact features that the selected SDs are indicating. For instance when it is concluded in chapter 5 that the SD of Front Value Added is an indicator for the Quality Gap number 4 (external communications), it is interesting to see what are the exact features and conditions that are included in this gap across the twelve service industries. To be able to do this, the conditions and reasons behind the rankings (as given in the within case tables) were integrated together to provide another perspective of the results. While the within case tables were the main source of analysis in this section, the maps were also used to make sure no valuable data is missed.

The following procedure was taken:

- Summarising each piece of data in the within case tables for each Subject of each Category in a short phrase
- Identifying the phrases that are overlapping in the content
- Rephrasing the overlapping phrases to make an integrated phrase

The results of the above procedure generate the conditions and reasons behind the importance of each of the Subjects in the Categories of PAs for all the services as a whole. Obviously there are cases where a Subject has been discussed in the qualitative data while the same Subject is not ranked as a highly important Subject in the quantitative data. To distinguish between the reasons and conditions behind these cases from the reasons and conditions behind the cases that were ranked as important, dark and hollow bullet points are used. Dark bullet points are for the cases that were ranked as important while hollow bullet points are for the cases that were not ranked as important. The results of this analysis are given in appendix 6.5.

6.3.2.2. Results of the Data Base Enquiries

The use of database enquiries was mainly to attempt the research question number 5:

Research question number 5:

"(Within the scope of the present research) what are the key factors and issues in productivity management in service industries?"

This section discusses the approach that was taken to attempt this question. It is a commonly believed notion that a researcher dealing with qualitative data will gradually get a sense of data by which he/she could identify what are the most valuable factors in the data. This was exactly what happened for the author in the sense of realising what are the key factors and main players in productivity management in services. These are the factors that (based on the database) have affected more or less all of the twelve services under investigation in terms of productivity management. Even for an observer it is not difficult to identify the significance of these factors from the database. This however is not the only process that was carried out in order to answer the research question number 5. By sorting the database on the Subjects and on the Message Codes, using enquiries and by searching for key words in the data, it became clear that there were a few issues that were repeated and referred to numerous times almost across all the 12 services. By checking the pieces of data related to these issues and using the cross table displays and causal maps it was possible to identify which of these issues (factors) have key roles in productivity management in most of the services. The findings were very much in line with what the author found by "getting the sense of the data", although a number of unnoticed but important issues were also identified throughout this more structured process.

In principle the following procedure was adopted to identify the key factors on productivity management in the services that were studied:

- Creating enquiries based on the Message Codes of "Difficult", "Bad At", "Costly", "Change", "Helpful" and "Important".
- Looking for common issues and trends for the data in the above enquiries as well as the within case tables and causal maps.
- Further investigation by searching for the main keywords in the data (based on the common issues and trends that were identified in the previous step).

- Summarising and structuring the identified key factors and their relevant elements and trends.

It should be noted that in the above analysis, the key factors other than the Subjects of the Categories are investigated, as those Subjects have already been identified by the authors and have been investigated in the previous sections.
The key factors, identified to be significantly influential for productivity management are:

- Standardisation
- Managing Cost
- Managing Change
- Staff Motivation and Loyalty

The above factors were found based on the study of cross case displays of the data. These factors will be further explored by revisiting the database and structuring the relevant data in the Conclusion stage of the qualitative analysis. A point that should be noted is that the above list is in no way exclusive. While the author could argue that the above will come to the notice of any researcher when analysing the data, one might like to suggest adding a few other factors to the list after studying the data. It is also a fact that the list is based on only twelve service industries (although the popular ones). It is perfectly possible that by studying other service sectors, more key factors could be added.

6.3.2.3. Analysis of the Counts of Data

Question number 6 of the research question asks for the possibility of having a productivity friendly service among the studied services. To investigate this, two possible approaches were available. To rely on the author's perception and understanding from the interviews or to try a more analytical method. Obviously the first choice is too subjective and it can only be used as a support for a more analytical method. The analytical method that could be used here was to count the total number of comments that are positive in terms of productivity management for each service as well as the total number of negative comments and to compare the results across the services. This is in fact a Counting Method for qualitative data that is widely used

in qualitative data analysis (Miles and Huberman 1994, Patton 2002). The author of the present research does agree that this is still a very subjective method of answering the above question. It can however be used as an approximate indicator that could provide a ground for further research (as will be discussed in chapter 8).

To be able to identify what comment is Positive and what comment is negative, the Message Codes were used. By looking at the Message codes it can easily be identified that there are two pairs of clear positive and negative messages. These are:

- Difficult Vs. Not Difficult
- Good At Vs. Not Good At

The objective is to see what are the services with less number of "Negative minus Positive" Message codes.

The following procedure was taken:

- The data was sorted based on the Message codes and copied to an Excel file.
- The number of codes was counted for each service using Excel IFCOUNT function.
- To provide consistency, the counts for each service were put as a percentage of the total comments in that service.
- The simple calculation of adding the counts of positive and negative codes separately and then deducting the counts of positive codes from the negative codes was carried on for each service.

The results are illustrated in figure 6.2. (the actual figures can be found in appendix 6.6).

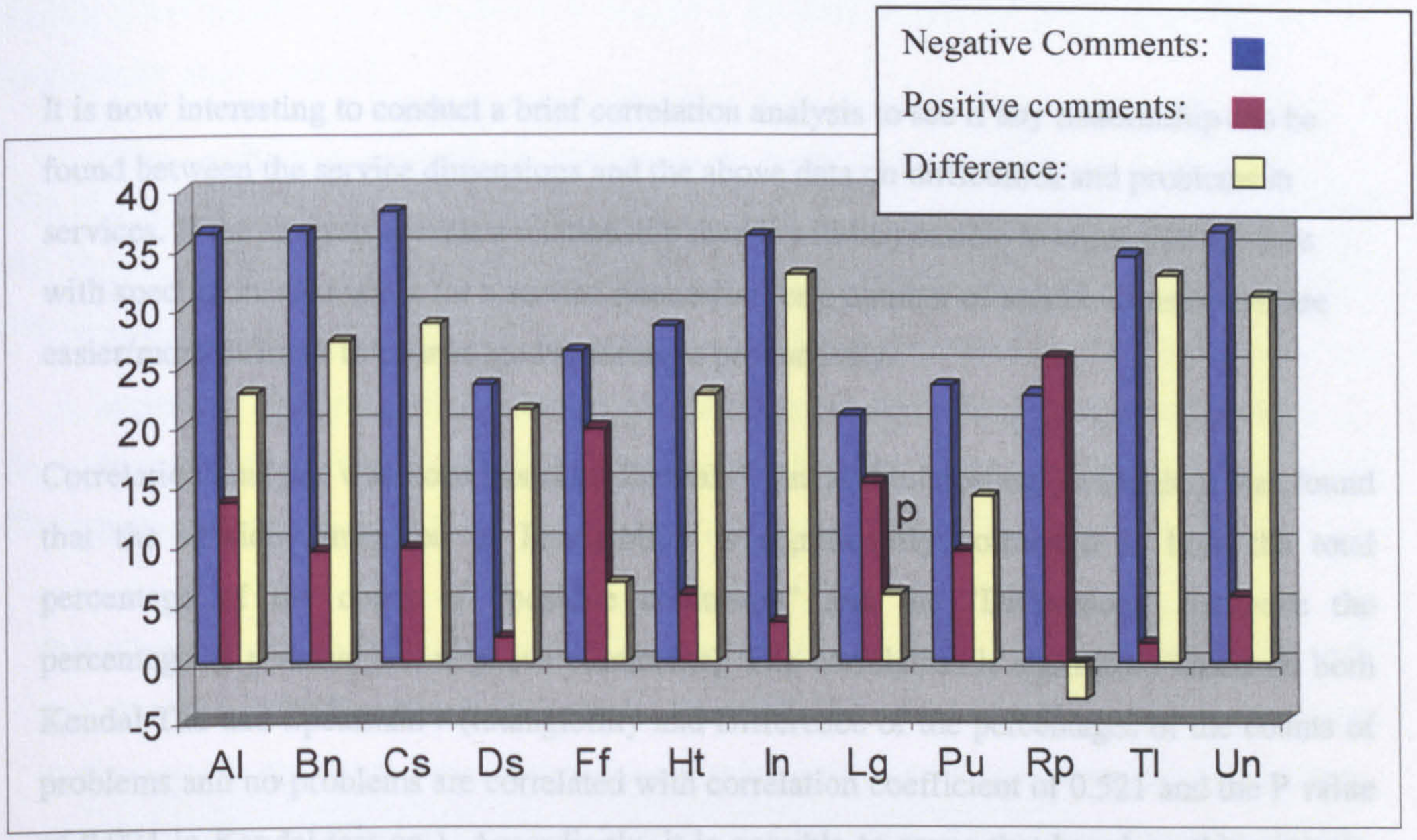


Figure 6.2 Percentages of the Comments about Positive and Negative Features for Each of the Services

As it is clear from the above chart, Auto-Repairing, Fast Food and Legal Services seem to be less trouble to some services in terms of productivity management. In fact Auto-Repairing is the only service sector with positive figures for the Difference measure. This is while University, Telecommunication and Insurance seem to be the most trouble in terms of productivity management. When looking at the database in an attempt to identify a common feature among the three services of Fast Food, Auto-Repair and Legal, the word "Standardisation" stands out. In all these three services standardisation is one of the main features of operations. In legal services the respondent pointed out that although the general perception from outside is that legal services are very customised, in reality because of regulations, all the customers' cases are categorised into one of the routine standard legal operations. It seems reasonable to argue that the more friendly services in terms of productivity are the ones that are more standard, or better to say, ones that have more room for standardisation. This is very much inline with Levitt's notion of product line approach (Levitt 1972).

It is now interesting to conduct a brief correlation analysis to see if any relationship can be found between the service dimensions and the above data on difficulties and problems in services. If the analysis reveals a relationship then it will be possible to argue that services with specific measurement for a service dimension (or a number of service dimensions) are easier/more difficult to be managed in terms of productivity.

Correlation analysis was done based on Kendal's' Tau and interestingly enough, it was found that the service dimension of Intangibility is significantly correlated to both the total percentage of the count of "positive comments" and the "Differences" (between the percentage in positive and negative comments). The correlation is significant based on both Kendal Tau and Spearman *r* (intangibility and Difference of the percentages of the counts of problems and no-problems are correlated with correlation coefficient of 0.521 and the P value of 0.024 in Kendal test on). Accordingly, it is possible to argue that based on this analysis, highly intangible services are more difficult to be managed in terms of productivity.

The service dimension of Customisation is also significantly correlated with the percentage of count of Problems based on the two correlation tests. This SD however is not correlated with the Difference (of the percentage of the count of Problems and No-Problems).

It should be noted that "Costly" was not included as problem because it was felt that Cost is very much dependant on organisational factors that are not quite relevant to SDs, however the same analysis was done with Cost included. The analysis leads to similar results in terms of correlation between Intangibility and the Difference (of the percentage of the count of Problems and No-Problems). It is also worth mentioning that although overall it was found that Intangibility and "Differences" (between the percentage of count of positive and negative comments) are significantly correlated, this was not particularly the case for Legal services. According to the measurements, Legal services are quite high in terms of intangibility (13), this is while the "Differences" score for legal services, is quite low. The low score of "Differences" for legal services can be indicated by the service dimension of Customisation (that is 3 for Legal services).

It is now possible to integrate this argument with the argument about standardisation being a reason for productivity friendly services:

"The qualitative analysis in this research (with some help from quantitative analysis), shows that among Service Dimensions that were studied, the dimensions of Intangibility and customisation have a positive correlation with the degree of difficulty of productivity management issues in the studied services. It is possible to argue that high intangibility and customisation leaves little room for standardisation in services and this leads to more complex situation, thus more difficulties in managing productivity."

It is of course clear that the above result can not be taken as definite due to the size of the data and also the possibility of high subjectivity. The result is in need of further study and support as discussed in chapter 8. Nevertheless the result is not alien to the general agreement in the service industry literature where there seems to be a consensus that intangibility (or what this concept is referring to, noting the controversial discussions about the validity of the term as referred to in section 3.3.1) in general adds to the complexity of service operations.

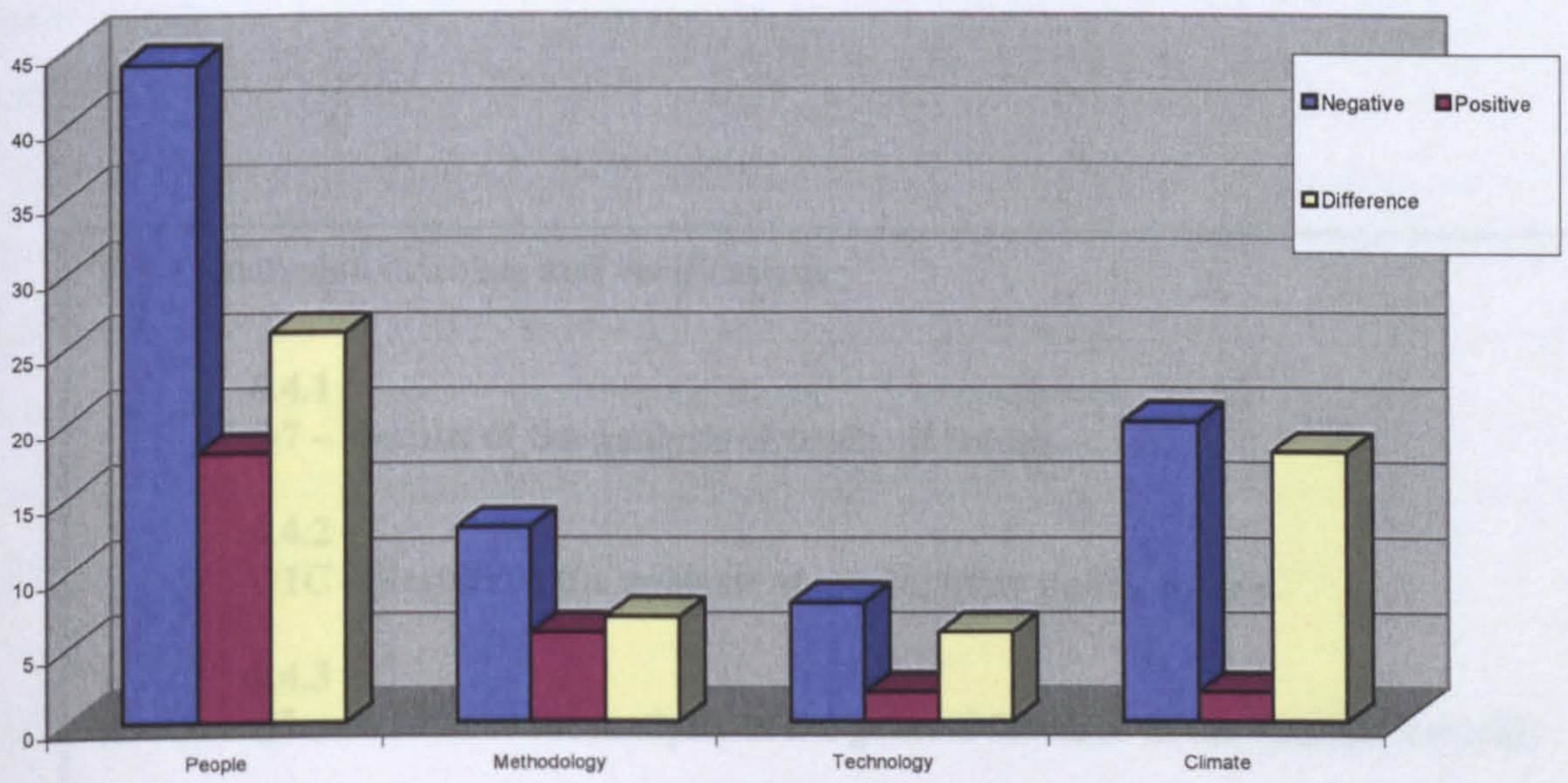
This section was mainly to attempt the research question number 6. However as the analysis is now including counting analysis, it is interesting to use the same technique to answer the research question number 5 from another perspective. Research question number 5 was about the key factors in productivity management. This can be done by counting the number of total "positive" and "negative" messages for the four Subjects of the Category of Productivity Problems (i.e. Technology, People, Methodology, and Climate) and to see among these four categories of problems, how positive and negative comments are allocated.

The results of the analysis are illustrated in figure 6.3. The calculations are in appendix 6.7. The chart shows that Competence of People is the main problem across the service industries under study. Followed by Climate and Methodology & Systems. Technology is less of a problem in the studied services. It is interesting to compare these results with table 5.2 in which the median of the PA measurements is presented. The results are the same for the highest and lowest measurements (that are People and Technology). In that table Methodology has a higher measurement than Climate while in the chart presented in this section Climate has a higher measurement. Apart from this, the results are consistent. Altogether it is possible to argue that in the 12 studied service sectors, (based on the results in

chapter 5 and chapter 6), competence of people is the most important problem in the way of productivity improvement.

This of course can be subjective to the structure of questions. However as the interviewees had freedom to put their emphasis on any of the questions and subjects, it is possible to argue that this subjectivity is not significant.

Figure 6.3. Count of Positive and Negative Comments for the Subjects of the PA Category of Productivity Problems



The above result is again referred to in chapter 7.2.

6.4. Conclusion Drawing and Verification

It should be noted that the "conclusion" here does not refer to the routine Conclusion section that usually comes at the end of a chapter. As discussed in section 6.1, here "Conclusion" refers to a specific phase of the three phases of qualitative analysis. As Miles and Huberman (1994) put it, from the beginning of the data collection and early stages of analysis, the qualitative analyst is beginning to decide what things mean, this means noting regularities, patterns, explanations, possible configurations, causal flows and propositions. Exactly in the

way that these authors describe, these conclusions were quite light and vague at the beginning and by the end of the data analysis they became clearer and stronger. In the following sections the final attempt to derive relevant conclusions from the qualitative data is described. In this attempt the raw results of the previous sections will be elaborated and summarised. This part is basically to make a final attempt to answer the research questions number 1, 5, and 7. As discussed before, the verification (as Miles and Huberman put it) takes place throughout the qualitative research by continuing to revisit the data and the conclusions. In section 4.13 some of the issues that were directly or indirectly related to verification were discussed. More related issues to verification are discussed in Chapter 8.

The structure of this section is repeated here for convenience:

6.4. Conclusion drawing and verification:

6.4.1
Q7 – Results of the analysis of trade off trends

6.4.2
Q1C – Results of the analysis of productivity policy trends

6.4.3 -
Q1 – Results of the analysis of the general features in the studied services

6.4.4
Q5 – Summary of the data enquiries results

6.4.1. Results of Analysis of Trade Off Trends

Here the final attempt is made to answer the research question number 7 about the trade off between productivity and quality in services. By looking at the database and creating enquiries with the Message codes of "TRDOF" (trade off) and "NTRDOF" (no trade off), also enquiries on "quality" and "productivity" in the main part of the records and by reviewing the causal maps and cross case tables, a number of conclusions can be made within the limits of the studies services.

First, it was noted that for most of the services that were studied it was impossible to draw a general conclusion with regard to productivity-quality trade off. These industries have different types of processes and different aspects of delivered services. While a certain type of process in a service sector might enjoy no significant trade off between productivity and quality, another type of process in the same service sector might face a huge trade off between the two concepts. In Telecommunications for instance, one data entry says: "There is a dilemma between external measures (customer satisfaction) and internal measures (meeting standards), internal measures can make external measures weak." This is clearly pointing to trade off. In the same industry another data entry says: "Low quality in front end causes productivity decrease in back office and high quality saves productivity in back office." This seems to refer to less trade off between productivity and quality. Another example is in the Hotel industry where one entry point says: "Quality expectations of customer are not always in line with the productive products and that results in losing the customer." while another entry point says: "Quality basically means what customer wants, and by providing it less complaints will be received, thus less waste (of time and energy) and more productivity." Clearly, in each of the above sets of apparently conflicting statements, two different types of processes or different aspects of quality are referred to. Therefore it is only reasonable to argue that in most cases no general rule can be drawn for any service sector.

While taking the above into account, in a number of studied services there were parts of operations or some aspects of operations that enjoy less trade off or no significant trade off. These can be categorised into three types. The following explains each type, starting with the most interesting one (from the point of view of this author):

I. In some of the services, both productivity and quality affairs (partially) are focused on a common element of the operations. In this respect there is no trade off between productivity and quality in these services. This is a notion that is called the notion of "Common Element" in this research. The examples of this Common Element in the studied services are:

   - Speed (mainly for Fast Food and partially for telecommunications in terms of processing information)

- Standards (mainly for Auto-Repair and partially for Power Utility in terms of obtaining quality accreditations)
- Defect Less product (partially for Insurance and Legal Services)

The above observation is illustrated in figures 6.4-a and 6.4-b where a Common Element is shown to be capable of lifting the barrier in front of the hand-in-hand productivity and quality. The barrier is a symbol of trade off and it was decreased down by the factor of Cost. The applications of this result and further works that can be done on this concept are elaborated in the discussion chapter.

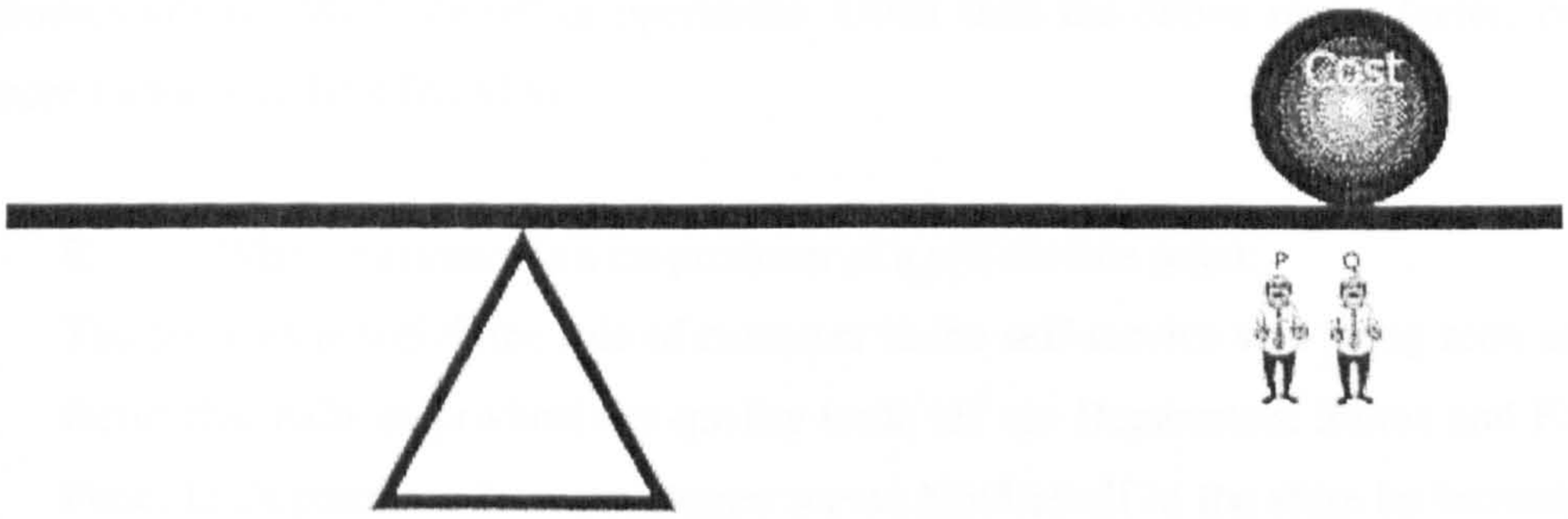


Figure 6.4-a: Trade off between productivity and quality: Cost does not allow Productivity and Quality to go hand in hand. There is a barrier that Productivity and Quality cannot pass.

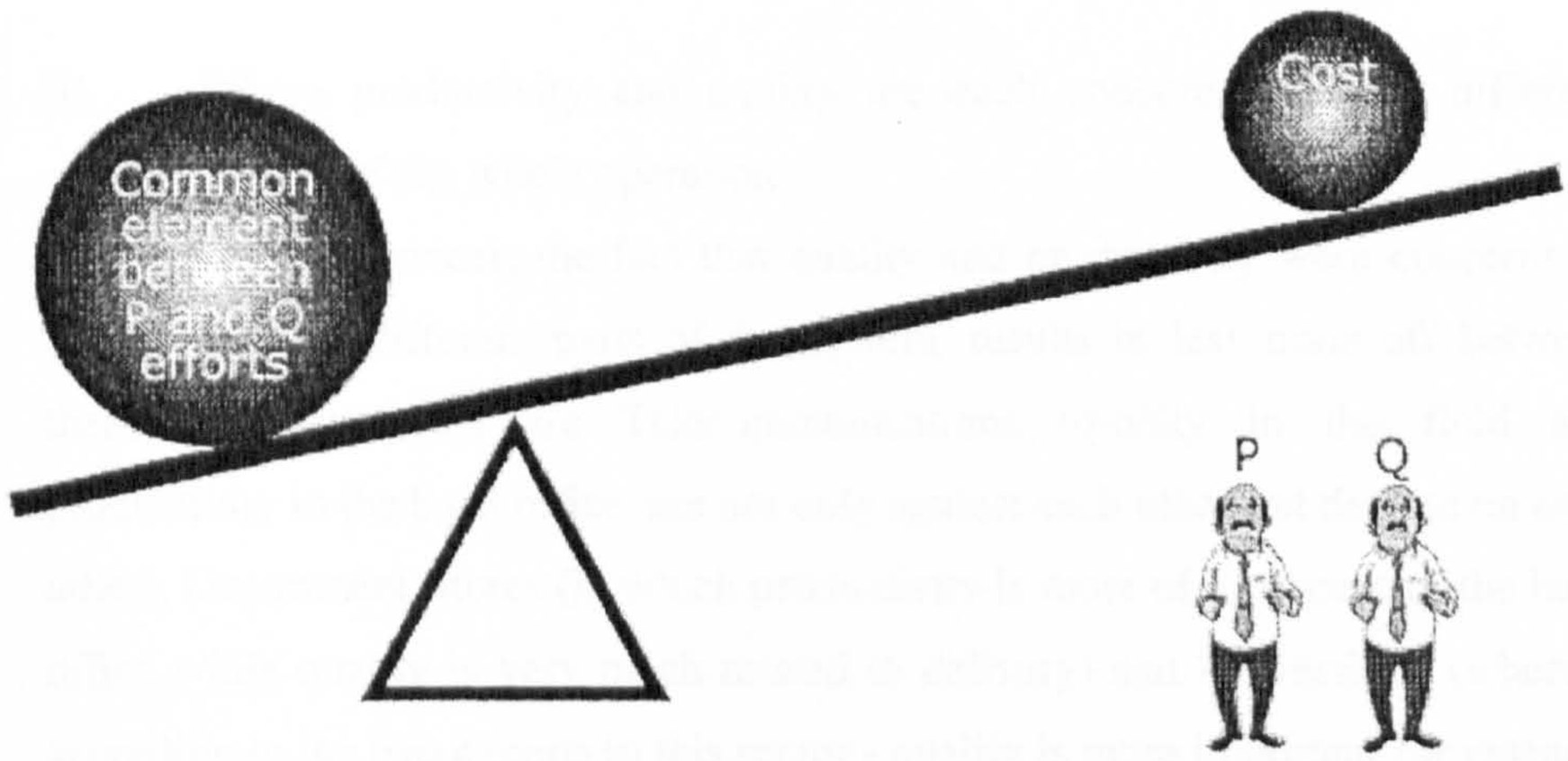


Figure 6.4-b: Overcoming the trade off between productivity and quality: A common element between Productivity and Quality is capable of lifting the barrier and allowing Productivity and Quality to go along hand in hand.

It is possible to argue that the above notion of Common Element between productivity and quality is very much inline with what is referred to in the recent researches on service productivity as "customer's perspective of productivity" (Gummesson, 1998; Parasuraman 2002; Johnston and Jones 2004; Martin et al. 2001). From one point of view, it is possible to argue that the Common Element in the present research is in fact the area of challenges that are in common between both "Operational Productivity" and "Customer Productivity" (Johnston and Jones, 2004).

The above seems to be the most effective factor in reducing (or eliminating) productivity-quality trade off in operations. Other than the above major factor, two more factors can be referred to:

II. Where customer is a co-producer at a self service point:

The services in which the role of customer in the self-service was being seen as a factor that reduces productivity-quality trade off are Department Stores and Fast Food. In Department Stores customer serves him/herself in the store by browsing through the products and if applicable (for clothes) trying them on. Here customer is contributing in providing quality without an aspect of productivity being significantly affected. Same is true for Fast Food. According to the respondents, in Fast Food the self-service in fact increases productivity. The above is clearly what is discussed by Lovelock and Young in 1979 and Fitzsimmons, 1985).

III. Where productivity and quality are each concerned with a different section of the whole operation:

In some of the services, the fact that quality and productivity were concerns of two completely different parts of the system, results in less trade off between them. The examples are Telecommunications (quality in the field and productivity in the back office, are not only against each other but depend on each other), Department Stores (in which productivity is more of a concern of the back office while quality is very much related to delivery) and Universities (where – according to the two experts in this sector - quality is more important for research activities while productivity is more important for teaching activities). Obviously in all the above examples, skills and energies can be divided and allocated

appropriately to get the most from quality targets and productivity targets in different parts of the operations.

The above three conditions in which less trade off is observed between productivity and quality can be summarised in the following figure:

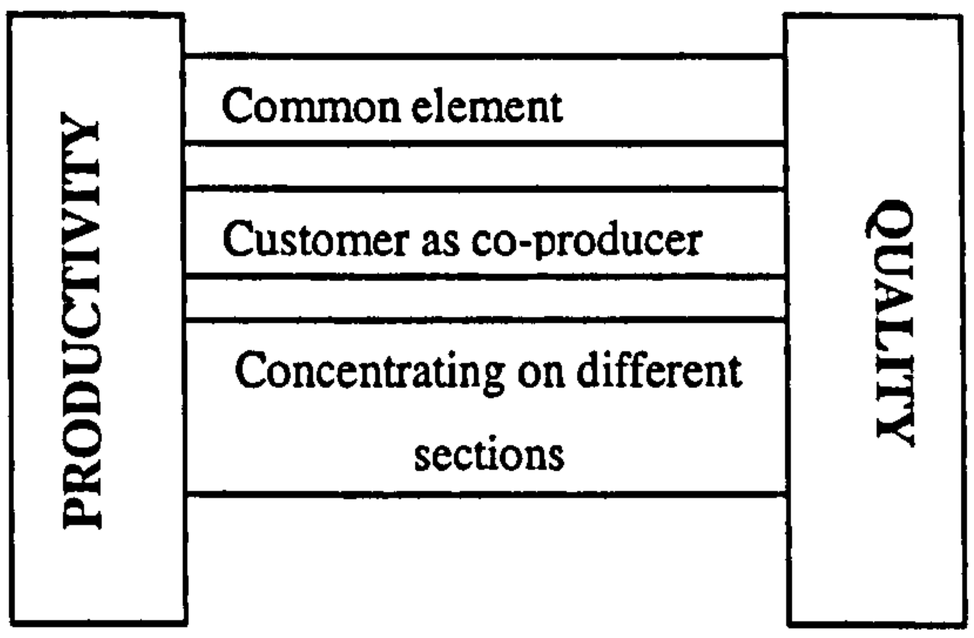


Figure 6.5. Reasons for less trade off between productivity and quality

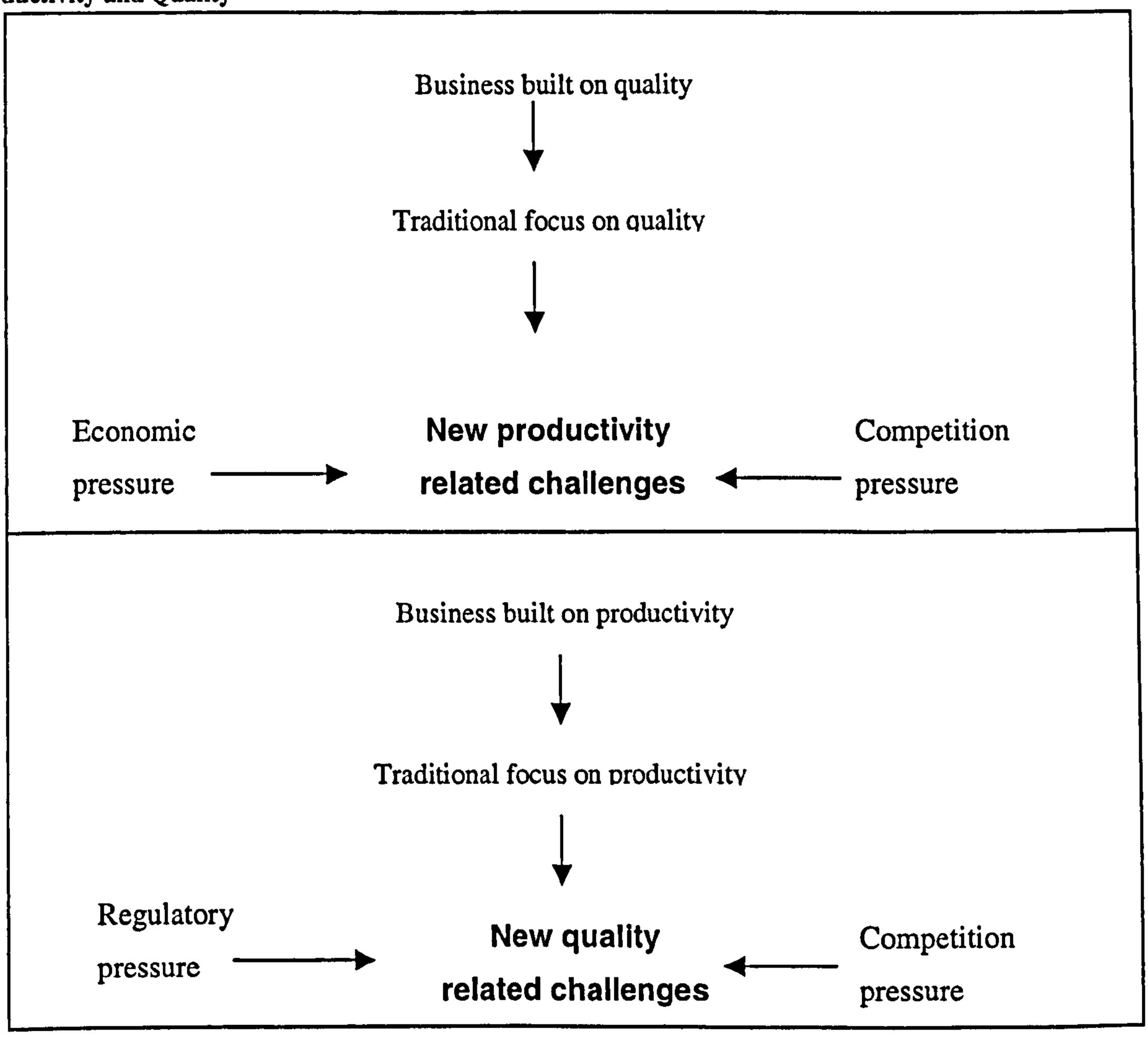
The above figures illustrate the finding in this section. Productivity and quality management are linked together via three pathways as explained above.

It is worth mentioning that in the most professional service in the list (Consultancy services), the question of productivity, its definition and the way it has to be managed and adjusted with quality is not very clear. In the words of one of the experts in this industry: *"It's difficult to understand the concept of productivity in this business. ... Our mission is to deliver a high quality work, this is while we are merely interested in productivity".* The concept certainly needs a special attention in professional services as discussed in chapter 8.

Another interesting observation about productivity and quality can be made by reviewing the first row of the within case tables (which is about Productivity and Quality relationship) and also the causal maps. It seems in many cases the organisations that were traditionally built based on one of these concepts have now begun to face some challenges to shift part of the

focus to the other concept. This is basically because of the new competition, regulation and economic conditions. For example, Insurance services are built on productivity, now because of the pressure of regulations and competition the business has started to put more focus on quality by changing the process oriented mentality of the system and developing a quality culture in the organisation. On the other hand Consultancy services are traditionally based on quality. In recent years because of the high competition and because of economic pressure, the business starts to focus more on productivity by better balancing of front and back office. This of course, is not an all inclusive rule but in general it seems like one of the common patterns among the service industries. This is summarised in the following figure:

Figure 6.6 The Effect of the Traditional Basis of a Service Organisation on Challenging Productivity and Quality



6.4.2. Results of the analysis of productivity policy trends

This section is another elaboration on the answer to the research question number 1 about the similarities and differences between services in terms of productivity management. Here the specific interest is the Productivity Policy question, as it can be considered to be a very strategic and influential issue. By having a review the second row of the within case tables and the causal maps and also by reviewing the list of common features in answering this question it will be evident that a general trend can be suggested among the studied service industries in terms of prioritising the three policies of "Volume Increase", "Quality Increase" and "Cost Decrease" for improving productivity.

Based on the collected data and the results so far, it seems the first condition to even think about increasing quality is whether customer seeks more quality. In the case of services where more quality is not desired (for various reasons that are mentioned in the within case tables) like Consultancies, Fast Foods, Hotels, Legal Services and Telecommunications, there is no need to make quality improvement a priority. Another important factor before considering the policy of quality improvement, is whether improving quality significantly increases cost. For instance, Airlines and Auto-Repairing services can give less priority to quality improvement simply because it is too difficult to control the cost when improving quality. Airlines have complex processes that result in complex relations of cost and quality. Auto-Repairing services are heavily based on standardisation and improving quality means a lot of investment to establish the new quality standards. As for the policy of cost reduction, the first thing needed to be considered, is if it is practically possible to decrease the cost without negatively affecting other factors of the business. Insurance Services and Power Utilities have a traditionally high cost and other productivity policies are preferred for them. As for the increasing volume, two conditions need to be met: firstly the concept of economy of scale should be applicable to the business. This means for services like Consultancies, Department Stores and Insurance Services where the unit cost is not significantly sensitive to the volume, it is unlikely to prioritise the volume policy over the other possible policies for productivity improvement. The second condition is market. It is impossible to increase the volume if there is no further demand in the market. This is the case for Universities and the well-established

Fast Food industries. Only after fulfilling the above two conditions is it possible to consider volume increase as a priority policy for improving productivity.

Perhaps there is no need to explain that the author can in no way, claim a generalisation of this model for all the services. However, the collected data can suggest that this model represents a reasonable trend in policy making for productivity improvement across a number of popular service industries, although even among the twelve studied services not all of them might exactly follow the details of the trend. This is definitely an area that needs more research (as discussed in chapter 8). The trend is illustrated in figure 6.7.

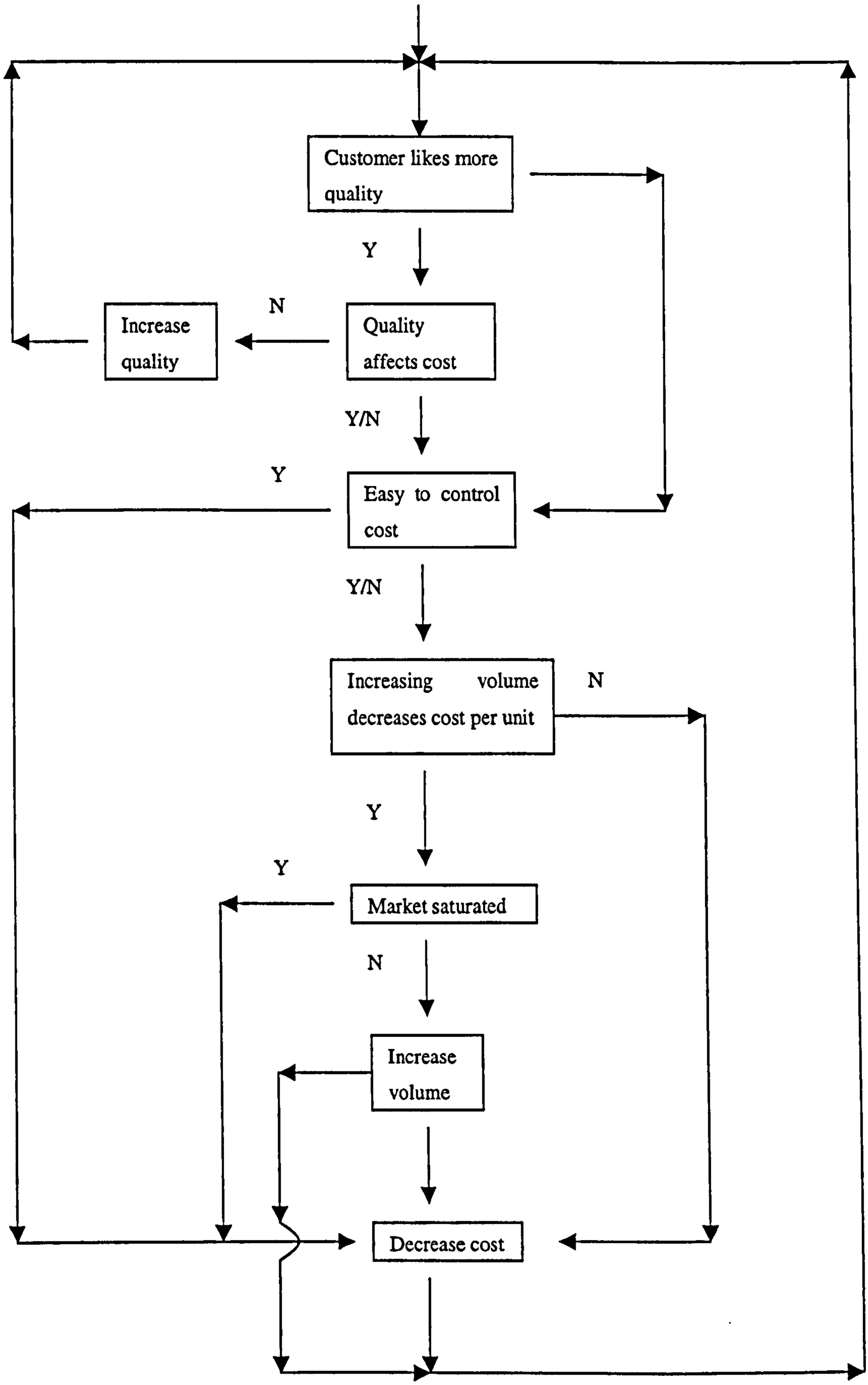


Figure 6.7 General Trend of Selecting Productivity Improvement Policies in the Service Industries

6.4.3. Results of the analysis of the general features in the studied services

In chapter 5 a number of classifications were suggested based on different productivity aspects. Also at the end of chapter 5 the studied services were classified based on a classification model that followed the format of the Service Process Matrix (Schmenner, 1986).

Here another classification is proposed for the studied services based on the qualitative data. Throughout the qualitative analysis and after developing the within-case tables for each service sector, it was evident that based on some general features, the studied services can be put into different clusters.

These clusters with the proposed titles for the clusters are as follows:

- Factory Services (Fast Food)
- Professional Services (Legal and Consultancies)
- Changing Services (Telecommunications, Power Utilities, Banks, Insurance)

The rest of the services in this study seemed to be a mixture of two or the three of the above:

University: Professional x Changing Services
Department Stores: Factory x Changing Services
Auto-Repair and Hotels: Factory x Professional Services
Airlines: Factory x Professional x Changing Services

According to the collected data, Airline is the only service sector that has features from all three clusters. The above clusters can be illustrated by the following classification model:

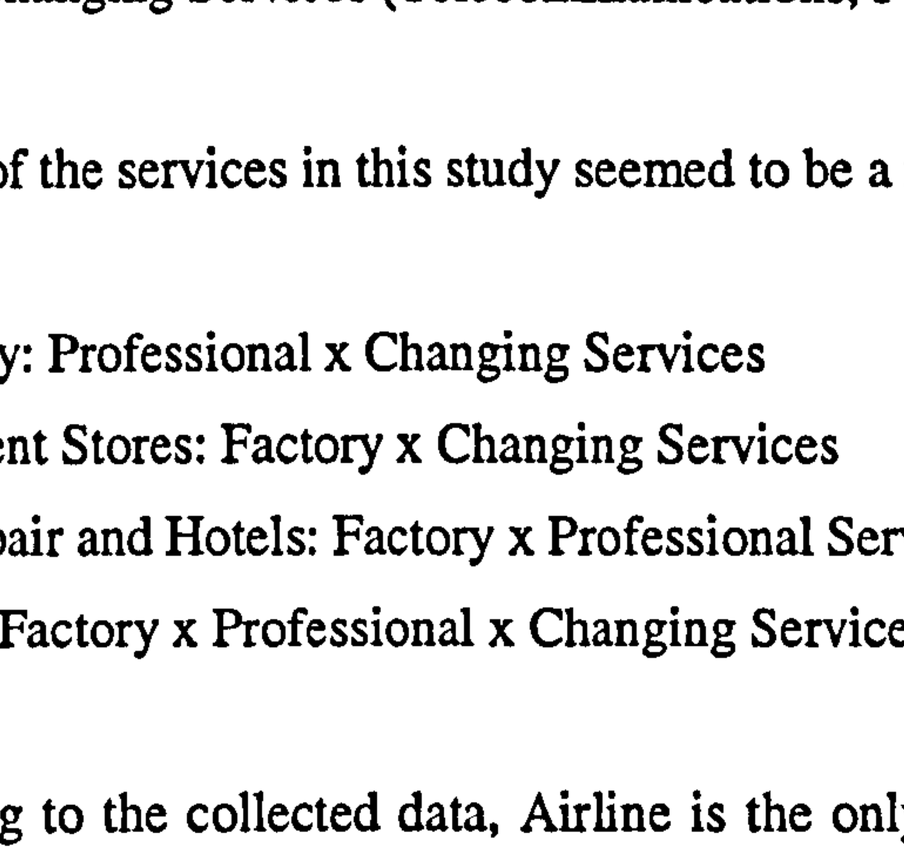


Figure 6.8 Classification of services based on the qualitative analysis.

A summary of the features of each cluster is given in table 6.1. These features are mainly derived from the within-case tables and causal maps, the main qualitative data base has also been revisited. It should be noted that the above are the overall features of each cluster. This means not all the features proposed for a cluster necessarily apply to all the services in that cluster. It is however, possible to argue that most of the features in a cluster apply to the services within cluster (according to the collected data in the present research).

Cluster	Advantages	Challenges
Factory Environment	- Standardisation - Standard customer expectations - Easy measurement - Low appraisal and external costs	- Human conflicts - High prevention cost - Less customer focus in measurement - Overspecialisation - Loyalty and motivation problems
Professional Environment	- Low prevention and appraisal costs - Team working - Good human relations between back and front office - Good motivation	- Not defined customer expectations - Difficulties in measuring intangibility - Inflexibility and scarcity of experts - Low motivation of supporting staff - Balancing back and front office
Changing Environment	- Technological advances - Growth - Easy to compete, for the newcomers	- Marketing gap - Staff difficulty (morale, loyalty) - High prevention cost - Rapid change of customer expectation

6.4.4. Summary of the data enquiries results

In this section the final attempt to answer the research question number 5 (about the key factors and issues in productivity management in services) is made. In section 6.3.2.2, four key factors were recognised that were considered as influential issues across almost all the studied services. These were:

- Standardisation
- Managing Cost
- Managing Change
- Staff Motivation and Loyalty

The method by which these factors were identified was discussed in section 6.3.2.2. Here the effects of these factors on the studied services (as illustrated by the experts) are presented. Identifying these effects was a simple task after identifying the factors themselves. Using the comments of the experts that were derived after performing each enquiry on the Microsoft Access, the common features/trends related to each of the above factors, were identified. These are illustrated separately for each of the above key factors in the following figures.

Figure 6.8 presents the advantages and disadvantages of standardisation according to this research. Figure 6.9 looks at the issue of cost management in the studied services. The figure lists the forces that put pressure on saving costs. The main expenditures and the main saving opportunities are also listed. Figure 6.10 illustrates the changes in services and their effects. The items in the Changes box are connected with many of the items in Effects box. The author preferred to connect the two boxes together (rather than connecting items in the two boxes) and leave a more detailed study for future research as it seems theoretically, it is arguable that most of the items in the two boxes are related.

Standardisation

Disadvantages:

- Establishment costs
- High prevention cost
- Limiting capabilities (skills)
- Ignoring certain areas in measurement and difficult to interpret the measures
- Over-estimating the benefits of standards in terms of customer satisfaction
- Customer expectations not necessarily fitting with standards
- Less adaptability
- Creating wrong assumptions
- Not applicable in certain areas:
  - Wide range of products
  - Flexibility/customization/feel of freedom is a major part of quality
  - Different skill levels are needed
  - Need for continuous adaptation with the environment
  - Customer expectation is not known or is changing

Advantages:

- Less internal and external failure costs
- Operational cost reduction
- Easily specified, checked and delivered quality
- Accreditations
- Easily controlled operations
- Easy to measure procedures
- Less contact with customer
- Easy to benchmark
- Easy to achieve productivity
- Less trade off between quality and productivity

Figure 6.9. The advantages and disadvantages of standardisation

Cost

Pressures:

- Regulated Price
- Demand Fluctuation
- Changing Environment
- Regulated Processes
- Competition after market saturation
- A certain level of quality is assumed by customer

Expenditures:

- Flexibility
- Training
- Technology
- Adaptation to Technology
- Establishing Standards
- Labour
- New Processes
- Changing Quality
- Complexity of Processes
- Being transparent to customer

Savings:

- Reducing/replacing Costly Staff
- Outsourcing
- Economies of Scale
- Established Standards
- Yield Management
- Maintaining Quality

Figure 6.10. (above) The management of cost in the studied services

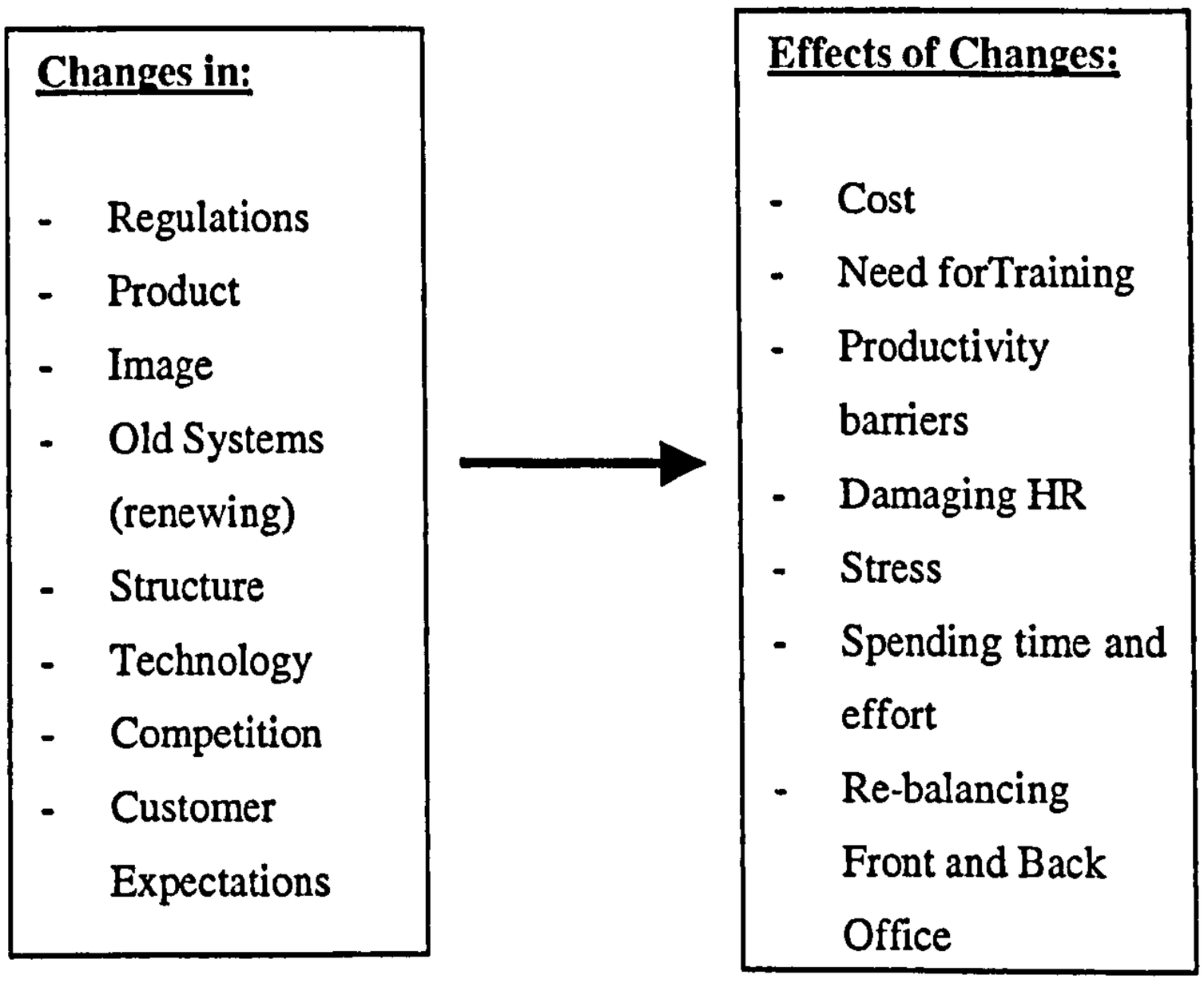


Figure 6.11 The effects of change in the studied services

One of the particular questions that was asked from the experts was about satisfaction and loyalty of staff and factors behind this (as discussed in chapter 4, this was an issue that was added during the phase of interviews, when it was noticed by the author to be an important issue). Figure 6.12 can summarise the results. The titles of Grumblers, Fellows, Passers-by and Visitors are introduced to represent each of the four zones in the chart. According to the Service Profit Chain (Heskett et al. 1997), the most helpful condition in terms of productivity of the operations is the condition of Fellows, where people are both motivated and loyal.

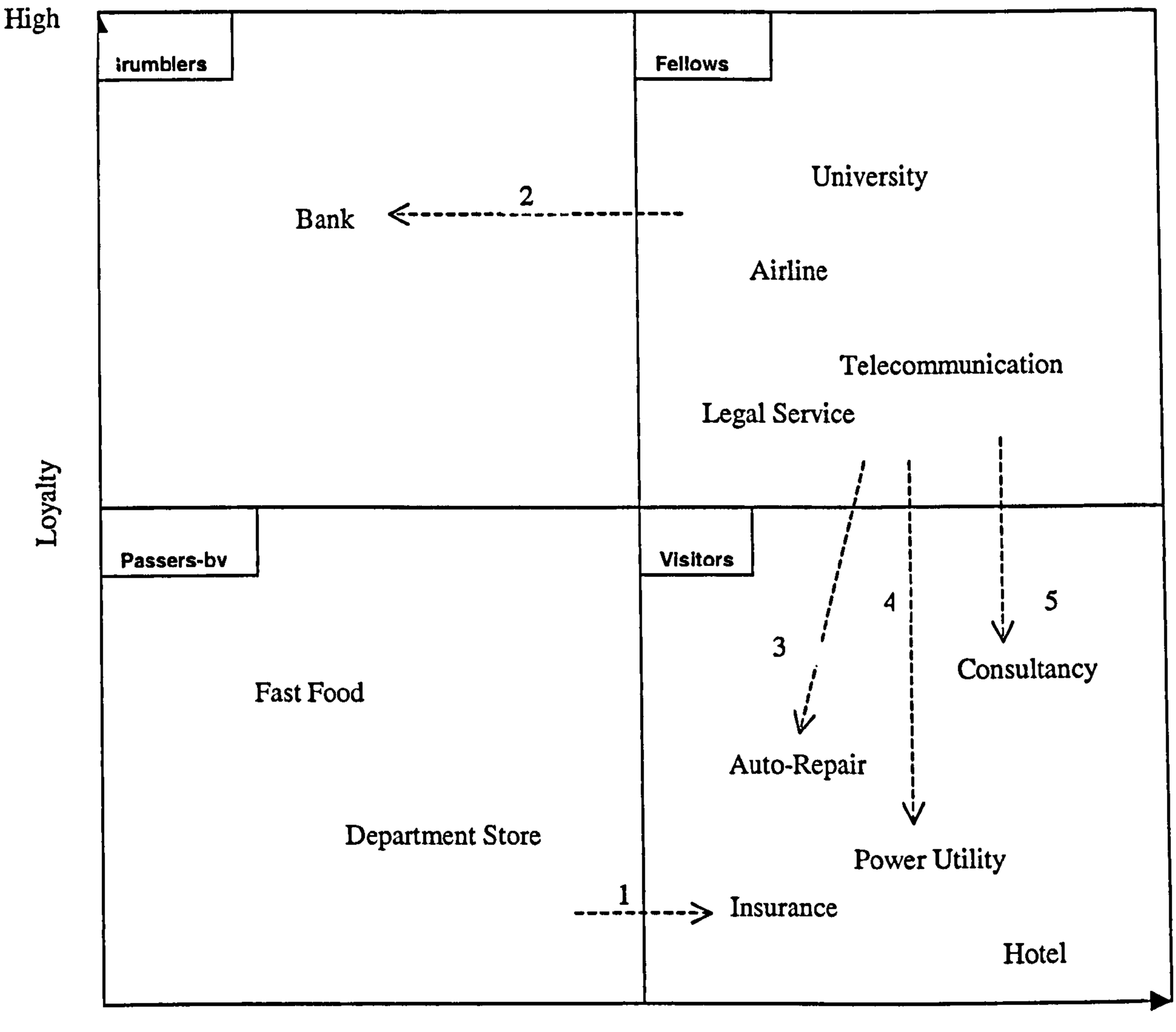


Figure 6.12. Satisfaction and Loyalty in the studied services

1: Changing Focus

2: Changing Structure

3, 4, 5: Competition

As illustrated in the chart, there have been some changes in industries in the last 10-15 years. As the result of increased competition in skilled-labour market, experts in Auto-repair, Consultancy and Power Utilities tend to remain less loyal in an attempt to try different organisations and add value to their expertise profile as well as (possibly) excelling in their financial/working conditions. This is while their motivation levels seem to remain the same. Insurance Services have changed their focus from a merely financial-process oriented industry to one that is more customer-focused. The expert who was interviewed defined this as a factor that has increased the satisfaction of employees although nothing was mentioned about any changes in loyalty of staff. The opposite has happened in Banks where according to the respondents, changing the structure (removing middle management, rebalancing the work in front and back office, reducing employees) has resulted in lowering staff satisfaction. Further application of the above chart is discussed in chapter 8.

6.5. Service dimensions movement

Throughout this research, given the variety of subjects under discussion, some other interesting results were explored. As stated in chapter 4.10.3, in the course of conducting the interviews, the dynamic condition of service sectors in terms of service dimensions came to the attention of the author (for the first time in the first interview with one of the experts in universities). At that stage a new piece of data was also collected (and were sent to the then previous respondents) to determine how (if at all) the degree of service dimensions are changing for the service sectors. The data is collected only for the externally measured service dimensions as it was felt that the internal experts do not have the knowledge related to this data for the internally measured service dimensions. The results are given in Appendix 6.8.

The results can be summarised below where the number of service sectors in which the same direction of change is suggested, is pointed out:

Labour Intensity:

Increase: 2

No change: 2

Decrease: **5**

Front Value Added:

Increase: 0

No change: **3**

Decrease: **3**

Customer Contact:

Increase: 1

No change: **9**

Decrease: 2

Customer Interaction:

Increase: 0

No change: **4**

Decrease: **4**

Customisation:

Increase: **6**

No change: 3

Decrease: 1

Personnel Judgement:

Increase: 2

No change: 1

Decrease: 3

In the above summary, the changes (or no changes) for each service dimension that is associated with a majority of the service sectors are pointed out in bold. One interesting observation is an overall consensus that customisation of the studied service sectors in future is getting higher while customer interaction tends to decrease and customer contact tends to remain unchanged.

Based on the above, overall it is possible to argue that the anticipation of experts in their respective service sectors indicates that overall, service industries are moving toward less labour intensity, less front value added operations, less customer interaction but more customisation. Except the last part, this seems to be an overall indication of support for Schmenner's theory of moving-up-diagonal in the SPM (Schmenner 1986) where it is argued that in general, services are moving towards more features of manufacturing operations. This also supports Levitt's theory of Production Line services (Levitt 1972). The extent of consistency in this result with Schmenner's theory is discussed in chapter 7. An interesting question that can be raised here is how this could be possible. The answer could point to the use of technology and in particular internet in services. Many services are offering customised services online, where the interaction is quite low comparing to face to face services. This is of course an area that is in need of more exploration by further research.

Looking at the SD that was found to be the most useful in indicating the productivity management issues in services (i.e. Front Value Added), it can be noticed that according to the above results the dimension tends to decrease.

Going back to chapter 5 where the relationship between the dimension of FV and the PAs were discussed, it can be argued that a decreasing degree of front value-added operations in services, results in the following trend in services (overall):

- Less application of capacity-based approaches for productivity improvement

- Less effectiveness of people-based approaches for productivity improvement
- Organisational climate will become a greater problem when improving productivity
- more communication gap with customer

The above reveals the importance of the notion of SD's movement and the usefulness of data gathered in this regard. An example of the application of these results is given in chapter 7 and more discussion on the benefit this data is given in chapter 8.

Summary

In this chapter the research questions number 5, 6 and 7 were attempted. Also the answer to the research question number 1 was elaborated and this question was attempted from a different perspective. Altogether, the chapter also provides more insights into the answer to the research main question. The chapter was following a logical process of qualitative research, starting from data reduction, proceeding to data display and finishing with conclusion. A number of common trends among the studied services were identified and illustrated. These were in terms of productivity improvement policy, productivity and quality trade off and the effects and features of some key factors in productivity management in services. The issue of staff loyalty and satisfaction was addresses by illustrating the situation of the studied services in this regard, using a two dimensional model. A new classification scheme for services was proposed, purely based on qualitative analysis. The reason that in some of the studied services there are less trade off between productivity and quality in parts of operations were explored. Accordingly the notion of Common Element was introduced. At the end of the chapter the issue of changes in degrees of service dimensions was discussed and concluded. The next chapter is using the results of the quantitative and qualitative analysis chapters to investigate three popular service classification schemes. These are Chase's customer contact model (1978), Schmenner's SPM (1986) and Silvestro's et al. Volume-Variety model (1992).

Chapter 7. Investigating the Customer Contact model, the SPM and the Volume-Variety model

Introduction

The main results of the research were presented in the last two chapters and all the research questions have been attempted so far. In the next chapter these results will be summarised and concluded. Before that, it is worth to examine three very relevant models of service classifications in the light of the data and results of this study. This is very much related to the research questions and can be seen as a complementary part for the literature review on chapter 3, where some of the service classification models were introduced and evaluated. From another point of view, this section is investigating whether some of the research questions of this work have been already answered satisfactorily by three of the most popular models of service classification. This is also an opportunity to compare some of the features and implications of these models with the results of the present research. The three models that are subjects of discussion here are Chase's Original Customer Contact Model (1978), Schmenner's original Service Process Matrix (1986) and Silvestro's et al. Volume-Variety Matrix (1992). The required analysis for discussing the Chase model has already been conducted in Chapter 5. Here the results will be further elaborated and discussed. Some basic analyses are conducted on the results of applying the other two models to the collected data. The three models are studied in turn. Before this, the relevance of the three models to this research is discussed.

7.1. The relevance of the three models:

The three models were discussed in detail in chapter 3. Here their relevance to this work is re-emphasised to clarify the basis for selecting them (from among the other models) for this chapter.

The Chase model (as discussed in chapter 3) is one of the first major classification models that was made based on operations management perspective, aiming to illustrate the relationship between efficiency and customer contact. The popularity of the model and its

developments and adaptations and improvements by Chase and other authors were discussed in detail in chapter 3. There it was shown that this service dimension became the basis of many other classification schemes. This was the reason that one whole category of service classification models was devoted to those that were based on this service dimension. The model is related to efficiency and the definition that Chase provides for efficiency is exactly the same as the definition of productivity, which suggests Chase uses these two concepts inter-changeably. This element of the model is therefore directly related to this research. Given the importance and popularity of the customer contact theory it is appropriate to start the chapter with this model. This model, in fact, can be considered as the first significant attempt from a pure operations management perspective to contribute towards service classifications. Most of the later service classification models in the discipline are some how affected by this model. Throughout the main quantitative analysis in this research, interesting results have been obtained that are directly relevant to the customer contact theory. These will be discussed later in this chapter.

After the Chase model, it is possible to single out Schmenner's SPM model as one that (while taking benefit from the main idea of the Chase model) started the idea of clearly associating groups of managerial challenges to clusters of services. In this respect, Schmenner's work is very much based on the same assumption as this work. That is, it is possible to associate particular managerial challenges to different types of services. Based on this assumption, Schmenner has proposed a classification model with four clusters in which each cluster is associated with two sets of managerial challenges. From the context point of view (ignoring the methodological aspects), the present work is very similar to SPM. The only difference is that here the managerial challenges are specified to be those that are related to productivity management. The format of two of the models that were presented at the end of chapter 5 is the same as the SPM (figures 5.9.1 and 5.9.2). Schmenner is addressing a similar question as the main research question in this work: "What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?". Only the phrase "productivity management" should be replaced with the phrase "managerial challenges". SPM is also interesting from another point of view, that not only it is a classification model but also a service positioning matrix (as defined in chapter 3). Given the significant similarity between the idea (but not approach) of the present work and the SPM, it is interesting to test the SPM by collecting some relevant data, using the unique opportunity of availability

of experts in 12 service sectors. As discussed in chapter 4, this was part of the data collection in the interview sessions.

After the SPM, Silvestro's et al. model of volume-variety can be singled out for a number of reasons. First that this is the first attempt to look at the previously defined service dimensions in order to correlate all of them together with the use of another variable. The model is also one of the first ones that have some basis in empirical research and it has been later used for more empirical research by one of the original authors (Silvestro 2001b). Apart from this, six out of the nine service dimensions that were chosen in this work were the same as those reviewed in Silvestro's et al. paper (1992). In fact, the paper was used as evidence for the popularity of these six service dimensions.

The variable of "Service Volume" has been introduced in this paper as a variable that can gather all the six service dimensions (similar to the idea of principle factor analysis) under one rule that is based on their correlation with this variable. This is in fact an attempt to answer question four of the present research: "What are the relationships between the popular service dimensions?" If one agrees that this variable can be used as an ultimate indicator for all six service dimensions, then one can argue that the variable can also be a good answer to the main research question in the present work. In other words, the variable might be a good candidate to be replaced with the other analytically selected service dimensions as indicator for productivity management challenges in services. This is worth studying in this chapter.

In fact, in an overall view it is possible to argue that in the operations management (OM) discipline the three works of Customer Contact Model, SPM and the Volume-Variety model represent three phases of research and contribution to the subject of service classifications. This can be presented as follows:

- Customer Contact Model (1981) - Establishment Phase:

The operations management contribution to the subject is established and relevant areas for research are pointed out.

- Service Process Matrix (1986) – Expansion Phase:

The extent to which operations management can use and take benefit from service classifications is illustrated.

- Volume-Variety Model (1992) – Operationalising Phase:

The already proposed service dimensions are looked at for the purposes of integration and correlation; some practical benefits are empirically illustrated.

It is therefore possible to argue that in this chapter the markers of the three phases of research in service classifications in the operations management discipline are studied, starting with the Chase model:

7.2. Chase Model

According to Chase, less customer contact means less uncertainty and therefore more room for efficiency. On the other hand, services with high customer contact have less room for efficiency based on the same reason. In other words, according to Chase, the dimension of customer contact is correlated with problems about improving efficiency (or productivity as the two definitions appear to be the same in the Chase's work).

In chapter 5 it was concluded that the dimension of customer contact is correlated with two of the elements of the category of productivity management problems. These two are problems related to staff and problems related to systems and methodology. Problems related to staff are positively correlated with the dimension of customer contact according to table 5.3. On the other hand, problems related to methodology and systems are negatively correlated to customer contact. This means that when customer contact is high in a service, the problems shift from those related to methodology and systems to those related to staff (people). In contrast, when customer contact is low in a service, the problems shift from people and staff to those related to methodology and systems.

The two problems of people and Methodology and Systems were compared in chapter 6 and it was found that the number of negative comments about people- based problems is much higher than the number of negative comments about methodology- based problems (figure 6.3). This can be a support for the generally agreed observation that it is easier to control and manage non-human tools than human tools.

The above discussion provides a new insight into the straightforward model of customer contact. Instead of saying that reducing customer contact will increase potential productivity (efficiency), it can be said that reducing customer contact will result in the shift of productivity problems from staff (people) to methodology and systems and (given that managing methodology and systems is easier than managing people) this leads to a higher potential for productivity.

This can be illustrated as follows:

Chase's model:

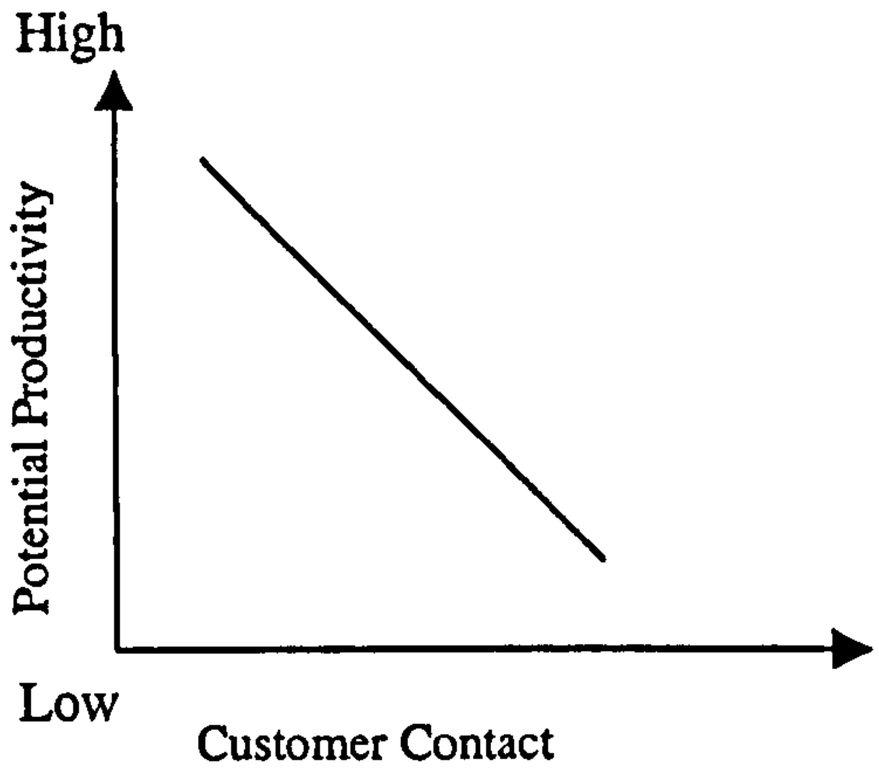


Figure 7.1.a The Customer Contact model

Insights into Chase's model based on this research:

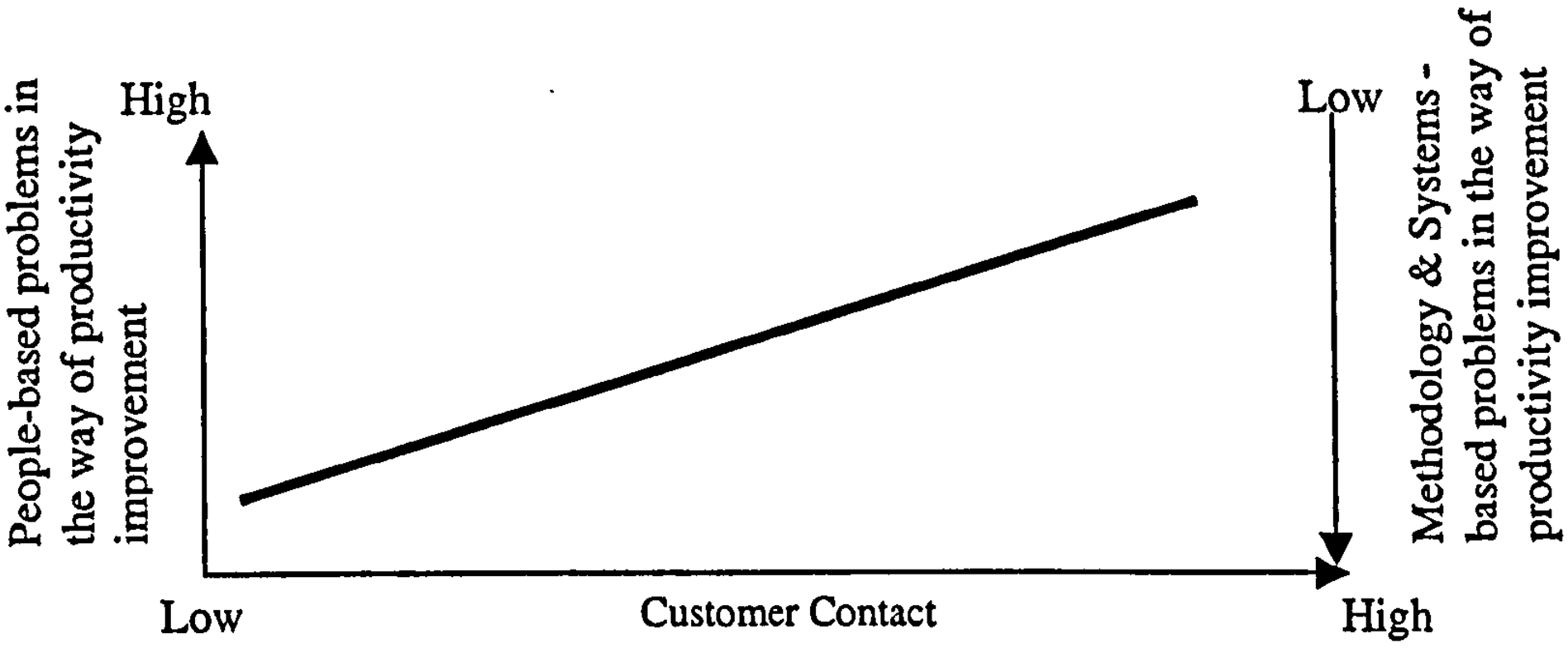


Figure 7.1.b Developing the Customer Contact Model

The above diagram shows that increased customer contact indicates an increase in people-based problems and a decrease in methodology & systems – based problems. Overall, it is appropriate to argue that the results of this study opened a new dimension to the Chase's customer contact model and showed that the logic of the model can be more sophisticated.

7.3. Original Service Process Matrix (SPM):

It should be noted that the discussion on SPM in this chapter is based on the original matrix that Schmenner developed in 1986. As discussed in chapter 3, Schmenner later revised his classification model (Schmenner 2003, 2004).

The SPM model can be evaluated here from different aspects:

1. The measurements of the service dimensions used in the model for the service sectors:

The paper in which the original SPM model is presented contains examples of services being positioned in the SPM based on personal judgements. Some of these services are also those that are studied in this research. It is interesting to see whether these same services will be positioned in the same places in the SPM based on the empirically derived data.

2. The movement to the upper level in the SPM diagonal:

One of the most interesting parts of the SPM theory is the notion of moving up the diagonal in the model. Given that data about changes going on in the service dimensions was collected while the experts were using the measurement scales, it is possible to investigate whether the three dimensions used in the model are changing in the same direction that Schmenner suggests.

3. Validity of the axis of "customer interaction and customisation"

Chase for the first time suggests integrating two different service dimensions together. He himself raises the possibility of these two being in conflict with each other in some services but holds that generally these two should be at the same level in service organisations. It is interesting to investigate to what extent this integration is possible. This can be done by the use of data collected for these two dimensions.

4. Preferring the dimension of customer interaction over the dimension of customer contact

Schmenner criticises Chase's notion of customer contact and argues that customer contact is not significantly relevant to efficiency. He introduces the dimension of customer interaction as a better choice. Using the results of the data analysis it is possible to verify whether this is a justifiable criticism and an advantageous choice.

5. Relationship between the managerial challenges and the service dimensions in the model:

One of the main parts of the SPM model is where specific groups of managerial challenges are associated with each cluster in the SPM. As explained in chapter 4, data regarding these managerial challenges are also collected along with the collection of the main data. It is therefore possible to use some basic descriptive analysis tools to investigate whether the association between managerial challenges and the position of services in the SPM can be backed. The above issues are discussed in turn in this section:

7.3.1 The measurements of the service dimensions used in the model for the service sectors:

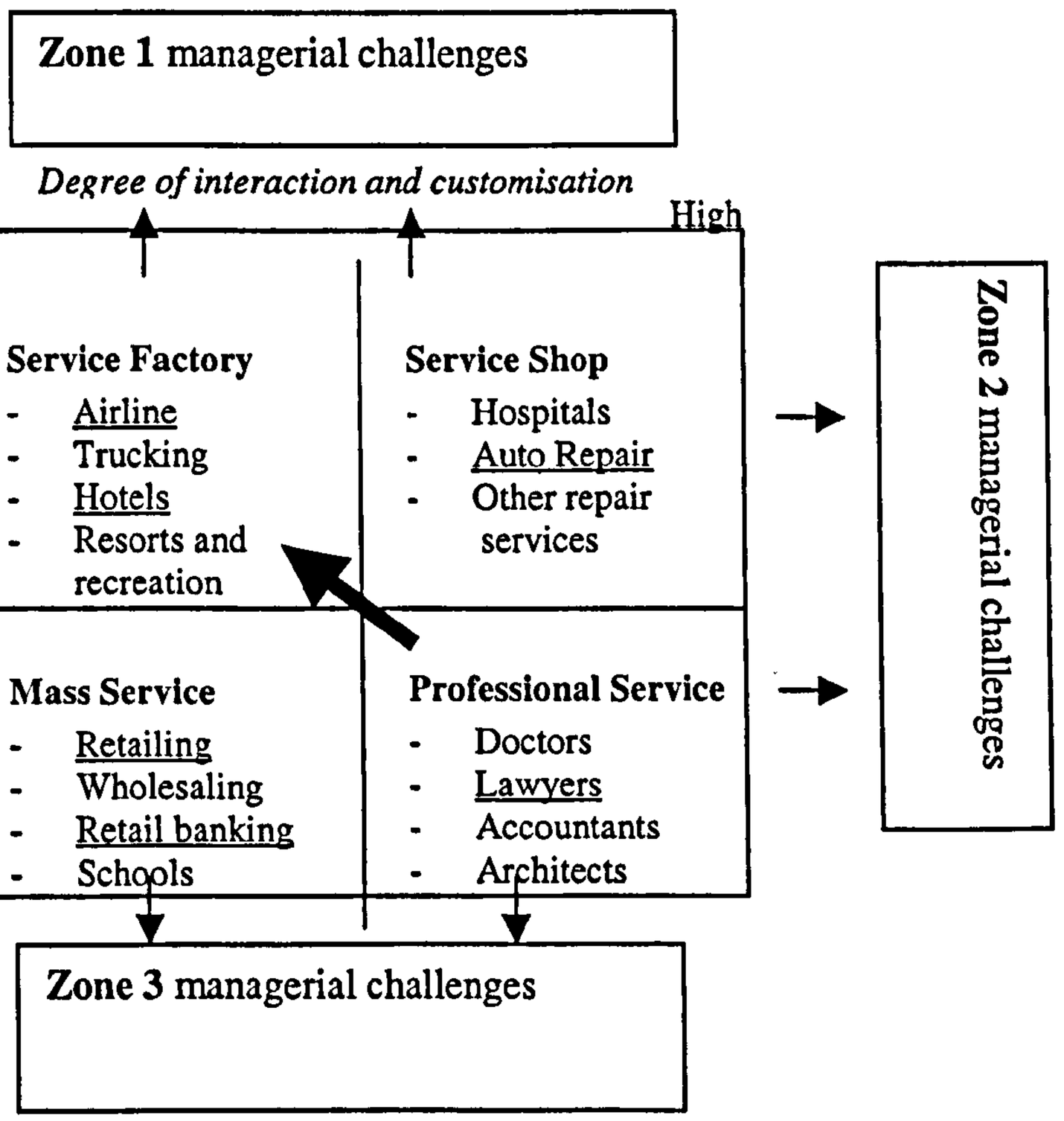


Figure 7.2.The Service Process Matrix (Schmenner, 1986)

SPM is presented in figure 7.2 with the examples from service sectors as presented by Schmenner. In the above figure, the services that are also measured in the present work in terms of service dimensions are underlined.

The first step in applying the SPM to the data collected in this research is to position the 12 service sectors (that are studied in this work) in the SPM based on the collected data for the relevant SDs. In doing so the first difficulty of applying the SPM was noticed: "There are no criteria to determine what is low and what is high in measuring the two service dimensions". The author therefore had to define such criteria so that the SPM model would be applied to the data.

The first obvious idea was to use the service dimension's measurement scale and divide it in two halves, considering measurements above 8 to be high and those below 8 to be low. This however led to very unrealistic and awkward results in terms of the position of services in the SPM. By this criterion most of the services were positioned under Mass service or Professional service. Fast Food will be included as a professional service with this criterion! It was obvious that the general consensus among the experts was that measurement of these service dimensions (labour intensity, customer interaction and customisation) were generally higher than what Schmenner suggests in his work. This is another support for what was discussed as the difficulties of not operationalising (i.e. introducing measurement tools for) the proposed service dimensions in chapter 3.

The author found that using another criterion will lead to more reasonable positioning of the services in the SPM that is more inline with the style of positioning of the Schmenner's examples of services in the model:

It was decided that instead of dividing the measurement scale, the medians of the dimensions' measurements should be used to translate the numeric measurements to Low and High categories.

To obtain the above table, the labour intensity measures obtained in chapter 5 are directly used. The median of the measurements for labour intensity is used as a criterion for determining high and low labels for the measurements. The median is 10.25. Measurements above 10.25 are labelled as High and measurements below 10.25 are labelled as Low.

As for the degree of customer interaction and customisation, based on the assumption of the model that these two dimensions are correlated to each other (an assumption that will be tested later in this chapter), the median (or average) between the measurements of these two dimensions for each service is used as the measure of the integrated dimension of customer interaction and customisation. From there, the High and Low labels are given in the same way as for the labour intensity (the median of the integrated dimension of customer interaction and customisation is 7). Three services of Airlines, Fast Food and Telecommunication are measured as 7; these are therefore positioned on the border line between Low and High of the dimension of customer interaction-customisation.

Accordingly, the 12 service sectors that are studied in this work are positioned in the SPM as illustrated in figure 7.3:

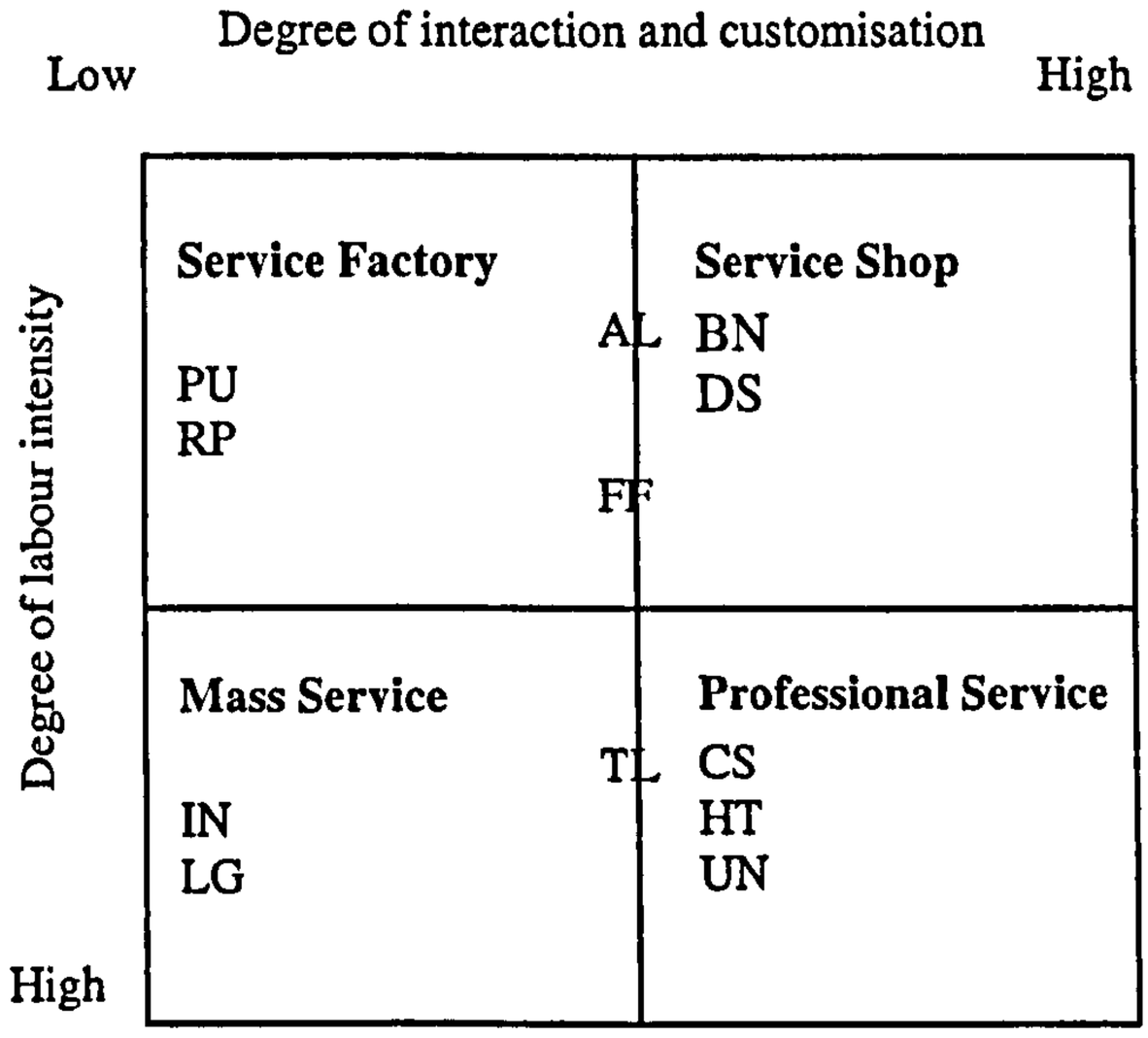


Figure 7.3 Applying the SPM to the present research

The differences between the measurements of the service sectors (in common) between the SPM and the results of the present research i.e. given in table 7.1

Service Sector	The SPM	The present research
Airline	service factory	service factory-service shop
Auto Repair	service shop	service factory
Hotel	service factory	Professional service
Lawyers	professional service	mass service
Retailing	mass service	service shop
Retail Banking	mass service	service shop

Table 7.1. Positioning of services in the SPM (comparison with the results of the present research)

It seems that the two works agree on the measurement of Airlines. As for Lawyers, the different position with Legal Services can be justified, noting that firstly these are not the same (lawyers are individuals while 'legal services' refers to companies). The second point is that (as pointed out in chapter 4) Legal Services in this research include only small size legal services in which very routine legal services are offered. Also, the difference about the Auto-repair's position can be justified by nothing that in this research Auto-Repair refers to highly standard auto services, thus a shift from service shop to service factory.

The significant disagreements, however, are about the position of three services of Hotels, Retailing and Retail Banking. The disagreements here are on both of the dimensions.

There could be a number of reasons for these differences. These reasons can be categorised in two types:

1. Consistency of definitions for services:

There are no guarantees that the services with similar titles in the two researches do refer to the same types of service operations:

Hotels are mentioned in SPM with no specifications. Formula 1 hotels and the only 6 star hotel in Dubai are both considered hotels, while in practice these are two completely different types of services. In this research, hotels are specified to be 4 star hotels. Obviously there is more customisation and customer interaction in 4 star hotels as compared to hotels with fewer stars.

Retailing in SPM is a very general term. It can include various types of retail shops. In the above table, Department Stores are deemed as the same as retailing. This might not be necessarily a correct assumption.

In theory it is also possible that the social context of the two researches lead to different measurements for services with same names. Schmenner's work is being conducted in the US while this work has been done in the UK. The generalisation of results of this work (also with respect to internationalisation) is discussed in chapter 8.

2. Measurement considerations:

The above is not the only example of a difference between two classification models in positioning service sectors. Differences can be seen in positioning along the same service dimension between SPM model and Lovelock's classification of services (Lovelock 1983). Similarly, between the positioning in the SPM model and Silvestro's Volume Variety Matrix as well as with Dotchin and Oakland's study.

Some of these are highlighted here:

- Hotels are positioned a highly customised in Lovelock's classification model (Lovelock 1983) while they are considered as low customised in Schmenner's SPM and are positioned in a medium degree of customisation in Silvestro's VVM.
- Retail banking is positioned as highly customised in Lovelock's classification model while it is considered as low customised in SPM and is positioned in a medium degree of customisation in VVM.
- Retail shops are considered as low customised service in SPM while positioned in a medium degree of customisation in VVM.

The above adds further support to the point that was brought up in chapter 3. Many of the proposed service dimensions are not accompanied by any measurement tool. It is obvious that this can lead to more subjectivity in positioning services along the dimensions as noticed above.

It is worth repeating here what was also referred to in chapter 4, that apart from lack of measurement tool for the majority of SDs, overall service dimensions measurement are suffering from the following:

a. The measurement being done by non–experts in the respective service sectors
b. The definition of service dimensions (as proposed by authors) not being robust and operationally easy to adapt.
c. No accurate border lines for the measurements of Low and High (and where applicable, Medium) in the service dimensions.

As explained in chapter 4, in this research while appreciating the difficult nature of SDs in general, it was attempted to avoid these factors by:

a. Having experts in each service sector to do the measurement for most of the service dimensions (the measurement scales for internally measured SDs were designed in a way so that customers could answer them; therefore, even here it is possible to argue that experts made the measurements).
b. Being in close contact with experts, in the measurement process, to discuss the possible difficulties and ensure consistency across the experts by clarifying terminologies and answering enquiries.
c. Developing a measurement scale in which descriptions for Low and High measurements are given along with typical examples from service operations as signposts. These descriptions were derived analytically in chapter 5.

As for point c. above, it should be noted that some (not all) of the differences between the positions of the services as proposed by Schmenner (Figure 7.2) and the ones that are proposed here (Figure 7.3), are not as major as it looks like. For instance, the degree of the integrated dimension of interaction and customisation for retailing is 7.5; that is only 0.5 units higher than the median. In other words, the only driver of retailing changing its

position from a mass service to a service shop is 0.5 unit of the degree of integrated dimension of customer interaction and customisation.

Like wise, the degree of the integrated dimension of interaction and customisation auto-repair services is only one degree less than the medium; therefore has fallen in the service factory cluster rather than service shop.

This again re-emphasises the difficulty of labelling services as High or Low (or Medium where applies) based on theoretical border lines in service dimensions. Schmenner himself has stated this difficulty when he says:

> *"Naturally, not all service businesses fit cleanly into these extremes: there are many shades of grey".* (Schmenner, 1986).

As discussed in chapter 4, this subjectivity has been avoided in this research by the use of a measurement scale that is more expanded than merely low, medium, high degrees and then finding the border lines for classifications based on managerial implications (through an empirical study) and by the use of a conditional probability function; an approach that was taken in this research (as illustrated in chapter 5).

The last point that needs to be raised here is that figure 7.3 merely illustrates the results of application of SPM to the data collected in this study. In other words, the author in no way intends to claim that (for instance) legal services have to be categorised as Mass Services or that hotels have to be categorised as Professional Services. On the contrary, the whole message of this section is to propose the need for more research in the areas that SPM is touching by showing some seemingly unexpected results of applying the matrix to a set of raw data.

7.3.2. The movement to the upper level in the SPM diagonal

An interesting point about Schmenner's SPM is that the matrix is not a static one. According to Schmenner, the general trend of services is up the diagonal (i.e. lower labour intensity and lower customer interaction and customisation). The trend is in fact in line with Chase notion of less potential efficiency with lower customer contact (Chase 1978).

It is also in line with Levitt's argument about more efficient service operations being those that are more like manufacturing operations (Levitt, 1976).

The issue of changes in SDs was discussed in chapter 4 where it was pointed out that the possibility of changes in SDs was brought up in one of the interviews and it was decided that this should be included in the data collection. Accordingly the experts also responded to the question of whether a particular SD is seen to be changing in their respective service sector. The results of this were discussed in chapter 6 where implications of some anticipation of movements in SDs were presented and discussed.

To focus on the subject of this chapter, it is interesting to see how consistent the data related to changes in service dimensions are with what is suggested in SPM. The summary of data was given in the end of chapter 6 and is presented here again for convenience:

Labour Intensity:
Increase: 2
No change: 2
Decrease: **5**

Front Value Added:
Increase: 0
No change: **3**
Decrease: **3**

Customer Contact:
Increase: 1
No change: **9**
Decrease: 2

Customer Interaction:
Increase: 0
No change: **4**
Decrease: **4**

Customisation:

Increase: 6

No change: 3

Decrease: 1

Personnel Judgement:

Increase: 2

No change: 1

Decrease: 3

As pointed out, customisation is suggested to be increased while customer interaction is suggested to be decreased. It is therefore difficult to conclude what might be the direction of change (if any) of an integrated dimension of customer interaction and customisation. It is possible to argue that the integrated dimension, overall, should remain unchanged. To support the idea of customer interaction and customisation becoming lower in future, Schmenner gives examples of emerging of no-frills airlines and fast-food restaurants. The results that were derived in this study, however, seem to be more in line with the following concluding remarks of Schmenner in his paper, where he states:

> *"... marketing pressures for <u>increased customisation</u> and generation of completely new services are likely to replenish the supply of service shops or mass service operations."* (Schmenner, 1986)

As for the service dimension of labour intensity, the results of this study are in line with the SPM model. Experts in five service sectors have anticipated moves towards lower degrees of labour intensity in future.

The size and nature of data does not allow a more comprehensive analysis than what was presented. Overall, it can be argued that the results of this study are in agreement with SPM notion of moving up the diagonal in terms of the Y- axis (labour intensity) but are not strongly agreeing with the notion in terms of the X- axis (customer interaction and customisation).

7.3.3. Preferring the dimension of customer interaction over the dimension of customer contact:

As discussed in detail in chapter 3, Schmenner criticises Chase's notion of customer contact by comparing it with customer interaction. He argues that not all contact periods could reduce efficiency. He suggests that what matters is whether there are any interactions in the contact period. In his own words:

"As far as I am concerned, contact time simply does not capture completely what is challenging about service sector management"

(Schmenner 1986)

Using the results in chapter 5 it is possible to compare the relationship between these two service dimensions and the PAs. It could be argued that a stronger relationship between the PA category of Productivity Improvement Problems and the dimension of customer interaction (when compared with the relationship with the dimension of customer contact) might be seen as a supporting evidence for Schmenner's criticism. The fact is such superior relationship is not evident from the results. In fact (as discussed earlier in this chapter) customer contact seems to be strongly associated with a number of aspects of productivity improvement problems (people, methodology). This is while customer interaction is not strongly correlated with any of the elements of the aspect of productivity improvement problems. Of course, based on the results customer interaction is associated with other aspects of productivity management like policies for productivity improvement. This, however, seems to be less relevant to the issue of easiness of control and management in terms of efficiency, which is (according to Chase) related to customer contact.

Accordingly, based on the results of the present research, it seems fair to put a question mark to Schmenner's criticism of Chase's notion of customer contact.

7.3.4 Validity of the axis of "customer interaction and customisation"

Schmenner has merged the two dimensions of Customer Interaction and Customisation to form one dimension as the X- axis of the SPM. He argues that these two dimensions are very much related to each other and that it is possible to distinguish service operations

based on an integrated dimension that includes both these dimensions. Although he points out the possibility that these two dimensions are not positively correlated for all operations and names operations in insurance services and advertising agencies as examples (Schmenner 1986), the original SPM is heavily based on the assumption of positive correlation between the two dimensions.

Looking at table 5.6 it can be seen that the two dimensions are significantly correlated based on Spearman's *r* but are not significantly correlated based on Kendal's Tau. Given the rather high number of ties in data, it is reasonable to consider the result derived based on the Kendal's Tau to be more reliable although it is also not reasonable to ignore totally the result derived based on the Spearman's *r*.

It is interesting to look at the studied services in which the degrees of interaction and customisation seem not to be in the same level. Four services out of 12 have this condition:

- In hotels, the degree of interaction is 5, which can be considered as low. This is while the degree of customisation is quite high (10). Interestingly enough, the qualitative data reveals that much of customisation is being contributed by self service aspects in hotels rather than interaction and that much of interaction is not because of the need for customisation but to fulfilling the desire of customer for human contact.
- An opposite example is legal services in which the customer interaction is measured to be 8 (nearly high) while customisation is only 3 (quite low). The argument here is that lots of time is spent to exchange information and views with customers. However, due to standard legal procedures and standard legal service packages, little customisation can be offered to customer. The interaction is mostly needed as a necessary part of the service procedure; in particular, to clarify the issues for the clients rather than a factor for customisation.

- In consultancy services, as another example, interaction with customer is seen as a valuable asset but it is carefully controlled and limited, while a very high level of customisation is offered through highly skilled experts and by brief but rich interactions with customer. This can explain why in consultancies (according to the collected data) customisation is extremely high, while interaction is only moderately high.

- In department stores, very much like hotels, part of customisation is contributed by customer self-service. Also, what helps to provide customisation in terms of product per se is not customer interaction but data that is obtained from sales and marketing activities. The interaction with customer is only limited to the areas of customer service and cashiers.

Overall, the analysis suggests that Schmenner's argument about the relationship between the dimensions of customer interaction and customisation cannot be denied altogether. It is true in most of the cases; however, there are some concerns and arguments on its application in some services. In particular, factors like self-service, staff expertise, availability of data and marketing activities can result in high customisation with less need for interaction. On the other hand, factors like desire for human contact and need for providing clarifications to customers result in higher customer interaction without necessarily leading to higher customisation.

7.3.5. Relationship between the managerial challenges and the service dimensions in the model

One of the most interesting aspects of the SPM model is the relationship between certain groups of managerial challenges and the SPM clusters. According to Schmenner each of the clusters of the SPM is associated with two sets of managerial challenges:

> "... the high versus low differentiation made for labour intensity and the degree of consumer interaction and customisation yield distinct combinations of management challenges for the four service types identified."
>
> (Schmenner, 1986)

As discussed in chapter 3, Rohit Verma (2000) investigated the reliability of the relationship between the suggested managerial challenges and the identified clusters based on empirically analysis and concluded that not all the relationships are significant.

As explained in chapter 4, the author was keen to investigate the application of the SPM in the present work. This investigation can be seen as a further support for the author's

arguments about the gap in the literature in terms of both methodology and context (as given in chapter 4). For this purpose, an additional questionnaire was given to the interviewees in which, they were asked to mark the managerial challenges (from the SPM) that were most relevant to their respective service sector. The experts were asked to fill out a simple checklist questionnaire consisting of a shuffled version of the managerial challenges that are associated with the SPM.

In the present work, because of the small size of data and the fact that this was supplementary data collection (and no further insights were sought during the data collection), such a detailed statistical analysis for this particular aspect of study will not be done. It is, however, interesting to see the result of a descriptive analysis of the collected data on Schmenner's managerial challenges and the service dimensions' measurements. The result of the questionnaire is presented in appendix 7.1.

In the table in appendix 7.1, the relationships deemed to be significant by the experts are marked with stars. The sets of managerial challenges are distinguished by shaded and none-shaded areas, inline with Schmenner's SPM. The title of the cluster with respective measurements for labour intensity and customer interaction & customisation are given at the top of each set of managerial challenges. Three columns are allocated to each service sector. The first two are the views of the two experts in the service sector. The third column is what can be considered as the final verdict.

Given the size of data, it was decided to be very lenient towards the SPM implications, so that a fair comment can be made about it. Accordingly the following rule has been used:

"If the two experts have marked a managerial challenge, the final cell will also be marked. If none of the experts have marked a managerial challenge, the final cell will not be marked. If only one of the experts has marked a managerial challenge, the final cell will be marked only if it is to the benefit of the SPM theory (i.e. if that managerial challenge according to the SPM model is associated with the service sector), otherwise the final cell will not be marked (which is again to the benefit of the SPM)."

According to the SPM, each cluster is associated with two zones of managerial challenges. Three service sectors that were found on the border line between high and low interaction

& customisation, are considered to be associated with three zones in the SPM. This is another point to the benefit of the model.

The idea is that the above given advantages (in favour of the SPM) will reduce any unfair results due to the of data.

Table 7.2 summarises the results. In each cell, the percentage of the marked challenges of a service sector in a particular zone out of the total marked challenges for that sector is given. For example in the case of Airlines, 33% of the marked managerial challenges are in zone 1.

Table 7.2. Applying the SPM to the present research

	Zone One Challenges (from 4)	Zone Two Challenges (from 6)	Zone Three Challenges (from 8)	Zone Four Challenges (from 4)
AL	0.33	0.25	0.17	0.25
BN	0.33	0.33	0.11	0.22
CS	0.23	0.38	0.38	0
DS	0.25	0.25	0.13	0.38
FF	0.18	0.09	0.64	0.09
HT	0.07	0.43	0.43	0.07
IN	0.13	0.25	0.38	0.25
LG	0.14	0.29	0.57	0
PU	0.31	0.23	0.31	0.15
RP	0.09	0.18	0.55	0.18
TL	0.25	0.33	0.25	0.17
UN	0.11	0.44	0.33	0.11

Some simple graphics have been used to highlight the stronger results. The managerial zones that according to the SPM should be associated with each service sector are shaded with blue. For instance according to the SPM model Universities should be associated with zones 2 and 3. The figures that indicate main disagreements with the SPM model are

made red. These are the figures that are among the highest in each row, indicating a strong relationship between a service and a zone of managerial challenges.

Adding up the figures in blue zones for each row indicates the degree of consistency between the above and the SPM implications. It can be concluded that the following service sectors (in order) seem consistent with the SPM theory of managerial challenges:

Airlines (with 83% coverage), Hotels (with 86% coverage), Universities (with 77% coverage), Consultancy (with 76% coverage), and at a lower level Insurance (with 61% coverage) and Telecommunications (with 58% coverage).

On the other hand, inconsistencies can be clearly seen for the rest of the services:
Fast Food (although enjoying three instead of two zones according to the SPM) has only 38% coverage in line with the SPM theory, 64% of the count of managerial challenges fall in zone 3, which according to Schmenner is only for professional and mass services. Fast Food was recognised to be on the border of service factory and service shop.

Repair operators have only 27% coverage inline with the SPM theory, 73% of the count of managerial challenges fall in zones 2 and 3 that are related to service shops, professional services and mass services but not service factory.

Power utilities only have 46% coverage in line with the SPM theory; 54% of the count of managerial challenges belongs to zones 2 and 3 that are related to service shops, professional services and mass services but not service factory.

Banks have 55% coverage in line with the SPM theory, 45% of the count of the managerial challenges belong to zones 3 and 4 that are related to service factory, professional and mass services.

Legal services has 0% for one of the zones that according to the SPM is associated with the position of this service, while having 29% coverage for zone two that according to the SPM is not associated with the position of the service.

As discussed at the beginning of this section, the size of the data and the fact that this was supplementary data collection (and no further insights were sought during the data

collection) prevent any definite conclusions. It is evident that some of the relationships are the same as proposed in the SPM, while the rest do not support the SPM relationships. This is despite the significant benefit that was given to the advantage of the SPM in the course of analysing the data. As mentioned earlier, the results derived from a large-size empirical study did not support all the relationships either (Verma 2000).

Summary of investigating the SPM:

The small size of the data does not allow a definite conclusion for or against the theories embodied in the SPM model. However, throughout the process of applying the SPM to the data in this work, it was very evident that a lack of measurement tools brings lots of subjectivity in positioning services in the SPM. In terms of the function of the diagonal in the model, the results overall supported the notion of moving up the diagonal, although there were some indications that, in a number of services, customisation will be increased rather than decreased, which is not quite in line with moving up the diagonal. As for the joint dimension of customisation – customer interaction, the results overall support the possibility of integrating these dimensions, although there are also a number of services in which these two dimensions do not seem to fit together. The use of the word 'Variation' by Schmenner in the revised version of the SPM removes this problem (Schmenner 2003). Schmenner's criticism of the choice of customer contact by Chase is not justified based on the results of this study. The results show that the dimension of customer interaction is not related to any of the issues among the PAs that could be deemed explicitly an obstacle to improving productivity. However, customer contact does relate to the productivity management obstacles, based on the present results. Finally, in terms of the managerial challenges clustered in the SPM, a number of conflicting results were found based on the present research. This is inline with the results of a large size empirical test that has been done on the SPM by Verma (2000). While being disadvantaged in terms of data size, the advantage of the analysis in this section over Verma's work is that here no presumptions have been made about the positions of services; while, as Verma makes it clear in his work, it has been assumed in his work that the position of services in the SPM are correct. All that can be said is that the results of the two studies are similar, and both indicate the fact that theoretical models are in need of empirical verifications and, if appropriate, improvements.

7.4. Evaluating the Volume-Variety model (VVM):

The VVM model can be evaluated here from different aspects:

1. The measurements of the service dimensions used in the model for the service sectors:

As in what was done for the SPM, here too there are some overlaps between the service sectors studied in the present research and those that were positioned in the VVM model by Silvestro et al. Again, it is interesting to see if these service sectors are positioned at the same places in the VVM. This also involves exploring the issues surrounded measurement of the Service Volume dimension that is the main element of the VVM.

2. The relationship between the six service dimensions and the volume variable.

Question number 4 of the present research was about the relationship between service dimensions. VVM is based on the assumption that the volume dimension is correlated with the combination of the six dimensions used on the vertical axis of the model. To prove this right or wrong, by analysing the present set of empirical data, can be considered as a significant contribution in answering this research question.

3. The possibility of using the volume variable as a service dimension indicator for some of the productivity management challenges in services:

Given the emphasis that Silvestro et al. have put on the implication of service volume in terms of managing service organisations and in particular the empirical study done by Silvestro (2001b) by applying the VVM to studying implementation issues in TQM, it seems appropriate to study the volume dimension, to see if it can be useful in indicating some of the productivity related managerial challenges in services. The same study that was done for the nine service dimensions in chapter 5 can be done for the Volume dimension to investigate the extent of application of this dimension in serving as indicator to productivity-related managerial challenges.

These issues are discussed in turn in this section.

7.4.1. The measurements of the service dimensions used in the model for the service sectors

Six of the dimensions in this research are the same as the ones used in the VVM model. These are:

Labour Intensity (People/Equipment Focus) – Front(/back) Value Added – Customer Contact – Customisation – Personnel Judgement – Process (/product) Focus

Silvestro et al. have measured these dimensions using a categorical scale of Low – Medium (mix) – High. Except for the Customer Contact time, which was measured based on the available data, the rest of the dimensions were measured based on applying a Delphi approach among the five members of the research team.

The measurement of the nine service dimensions including the above six, for the 12 service sectors studied in the present research are available. The scaling measure has been divided in three zones of 1-5 for Low, 6-10 for Medium and 11-15 for High.

The result, containing only the overlapping service sectors in the two studies and their category for the six dimensions is given in table 7.3. Added to the table is the category of service dimensions according to the VVM for comparison purposes (distinguished with the label of VVM):

	LI	LI-VVM	FVD	FVD-VVM	CC	CC-VVM	CUS	CUS-VVM	PJ	PJ-VVM	PF	PF-VVM
Al	M	L	M	L	H	H	M	M	M	M	M	L
Bn	M	M	M	M	M	L	M	M	M	M	M	M
Cs	H	H	H	H	H	H	H	H	H	H	M	H
Ds	M	M	M	M	H	M	M	M	L	M	L	M
Ht	H	M	H	M	H	H	H	M	H	M	M	H

Table 7.3 Comparing the measurements of the Volume- Variety model with the measurements of the present research

Looking at the above table, it seems like the consistency between the two measurements is not too little. There are a good number of agreements (17 out of possible 30) and the disagreements are only differ to the extent of one level and not two levels (i.e. there is no

case where a service is categorised as High for one research while being categorised as Low for the other research).

Banks (retail) and consultancy are enjoying the most agreement (5 out of possible 6 dimensions). Among the service dimensions, the most number of agreements is for Customisation (4 out of possible 5).

It should also be noted that except for Customisation (and disregarding Customer Contact, which was measured directly from data), the rest of the dimensions are defined in the Silvestro et el. paper from the provider's perspective and not the customer's perspective. This makes the measurement of these measures by the research team members (who are at the best the customers of the studied service sectors) problematic. In contrast in the present research six out of the nine dimensions are measured directly by the experts among the service providers while using a measurement tool for this purpose. The three dimensions that were measured by the members of the department of Management Science were defined from the customer's point of view, so that the measurement by non-service-providers could be justified and more reliable. The same measurement tool (that was used for the six service dimensions measured by experts) was used for this purpose. (The reasons behind measuring these three dimensions internally rather than externally (by the experts from service providers) are explained in chapter 4)

Having said this, it is clear that compared to the SPM, a significant level of consistency with the results of this research can be seen. This can be due to two reasons; 1. the addition of a third category of Medium to the measurement and 2. less subjectivity of the measurements in the VVM, being based on the overall opinion of 5 researchers as opposed to only one (i.e. Schmenner in the SPM).

7.4.2. The relationship between the six service dimensions and the volume variable

Silvestro et al. do not offer any statistical analysis to support their argument about the correlation between the volume measure and the six service dimensions. The correlation is only indicated by a graphical representation. In the present work, first the first approach

will be taken (graphical representation), and then a simple correlation analysis will be done to further support the results.

The first step is to define the Volume measure for the 12 service sectors. This has proved to be a difficult and tricky task. The volume measures for the 12 service sectors were studied by an MSc student under the supervision of the present author. In the course of doing this, it was obvious that the definition of Volume measure (as provided in the Silvestro et al. paper) is difficult to be adopted for some of the studied services. As Silvestro et al. present it, Volume measure is "the number of customers processed by an individual service unit per day." (Silvestro et al. 1992: 66).

The problems emerged when it was attempted to decide what is meant by "customer processed per day" and "service unit" in some of the services. It was easy to decide about these for services like Fast Food, Auto-Repair or Department Stores. However, when it came to services like University, Telecommunication, Banks, Insurance or Power Utilities, the meaning of the above two terms (customer processed per day and service unit) was not clear and different answers were reached based on different assumptions and perspectives. Banks, for instance, have two very different types of processing for customers. Accepting routine payments and routine teller jobs are one type of processing, for which a volume per day can be easily estimated; but there is also managing customers' accounts on a continuous basis, for which the term processed per day might not be easily applied. Also, a branch can be seen as a service unit, while a bank as a whole can be seen as a service unit too. In terms of a university, for instance, it was not clear whether to consider a whole programme of a degree as processing or to consider passing (or failing) one class as processing. Again, it was not clear whether a team of lecturers, a department or a faculty should be considered as a service unit. Similar difficulties were faced when looking at some of the other service sectors.

In an e-mail conversation between the MSc student and Silvestro, the student was advised that no measurement tools were used for measuring Volume of services and that this was measured broadly and roughly based on the estimated unit of the processed customers per day (Silvestro 2001a). Following this piece of information, the MSc student conducted brief interviews with contacts she had in 9 of the service sectors in this study and also visited the websites of services within the 12 studied service sectors. As a result, she

estimated the Volume measure for the 12 service sectors and put it in her report with full explanation about the reasons and sources of information for each sector.

The following is the proposed ranking of the service volume for the 12 service sectors. The higher the rank, the higher is the Volume measure:

Service	Cs	Lg	Rp	Un	Ht	Al	Ff	Ds	Bn	In	PU	Tl
Volume												
Rank	1	2	3	4	5	6	7	8	9	10	11	12

Table: 7.4. Estimation of Volume of service for the present research

It is interesting that the above ranking is in agreement about the order of 4 out of the 5 overlapping service sectors between the present research and the Silvestro's et al. research. Airlines are ranked between Department Stores (Retailing) and Hotels, while in Silvestro's et al. work Transport is ranked quite low (lower than banks retail) in terms of Volume (i.e. Volume of transports are deemed to be higher than Banks Retail). This, however, could be because of the general title of Transport rather than the specific title of Airlines. It is obvious that in some of the transport services other than Airlines (trains, buses), the volume of customers processed per day could be higher than in Airlines.

Overall, it is evident that using and operationalising the Volume measure is not an easy task for a number of services. This is what Collier and Meyer also refer to in their work:

> "Service volume may not be an appropriate surrogate for product volume because it is unclear how service volume should be measured (e.g. should each customer be measured as one service, or is each transaction one service?)."
>
> (Collier and Meyer 2000: 707, also 1998)

It is interesting that in a later work, Silvestro changed the definition of Service Volume from "number of customers processed by a unit per day" (Silvestro et al. 1992: 66) to "number of customers processed by a unit per period" (Silvestro 1999: 400). The

replacement of Period for Day seems a step towards making the dimension more flexible in terms of measurement. Although no definition for period is offered in this latter work.

Using the above estimated data and the data of service dimensions, a schematic representation of relationship between the volume and the six service dimension, similar to what Silvestro et al. presented in their work, was made.

Silvestro's et al. work is presented (for ease of reference) in the next page. In the page after, the schematic representation related to the data of this research is presented.

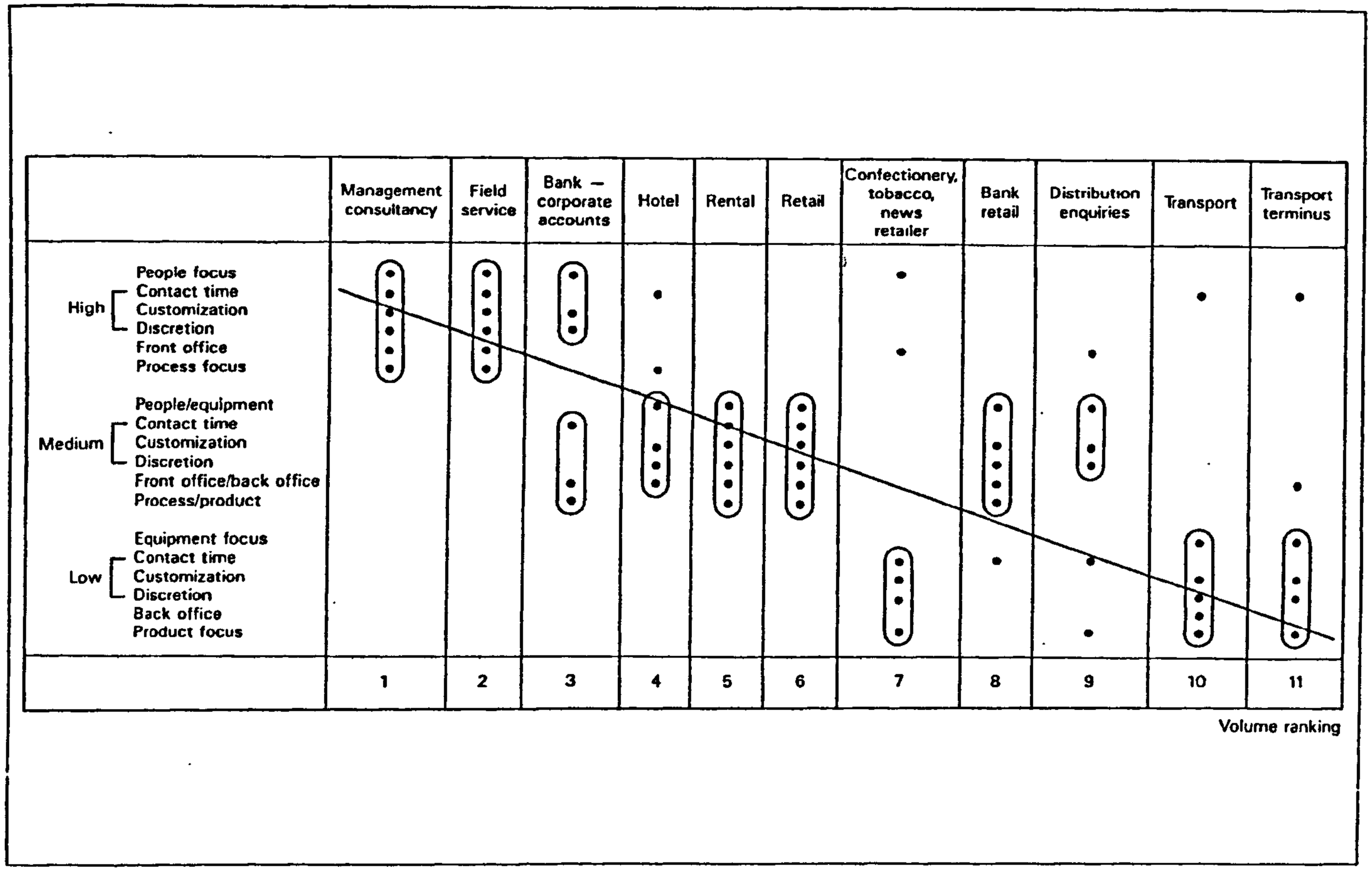
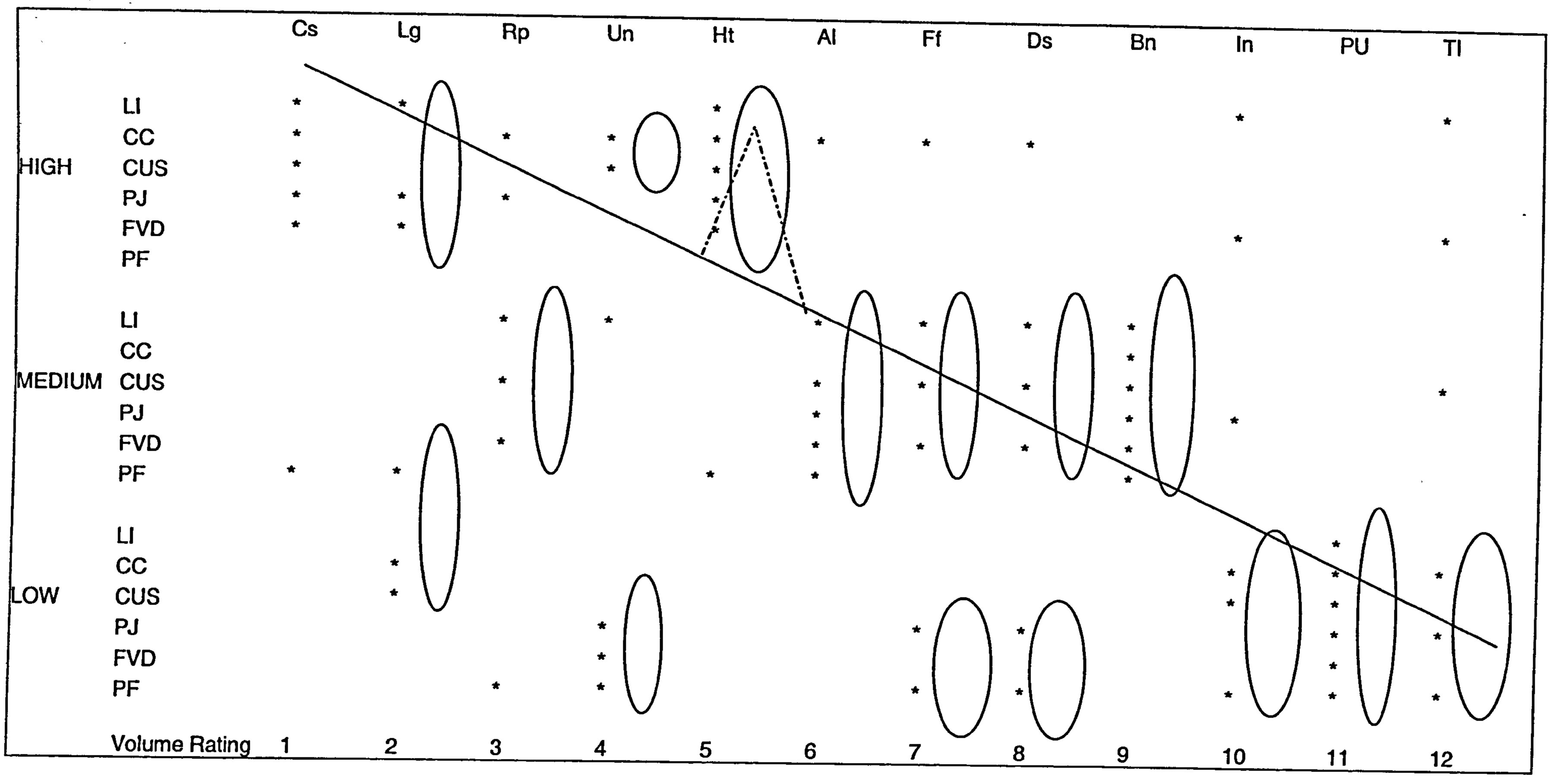

Management consultancy
Field service
Bank — corporate accounts
Hotel
Rental
Retail
Confectionery, tobacco, news retailer
Bank retail
Distribution enquiries
Transport
Transport terminus
High
People focus
Contact time
Customization
Discretion
Front office
Process focus
Medium
People/equipment
Contact time
Customization
Discretion
Front office/back office
Process/product
Low
Equipment focus
Contact time
Customization
Discretion
Back office
Product focus
1
2
3
4
5
6
7
8
9
10
11
Volume ranking

Figure 7.5.Applying the Volume-Variety Model to the present research



There are no guidelines to conclude merely based on the schematic presentation whether there is a correlation between volume and the six service dimensions. Drawing ovals and the diagonal lines is purely based on personal judgement (as it appears to be the same in the Silvestro et al. paper).

A general trend is evident in figure 7.5 and it seems to be possible to argue for existence of relationship between volume and the six service dimensions. Although the condition of Hotels in the figure seems to bring a "break" in this relationship (as illustrated by the dotted lines).

As the data for the SDs and the volume of the 12 services are available, it seems worth the effort, as well as relevant, to conduct a brief correlation analysis on the data in an attempt to get better evidence and insights in terms of relationships. A reminder that this part is, in particular, related to research question number 4, which was about studying relationships between the service dimensions.

At the first stage, the correlation test was done between the Volume ranks and the original measurement for each service dimension. The correlation between the volume rank and all service dimensions were found to be negative. This means higher measurements of SDs are associated with lower volumes of the service. This is consistent with the VVM. However, only two of the correlations were found to be significant. These are the correlation between Volume rank and the dimension of Front Value Added (-0.504 with the P value of 0.023) and the correlation between Volume rank and the dimension of Personnel Judgement (-0.576 with the P value of 0.009, significant at the 0.01 level). It is interesting that the two service dimensions that are correlated with the Volume rank dimension are two of the most applicable ones according to the results of chapter 5.

In the Silvestro et al. paper, however, the six service dimensions are all being integrated together to define one single measurement. This is made by putting an oval on a chart in a place that could be seen as the best representative for the overall measurement of the six service dimensions for each service (refer to Silvestro's chart figure 7.4). In the Silvestro's paper, it is argued that the correlation is in fact between this integrated (overall) measurement of the six service dimensions and the Volume rank. This is going to be applied to the data of this research:

The median of the measurement of the SDs on the basis of High, Medium and Low are found. This is the last column in table 7.5. In the table numbers 3, 2 and 1 are respectively representing High, Medium and Low measurements for the SDs.

	LI	CC	CUS	PJ	FVD	PF	Overall
Al	2	3	2	2	2	2	**2**
Bn	2	2	2	2	2	2	**2**
Cs	3	3	3	3	3	2	**3**
Ds	2	3	2	1	2	1	**2**
Ff	2	3	2	1	2	1	**2**
Ht	3	3	3	3	3	2	**3**
In	3	1	1	2	3	1	**1.5**
Lg	3	1	1	3	3	2	**2.5**
PU	1	1	1	1	1	1	**1**
Rp	2	3	2	3	2	1	**2**
Tl	3	1	2	1	3	1	**1.5**
Un	2	3	3	2	2	2	**2**

Table 7.5: Correlation analysis on the Volume-Variety model, based on the results of the present research

The bold figures in the last column are the overall measurement of the six service dimensions. It is now possible to test the correlation between these figures and the Volume measurements (as in table 7.4).

The result of this correlation analysis is interesting. Based on Kendal's Tau, the correlation is highly significant and far beyond the 0.01 level (-0.721, P value of 0.002).
The size of the data is small, but the result is very good. This seems to support the theory behind the VVM that the Volume rank is correlated with the overall measure of the six service dimensions.

7.4.3. The possibility of using the volume variable as a service dimension indicator for some of the productivity management challenges in services

The variable of Volume can be considered as a service dimension like the other service dimensions that have been introduced throughout this work. It is obvious from Silvestro et al. (1992) and later applications of the VVM by Silvestro (2001b) that the authors look at the volume dimension in the same way that Schmenner looks at the dimensions of the SPM; that is in terms of being coordinated with specific managerial challenges. In chapter 5, nine service dimensions were studied to find the relationships between each one of them and the different aspects of productivity management. It is interesting and relevant to use the same approach to investigate the same thing for the applicability of the dimension of Volume in the context of productivity management. To be consistent, the same two approaches of

'Democratic' and 'Conservative' have been used with Kendal's Tau coefficient (refer to chapter 5).

The results show that the Volume dimension can be helpful in indicating two of the productivity management aspects in services. These are the "importance of Input as a productivity management factor" (significant negative correlation based on the two approaches) and application of "technology based approaches" in improving productivity (significant positive correlation based on the two approaches). In practice, this suggests that technology-based approaches in improving productivity are better applied in services with higher service volumes. Also, that input as a productivity factor is less important (compared to other productivity factors) in high volume services.

The results overall indicate that (based on the criteria set for the present research), Volume of Service is capable of indicating two of the productivity aspect subjects. In terms of the number of indications per se, this means that the Volume measure is as good as service dimensions as Customer Contact, Customer interaction and Intangibility, but not as good as the other service dimensions studied in the present research (with the exception of Labour Intensity) that did not show any indicating relationships at all.

On the other hand, this means that, in line with what was found in chapter 5 and like other service dimensions, Volume of Service cannot be seen as an ultimate dimension of services capable of indicating towards a vast range of managerial challenges (at least not in the area of productivity).

Summary of investigating the VVM:

The main difficulty with applying the Volume measure is the question of measurement and lack of clarity in the way some of the words in the definition of the Volume measure have to be understood in the context of some services. However, this seems not to be a significant obstacle, as it seems like even a rough estimation of the Volume measure is good enough for the analysis. The analysis in this section strongly supported the main theory of the VVM, that is, the Volume measure is correlated with the integrated measure of the six dimensions mentioned in the Silvestro et al. paper•. This correlation however was not found between the Volume and all of the six service dimensions in the Silvestro's et al. model.

• Keen to see if adding the other three service dimensions to the integrated dimension would affect the correlation with the Volume measure it was found that the integrated dimension of the nine SDs too is

When it comes to discussing the managerial implications of the model the Volume measure appears to be no better than any other service dimension in that it can only be used as indicator for few (and in fact very few) of the (productivity related) managerial challenges. The integrating of the six dimensions together and having all of them as one dimension with an additional dimension of Volume is quite helpful for classification of services and understanding their overall nature, however when it comes to a more detailed discussions about specific managerial challenges the VVM appears to be less responsive and sensitive because of being based on only two dimensions. It is however interesting to see that the measure of Volume can indicate as many productivity aspect subjects as some of the popular service dimensions do (like Customer Contact, Customer Interaction and Intangibility).

Summary and Conclusions

In this chapter the three service classification models of Customer Contact (Chase 1978), SPM (Schmenner 1986) and Volume-Variety (Silvestro et al.) were studied in the light of the data and results of the present research. The latter two models were studied from a number of different perspectives. It is possible to briefly describe the results to be:

- of "improving nature" for the Customer Contact model
- of "questioning nature" for the SPM
- of "supporting nature" for the Volume-Variety model

In all the above cases, both conflicting and consistent results were found based on the present research. Overall, this chapter illustrates the difference between the degrees of reliability and validity of three researches, each with different levels of reliance on empirical study. At this point, all the research questions are attempted and the three most relevant classification models to the present research are studied in detail. The next chapter summarises and concludes this research.

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significantly coordinated with the Volume measure, although the strength of coordination is not as strong as the one with the six integrated SDs.

Chapter 8: Conclusion

Throughout chapters 5 and 6 the research questions have been answered and in chapter 7 three of the most relevant service classification models were investigated using the processed data and results of the present research. In the last chapter of this report first a summary of what has been done is given. This is followed by a summary of literature review that includes the two streams of literature survey in the present work. In section 8.3, the answers given to each of the research questions are summarised. This includes table 8.1 in which a quick reference to the models and figures related to the answers to each research question is given. Discussions about reliability and validity of this work are taken place in section 8.4. Section 8.5 summarises the contribution of the present work in the body of knowledge from different perspectives. The benefits of this work for practitioners and academia (teaching and research) are explained in section 8.6. Finally section 8.7 proposes a number of research agendas as the follow up researches for the present work.

8.1. Summary of what was done

This research aimed at a cross-comparison study of aspects of productivity management in services, primarily to explore what service dimensions (SDs) were the most useful (among a list of candidate SDs) in indicating the nature of service operations with regard to productivity management challenges. Following a literature review on productivity aspects in services a general lack of empirical work in this area was revealed. In particular the controversial debate about the relationship between productivity and quality and whether traditional concept of productivity is a viable concept in services was noticed. Throughout a literature review on service dimensions and service classifications the author was inspired by the attempt of researchers throughout more than 20 years to use service classifications based on service dimensions (that are operational features with unique conditions for each type of service) to study services and compare them from variety of aspects. Noticing the highly theoretical based approach in choosing and applying service dimensions for studying services, the author was keen to explore a new approach in application of service dimensions that was based on empirical work. It was found that the context of productivity management is an appropriate context for such a study.

The above two aspirations (1. empirical study of service productivity, 2. proposing a new approach for choosing and applying service dimensions in studying services) matched together very well as they provided the context (service productivity) and the tool (service dimensions). Accordingly a "qualitative dominant – less quantitative dominant" research was designed (Creswell et al. 1994, also refer to chapter 4.17). The research main question was to explore what were the service dimensions that were useful in indicating the nature of service operations with regard to productivity management. Seven other relevant research questions were established, that could be attempted while answering the main research question.

Technically, the target was to select a number of popular service dimensions from the point of view of operations management and investigate through an empirical study, which one/s (if any) could be used as indicator/s for productivity management aspects in services. The overall approach of the research was to start from studying productivity managerial challenges in services, by doing an empirical work heavily based on qualitative data derived from structured and semi-structured interviews with experts in 12 service sectors in the UK. The data included those related to productivity aspects (through semi-structured interviews) and those related to measuring the 9 candidate service dimensions (through structured interviews). From here differences and similarities between the studied services were identified and in the next stage relationship between these similarities (and differences) and the measurements for the 9 service dimensions were found through correlation analysis. In an overall view it was revealed that (as expected) it was not possible to develop a robust clear cut two by two service classification model to study all the aspects of productivity management in services. It was found that a few of the service dimensions (from the 9 candidates) each had relationships with some specific aspects of productivity management in services while some did not show any or a considerable number of relationships.

Using the rich qualitative data that was the ground for the quantitative analysis of the work (above), a number of other results related to the other research questions were reached:

The key factors in productivity management in services were discussed based on a qualitative analysis and the main problem areas were identified. The relationship between productivity and quality in the studied services and the reasons why in some of these

services there are less degree of trade off between the two concepts were explored. The idea of "productivity friendly services" was examined and some features of services that could be called with this title were found and discussed. The differences of services in terms of staff loyalty and satisfaction and the changes in this respect and the reasons behind changes were discussed. A new classification model based on the identified features of productivity management challenges was proposed. The notion of changes of degrees of service dimensions and their anticipated effect on productivity management issues were analysed and discussed. A flow chart was developed to demonstrate the decision making (or the policy making) related to prioritising volume increase, cost decrease or quality increase for improving a broad definition of productivity (that includes quality) in services.

As a complementary study, the data and the results were used to examine three popular classification models in the operations management field (Chase 1978, Schmenner 1986, Silvestro et al. 1992). This was done by looking at the results and (where possible) applying these classification models to the studied services using the available data. Each model was examined from a number of perspectives and results were discussed.

8.2. Summary of literature review

Literature review in this research includes two separate but relevant sections: Service Productivity (chapter 2) and Service dimensions (chapter 3). Here the findings of each of these sections are presented in brief and at the end the overall conclusion from the literature review is summarised:

8.2.1. Summary of literature review for service productivity

In chapter 2 the results of literature review on service productivity was presented by describing how 6 inter-related observations were shaped by literature review. These observations are linked and summarised here:

In brief it seems like the service research was very much dominated by the Marketing discipline and under the influence of this discipline. One of the results of such influence

and domination was that operations management researchers found fewer opportunities to look at the area from their core perspective and therefore some important concepts like productivity in services enjoyed less attention. This is in particular important when taking into the account that the concept of productivity is originated and rooted in traditional industrial, manufacturing context. As a result lots of controversy issues have emerged when attempting to apply the concept in services. Overall the authors in service domain do not agree with the traditional, rather straight-forward conceptualisation of productivity in manufacturing and firmly believe that in services the concept is a multi-dimensional and complex one. One of the main aspects of complexity of service productivity is the relationship between productivity and quality in services. Authors generally agree that in service operations looking at productivity as an isolated internal concept is not valid and relevant. Despite all the above, the field of service productivity has enjoyed only little contribution from academia and is still a fresh area for research.

8.2.2 Summary of literature review for SDs

In chapter 3 service classification schemes based on service dimensions were critically reviewed in 7 sections. Each section had grouped similar classifications. Five questions were raised at the beginning of the literature review chapter for service dimensions (chapter 3) and the literature was reviewed in an attempt to answer these questions. These answers are linked together with some more important points and are summarised here:

Service dimensions (as a basis for service classifications) have been used extensively from 1960s for generic researches in services by researchers from different disciplines including operations management. Gradually the area became of interest to people of different disciplines in particular operations management and more contributions took place to study managerial implications based on service classifications. Later on a significant attention was given to validation, revision, operationalising and comparing the proposed service classifications. Overall service classifications so far are initiated in theoretical ground. Accordingly the choice of service dimensions is hardly justified and the managerial implications are often not proven. Also not all service dimensions that are proposed are operationalised in terms of measurement. It seemed like it was possible to propose a new approach to classification of services, based on service dimensions, that was literally opposite to the routine approach, aiming to find results that are more based

on empirical research. This approach starts from exploring managerial challenges and then leads to service classifications and finally results in analytical selection of the most relevant service dimensions. This approach is opposite to the routine approach that was applied so far. Looking at the literature, 9 service dimensions were chosen to be looked at on the basis of this approach.

8.2.3 Summary of literature review as a whole

As a whole the results of the two streams of literature review could not match any better. Chapter 2 (service productivity) provides a fresh and complex context to be examined and Chapter 3 (service dimensions) provides a popular but tricky tool to use in the context. Chapter 2 revealed the multi dimensional and complexity of the context of service productivity and chapter 3 led to an innovative way of using service dimensions as an analytical tool. It is possible to say that chapter 2 provided (information about) a context in which the use of service dimensions and classifications could be explored by a new approach. On the other hand, Chapter 3 with the subject of service dimensions, provided a good tool to start looking at the complex context of productivity in services.

8.3. Answers to the research questions

In this section, answers that were achieved for each research question are briefly reported. It should be noted that for some of the questions more than one answer was reached, because the question was attempted from different perspectives.

Main Research Question: What are the service dimensions that are useful in indicating the nature of service operations with regard to productivity management?

The answer to this part was reached through extensive analysis of data in chapter 5 and is mainly presented in section 5.3. Based on the analysis a number of service dimensions were found to be useful, each for specific productivity management aspects. In an overall view and from pragmatic perspective, the most useful Service Dimension is Front/back value added (Maister 1983) that relates to 6 subjects in the list of the studied productivity aspects. The other useful dimensions are Product/process focus (Johnston and Morris 1985), Customer Contact (Chase 1978) and Customer Interaction (Schmenner 1986). The

dimension of Labour Intensity was found to be of no use in terms of relationships with productivity management aspects.

More detailed insights into the use of service dimensions in studying productivity management aspects in services were presented by a series of schematic representations in section 5.3.4. From a point of view, these models are also providing an answer to the research questions number 1 and 2, although these questions are also answered with no regard to the results of answering the main research question.

The fact that instead of one robust and well structured classification model, the analysis led to a series of models with different formats and features is a reminder that this was an analytically driven result based on an empirical work.

Research question number 1: In terms of Productivity management, how are the service industries similar/different and how can they be classified?

A number of answers were provided for this question, each from a different perspective:

From the point of view of the specific productivity aspects that were chosen for this study and purely based on quantitative analysis presented in chapter 5, services fall in different clusters depending on what productivity aspect is looked at. These clusters are presented in section 5.2.3.

A more advanced classification of services can be said to be the classification models based on both the service dimensions and the productivity aspects. These are the ones that were presented in section 5.3.4. The format of some of these classification models were derived from the Schmenner's SPM (1986) while the approach was totally different.

In chapter 6, within case and cross case tables and also causal maps were used to elaborate on features of each of the services separately and in comparison with other services. These were listed in appendix 6.2, 6.3 and 6.4.

From an overall point of view and based on general behaviour of services in the context of productivity management, according to the qualitative analysis that was presented in chapter 6, seven of the studied services can be classified in three clusters of Factory environment (including Fast Food), Professional environment (including Consultancy and

Legal Services), Changing environment (including Telecommunications, Power Utilities, Banks and Insurance services). The other 5 studied services were found to have a mixture of the features of two or the three of the above clusters (figure 6.8). Each cluster has its own managerial features as presented in table 6.1).

From the point of view of productivity improvement policies (when considering a broad definition of productivity that includes quality), a flow chart was used to illustrate and compare the decision trends or logic of different services (figure 6.7). This

Research question number 2: How can the service industries be classified with regard to the Service Dimensions?

Services were put in different clusters according to their overall measurements of service dimensions as presented in figure 5.7 (using relationship map) and the dendogram at the end of section 5.1.4 (using cluster analysis). Overall, Department Stores, Fast Foods, Auto- Repairing, Hotels and Airlines can form one cluster and each of 'Consultancy and University' and 'Insurance and Telecommunications' can form a separate cluster. Banks and Legal Services are close to one or two of the above clusters while Power Utilities are not close to any of the clusters.

From another point of view, a detailed study was done (in section 5.3.2) to explore what are the definition of low or high for each of the service dimensions when they are used as indicators for the productivity aspects. Accordingly detailed description of clusters of services based on indicating service dimensions were also presented in section 5.3.3.

Research question number 3: What are the measurements of the studied service sectors for each of the service dimensions?

These measurements were presented and elaborated in various formats in section 5.1.2. It was found that overall the studied services have higher degrees of Customer Contact and Labour Intensity and lower degrees of Personnel Judgement, Customer Inability to Evaluate, Customer Interaction and Process Focus. Also it was evident that the studied service sectors were not widely different in terms of Customer Interaction and Process Focus. They were however very different when it came to Customer Contact, Personnel Judgement and Customer Inability to Evaluate.

Research question number 4: What are the relationships between the popular service dimensions?

Based on correlation analysis the relationships were presented in numeric and schematic format. These can be found in section 5.1.3. The most interesting result in this part was that no significant relationship was found between Customer Contact dimension and any of the other service dimensions while all the other service dimensions were significantly correlated to one or more of the other dimensions. No significant correlation was found between Customisation and Customer Interaction (contrary to the underlined assumption of the Schmenner's service process matrix 1986).

Research question number 5: What are the key factors and issues in productivity management in service industries?

Here the aim was to find the factors that were most frequently referred to as influential factors in the interviews across the 12 service sectors. These factors were explored through qualitative analysis and were presented mainly in section 6.4.4. The most important factors were found to be Standardisation, Cost, Staff satisfaction and loyalty and Managing change. The effects of each of these factors and (where applied) their features were illustrated using simple figures and charts in section 6.4.4. For the factor of "Staff satisfaction and loyalty" a two dimensional model was developed in which the position of each of the studied services along with historical changes of the positions (where applied) were illustrated (figure 6.12).

From another point of view, using a count analysis of data in chapter 6 (and supported by the results in chapter 5) it was found that among the problems in the way of productivity management, the most difficult one is the factor of (Competence of) People.

Research question number 6: Is there anything like productivity friendly services and if the answer is positive, what are the conditions of these services?

According to the research results the answer is "Yes". Figure 6.2 compares the difficulty of productivity management in the studied services based on counting analysis. Integrating this with the results in chapter 5, it was found that there is a negative relationship between

the service dimensions of Intangibility and customisation and "productivity-friendliness". Accordingly it can be argued that services with lower degrees of customisation and/or intangibility are more "productivity friendly", although clearly more research is needed to back up this argument. Based on the contents of the interview it was also found that services that are able to apply more standardisation have less problems in managing productivity.

Research question number 7: How is the interaction between productivity and quality in service operations?

It was found that in all the studied service sectors, overall there were some trade offs between productivity and quality in short term. The productivity and quality campaigns however do pay off for each other in longer terms. This however can mean different lengths of time for different service sectors.

Three main explanations were found, based on qualitative analysis, to understand why in some of the studied service sectors there were less problem in managing productivity and quality at the same time (at least for some of their operations). Three explanations were found:

- The existence of a "common element" of interest between productivity and quality (illustrated in figures 6.4-a and 6.4-b). An example is the element of 'Speed' that is a common interest between productivity and quality in Fast Food. Other examples are Auto-repair services (standardisation as common element) and Insurance services (defect free product is the common element).
- Where customer is a co-producer (inline with Lovelock and Young's argument, 1979). An example for this explanation is Department Stores where customer does lots of the shopping processes as self service. Other example if Fast Food.

- Where productivity and quality are each concerning with a different part of the whole operations (like front and back office). Telecommunications can be seen as example where quality is mostly focused on the field work and productivity is mostly focused on the back office. Other examples can be found in Department Stores and Universities.

The above was summarised in figure 6.5. Also a general trend was explored in terms of historical background and its effect on productivity and quality challenges in services. This is illustrated in figure 6.6.

Other Results:

Throughout the research some other results were also raised. The most interesting, as well as relevant result, however, was the notion of changes in the degrees of service dimensions (as Schmenner has proposed in 1986). Data was collected to see the experts' views on expected changes in service dimensions for their respective service. Overall it was revealed that the anticipation of experts in their respective service sectors indicated that generally service industries are moving toward less labour intensity, less front value added operations, less customer interaction but more customisation. Except for the Customisation, this is very much inline with the Schmenner's notion of 'moving up diagonal' (Schmenner 1986).

The present work also investigated three very relevant and popular service classification models (Chapter 7). These were the Chase's Customer Contact Model (1978), Schmenner's Service Process Matrix (1986) and Silvestro et al. Volume – Variety model (1992). The processed data was used where applicable to study the underlined theory and the implications of these models. Consistent and conflicting results were highlighted.

Quick reference to the answers to research questions:

Throughout this research the intention was to (where possible) model and illustrate the results with the use of tables and figures. This now allows a more summarised and packed review of the answers to the research questions in this section. Table 8.1 shows that which tables or figures are the final answers to each of the research questions. For ease of usage, instead of merely the question numbers, the key words of each research question is given:

Research question	Illustrated answers
The main question: Selecting the most relevant service dimensions	Figures 5.8, 5.9.1, 5.9.2, 5.10.
Question 1: Similarities and differences of services in terms of productivity management	Appendices 6.2, 6.3, 6.4. Figures 6.7, 6.8. Table 6.1.
Question 2: Classification of services based on the service dimensions	Figure 5.7 – Dendogram in section 5.1.4.
Question 3: Measurements of services for each of the service dimensions	Figures 5.2., 5.3, 5.4.
Question 4: Relationship between the service dimensions	Figure 5.6.
Question 5: Key factors in productivity management in services	Figures 6.9, 6.10, 6.11, 6.12
Question 6: Searching for a productivity friendly service	Figure 6.2
Question 7: Interaction between productivity and quality in services	Figures 6.4-a, 6.4-b, 6.5, 6.6

8.4. Reliability and Validity

"Every way of seeing is also a way of not seeing"

(Silverman 2000: 825)

In section 4.16 the point was made that many measures discussed in that chapter where in fact in place not only to make the research possible but also to contribute towards more reliability and validity of the work. It was mentioned that given the two types of analytical approaches in this research, finding appropriate criteria to evaluate the research as a whole needs to be done carefully. This research has been introduced as a dominant-less-dominant research to the benefit of qualitative (inductive) approach (Creswell et al. 1994). Accordingly it is appropriate if criteria could be found that could be basically used for the dominant approach (qualitative) while still being applicable for the less dominant approach (quantitative).

The issue of applicability of reliability and validity criteria to qualitative research has been a matter of debate among researchers (Creswell et al. 1994). Lincoln and Guba introduce different criteria for non-positivist approaches depending on whether the approach is

Interpretativism or Constructivism (Lincoln and Guba 1985). Patton identifies 5 contrasting sets of criteria for judging the quality of qualitative inquiry from different perspectives. These are "traditional scientific research criteria", "social construction and constructivist criteria", "artistic and evocative criteria", "critical change criteria" and "evaluation standards and principles" (Patton 2002). Creswell reports that in many works on qualitative research the criteria for assessing the quality of work in terms of reliability and validity can be inferred from discussions of the authors about steps and core facets of a qualitative research work. He also adds that he has found the direct discussions about criteria to be missed (Creswell, 1991). Authors like Erlandson et al. have come up with new terminologies for quality criteria of an inductive qualitative research. These are "trustworthiness" and "authenticity" (Erlandson et al. 1993, also Guba and Lincoln 1981). Quoting from Wolcott (1990), Miles and Huberman argue that (in qualitative research) we may acknowledge that "getting it alright" is an unworkable aim but we should try to "not get it all wrong" (Miles and Huberman 1994: 277).

Overall, the author found the suggestion of Creswell, the one that could be appropriate for this work. Creswell agrees to remain with the two traditional titles of reliability and external and internal verification; he however rectifies these concepts and adapts them for qualitative research based on the arguments of Merriam (1998) and Miles and Huberman (1984). He describes how each of these concepts can be seen in a qualitative based study:

"Reliability: In principle meaning repeatability of the study. Here (in an inductive dominant research) it should concentrate on discussing limitations in replicating the study.

Internal Validity: In principle meaning the extent to which the results can be attributed solely to the explanatory variables. Here the discussion should refer to procedures that lend internal validity to a study.

External Validity: In principle meaning the generalisability of findings. Here the discussion can focus on limited generalisability for the categories or themes to emerge from the data analysis or for the data collection protocol used by the researcher."

(extracted from Creswell, 1994: 158-9, the original definitions are based on Drucker-Godard, et al. 2001)

Using the above adapted version of the popular criteria, a bullet point format of the quality assessment for this work is presented here:

Reliability:

Strong points of the research in terms of Reliability:

- For the qualitative analysis there is a detailed explanation of the method by which the results of the work have been derived.
- Every piece of the results derived from the qualitative analysis can be traced back to the raw qualitative data.
- The quantitative analysis has been discussed in detail, including detailed process of collecting and finalising the data.
- The assumptions of the study are stated explicitly.
- The criteria for selecting experts have been given.
- It is not possible to argue that in a qualitative research (mainly based on semi-structured interviews) the researcher has absolutely no effects on the respondents. However this researcher tried his best to limit his inputs to the occasions where asking follow up or clarification questions were necessary and also where a misunderstood concept (from an expert's part) was in need of explanation.

Weak points of the research in terms of Reliability:

- Like any qualitative analysis based on semi-structured interview, there are no guarantee that the respondents would lead the discussions to the same detailed directions if another study like this was to take place.
- The measurement of service dimensions could be biased by the recent observations of the expert (this was tried to be avoided by stressing on the terms like "average" etc. but it is not possible to argue that it was completely prevented).
- Deriving conclusions from a qualitative data as rich as the data in this work might lead to different (but not opposite or conflicting) results. This might be seen as a weak point although the author argues that this weakness is tolerable (if not desirable).

Internal Validity:

Strong points of the research in terms of Internal Validity:

- The differences of answers in terms of service dimensions measurements have been rectified if they were more than a certain degree.

- As presented in section 5.4 the differences of answers for both ranking of productivity management aspects and measuring service dimensions as a whole was quite little.

- In terms of rankings of productivity management aspects a triangulation method has been applied to accept only the final rankings that are in accordance to two (theoretically justified) approaches.

- A pilot study was done for all the stages of the data collection to assure the questions and wordings as well as the measurement scales are clear and appropriate.

- There were no conflicting comments in the context of interviews of respondents from same service sectors.

- An extreme care was taken to make sure the respondents were qualified enough to answer the questions.

- The nature of questions was very general and they were asked about the expert's observations rather than their opinions.

- The data collection was in the level of industries (sectors) rather than organisation, thus avoiding subjective comments due to specific circumstances of an organisation. This also facilitated the generating of critical comments by the respondents.

- Given the small size of data for quantitative analysis, a number of different statistical and numerical methods were applied (including exact test) to derive results that were as reliable as possible.

- The data from which the quantitative data was derived was not generated without any background preparation. This data have been generated by the respondents on the ground of an inductively developed structured knowledge (using semi-structured interview) as explained in detail in chapter 4.

Weak points of the research in terms of Internal Validity:

- The small size of data for quantitative analysis is an undeniable fact. As explained in the list of strong points above, a number of measures have been put in the place to reduce the effects of this and accordingly the author argues that the results derived from quantitative analysis are valid. However this does not rejects the need to test these results using a statistically big enough sample (as explained in section 8.8). Doing so however needs a careful design of data collection tools based on the results and insights that were achieved in this research.

External Validity:

As Creswell puts it, here the researcher should discuss the limited generalisability of the work (Creswell 1994). This work has two main results, these are the results derived from quantitative analysis and those derived from qualitative analysis. As explained before, a number of measures have been put in place to assure the validity and reliability of the data that was used for quantitative analysis. This was done to reduce possible subjectivity of data because of the small size (as a quantitative data). The author argues that the results of the quantitative analysis are no less generalisable than the results derived from the theoretical service classification models that were discussed in chapter 3. In fact being based on empirical work, inclusion of highly qualified experts in the study and conducting analysis on the collected data, can be seen as the advantages of this work in terms of external validity when compared to similar works. Also the service sectors have been selected in a way that they could cover a wide range of services. The work is therefore likely to be generalisable to all services although there is no doubt that wider testing of the results is needed.

As for the results derived from qualitative analysis, given the in depth interviews with the experts and the number and wide range of service sectors being involved in the study, the author can argue that the results are generalisable within the limits and

scopes of what is normally expected from qualitative research. In section 8.8 it will be illustrated that the results are generalisable enough to inspire future research to further confirm generalisability.

It should also be noted that another outcome of this work is to introduce and illustrate a new approach to service classification. In this regard the work can be seen as one that can be generalised to other areas of service operations.

Overall it is possible to summarise this section by arguing that in this research detailed methodological descriptions have been put in place to make sure of reliability. Accordingly the author can argue that the research is repeatable and will lead to (not necessarily exact but) similar results. The work contains numerous measures to ensure internal validity. In terms of external validity (generalisability) the author can argue that overall the work has advantage over the similar works that have been done on theoretical basis.

8.5. Contribution of the present research

The contribution of this work to the body of knowledge is based on the main differences of this work with other similar works. These differences are explained in section 4.3. Accordingly the type of contributions can be separated as follows:

Methodology-based contributions:

- Proposing and illustrating a new and advantageous empirical approach in using service dimensions for service operations' studies. This approach has been discussed in detail in section 4.3. The approach is based on empirical study in which first the managerial challenges of services in a specific area of management are studied. From there, services will be put in clusters and accordingly appropriate service dimensions for developing more structured clusters are identified by analytical methods. The approach is heavily based on empirical work and addressed a number of criticisms on service classifications like lack of measurement and lack of evidence for managerial implications.

Results-based contribution:

- Empirical measurement of a number of service dimensions for different service sectors.
- Analysing the relationship between a number of service dimensions based on empirically derived data.
- Introducing service dimensions that are good for productivity management studies based on an empirical approach.
- Exploring differences and similarities between service sectors in terms of productivity management and identifying common trends for the purpose of theory building.
- Looking at the relationship between productivity and quality in services and the trade off, based on empirically derived data.

Verification- based contributions:

- Providing appropriate raw data as well as processed data to verify the reliability of some of the classification models and their proposed managerial implications.

8.6. Benefit for practitioners and academia

The outcomes of this work can be seen as managerial tools as well as academic tools for those interested in service operations:

For practitioners:

The issue of relationship between academic and professional world in the context of operational research is the subject of long debate. It is obvious that this discipline does not have the same straightforward and direct relationship with the professional world as some other disciplines like Science or Engineering. It seems like in this discipline (operational research), the professional world takes benefit of academic world in a very slow and cautious way. In fact it seems like it is the collectivity of academia work that manages to relate itself with the professional world rather than each individual research work. This author has not done any particular study to discover the reasons behind this. It might be

true (as a colleague once mentioned) that the professional world is still under the influence of academic contribution brought forward by Taylor therefore they are not yet allowed themselves to be affected by more contemporary contributions. As Smither says (1998), when practitioners close their eyes to research findings, they have no one but themselves to blame (sited in Soltani, 2003).

The results of this research can be only useful for practitioners if they approach them and put them in practice both for getting benefit from them and more importantly to provide feedback for improving them where needed.

The service dimensions that were found to be good for making service classifications for productivity management can be used as productivity management tools by practitioners in the business world:

- Practitioners will first measure their respective service for each of the relevant service dimensions. From here and based on the results presented in chapter 5 they can identify the 'common' productivity related managerial challenges in their service. The word 'common' here means common between services with the similar measurements for the relevant service dimensions. This will provide the managers a better understanding of the nature of their service and the consequences in terms of productivity management. As mentioned in chapter 4, even the experts that were (supposedly) well-versed with productivity managerial challenges in their respective service mostly confessed to the fact that the interviews have helped them understanding the situation better and to better form and structure their thoughts. It is not difficult to imagine that for a manager who is usually engaged in daily basis activities and is too much occupied with cycle of failure or (optimistically) cycle of success (as Schlesinger and Heskett put it - 1991), such a structured tool (service dimensions linked with common managerial challenges) can be a very helpful tool to first appreciate and then control and manage different issues related to productivity in his/her respective service organisation.

- From another perspective, as stressed by Schmenner (1986) and Lovelock (1983), by looking at the classifications presented in this work and their relationships with certain service dimensions managers will come to agree that despite the traditional

belief that every service is unique and different, there are in facts lots of similarities between groups of apparently different services. Managers can learn from other services that are in similar conditions (in terms of service dimensions) as their respective service.

- A step further, managers can also start to think about service dimensions as drivers that can lead them to different areas of managerial challenges (in terms of productivity). Using the relationships between service dimensions and productivity management challenges, a manager that finds that the (for instance) degree of Front Value Added of his/her respective service is going to get lower in near future will be able to anticipate what changes will happen to the managerial challenges (in terms of productivity) in his/her respective service (i.e. what new issue will raise and what issues might not be applied any more).

- Likewise (and in an opposite causal direction compared to the above) managers who want to change the type of challenges they are facing with in every day life can see that changing which service dimension in their respective service might lead to the change of the type of managerial challenges in their service. For instance if a manager wants and is prepared to invest more on methodologies and systems rather than staff for future productivity improvement plans, he/she might want to look at the results of this work to see which service dimension/s need to be change and in what direction to be able to change this aspect of managerial challenges.

- On the other hand, the results of this work can be particularly interesting for new service development (NSD). Before establishing that what type of operations and what type of relationship with customer is going to be designed, the service developers can decide about what sort of managerial challenges they want to face with (when it comes to productivity management) and from there, based on the results of this study they can determine the condition of their service in terms of relevant service dimensions (like low or high for Front Value Added, Customer Contact, Personnel Judgement, etc.).

The results related to trade off can be particularly interesting for practitioners:

- They can explore the ways they might better manage productivity and quality trade off in their services. This can be done by looking at the three factors that were introduced in section 6.3.1. These are the ones that could result in positive effects in trade off between productivity and quality. In particular the notion of "common element" can be looked at and the managers can start the important task of discovering potential "common elements" in their services, perhaps by learning from other services that have successfully controlled the trade off between productivity and quality in their services by (often unconsciously) use of this concept in their services.

The concept of "productivity friendly" services is applicable in practice:

- Based on the results, less intangibility makes productivity management easier. This can inspire the managers to bring more tangible aspects to their service. This (making service more tangible) is also addressed by other researchers (Fitzsimmons and Fitzsimmons, 2001). More tangibility can also result in more opportunities for standardisation which was found to be a common feature between services with less difficulty in the present study.

In terms of the VCQ flowchart (volume-cost-quality):

- Managers will understand why working with one or two of Volume, Cost and Quality is more applicable than the rest when it comes to improving a broad definition of productivity that includes quality (as discussed in chapter 4). By looking at the flowchart in figure 6.7 they can explore the dynamics behind the applicability of each of these factors (volume, cost, quality) in improving the broad concept of productivity in their service.

Other results:

- The other results of the work including the Key Factors in productivity management in services and also employee satisfaction and loyalty chart can offer managers a wider view of these issues across the service industries and provide them with a more strategic view in dealing with these aspects of productivity management in their work. The developed models can be used as tools to simplify the complicated business situation and facilitate decision-making.

It is appropriate to end this part by a quote from Schmenner:

> *"Service managers who continue to claim that their operations are unique may be left in the dust by those who see their operations as more generic. When service firms begin to appraise themselves as service factories, service shops, mass service or professional service ... the service version of the not-invented-here syndrome will fade away and management minds will be more receptive to general and generalisable, service management concepts"*
>
> (Schmenner 1986)

All in all, it is possible to say that the results of this research can be seen as tools and insights to facilitate what Schmenner refers to as being "receptive to general and generalisable, service management concepts" in the above quote.

<u>For academia:</u>

Teaching:

As the author engages in teaching service operations in undergraduate and postgraduate levels for nearly 5 years, he was particularly interested to see how the results of this work can be used and can be put in a form of teaching material. Some of these results, in particular the concept of Trade Off between productivity and quality have been tried in teaching programmes and the feedbacks show that students comprehend, appreciate and value these materials. In particular the role of service dimensions in understanding service's behaviour was found to be very helpful in delivering rather complex messages to students. Being OR students, what can differentiate a Marketing class on service operations with an OR class in service operations is modelling. Service dimensions have proved to be excellent tools for inspiring and feeding students' thoughts in terms of modelling. The whole process of this research and the outcomes has helped the author to transfer this modelling approach to understanding services, using service dimensions, throughout the years of his teaching. The use of service dimensions in service operation classes can be very similar to the use of the concept of 4Vs (Volume, Variety, Variation, Visibility) by Slack et al. in their widely used text book of Operations Management (Slack et al. 2001). Slack et al. use the 4 Vs to discuss the implications of different types of

operations for different subjects of operations management (from design to capacity to improvement, etc.). The concept of service dimensions can be used (and have been used by this author) for the same purpose and the approach of this research as well as results related to service dimensions provide plenty of material for this purpose.

On the other hand, other results of the work related to productivity in services (its degree of importance, trade off with quality, easiness of managing, etc.) are always interesting for students, not as absolutely reliable results but as food for thought and material to criticise. This has always made up the lack of enough material on service productivity for teaching purposes.

The author hopes that in the same way that this research supported his teaching, it could also become useful for other instructors.

Academia: Research:

Benefits of this research to academia in terms of contribution have been discussed in detail in section 8.5 (where the contributions of the work were listed) and are discussed in terms of research agendas in the next section where areas for future research are discussed.

In an overall view however, it is possible to say that this work is a contribution towards what a number of researchers in service operations have encouraged in the past few years, that is empirical work.

Two areas that were less researched empirically (service dimensions and service productivity) were matched together and studied empirically. A new approach to the use of service dimensions was put into test, which can be taken further by research academia. It is hoped that through a number of papers that are in the process of writing, out of this work, the academia in service operations get to know the approach and the results of the work and as a whole the work could be seen as a step (no matter how little) towards more empirical works and hopefully an encouragement for others to do more empirical works in the less clear areas in service operations (even if it means putting the results of the present work under question by further empirical work).

The following section specifies use of the research results for academia by suggesting a number of research agendas:

8.7. Future Research and recommendations

This research can be developed and improved from three perspectives, vertical perspective (seeking more in-depth insights into the results), horizontal perspective (seeking more evidences for the results) and cross-direction perspective (examining the same approach on other subjects).

A. Vertical Development (seeking more in-depth insights into the results):

Most of the results in chapter 6 can also be subject to positivist-based survey for further verification purposes. However it seems beneficial to explore these findings in a more focused phenomenology-based research before conducting any deductive survey. Moreover there are rooms for more focused studies for other outcomes of this work as well:

- The issue of trade off in services and the notion of "common element" are interesting areas for further work. Three broad factors were found for the services that have fewer problems in balancing between productivity and quality. In depth studies can explore the extent of effect of each of these factors. In particular these studies could lead to more practically used "common elements" in services and the opportunity of organisational learning and adaptation of the concept in other organisations can be looked at.

- The service clusters that were identified purely based on productivity management challenges in services (Professional, Factory and Changing environments) are in need of further investigation. It might be possible to conduct three case studies each representing one of the clusters to further explore the features of each cluster. In particular it will be interesting to see if Changing Environment organisations are also literally changing, meaning that the change is leading to a stable condition of Factory or Professional environment as defined in chapter 6 (or is "changing" a core substance of the nature of these services).

- It will be interesting to explore why some service dimensions seem to be more relevant as indicators for productivity management aspects in service organisations. For instance the dimension of Front Value Added was found to be one of the most helpful dimensions in this regard while the dimension of Labour Intensity did not show any significant relationships with any of the aspects of productivity management in services. An in-depth case study survey focused on these two dimensions could lead to exploration of reasons behind relationships or lack of relationships.

- This was a generic study on 12 service sectors. It will be interested to narrow down a follow up research to focus on two or three organisations each from one of the studied service sectors again for comparison purposes but this time with a more in-depth and detailed data collection approach to cover more operational and technical levels of the organisations in terms of productivity management. In doing so, an emphasis can be put on processes (as referred to in section 4.7.1). Service dimensions can be measured for different processes within each service organisation and their relationship with more technical aspects of productivity management in different types of service processes can be studied.

- As illustrated in section 4.3, the finding of service dimensions in this research was not fully explorative. This (as explained in section 4.3) was due to the broad scope of the study, aiming at a variety of service industries. A more focused and in-depth research (perhaps a grounded or action research) could not lead to many of the results that were sought in the present work. Having reached these determining results, it is now possible to carry out a more explorative work, aiming to find "the best" (and not merely best from a list of candidates) service dimensions for productivity management studies in services. Grounded theory and/or action research are two of the most obvious approaches in carrying out such study.

- What was referred to as an ideal way of collecting data for this research in chapter 4 can be done when the research goes out from the limited scope of a PhD research and take benefit of more human and financial resources. A series of workshops can be arranged, attracting managers from a number of service sectors

that were studied in this research in an attempt to first rectify and polish some of the results and then to verify them through group discussions. The presence of managers from different service sectors will be a great opportunity for synergic outcomes and the results of this research will be both developed and improved this way. The main obstacle of course would be gathering all the relevant managers at one room and at one time. This can be taken care of by spending some of the financial and human resources to establish contacts and perhaps offer intensives and academic support to the attendants.

- The productivity policy aspect (referred to as VCQ flowchart in this research, section 6.4.2) is another interesting area to first gain more insights in and then to verify. The flowchart was developed based on the qualitative results collected from 23 experts in services. It would be beneficial to choose few case studies and identify the other possible factors that could influence this flowchart.

- The issue of "productivity friendly" services is another one to explore further. In a not very objective way it was found that there is a relationship between intangibility and difficulty of managing productivity in services. As discussed earlier in this chapter, the result does make sense and is inline with literature however more insights are needed to discover the dynamics behind this relationship before conducting verification surveys (as explained in Horizontal Development section).

- Standardisation was found to be a popular factor in easing productivity management in the 12 service sectors. On the other hand not all the studied services have found standardisation to be significantly applicable in their studies. A number of issues related to standardisation in services were explored as presented in chapter 6. Case study research in two types of service organisations (one that has many applications for standardisation and one in which standardisation can hardly take place) can reveal more insights into this important factor that seems to be a key to productivity but not usually applicable to all services. The relationship between standardisation and Intangibility as an indicator for productivity friendly services is another area to explore. Questions like whether it can be argued that highly intangible services are hardly suitable for standardisation can be attempted.

- The issue of changes of service dimensions was noticed during the research and not particularly rich but interesting data was collected to generate some initial evidences. This can be further studied by focusing on services in which the degrees of a number of service dimensions are changing. This can be linked with two other issues: first the changing environment services and second the set of changing factors and their effects that were presented in figure 6.11. Relationship between these three notions (service dimensions movement, changing environment, and the effects of change in services) can be explored.

- A particular attention was given to the issues of staff satisfaction and loyalty given the importance of these factors in productivity improvement particularly in service organisations (Heskett at al., 1994). The work on this particular area is not the only one of its kind as discussed earlier in this chapter however the way work was presented in a two dimensional model with highlighting the changes and the causes of changes can open a new perspective to the subject in which researches can be done to identify the conditions of these two features (satisfaction and loyalty) in service organisations and more importantly to find the factors that have made drastic changes in any or both of these two conditions in the long time history of organisations. Historical records might be used as evidences of changes in loyalty and satisfaction although the main sources will be semi-structured interviews with different stakeholders who are the main players of the subject in organisations.

- In this research only one professional service sector was included (management consultancy) with another service sector being seen as semi-professional (small Legal service). It would be interesting to

B. Horizontal Development (seeking more evidences for the results):

As pointed out in section 4.5 the research questions were needed to be attempted through an explorative, inductive approach to assure the collected data is relevant and valid as much as possible and that the insight needed for answering the research question is provided. Although a wholly positivism (Easterby-Smith et al. 1991) approach was not appropriate for this research, the results can be verified and tested by this approach. The

main output of this work has clarified and explored productivity management issues in services and their relationships with service dimensions. Also the experience of measuring service dimensions can provide a researcher with more insights to improve future measurement tools for the same purpose. These all mean that unlike the condition before starting this research, the process and the outcome of this research have now provided enough insights into the area of service dimensions and productivity management that verifying the results by a positivism approach (typically sending questionnaires based on the results to a big sample of services) is possible. This verification can be done on a number of aspects related to the research's outcomes, understandably many of them being picked up from the results presented in chapter 5:

- Results related to the relationship between service dimensions and productivity management aspects can be studied further in an attempt for verification by designing a two fold questionnaires. One to measure the most relevant service dimensions (as explored in the research, e.g. Front Value Added, Personnel Judgement) and the other one to ask about the degree of applicability of specific aspects of productivity management (as explored in this research) that have relationships with these service dimensions. Designing the first questionnaire (for measuring service dimensions) should take benefit from what was learned throughout this work to further refine the already designed measurement tool. The second questionnaire (for productivity aspects) should take benefit of the results of chapter 6 (within case tables that were derived through qualitative analysis) to further clarify what is meant by each qualitative aspect and what are their different elements and examples. These two questionnaires will be sent to a vast number of service organisations. The hypothesis should be that there is a statistically significant correlation between the measurement of service dimensions for the services in the sample and the degree of applicability of specific aspects of productivity management in these services. This statistical analysis should be done with a careful consideration of all potential and significant biases and subjectivities of the survey. Important point is that such study should be seen as a complementary study rather than a straightforward verification study. This is because this author believes that due to the complexity of the notion of productivity in services and different understandings and view points to the issues related, there is no guarantee that the results of such positivist-based research is any more reliable than the result of the phenomenology-based research that was done in this work.

- Comparing to the above, a more comprehensive and general questionnaire can be sent to a big sample of services to verify and further study the results of the work for differences between services in terms of productivity aspects. These differences were highlighted in section 5.2.3. Also some general trends/features that were explored in section 5.2.2 can be included in the study (examples being relationship between input and output of operations being the most common problem in measuring service productivity, the role of technology as a tool to improve productivity or as an obstacle towards productivity. The collected data can be analysed for ANOVA Test and clustering techniques can be used in an attempt to establish statistically reliable differences and similarities between different services. Included in this further study, the results presented in figure 6.3 on the sources of the most problematic factors in productivity management in services can be tested for verification.

- With the same approach as above the three clusters of services (as introduced in section 6.4.3) can be tested for generalisation. Obviously this classification proposal was based on studying only 12 service sectors and in a general and strategic level. The features described in section 6.4.3 can be used to design a questionnaire in which these features are shuffled in the form of relevant questions. Clustering analysis can be done on the collected data to explore whether this classification scheme still applies when looking at a vaster and more micro level (organisations rather than sectors).

- Given the small sample size in this study, the important issue of changes of the degrees of service dimensions in some services is in need of further verification. Very simple questionnaire can be developed basically asking the respondents (perhaps top managers in service organisations) to verify for each service dimension whether it is seemed to be changing in their origination and if the answer is yes, what is the direction of change. Based on the results of relationships between service dimensions of productivity management aspects the outcomes of this survey can be used to anticipate the future changes of points of focus in services in terms of managerial challenges related to productivity issues.

- The notion of "less tangible more difficult" in terms of productivity management can be verified after gaining more insights into the theory, as explained in Vertical development. Intangibility of different types of services can be estimated and as a comparison estimation this can even be done by the team of researchers instead of

relying on a costly survey. The main point however is to develop some criteria to be able to objectively determine which services are easier in terms of productivity management. Referring to productivity indices might not be an appropriate way of doing this due to the presence of many economic/political factors that could influence these figures. Once criteria for identifying "productivity friendly" services are set up and the relevant data has been collected from a sample, the analysis can be easily done using correlation tests.

C. Cross-direction perspective (examining the same approach on other subjects):

- As referred to extensively in this report, service dimensions are used by researchers to study service operations and service organisations in general, in particular when the study is of a comparative nature. This study presented a new approach in using service dimensions for studying services in terms of productivity. The same approach can be used to study services for other subjects like quality management, human resources, performance measurement, marketing, etc. The approach can be phrased in few words: start from challenges, derive the classifications and identify relevant service dimensions.

- The helpful service dimensions were chosen from a list of 12 service dimensions derived form the literature. Although most of these service dimensions were among the most popular ones to the researchers of service operations management, there is no guarantee that other less popular dimensions are not as good or even better. In Chapter 3 numerous service dimensions were presented. The same study can be repeated to test the relevance and helpfulness of any of service dimensions for productivity management studies or more generally for any managerial challenges in services.

- From the cross case displays it is possible to investigate (in a study on quality in service industries) that what are the reasons that internal quality gaps are developed (referring to the SERVQUAL model). A comparative study of a number of service organisations can be done to explore these factors and to assess their influence on the internal quality gaps. This study can be done in conjunction with the previously mentioned study.

Summary

In the last chapter of this report the whole research was reviewed from different points of view. After presenting a summary of what had been done, the results of literature review was summarised. Answers to the main research question and the other seven research questions were reviewed and the reliability and validity of the research findings were discussed. This was followed by a summary of the contribution of the work in the body of knowledge and the potential benefits of the work for both practitioners and academia (research and teaching). A number of research agendas were proposed as follow researchers for the present work.

In section 8.6 it was discussed that research in social sciences is very different from research in other disciplines, like engineering or science. While inventing a new technology or discovering a new phenomenon in engineering and science leads to definite practical benefits, in social sciences (and in particular in business studies) it seems that very rarely a single piece of research leads to such definite practical benefits. Unlike some other disciplines, there is less certainty and accuracy in this discipline. The word Breakthrough has a little meaning here. Each research is built on the past researches and intends to verify them or apply or adopt them or to develop or improve them. Each research itself can become a basis for future researches. While this is also a trend in all disciplines, in social research it seems to be the only one. It is possible to argue that in this discipline, instead of a single research, it is the collective of research on a same area and the resulted insights that provide practical benefits. This happens when the outcomes of this collective research are gradually appreciated and adopted by practitioners.

Looking from this perspective, the present research can be seen as another contribution to the area of service operations. The work can only be absorbed in the body of knowledge if it becomes subject to constructive criticism as much as it criticised the past works, if not more. It is only then, that the contribution can be considered done.

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Appendix 4.1

Service Dimensions' Measurement Scales

1-Degree of Labour Intensity:

Definition:
"A very high degree of labour intensity is where the provision of contact staff is the core element, considering the whole process of providing the service (including delivery) . A very low degree of labour intensity is where the provision of plant and equipment is the core element, considering the whole process of providing the service (including delivery)."

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)

High Degree of Labour Intensity

Human resource is the main input into the whole process of providing the service (in terms of cost, *compared* with equipment/plant) and no special equipment/plant, with a relatively considerable associated cost, is necessary; e.g..... **Solicitor**

Human resource is needed as an important input into the whole process of providing the service (in terms of cost, *compared* with equipment/plant), however relatively *low cost* equipment/plant is also needed;
e.g. .....**Schools**

Equipment/plant is needed as an important input into the whole process of providing the service (in terms of cost, *compared* with human resource) but a relatively *low* cost human resource is also needed; e.g.....**Rail Transport**

Mechanisation is needed as the main input into the whole process of providing the service (in terms of cost, *compared* with the human resource), a relatively minor cost human resource is needed mostly for operating the equipment or supporting activities; e.g..... **Water Utility**

Low Degree of Labour Intensity

2-Degree of Front/Back Value Added:

Definition:
A back office - oriented service is where the proportion of "front office (customer contact) staff and equipment" to "total staff and equipment" is small. A front office - oriented service is where the proportion of "front office staff and equipment" to "total staff and equipment" is large.

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)

Front Value Added

The *majority of* work to provide the service is done by the *front* office.
The *relatively small* amount of work done in the *back* office, *mainly*
consists of some *supporting* activities; **e.g.... Beautician**

Most of the work for providing the service is done by the *front* office,
however *some parts* of work on providing the service are done in the
back office; **e.g. .....Railway Station**

Mostly the back office provides the service but
still there are *some* parts of the work that are
done by the *front* office; **e.g...Cafeteria**

Almost all of the work for providing the service is done by the *back* office.
The *relatively small* amount of work done in the *front* office consists *mainly*
of delivering activities or information exchanges; **e.g..... Water Utility**

Back Value Added

3-Degree of Customer Contact:

Definition:
"A very high degree of customer contact is where the customer is present in the service system (including on-line calls) during most of the time in the service transaction process. A very low degree of customer contact is where the time of customer's presence in the service system compared with the whole time needed for the service transaction process is very short."

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)

Note: In the following statements, service transaction process is defined as the exact process during which a required service is provided and delivered in cooperation between back office and front office only; thus the managerial and support functions are excluded from this process.

High Degree of Customer Contact

Customer is within the service system *almost* all of the time during the service transaction;
e.g. ..... **Beautician**

Customer is within the service system for a *relatively long* period of time but still there is *a short* time during the service transaction period where, the customer is not present within the service system;
e.g. **Management Consultancy**

Most of the service transaction process is done without the presence of the customer within the service system. His/her presence however *is needed* for a relatively *short* time in some stages during the service transaction process; e.g. **Solicitor**

The service transaction process is done *mainly* without the presence of the customer, his/her presence *may* be needed only for a *relatively minor time* at the beginning, end or during the service transaction; e.g. **Water Utility**

Low Degree of Customer Contact

4-Degree of Customer Interaction:

Definition:
"A very high degree of customer interaction is where the customer is interacting (exchanging information in any way to define or change the service package/process) with the front staff / encounter during most of the time of the service transaction. A very low degree of customer interaction is where the time that customer is interacting with the front staff / encounters is very short compared with the whole time needed for the service transaction."

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)

Note: In the following statements, service transaction process is defined as the exact process during which a required service is provided and delivered in cooperation between back office and front office only, thus the managerial and support functions are excluded from this process.

High Degree of Customer Interaction

Customer has *a high number* of interaction time periods *or a relatively long* interaction time period with the front office during the service transaction process;
e.g. ..... **Optician**

Although the *main* period of service transaction is without customer interaction, customer interaction time is still *considerable* during the service transaction;
e.g.....**Beautician**

The *main* period of service transaction is without customer interaction, there is however *a short* amount of the transaction period during which customer interaction takes place; e.g..... **Solicitor**

Customer has no *significant* interaction during the service transaction Period; e.g..... **Museum**

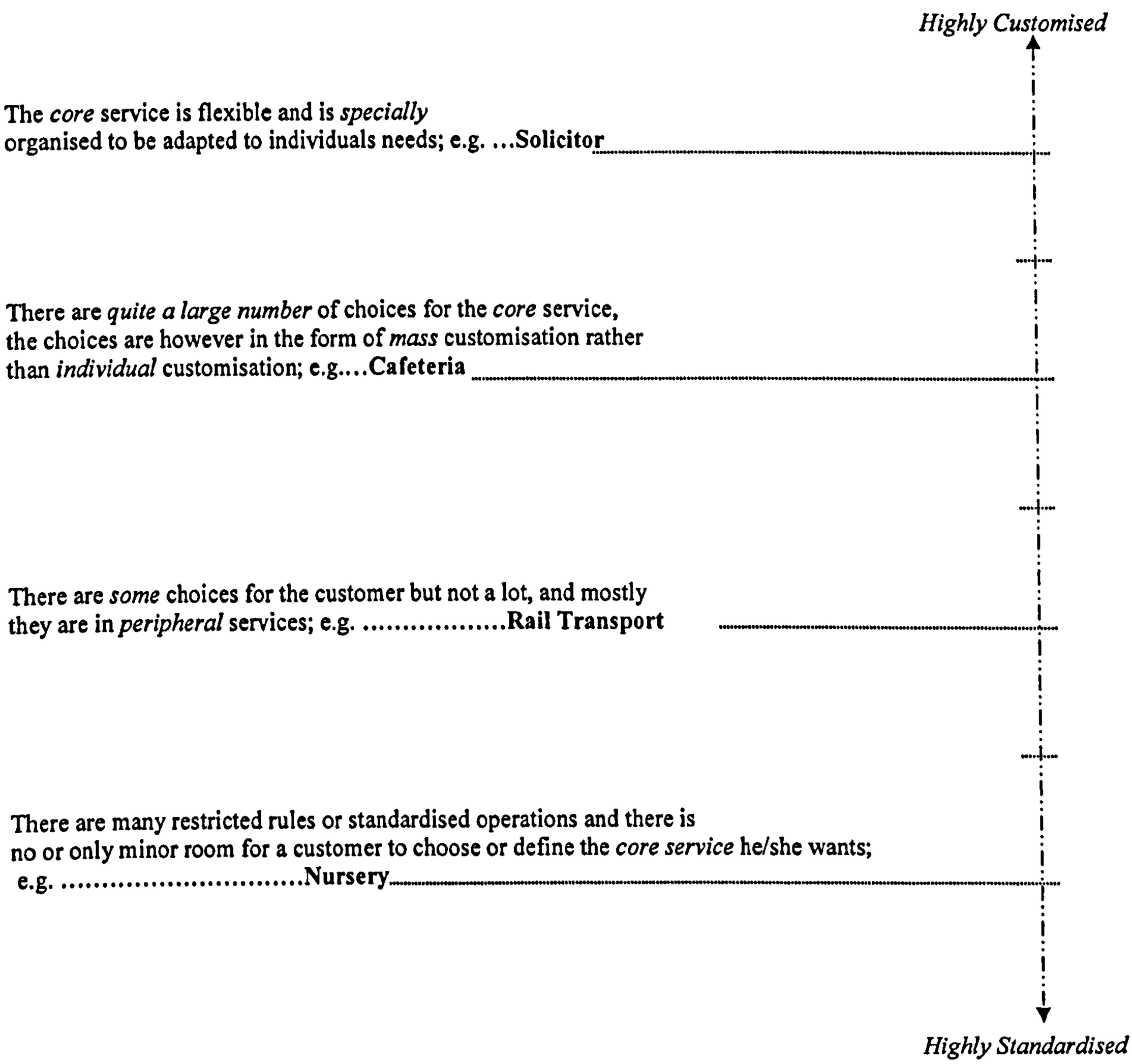
Low Degree of Customer Interaction

5-Degree of Customisation:

Definition:
"A very high degree of customisation is where the service process can be adapted to suit the needs of individual customers. A very low degree of customisation (highly standardised) is where there is a non-varying standardised process with little or no possibility for satisfying individual needs of customers."

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)



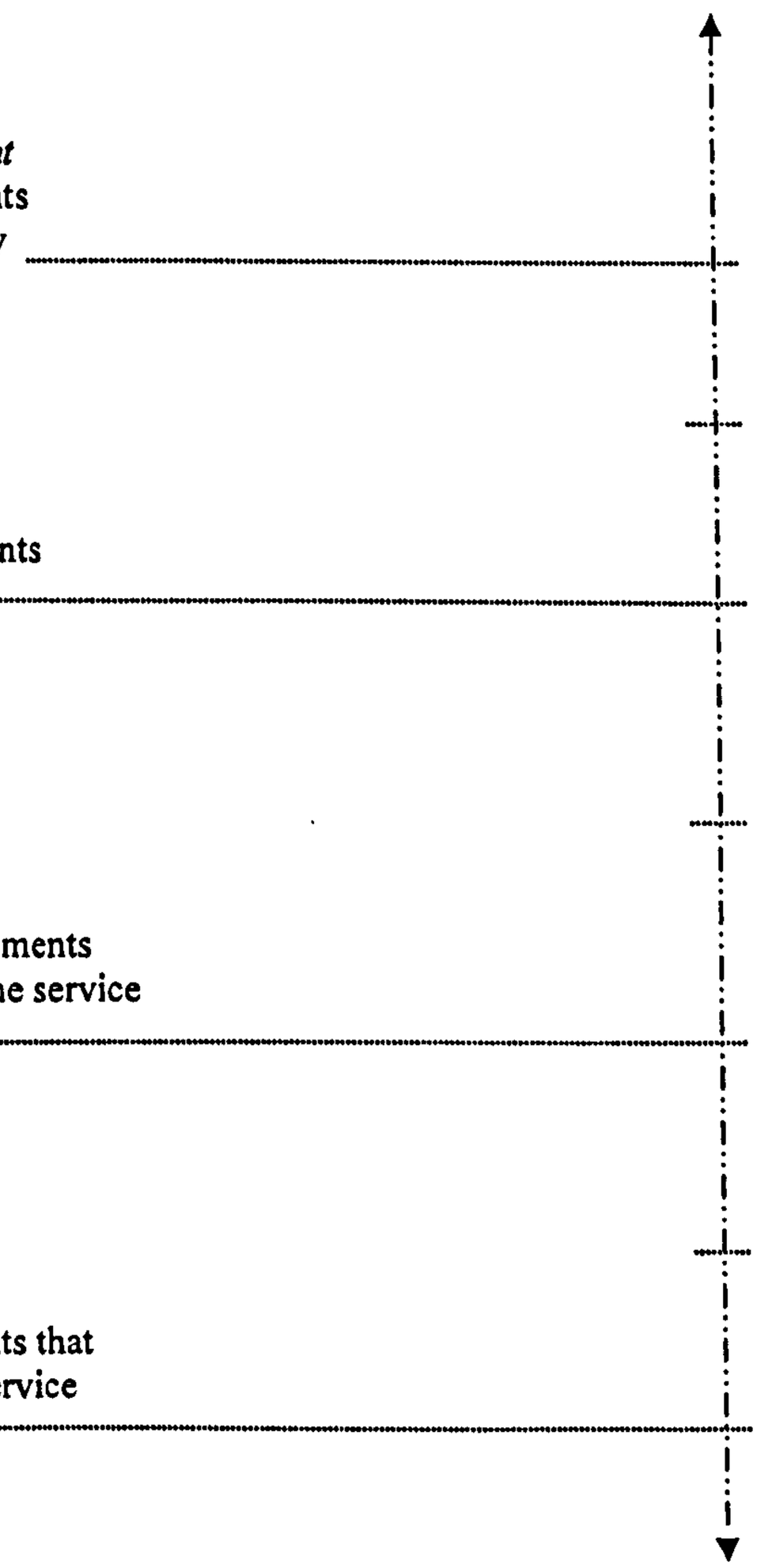
6-Degree of Personnel Judgement:

Definition:
"A very high degree of personnel judgement is where front office personnel can exercise judgement in altering the service package or process without referring to superiors. A very low degree of personnel judgement is where changes to service provision can be made only with authorisation from superiors."

- Please put the mark at the appropriate place on the scale. Also in case of any significant changes predicted in the next five years, please draw an arrow near your mark, directed up (to show moving towards the higher degree) or down (to show moving towards the lower degree). Please do not draw any arrows if no significant changes are expected.

(All the following explanations are based on the normal situation, average measures and the core service.)

High Degree of Personnel Judgement



Front office staff exercise a *very high number of important* personal judgements or a *few very vital* personal judgements during the service process; e.g **Management Consultancy**

Front office staff exercise *a moderately high number* of personal judgements or *a few important* personal judgements during the service process; e.g..... **Beautician**

Front office staff exercise *a low number* of personal judgements that could *considerably* alter the service package during the service process; e.g..... **Coach Service**

Front office staff exercise *minor or no* personal judgements that could *considerably* alter the service package during the service process; e.g. ..... **Museum**

Low Degree of Personnel Judgement

- Degree of Tangibility:

Definition:
"A very tangible service is where the service act is perceptible to touch and capable of being possessed. A very intangible service is where the service act is insubstantial and eludes the grasp of the mind."
- What position do you believe is the best description of the degree of Tangibility/Intangibility for each of the service industries, mentioned at the end of this page (Considering the position of the given examples)? **Please put the code of each of the services at the appropriate place in the scale below:**
(All the following explanations are based on the normal situation, average measures and the core service.)

High Degree of Intangibility

The service act is intangible and is mainly directed to the customer's mind or immaterial goods, there might be some tangible aspects of the service, directed to the customer's body or material goods;
e.g...... *Museum*

The service act is intangible and is mainly directed to the customer's mind or immaterial goods, however there are some tangible aspects of the service that significantly affect the customer's body or material goods.
e.g...... *Psychiatrist*

The service act is tangible and is mainly directed to the customer's body or material goods with some intangible aspects that significantly affects the customer's mind or immaterial goods; e.g...... *Beautician*

The service act is tangible and is completely directed to the customer's body or material goods with no significant effects that could be directed to the customer's mind or immaterial goods; e.g...... *Laundry*

Low Degree of Intangibility

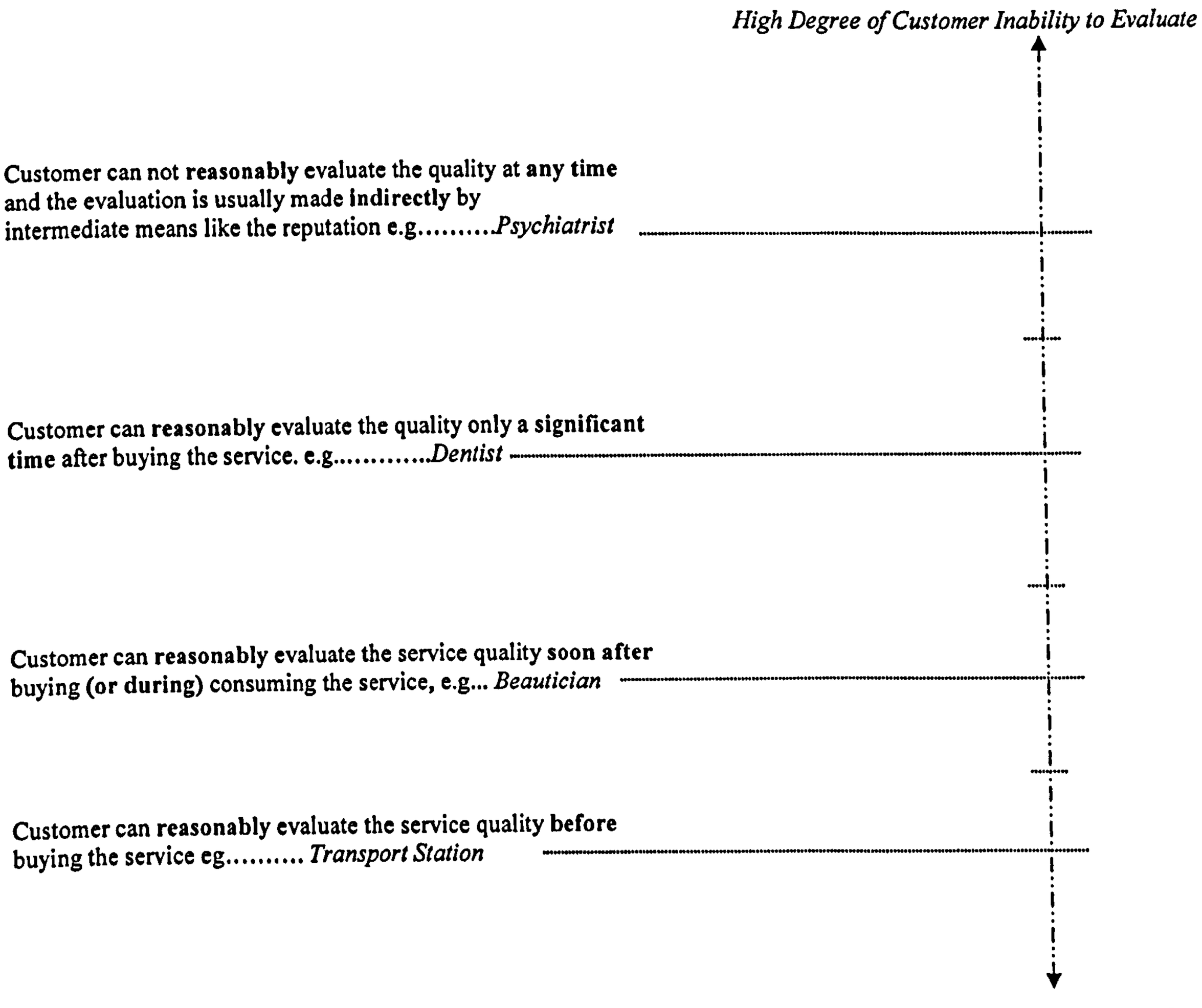
- Airlines **(An)**
- Banks **(Bn)**
- Car Repairing Services (e.g. Kwik Fit, National Tire) **(Rp)**
- Consultancy Services **(Cs)**
- Department Stores (e g. John Lewis, Littlewoods) **(Ds)**
- Fastfoods **(Ff)**
- Hospitals **(Sp)**
- Hotels (4 or 5 Star) **(Ht)**
- Legal Services **(Ls)**
- Life Insurance **(In)**
- Power Utilities (Supplying Business only) **(Pu)**
- Telecommunications **(Tl)**
- Universities (Customers are the students) **(Un)**

-Degree of Customer Inability to Evaluate the Service Quality:

Definition:
"A very high degree of customer inability to evaluate is where customer can not evaluate the service quality by him/her self, even after consuming the service. A very low degree of customer inability to evaluate is where customer can easily evaluate the service quality even before buying or consuming the service"

- What position do you believe is the best description of the degree of Customer's Ability to Evaluate the Service Quality for each of the service industries, mentioned at the end of this page (Considering the position of the given examples)? **Please put the code of each of the services at the appropriate place in the scale below:**

(All the following explanations are based on the normal situation, average measures and the core service.)



- Airlines (An)
- Banks (Bn)
- Car Repairing Services (e g. Kwik Fit, National Tire) (Rp)
- Consultancy Services (Cs)
- Department Stores (e.g. John Lewis, Littlewoods) (Ds)
- Fastfoods (Ff)
- Hospitals (Sp)
- Hotels (4 or 5 Star) (Ht)
- Legal Services (Ls)
- Life Insurance (In)
- Power Utilities (Supplying Business only) (Pu)
- Telecommunications (Tl)
- Universities (Customers are the students) (Un)

- Degree of Product/Process Focus:

Definition:
A high degree of product focus service is where the emphasis is on "what" service package the customer buys. A high degree of process focus service is where the emphasis is on "how" the service delivered to the customer.

- What position do you believe is the best description of the degree of product/process focus for each of the service industries, mentioned at the end of this page (Considering the position of the given examples)? (All the following explanations are based on the normal situation, average measures and the core service.)
Please put the code of each of the services at the appropriate place in the scale below:

High Degree of Process Focus

The quality of the service package per se could be a matter of concern, however to the customer, the quality of the service is mainly perceived **during the process** of providing the service as **how** the service is delivered from the beginning to the end. E.g.....*Airport*

Although to the customer the quality of the service is mainly perceived **during the process** of providing the service as ***how*** the service is delivered, there are **significant** perceptions about **what** service package is received **at the end (or a certain point)** of the process. E.g.....*Dentist*

To the customer the quality of the service is mainly perceived as **what service package** is received **at the end (or a certain point)** of the process, however there are **significant** perceptions about **how** the service is delivered during the process of providing the service. E.g. ..... *Restaurant*

How the service is delivered could be a matter of concern, however to the customer the quality of the service is mainly perceived as **what service package** is received **at the end (or a certain point) of the process of providing the service** E.g.....*Car rental*

Low Degree of Process Focus (Highly Product Focus)

- Airlines **(An)**
- Banks **(Bn)**
- Car Repairing Services (e.g. Kwik Fit, National Tire) **(Rp)**
- Consultancy Services **(Cs)**
- Department Stores (e.g. John Lewis, Littlewoods) **(Ds)**
- Fastfoods **(Ff)**
- Hospitals **(Sp)**
- Hotels (4 or 5 Star) **(Ht)**
- Legal Services **(Ls)**
- Life Insurance **(In)**
- Power Utilities (Supplying Business only) **(Pu)**
- Telecommunications **(Tl)**
- Universities (Customers are the students) **(Un)**

Appendix 5.1

Service Dimensions' Measurements

Externally Measured Service Dimensions

	Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Customisation	Personal Judgement
Al1	7	11	11	7	9	9
Al2	9	7	13	5	7	9
Al (Median)	**8**	**9**	**12**	**6**	**8**	**9**
Bn1	7	6	9	8	10	6
Bn2	11	5	7	9	10	8
Bn (Median)	**9**	**5.5**	**8**	**8.5**	**10**	**7**
Cs1	13	11	11	7	15	15
Cs2	13	13	11	11	13	13
Cs (Median)	**13**	**12**	**11**	**9**	**14**	**14**
Ds1	11	8	15	3	10	3
Ds2	9	8	13	7	10	5
Ds (Median)	**10**	**8**	**14**	**5**	**10**	**4**
Ff	**10**	**7**	**15**	**5**	**9**	**2**
Ht1	13	11	15	7	13	11
Ht2	13	13	15	7	11	11
Ht (Median)	**13**	**12**	**15**	**7**	**12**	**11**
In1	9	8	3	4	4	10
In2	13	9	5	5	7	6
In (Median)	**11**	**8.5**	**4**	**4.5**	**5.5**	**8**
Lg1	14	9	6	8	2	14
Lg2	15	11	2	8	4	15
Lg (Median)	**14.5**	**10**	**4**	**8**	**3**	**14.5**
Pu1	3	3	3	4	2	2
Pu2	5	3	3	3	3	3
Pu (Median)	**4**	**3**	**3**	**3.5**	**2.5**	**2.5**
Rp	**8**	**6**	**14**	**6**	**6**	**12**
Tl1	15	7	2	5	9	5
Tl2	12	6	2	6	8	6
Tl (Median)	**13.5**	**6.5**	**2**	**5.5**	**8.5**	**5.5**
Un1	9	11	10	11	11	7
Un2	12	11	14	9	11	8
Un (Median)	**10.5**	**11**	**12**	**10**	**11**	**7.5**

Internally measured service dimensions

Intangibility	Expert1	Expert2	Expert3	Expert4	Expert5	Expert6	Expert7	Median
Al	3	4	5	6	4	10	8	5
Bn	7	7	10	9	13	11	13	10
Cs	15	10	14	14	14	10	10	14
Ds	3	4	4	3	2	4	3	3
Ff	4	2	2	3	3	4	4	3
Ht		7	8	6	9	8	7	7.5
In	14	10	12	12	15	11	15	12
Lg	14	10	14	12	14	12	13	13
Pu	5	2	2	3	5	2	5	3
Rp	7	2	5	3	2	3	4	3
Tl	14	10	14	9	12	13	12	12
Un	15	12	12	14	9	15	15	14
Customer's Inability in Evaluation	Expert1	Expert2	Expert3	Expert4	Expert5	Expert6	Expert7	Median
Al	1	6	6	1	11	8	7	6
Bn	9	7	7	10	13	11	11	10
Cs	9	12	10	8	12	12	10	10
Ds	1	4	4	1	8	3	1	3
Ff	1	6	2	1	3	1	5	2
Ht	1	4	5	1	6	2	6	4
In	15	12	10	10	15	9	1	10
Lg	13	14	10	10	10	11	10	10
Pu	7	2	5	6	7	1		5.5
Rp	1	9	9	1		7	5	6
Tl	13	4	5	6	4	1	6	5
Un	15	14	10	8	15	11	15	14
Process Focus	Expert1	Expert2	Expert3	Expert4	Expert5	Expert6	Expert7	Median
Al	13	8	7	10	8	15	15	10
Bn	7	7	6	6	10	10	5	7
Cs	13	8	10	12	6	11	9	10
Ds	3	2	5	3	4	5	5	4
Ff	3	2	2	3	8	3	2	3
Ht	9	10	11	8	6	9	15	9
In	15	2	6	2	2	3	2	2
Lg	15	8	10	8	4	9	9	9
Pu	9	2	3	2	2	7	3	3
Rp	7	2	6	2	10	3	1	3
Tl	9	4	3	5	2	7	3	4
Un	8	14	10	12	4	7	13	10

Appendix 5.2

Service Dimensions' Measurements (Descriptive Analysis)

Descriptive analysis: Service Dimensions Measurements

			Service Industry	Value
Labour Intensity	Highest	1	Lg	15
		2	Tl	14
		3	Ht - Cs	13
	Lowest	1	PU	4
		2	Al - Rp	8
		3	Bn	9
Front Value Added	Highest	1	Ht - Cs	12
		2	Un	11
		3	Lg	10
	Lowest	1	PU	3
		2	Bn - Rp	6
		3	Tl - Ff	7
Customer Contact	Highest	1	Ht - Ff	15
		2	Rp - Ds	14
		3	Al - Un	12
	Lowest	1	Tl	2
		2	PU	3
		3	Lg - In	4
Customer Interaction	Highest	1	Un	10
		2	Cs - Bn	9
		3	Lg	8
	Lowest	1	PU	4
		2	In – Ff - Ds	5
		3	Tl	6
Customisation	Highest	1	Cs	14
		2	Ht	12
		3	Un	11
	Lowest	1	PU - Lg	3
		2	In - Rp	6
		3	Al	8

			Service Industry	Value
Personnel Judgement	Highest	1	Lg	15
		2	Cs	14
		3	Rp	12
	Lowest	1	Ff	2
		2	PU	3
		3	Ds	4
Intangibility	Highest	1	Un - Cs	14
		2	Lg	13
		3	Tl - In	12
	Lowest	1	Ff – Ds – Pu - Rp	3
		2	Al	5
		3	Ht	7.5
Customer Inability to Evaluate	Highest	1	Un	14
		2	Cs – Lg – In - Bn	10
		3	Al - Rp	6.5
	Lowest	1	Ff	2
		2	Ds	3
		3	Ht	4
Process Focus	Highest	1	Un – Cs - Al	10
		2	Lg - Ht	9
		3	Bn	7
	Lowest	1	In	2
		2	Rp – Ff - Pu	3
		3	Tl - Ds	4

		Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Custom.	Person. Judg.	Intangibility	Customer Inability to Evaluate	Process Focus
Median		10.250	8.250	11.500	6.000	8.750	7.750	8.750	6.000	5.500
Range		10.5	9.0	13.0	6.5	11.5	12.5	11.0	12.0	8.0
Minimum		4.0	3.0	2.0	3.5	2.5	2.0	3.0	2.0	2.0
Maximum		14.5	12.0	15.0	10.0	14.0	14.5	14.0	14.0	10.0
Percentiles	25	8.250	6.125	4.000	5.000	5.625	4.375	3.000	4.250	3.000
	50	10.250	8.250	11.500	6.000	8.750	7.750	8.750	6.000	5.500
	75	13.000	10.750	14.000	8.375	10.750	11.750	12.750	10.000	9.750
Percentage Below the Average		8	42	33	67	33	50	50	58	58
Percentage Above the Average		75	50	58	25	58	42	50	42	42

Appendix 5.3

A brief on Spearman's Rho and Kendall's Tau

A brief on Spearman's Rho and Kendall's Tau

Spearman's Rho can be thought of as the regular Pearson Product Moment Correlation Coefficient except that instead of the actual observations, ranks of the observations are used. The measure of correlation is simply Pearson's *r* computed on the ranks and average ranks (Conover, 1999; McGhee, 1985; Walsh 1990).

Kendall's Tau is another popular rank correlation test. Conover explains that the chief advantage of Kendall's Tau is that its distribution approaches the normal distribution quite rapidly so that the normal approximation is better for Kendall's Tau than it is for Spearman's *p*, when the null hypothesis of independence between X and Y is true. In simple words this means we can trust Kendall's Tau better as compared to Spearman's *p* as it is more conservative in indicating a significant association in between two sets of data. Conover also argues that another advantage of Kendall's Tau is its direct and simple interpretation in terms of probabilities of observing concordant and discordant pairs. Conover however rejects to directly prefer either of the two techniques to the other one as he states that the two tests in most situations produce nearly identical results, with Spearman's *p* tending to be larger than Kendall's Tau. He further argues that there is no strong reason to prefer one to the other (Conover, 1999). However when it comes to the size and the structure of data, the popular view is that Tau is preferred over the Spearmn's *r* where the size of the data is small and there are a large number of tied ranks (Field, 2000; Walsh 1990)*. Field also puts forward the argument made by Howell (1997) that although Spearman's statistic is the more popular of the two coefficients, there is much to suggest that Kendall's statistic is actually a better estimate of the correlation in the population. He concludes that we can draw more accurate generalizations from Kendall's statistic than from Spearman's (Field, 2000).

* For the definition of Concordance and Discordance and explanation of Ties, refer to Conover (1999), page 319.

Appendix 5.4

Correlation Analysis: Service Dimensions

Pearson Correlation Sig. (2-tailed)	Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Customis.	Pers. Jud.	Intang.	Cust. Inab. Ev.	Process Focus
Labour Intensity	1	.708(*)	-.048	.464	.371	.522	.678(*)	.192	.376
	.	.010	.883	.129	.236	.082	.015	.549	.229
Front Value Added	.708(*)	1	.375	.624(*)	.580(*)	.626(*)	.542	.339	.724(**)
	.010	.	.230	.030	.048	.029	.069	.281	.008
Customer Contact	-.048	.375	1	.213	.591(*)	.060	-.421	-.300	.233
	.883	.230	.	.507	.043	.852	.173	.343	.467
Customer Interaction	.464	.624(*)	.213	1	.539	.585(*)	.672(*)	.706(*)	.806(**)
	.129	.030	.507	.	.071	.046	.017	.010	.002
Customisation	.371	.580(*)	.591(*)	.539	1	.116	.247	.045	.468
	.236	.048	.043	.071	.	.720	.439	.888	.125
Personal Judgement	.522	.626(*)	.060	.585(*)	.116	1	.491	.457	.588(*)
	.082	.029	.852	.046	.720	.	.105	.135	.044
Intangibility	.678(*)	.542	-.421	.672(*)	.247	.491	1	.789(**)	.486
	.015	.069	.173	.017	.439	.105	.	.002	.109
Customer Inability to Evaluate	.192	.339	-.300	.706(*)	.045	.457	.789(**)	1	.472
	.549	.281	.343	.010	.888	.135	.002	.	.121
Process Focus	.376	.724(**)	.233	.806(**)	.468	.588(*)	.486	.472	1
	.229	.008	.467	.002	.125	.044	.109	.121	.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Spearman's Correlation Sig. (2-tailed)		Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Customis.	Pers. Jud.	Intang.	Cus. Inab. Ev.aluate the Quality	Process Focus
Labour Intensity		1.000	.609(*)	-.193	.342	.269	.408	.704(*)	.156	.276
		.	.036	.548	.276	.397	.188	.011	.628	.386
Front Value Added		.609(*)	1.000	.312	.545	.537	.595(*)	.603(*)	.266	.676(*)
		.036	.	.323	.067	.072	.041	.038	.403	.016
Customer Contact		-.193	.312	1.000	.145	.503	.014	-.401	-.406	.120
		.548	.323	.	.653	.096	.965	.196	.191	.710
Customer Interaction		.342	.545	.145	1.000	.603(*)	.582(*)	.672(*)	.608(*)	.813(**)
		.276	.067	.653	.	.038	.047	.017	.036	.001
Customisation		.269	.537	.503	.603(*)	1.000	.070	.317	-.002	.562
		.397	.072	.096	.038	.	.829	.316	.996	.057
Personal Judgement		.408	.595(*)	.014	.582(*)	.070	1.000	.507	.531	.470
		.188	.041	.965	.047	.829	.	.092	.075	.123
Intangibility		.704(*)	.603(*)	-.401	.672(*)	.317	.507	1.000	.752(**)	.564
		.011	.038	.196	.017	.316	.092	.	.005	.056
Customer Inability to Evaluate the Quality		.156	.266	-.406	.608(*)	-.002	.531	.752(**)	1.000	.390
		.628	.403	.191	.036	.996	.075	.005	.	.210
Process Focus		.276	.676(*)	.120	.813(**)	.562	.470	.564	.390	1.000
		.386	.016	.710	.001	.057	.123	.056	.210	.

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

Kendall's tau_ Correlation Sig. (2-tailed)		Labour Intensity	Front Value Added	Customer Contact	Customer Interaction	Customis.	Pers. Jud.	Intang.	Cus. Inab. Ev.	Process Focus
	Labour Intensity	1.000	.484(*)	-.144	.236	.250	.326	.529(*)	.148	.182
		.	.032	.530	.298	.268	.147	.023	.525	.437
	Front Value Added	.484(*)	1.000	.205	.357	.400	.443(*)	.505(*)	.194	.472(*)
		.032	.	.367	.112	.073	.046	.029	.399	.042
	Customer Contact	-.144	.205	1.000	.127	.362	.000	-.283	-.265	.083
		.530	.367	.	.578	.111	1.000	.228	.257	.724
	Customer Interaction	.236	.357	.127	1.000	.419	.462(*)	.574(*)	.521(*)	.657(**)
		.298	.112	.578	.	.062	.039	.013	.024	.005
	Customisation	.250	.400	.362	.419	1.000	.076	.212	-.032	.472(*)
		.268	.073	.111	.062	.	.731	.359	.888	.042
	Personal Judgement	.326	.443(*)	.000	.462(*)	.076	1.000	.356	.401	.388
		.147	.046	1.000	.039	.731	.	.122	.079	.092
	Intangibility	.529(*)	.505(*)	-.283	.574(*)	.212	.356	1.000	.633(**)	.448
		.023	.029	.228	.013	.359	.122	.	.008	.062
	Customer Inability to Evaluate the Quality	.148	.194	-.265	.521(*)	-.032	.401	.633(**)	1.000	.291
		.525	.399	.257	.024	.888	.079	.008	.	.223
	Process Focus	.182	.472(*)	.083	.657(**)	.472(*)	.388	.448	.291	1.000
		.437	.042	.724	.005	.042	.092	.062	.223	.

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed).

Appendix 5.5

Difference of Services in Terms of Service Dimensions

Total differences of services in terms of service dimensions

Comparison		LI	FV	CC	CI	CUS	PJ	INT	CIV	PFC	Total
Ds	Ff	0	1	1	0	1	2	0	1	1	7
Al	Rp	0	3	2	0	2	3	2	0	7	19
Cs	Un	2.5	1	1	1	3	6.5	0	4	0	19
In	Tl	2.5	2	2	1	3	2.5	0	5	2	20
Ds	Rp	2	2	0	1	4	8	0	3	1	21
Ff	Rp	2	1	1	1	3	10	0	4	0	22
Al	Ht	5	3	3	1	4	2	2.5	2	1	23.5
Al	Ds	2	1	2	1	2	5	2	3	6	24
Cs	Ht	0	0	4	2	2	3	6.5	6	1	24.5
Bn	Un	1.5	5.5	4	2	1	0.5	4	4	3	25
Cs	Lg	1.5	2	7	1	11	0.5	1	0	1	25
Bn	In	2	3	4	4	4.5	1	2	0	5	25.5
In	Lg	3.5	1.5	0	4	2.5	6.5	1	0	7	25.5
Al	Bn	1	3.5	4	3	2	2	5	4	3	27
Bn	Tl	4.5	1	6	3	1.5	1.5	2	5	3	27.5
Al	Ff	2	2	3	1	1	7	2	4	7	29
Ds	Ht	3	4	1	2	2	7	4.5	1	5	29.5
Al	Un	2.5	2	0	4	3	1.5	9	8	0	30
Ds	Tl	3.5	1.5	12	1	1.5	1.5	9	2	0	31.5
Ht	Un	2.5	1	3	3	1	3.5	6.5	10	1	31.5
Bn	Cs	4	6.5	3	1	4	7	4	0	3	32
Ht	Rp	5	6	1	1	6	1	4.5	2	6	32.5
Bn	Ds	1	2.5	6	4	0	3	7	7	3	33
Bn	Lg	5.5	4.5	4	1	7	7.5	3	0	2	34
Bn	Rp	1	0.5	6	3	4	5	7	4	4	34
Ff	PU	6	4	12	2	6.5	0.5	0	3.5	0	34
PU	Rp	4	3	11	3	3.5	9.5	0	0.5	0	34
Ff	Ht	3	5	0	2	3	9	4.5	2	6	34.5
Ff	Tl	3.5	0.5	13	1	0.5	3.5	9	3	1	34.5
Lg	Tl	1	3.5	2	3	5.5	9	1	5	5	34.5
Al	In	3	0.5	8	2	2.5	1	7	4	8	35.5
Bn	Ht	4	6.5	7	2	2	4	2.5	6	2	35.5
In	Rp	3	2.5	10	2	0.5	4	9	4	1	35.5
PU	Tl	9.5	3.5	1	2	6	3	9	0.5	1	35.5
Al	Cs	5	3	1	3	6	5	9	4	0	36
Ds	PU	6	5	11	2	7.5	1.5	0	2.5	1	36
Lg	Un	4	1	8	2	8	7	1	4	1	36
Al	Tl	5.5	2.5	10	1	0.5	3.5	7	1	6	36.5
In	Un	0.5	2.5	8	6	5.5	0.5	2	4	8	36.5
In	PU	7	5.5	1	1	3	5.5	9	4.5	1	37.5
Bn	Ff	1	1.5	7	4	1	5	7	8	4	38
Ds	In	1	0.5	10	1	4.5	4	9	7	2	38.5
Rp	Tl	5.5	0.5	12	1	2.5	6.5	9	1	1	38.5
Ht	Lg	1.5	2	11	1	9	3.5	5.5	6	0	39.5
Ht	Tl	0.5	5.5	13	2	3.5	5.5	4.5	1	5	40
Al	Lg	6.5	1	8	2	5	5.5	8	4	1	41
Cs	In	2	3.5	7	5	8.5	6	2	0	8	41.5
Ff	In	1	1.5	11	1	3.5	6	9	8	1	41.5

Al	PU	4	6	9	3	5.5	6.5	2	0.5	7	43
Ds	Un	0.5	3	2	5	1	3.5	11	11	6	43
Tl	Un	3	4.5	10	5	2.5	2	2	9	6	43.5
Bn	PU	5	2.5	5	5	7.5	4.5	7	4.5	4	45
Cs	Tl	0.5	5.5	9	4	5.5	8.5	2	5	6	45.5
Ht	In	2	3.5	11	3	6.5	3	4.5	6	7	46
Lg	Rp	6.5	4	10	2	3	2.5	10	4	6	48
Cs	Rp	5	6	3	3	8	2	11	4	7	49
Rp	Un	2.5	5	2	4	5	4.5	11	8	7	49
Ff	Un	0.5	4	3	5	2	5.5	11	12	7	50
Cs	Ds	3	4	3	4	4	10	11	7	6	52
Lg	PU	10.5	7	1	5	0.5	12	10	4.5	6	56
Cs	Ff	3	5	4	4	5	12	11	8	7	59
Ds	Lg	4.5	2	10	3	7	11	10	7	5	59
Ht	PU	9	9	12	4	9.5	8.5	4.5	1.5	6	63.5
Ff	Lg	4.5	3	11	3	6	13	10	8	6	64
PU	Un	6.5	8	9	7	8.5	5	11	8.5	7	70
Cs	PU	9	9	8	6	11.5	12	11	4.5	7	77

Appendix 5.6

Measurements of the Productivity Aspects' Subjects for Services

Ranking of the PAs by the experts in each service sector

Expert's Response	PQ-P	PQ- Q	TRDOF	PLC-Vl	PLC-Q	PLC-Ct	FCT-In	FCT-Pr	FCT-Ot	FCT-Fb	FCT-Cus	PRB-Tc	PRB-Mt	PRB-Pp	PRB-Cl
Al1	0	2	2	2	0	2	2	1	1	0	0	2	0	1	0
Al2	0	2	2	1	0	2	1	2	1	0	0	0	0	2	1
Democ.	0	2	2	1.5	0	2	1.5	1.5	1	0	0	1	0	1.5	0.5
Conserv.	0	2	2	1	0	2	1	1	1	0	0	0	0	1	0
Bn1	0	2	1	2	0	2	1	2	0	1	0	1	1	2	2
Bn2	0	2	1	2	1	2	2	1	0	0	0	0	1	2	2
Democ.	0	2	1	2	0.5	2	1.5	1.5	0	0.5	0	0.5	1	2	2
Conserv.	0	2	1	2	0	2	1	1	0	0	0	0	1	2	2
Cs1	0	2	1	0	0	2	2	1	0	0	0	1	1	2	0
Cs2	0	2	1	0	0	2	2	2	0	0	0	1	2	2	0
Democ.	0	2	1	0	0	2	2	1	0	0	0	1	1	2	0
Conserv.	0	2	1	0	0	2	2	1	0	0	0	1	1	2	0
Ds1	2	0	2	0	2	2	0	2	2	1	0	2	1	2	1
Ds2	2	0	2	0	1	2	2	0	2	1	0	2	1	2	1
Democ.	2	0	2	0	1.5	2	1	1	2	1	0	2	1	2	1
Conserv.	2	0	2	0	1	2	0	0	2	1	0	2	1	2	1
Ff1	2	0	1	2	0	1	1	1	0	2	1	0	1	2	2
Ff2	2	0	1	2	0	1	1	1	0	1	2	1	2	2	2
Democ.	2	0	1	2	0	1	1	1	0	1.5	1.5	0.5	1.5	2	2
Conserv.	2	0	1	2	0	1	1	1	0	1	1	0	1	2	2
Ht1	2	0	2	2	0	1	2	0	0	2	2	0	1	2	0
Ht2	2	0	2	2	0	1	2	0	0	1	0	0	2	2	1
Democ.	2	0	2	2	0	1	2	0	0	1.5	1	0	1.5	2	0.5
Conserv.	2	0	2	2	0	1	2	0	0	1	0	0	1	2	0
In1	0	2	2	0	2	0	1	2	1	0	0	2	2	1	1
In2	0	2	1	0	2	1	2	2	1	0	0	1	2	1	2
Democ.	0	2	1.5	0	2	0.5	1.5	2	1	0	0	1.5	2	1	1.5
Conserv.	0	2	1	0	2	0	1	2	1	0	0	1	2	1	1
Lg1	0	2	2	2	0	0	2	2	0	0	0	0	2	2	0
Lg2	0	2	2	2	0	0	2	2	2	0	1	0	2	1	0
Democ.	0	2	2	2	0	0	2	2	1	0	0.5	0	2	1.5	0
Conserv.	0	2	2	2	0	0	2	2	0	0	0	0	2	1	0
Pu1	2	0	1	2	1	0	2	1	2	1	0	0	2	1	2
Pu2	2	0	1	2	2	1	1	2	1	0	0	0	2	1	1
Democ.	2	0	1	2	1.5	0.5	1.5	1.5	1.5	0.5	0	0	2	1	1.5
Conserv.	2	0	1	2	1	0	1	1	1	0	0	0	2	1	1
Rp1	0	2	2	2	0	1	2	2	1	1	0	0	1	2	1
Tl1	0	2	1	1	0	2	2	1	0	1	0	1	2	1	0
Tl2	0	2	1	2	1	2	1	1	1	2	2	1	2	1	1
Democ.	0	2	1	1.5	0.5	2	1.5	1	0.5	1.5	1	1	2	1	0.5
Conserv.	0	2	1	1	0	2	1	1	0	1	0	1	2	1	0
Un1	0	2	3	1	0	2	2	1	2	0	1	1	1	2	0
Un2	0	2	3	1	0	2	1	2	2	0	1	0	2	2	1
Democ.	0	2	3	1	0	2	1.5	1.5	2	0	1	0.5	1.5	2	0.5
Conserv.	0	2	3	1	0	2	1	1	2	0	1	0	1	2	0

Expert's Response	APP-Tc	APP-Pp	APP-Sr	APP-Tk	APP-Cp	APP-Cus	MES-In	MES-Ot	MES-Rl	MES-Fc	MES-Int
Al1	2	1	1	1	1	1	0	2	1	0	2
Al2	2	2	2	2	2	2	0	0	0	0	2
Democ.	2	1.5	1.5	1.5	1.5	1.5	0	1	0.5	0	2
Conserv.	2	1	1	1	1	1	0	0	0	0	2
Bn1	2	1	0	1	0	0	0	0	2	0	0
Bn2	2	1	0	1	0	0	1	2	2	1	0
Democ.	2	1	0	1	0	0	0.5	1	2	0.5	0
Conserv.	2	1	0	1	0	0	0	0	2	0	0
Cs1	1	2	0	0	0	1	0	2	0	0	1
Cs2	1	2	0	2	1	0	2	2	2	0	2
Democ.	1	2	0	0	0	0	0	2	0	0	1
Conserv.	1	2	0	0	0	0	0	2	0	0	1
Ds1	2	1	0	1	0	1	0	0	2	1	0
Ds2	2	1	0	2	0	1	0	0	2	1	0
Democ.	2	1	0	1.5	0	1	0	0	2	1	0
Conserv.	2	1	0	1	0	1	0	0	2	1	0
Ff1	2	1	1	0	0	0	0	0	2	0	0
Ff2	2	1	1	0	0	0	0	0	2	0	0
Democ.	2	1	1	0	0	0	0	0	2	0	0
Conserv.	2	1	1	0	0	0	0	0	2	0	0
Ht1	2	2	0	0	2	0	2	2	0	0	2
Ht2	1	2	0	0	2	0	2	2	1	0	1
Democ.	1.5	2	0	0	2	0	2	2	0.5	0	1.5
Conserv.	1	2	0	0	2	0	2	2	0	0	1
In1	1	1	2	0	0	1	2	0	2	0	2
In2	1	0	2	2	0	1	0	0	0	0	2
Democ.	1	0.5	2	1	0	1	1	0	1	0	2
Conserv.	1	0	2	0	0	1	0	0	0	0	2
Lg1	0	2	2	1	0	1	0	1	0	1	2
Lg2	0	1	2	1	0	0	0	0	0	2	2
Democ.	0	1.5	2	1	0	0.5	0	0.5	0	1.5	2
Conserv.	0	1	2	1	0	0	0	0	0	1	2
Pu1	2	1	2	1	0	0	0	0	1	0	2
Pu2	2	2	2	2	0	0	0	0	2	0	1
Democ.	2	1.5	2	1.5	0	0	0	0	1.5	0	1.5
Conserv.	2	1	2	1	0	0	0	0	1	0	1
Rp1	0	1	2	0	0	1	0	0	2	0	0
Tl1	2	1	1	1	0	0	0	2	2	0	0
Tl2	2	1	0	1	0	0	0	1	2	0	0
Democ.	2	1	0.5	1	0	0	0	1.5	2	0	0
Conserv.	2	1	0	1	0	0	0	1	2	0	0
Un1	0	2	2	2	1	1	2	0	1	2	0
Un2	0	2	1	1	2	2	1	0	2	0	2
Democ.	0	2	1.5	1.5	1.5	1.5	1.5	0	1.5	1	1
Conserv.	0	2	1	1	1	1	1	0	1	0	0

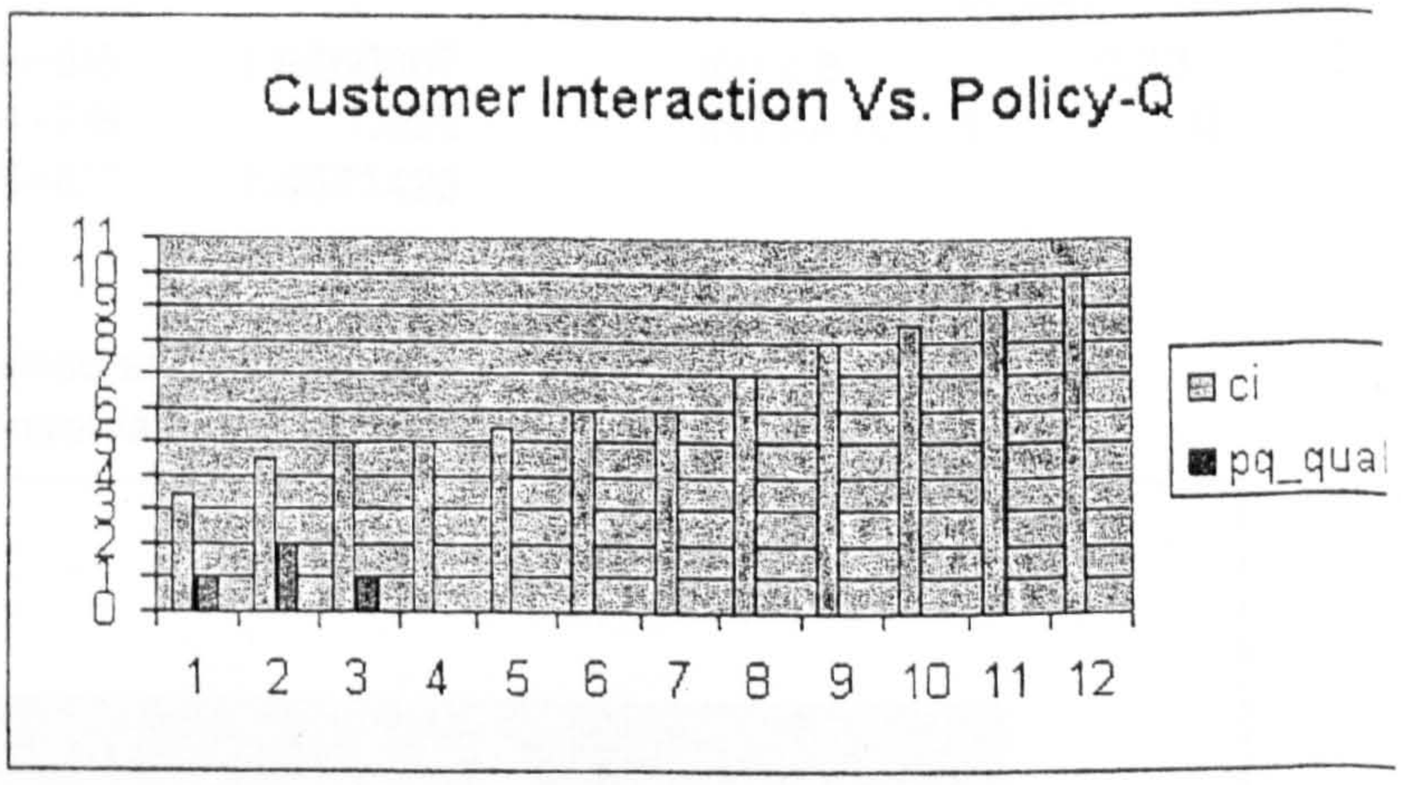
Expert's Response	QGP-1	QGP-2	QGP-3	QGP-4	QCT-pv	QCT-app	QCT-int	QCT-ext
Al1	1	1	2	1	0	0	1	2
Al2	2	0	1	0	0	0	1	2
Democ.	1.5	0.5	1.5	0.5	0	0	1	2
Conserv.	1	0	1	0	0	0	1	2
Bn1	2	1	1	2	2	0	1	2
Bn2	2	0	2	2	1	0	0	2
Democ.	2	0.5	1.5	2	1.5	0	0.5	2
Conserv.	2	0	1	2	1	0	0	2
Cs1	2	2	0	0	0	0	2	1
Cs2	2	2	1	0	0	0	1	2
Democ.	2	2	0	0	0	0	1	1
Conserv.	2	2	0	0	0	0	1	1
Ds1	2	0	0	1	1	0	1	2
Ds2	2	2	1	1	2	0	0	1
Democ.	2	1	0.5	1	1.5	0	0.5	1.5
Conserv.	2	0	0	1	1	0	0	1
Ff1	1	0	0	2	2	0	2	0
Ff2	0	0	0	2	2	2	0	1
Democ.	0.5	0	0	2	2	1	1	0.5
Conserv.	0	0	0	2	2	0	0	0
Ht1	2	2	2	0	2	2	1	1
Ht2	2	0	1	0	2	1	0	0
Democ.	2	1	1.5	0	2	1.5	0.5	0.5
Conserv.	2	0	1	0	2	1	0	0
In1	2	2	2	0	2	2	0	2
In2	2	0	0	0	2	2	0	0
Democ.	2	1	1	0	2	2	0	1
Conserv.	2	0	0	0	2	2	0	0
Lg1	0	0	2	0	0	0	1	2
Lg2	0	0	1	0	0	0	2	2
Democ.	0	0	1.5	0	0	0	1.5	2
Conserv.	0	0	1	0	0	0	1	2
Pu1	2	0	2	2	2	1	1	0
Pu2	1	0	2	1	2	2	1	1
Democ.	1.5	0	2	1.5	2	1.5	1	0.5
Conserv.	1	0	2	1	2	1	1	0
Rp1	0	0	0	2	2	2	0	1
Tl1	0	1	0	2	1	0	2	0
Tl2	2	0	0	2	2	0	2	0
Democ.	1	0.5	0	2	1.5	0	2	0
Conserv.	0	0	0	2	1	0	2	0
Un1	0	2	1	1	2	2	1	0
Un2	0	0	0	1	2	0	2	0
Democ.	0	1	0.5	1	2	1	1.5	0
Conserv.	0	0	0	1	2	0	1	0

Appendix 5.7

Calculations for Exploring the Borderlines for the Service Dimensions

democrat: -534, .029
conservative:-604, .017

ci	pq_qual
3.5	1
4.5	2
5	1
5	0
5.5	0
6	0
6	0
7	0
8	0
8.5	0
9	0
10	0

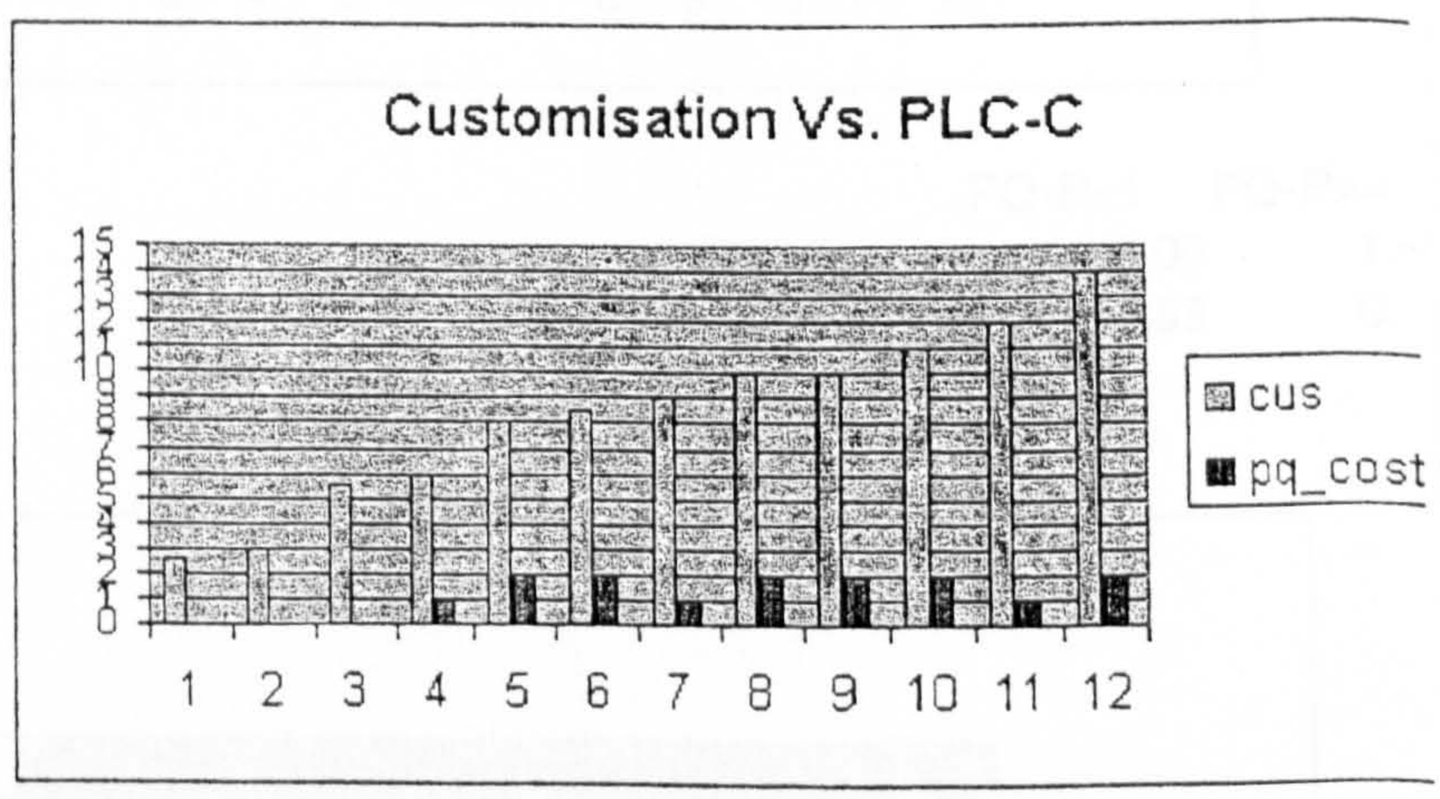


High: >=5 (9/12)/(10/12)=9/10
Low: <5 (2/12)/(2/12)=1

	PLC-Q<1	PLC-Q>
CI<5	0.00	1.
CI>=5	0.90	0.

democrat: .561, .020
conserv: 573, .020

cus	pq_cost
2.5	0
3	0
5.5	0
6	1
8	2
8.5	2
9	1
10	2
10	2
11	2
12	1
14	2

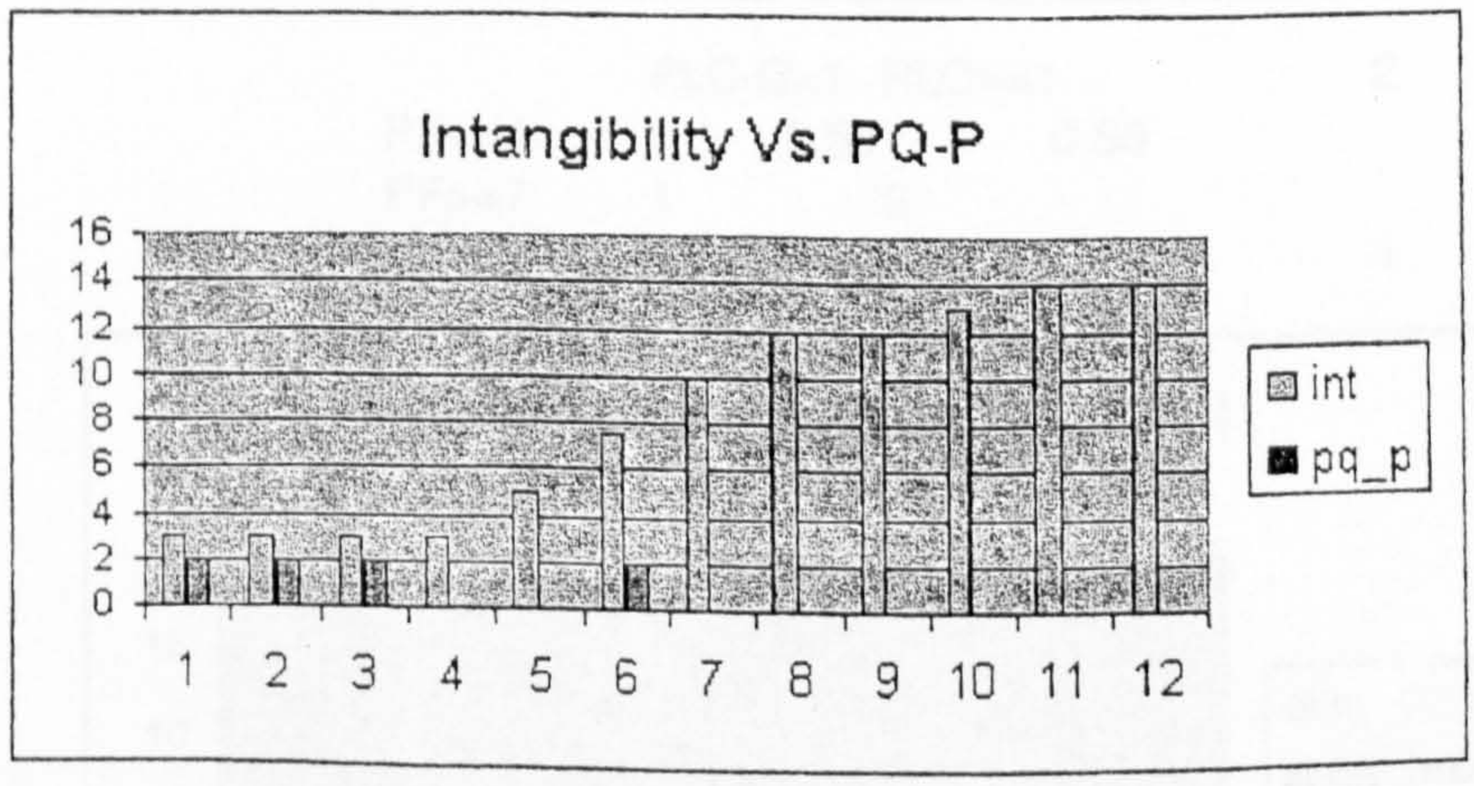


High: >=6 (9/12)/(9/12)=1
Low: <6 (3/12)/(3/12)=1

	PLC-C <1	PLC-C ≥
CUS<6	1	
CUS>=6	0	

democratic:- 0.580 , 0.030
conservative:- 0.580 , 0.030

int	pq_p
Ds 3	2
Ff 3	2
PU 3	2
Rp 3	0
Al 5	0
Ht 7.5	2
Bn 10	0
In 12	0
Tl 12	0
Lg 13	0

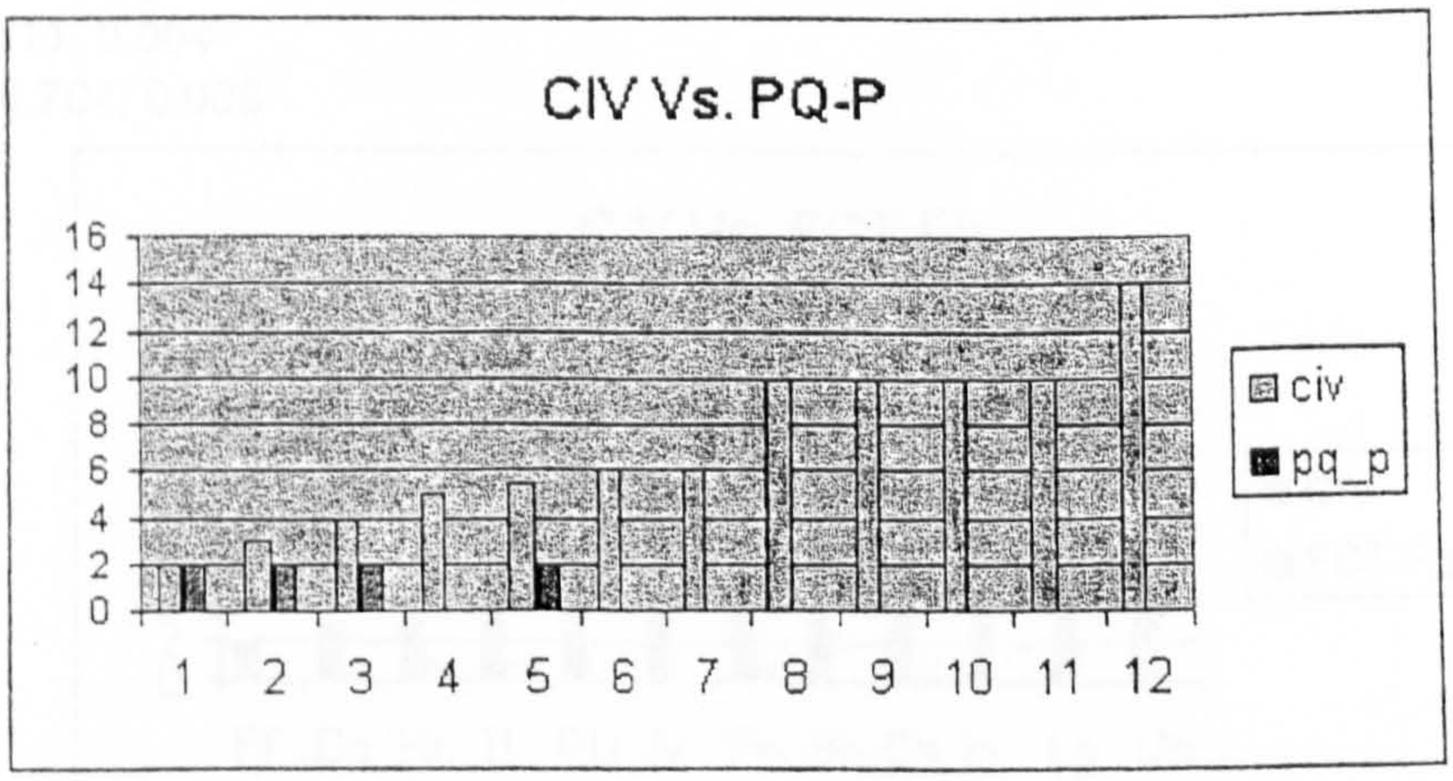


Cs	14	0
Un	14	0

		PQ-P<1 PQ-P>=
4/6+6/6	1.6666667	INT< 8 0.33 0.
3/4+7/8	1.625	INT>= 10 1 0
3/5+6/7	1.4571429	

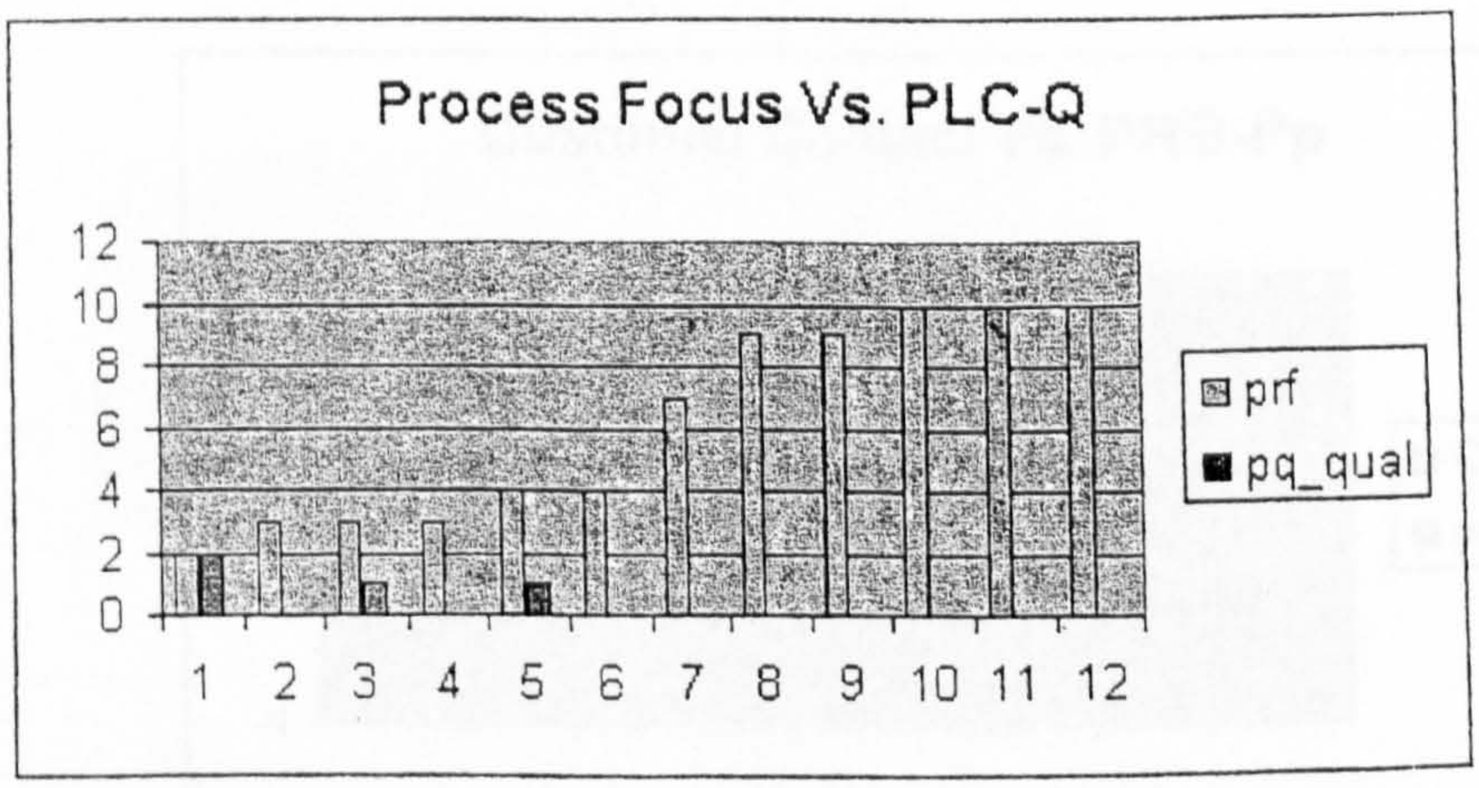
civ	pq_p
Ff	2 2
Ds	3 2
Ht	4 2
Tl	5 0
PU	5.5 2
Al	6 0
Rp	6 0
Bn	10 0
Cs	10 0
In	10 0
Lg	10 0
Un	14 0

democratic: -690 0.009
conservative -690 0.009



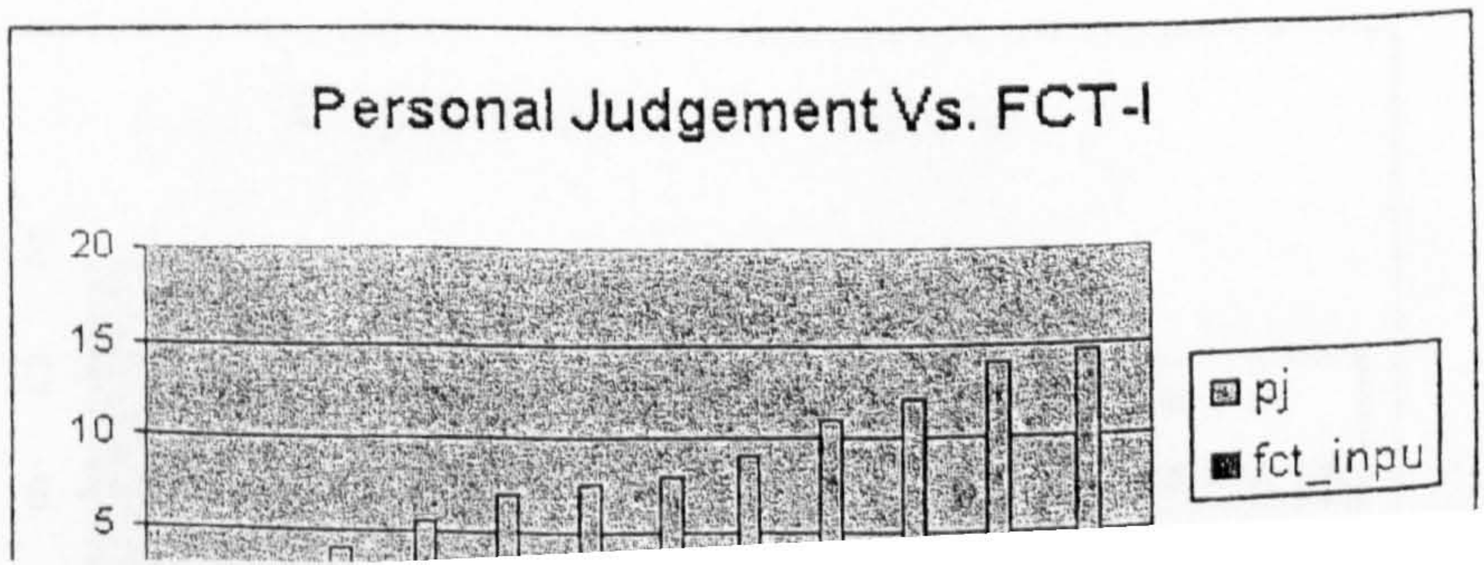
	PQ-P<1	PQ-P>=
CIV<5	0.00	1.
CIV>=5	0.89	0.

prf	pq_qual	
In	2	2
Ff	3	0
PU	3	1
Rp	3	0
Ds	4	1
Tl	4	0
Bn	7	0
Ht	9	0
Lg	9	0
Al	10	0
Cs	10	0
Un	10	0



	PLC-Q<1	PLC>=1	2
PF<=4	0.50	0.50	
PF>=7	1	0	
<2			1

pj	fct_inpu	
Ff	2	1
PU	2.5	1
Ds	4	0
Tl	5.5	1

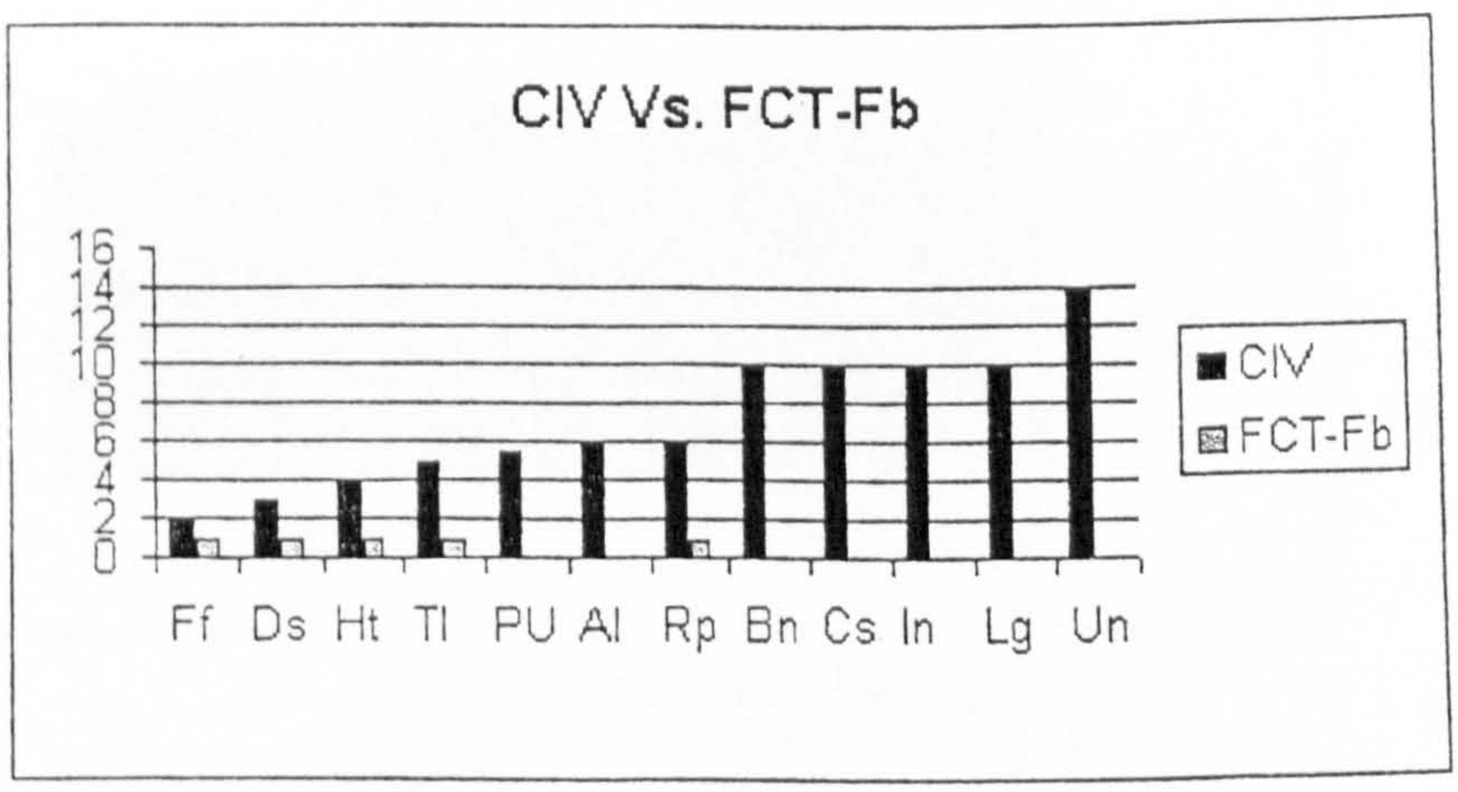


Bn	7	1
Un	7.5	1
In	8	1
Al	9	1
Ht	11	2
Rp	12	2
Cs	14	2
Lg	14.5	2

	FCT-I<2	FCT-I=2
PJD<=9(10)	1	0
PJD>=11	0	1

democratic: -0.711, 0.004
conservative: - 0.704, 0.008

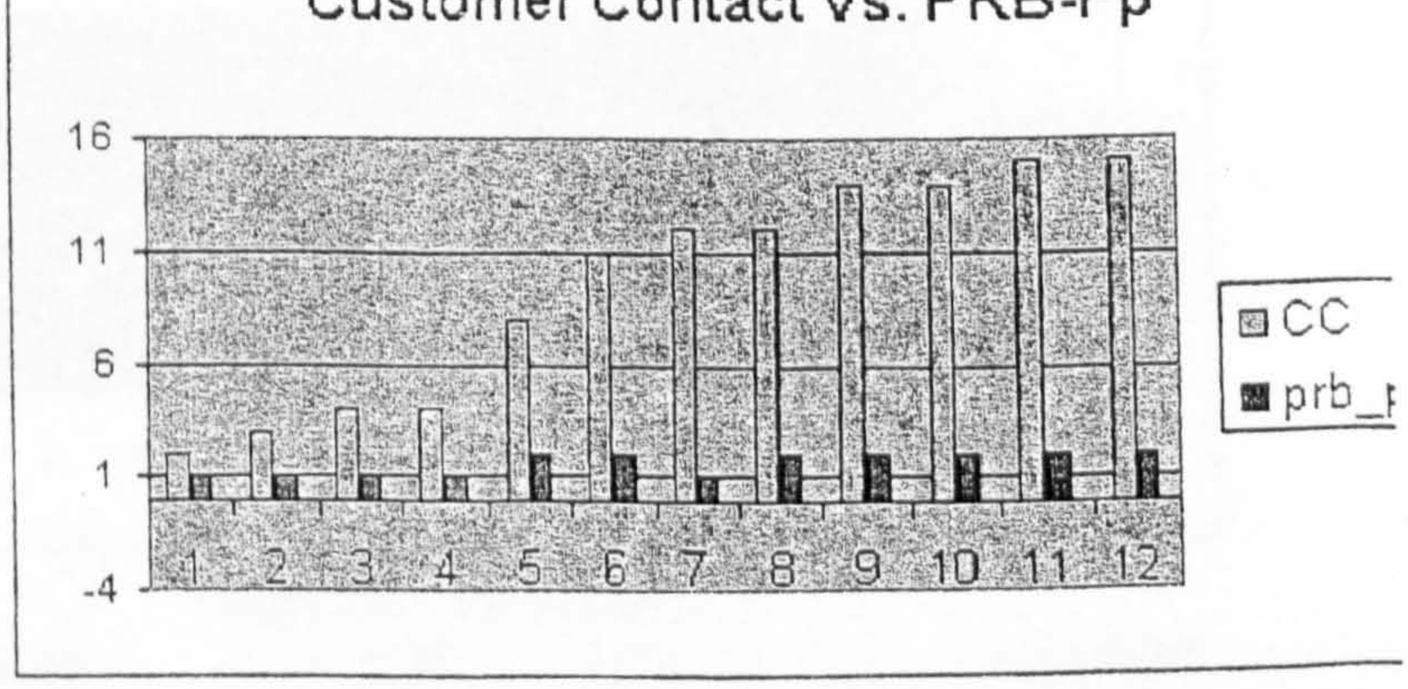
SERVICE	CIV	FCT-Fb
Ff	2	1
Ds	3	1
Ht	4	1
Tl	5	1
PU	5.5	0
Al	6	0
Rp	6	1
Bn	10	0
Cs	10	0
In	10	0
Lg	10	0
Un	14	0



			FCT-P<1	FCT-P>=1
0.285714	1.6571429	CUS<=5	0	1
0.714286	1.875	CUS>5	0.88	0.13
	1.7142857			

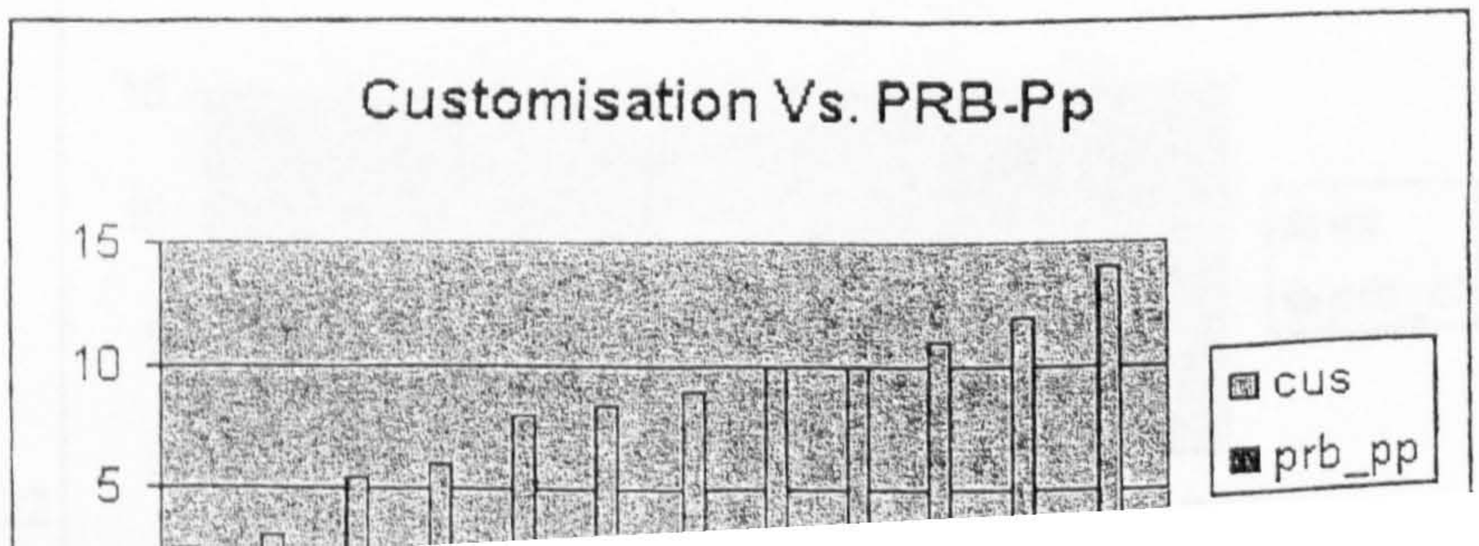
Democratic: 0.694, 0.006
Conservative: 0.644, 0.014

	CC	prb_pp
Tl	2	1
PU	3	1
In	4	1
Lg	4	1
Bn	8	2
Cs	11	2
Al	12	1
Un	12	2
Ds	14	2
Rp	14	2
Ff	15	2
Ht	15	2



	PRB-Pp<2	PRB-Pp=2
CC<=4	1	0
CC>=8	0.13	0.88

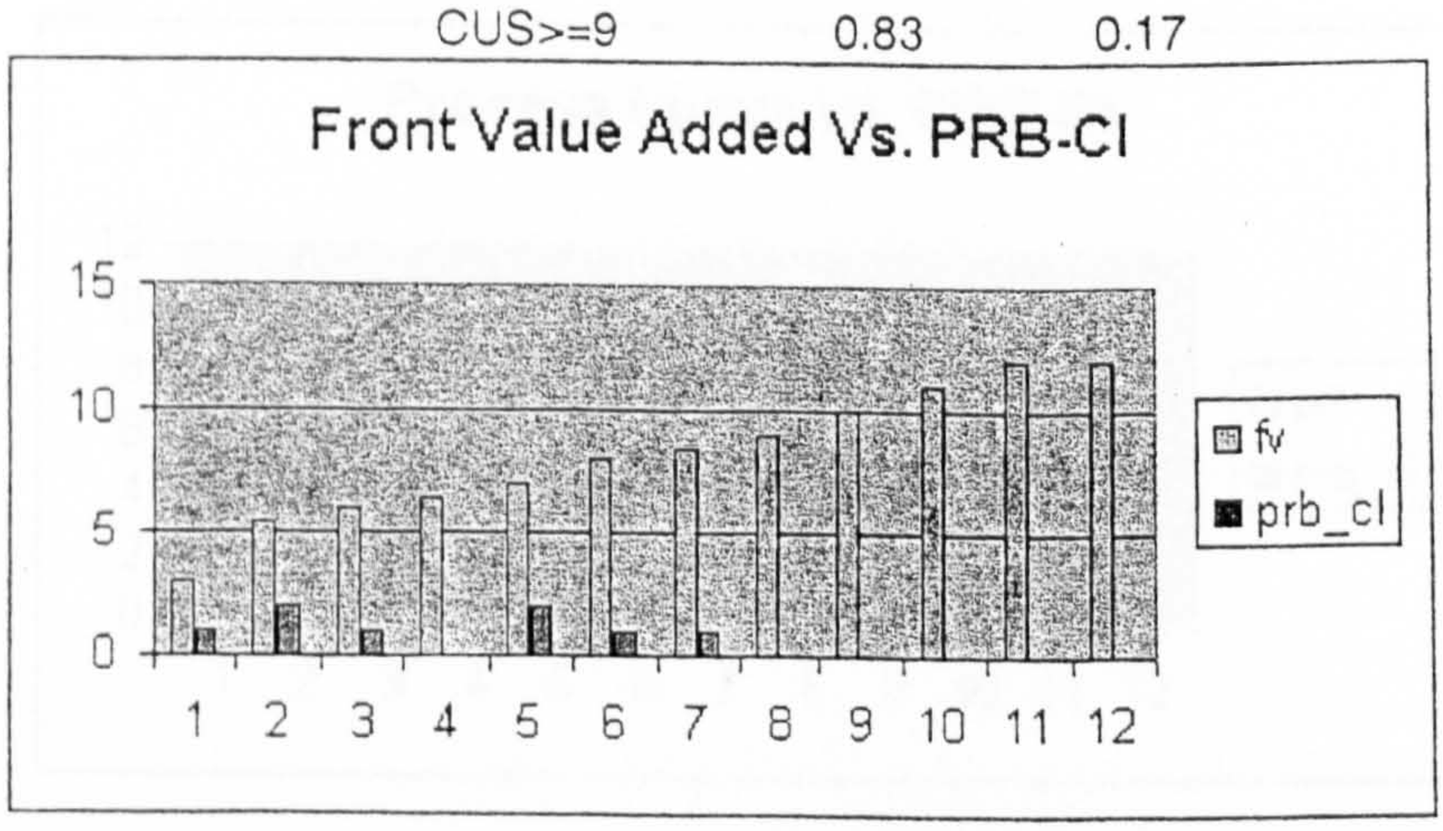
	cus	prb_pp
PU	2.5	1
Lg	3	1
In	5.5	1
Rp	6	2



Al	8	1
Tl	8.5	1
Ff	9	2
Bn	10	2
Ds	10	2
Un	11	2
Ht	12	2
Cs	14	2

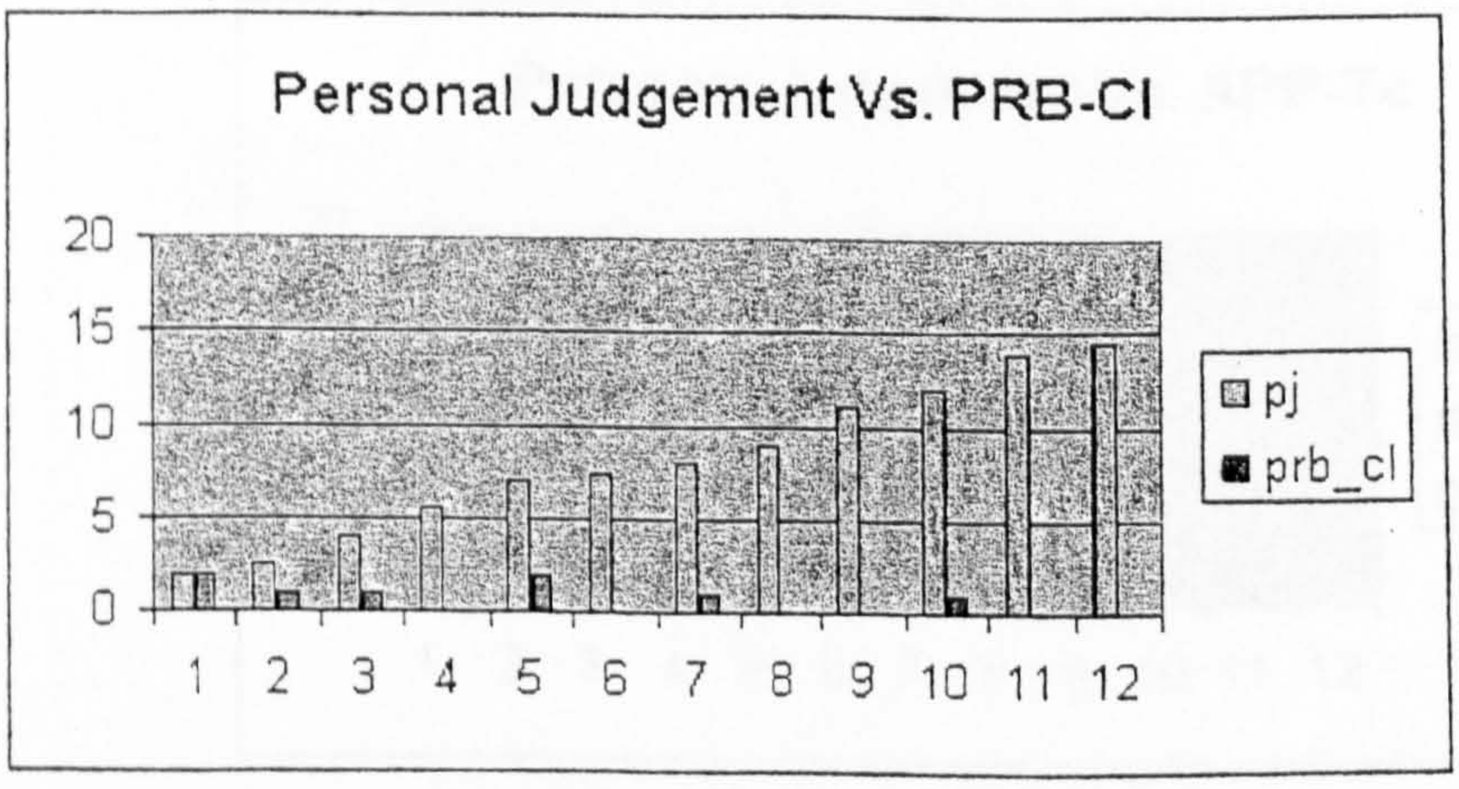
	PRB-Pp<2	PRB-Pp=2
CUS<9	0.00	1.00
CUS>=9	0.83	0.17

	fv	prb_cl
PU	3	1
Bn	5.5	2
Rp	6	1
Tl	6.5	0
Ff	7	2
Ds	8	1
In	8.5	1
Al	9	0
Lg	10	0
Un	11	0
Cs	12	0
Ht	12	0



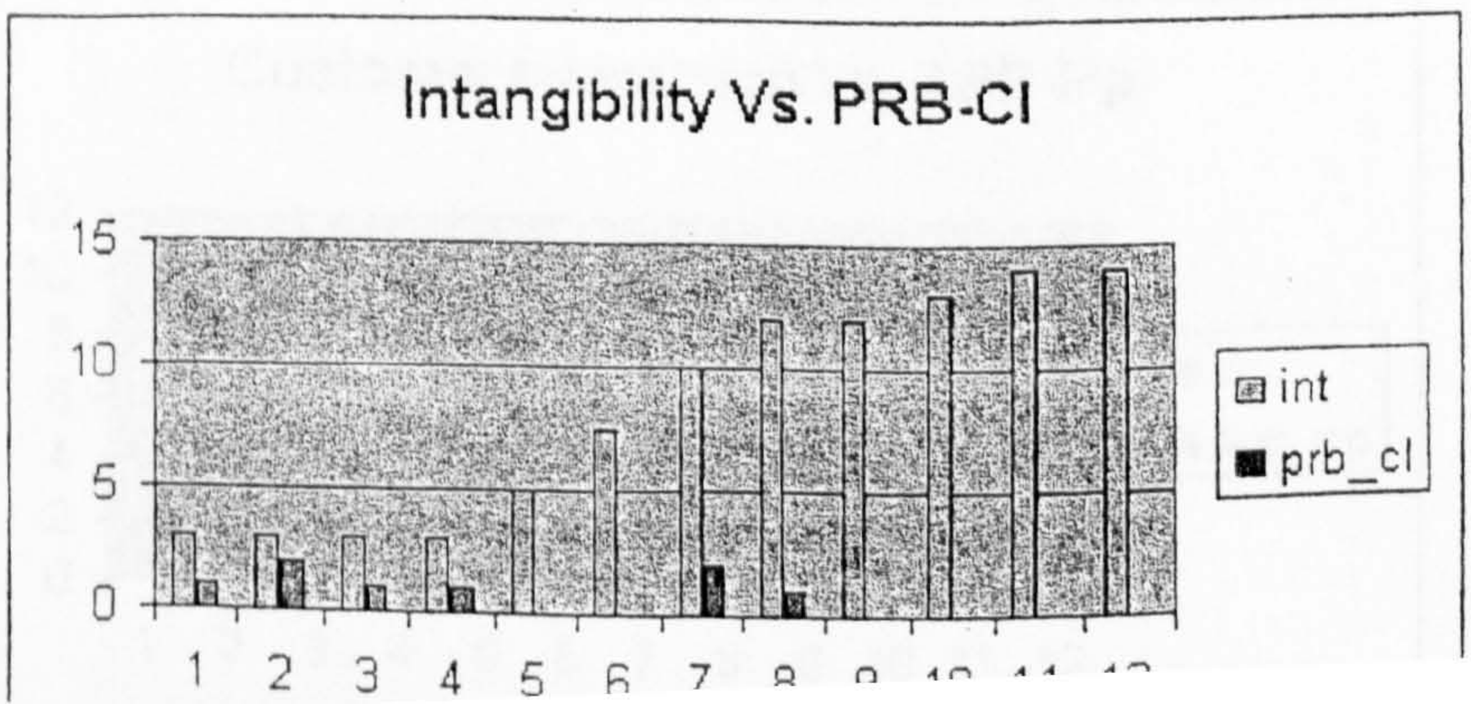
	PRB-CI<1	PRB-CI>=1
FVD<9	0.14	0.86
FVD>=9	1	0

	pj	prb_cl
Ff	2	2
PU	2.5	1
Ds	4	1
Tl	5.5	0
Bn	7	2
Un	7.5	0
In	8	1
Al	9	0
Ht	11	0
Rp	12	1
Cs	14	0
Lg	14.5	0



	PRB-CI<1	PRB-CI>=1	
PJD<9	0.29	0.71	1.514286
PJD>=9	0.80	0.20	1.514286

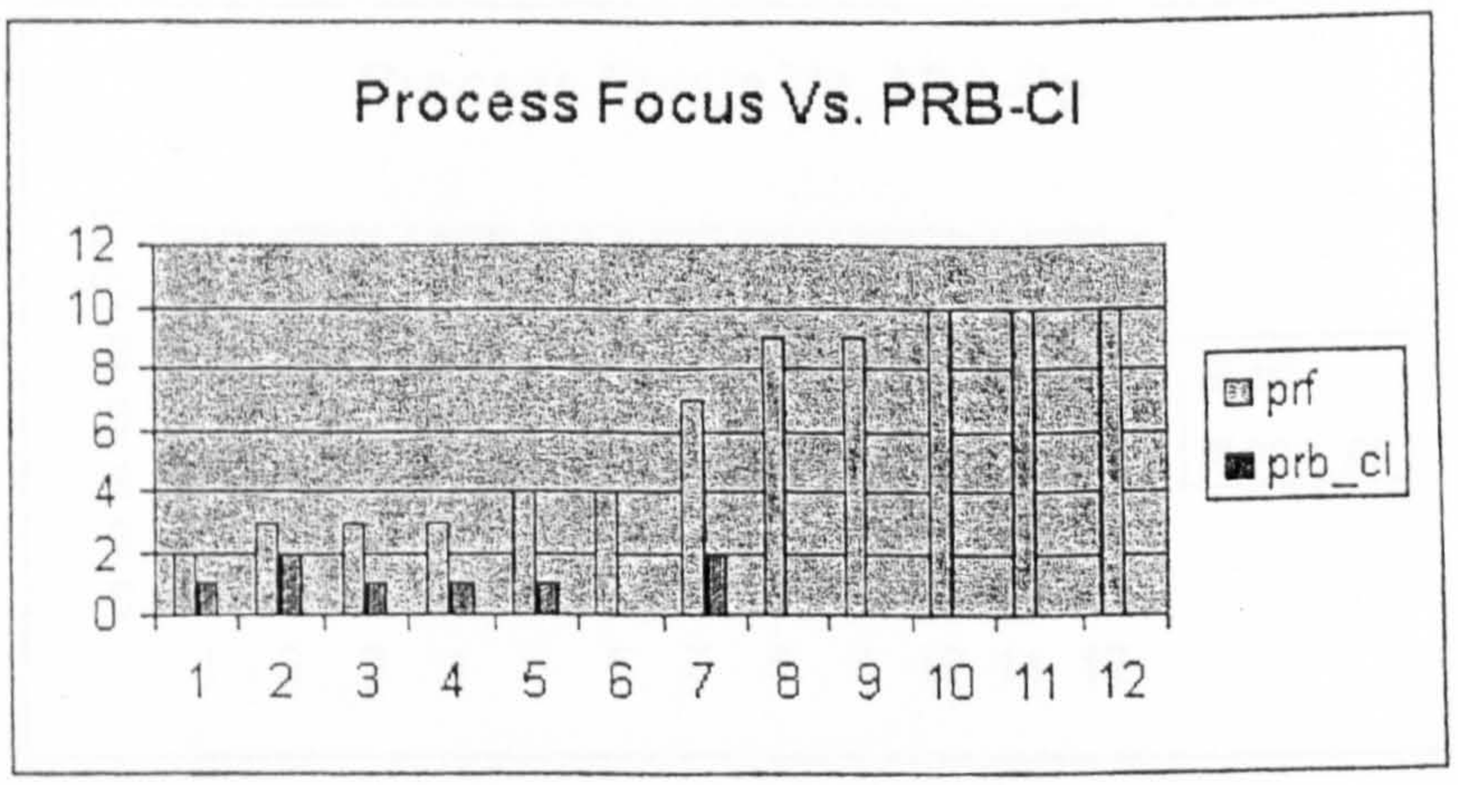
	int	prb_cl
Ds	3	1
Ff	3	2
PU	3	1
Rp	3	1
Al	5	0
Ht	7.5	0



Bn	10	2
In	12	1
Tl	12	0
Lg	13	0
Cs	14	0
Un	14	0

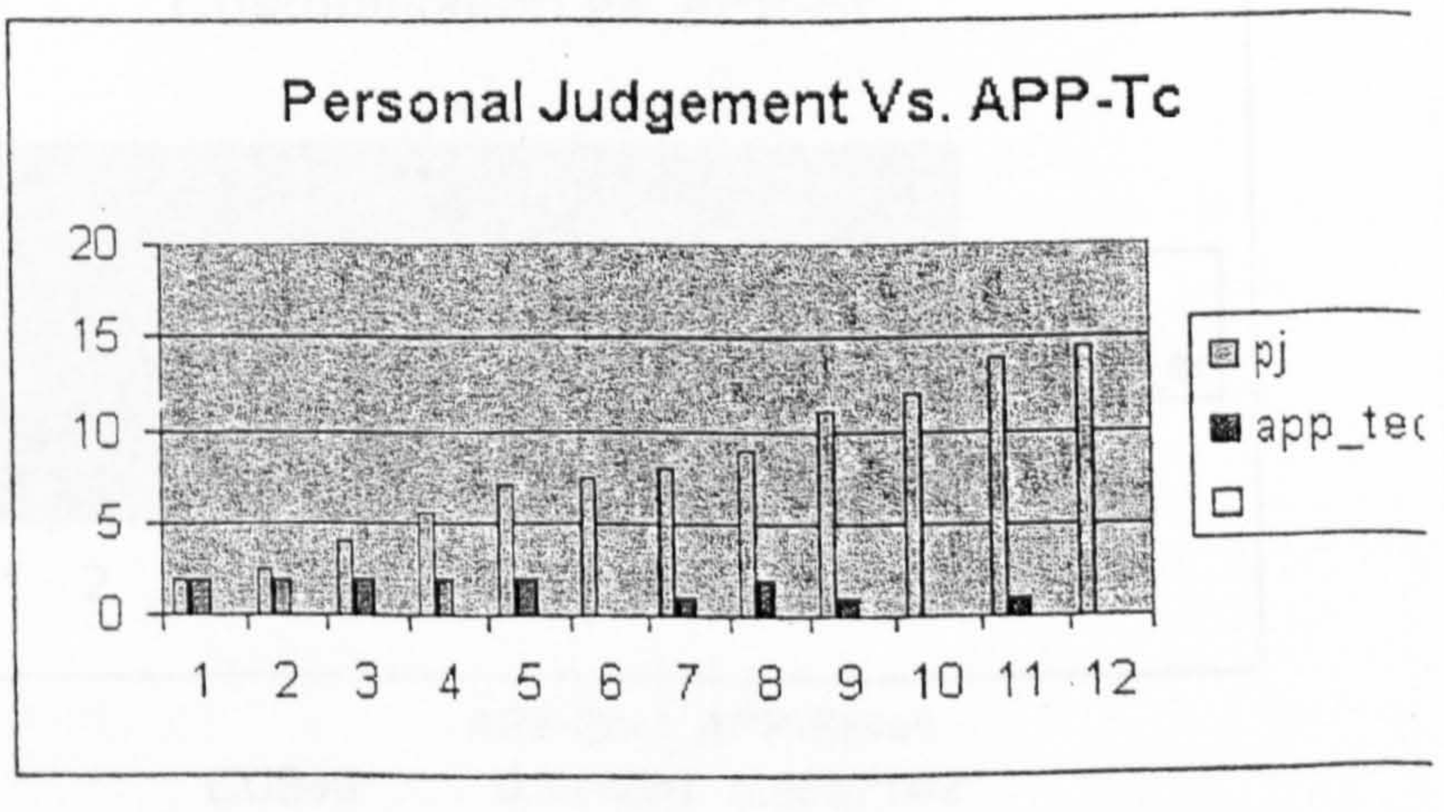
	PRB-Cl<1	PRB-Cl>=1
INT<=3	0	1
INT>=5	0.75	0.25

	prf	prb_cl
In	2	1
Ff	3	2
PU	3	1
Rp	3	1
Ds	4	1
Tl	4	0
Bn	7	2
Ht	9	0
Lg	9	0
Al	10	0
Cs	10	0
Un	10	0



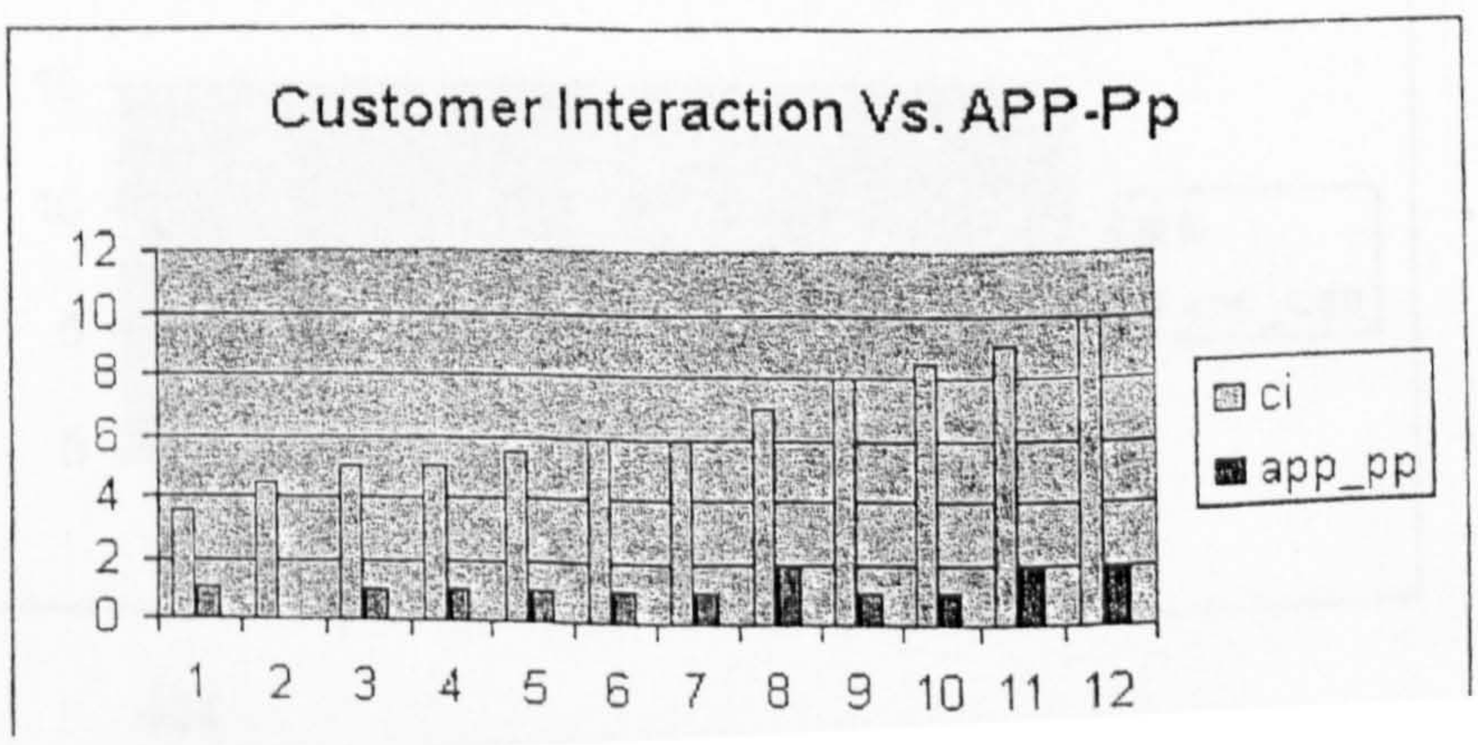
	PRB-Cl<1	PRB-Cl>=1
PF<=7	0.1428571	0.857143
PF>=9	1	0

	pj	app_tec
Ff	2	2
PU	2.5	2
Ds	4	2
Tl	5.5	2
Bn	7	2
Un	7.5	0
In	8	1
Al	9	2
Ht	11	1
Rp	12	0
Cs	14	1
Lg	14.5	0



	APP-Tc<2	APP-Tc=2
PJD<=7	0	1
PJD>7	0.8571429	0.142857

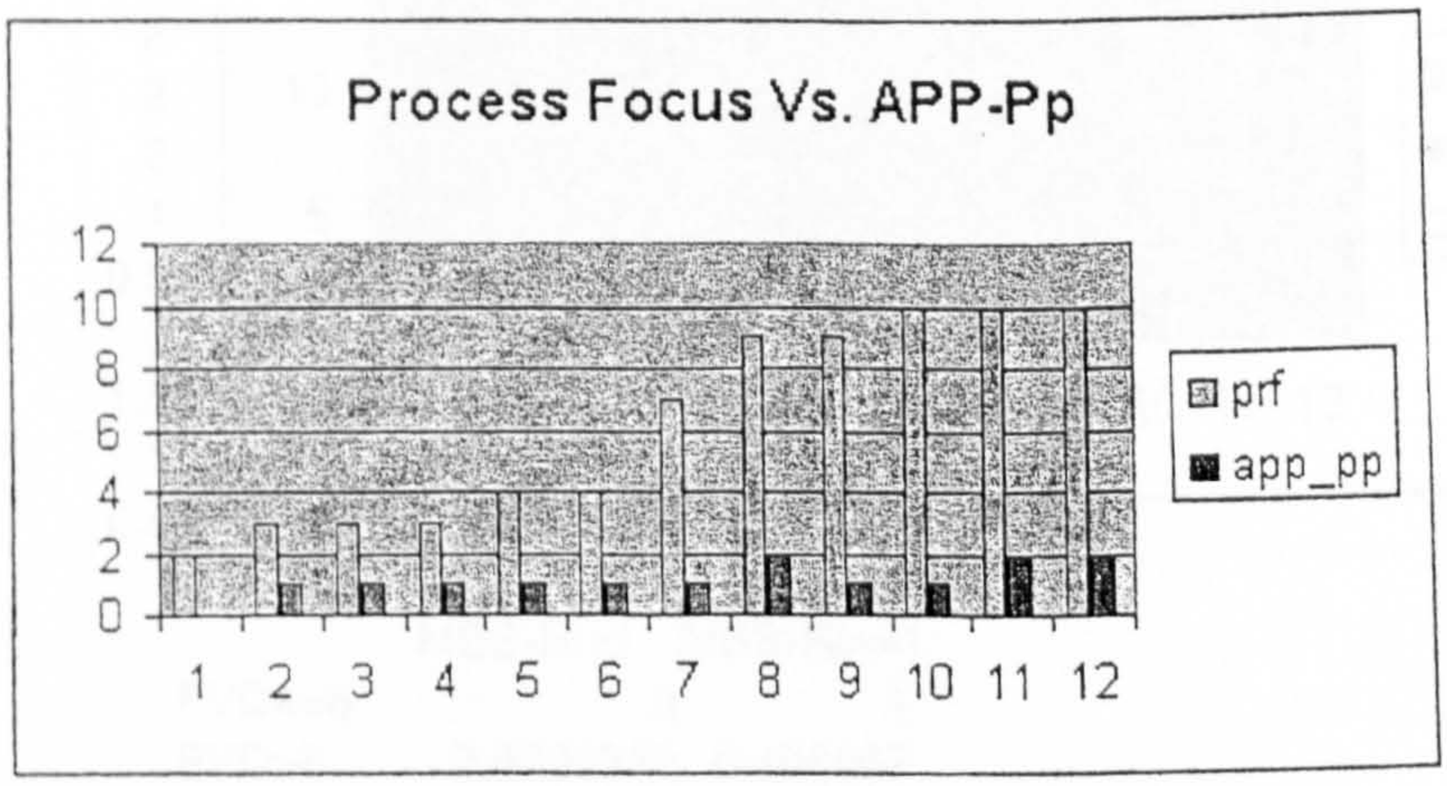
	ci	app_pp
PU	3.5	1
In	4.5	0
Ds	5	1
Ff	5	1
Tl	5.5	1
Al	6	1



Rp	6	1
Ht	7	2
Lg	8	1
Bn	8.5	1
Cs	9	2
Un	10	2

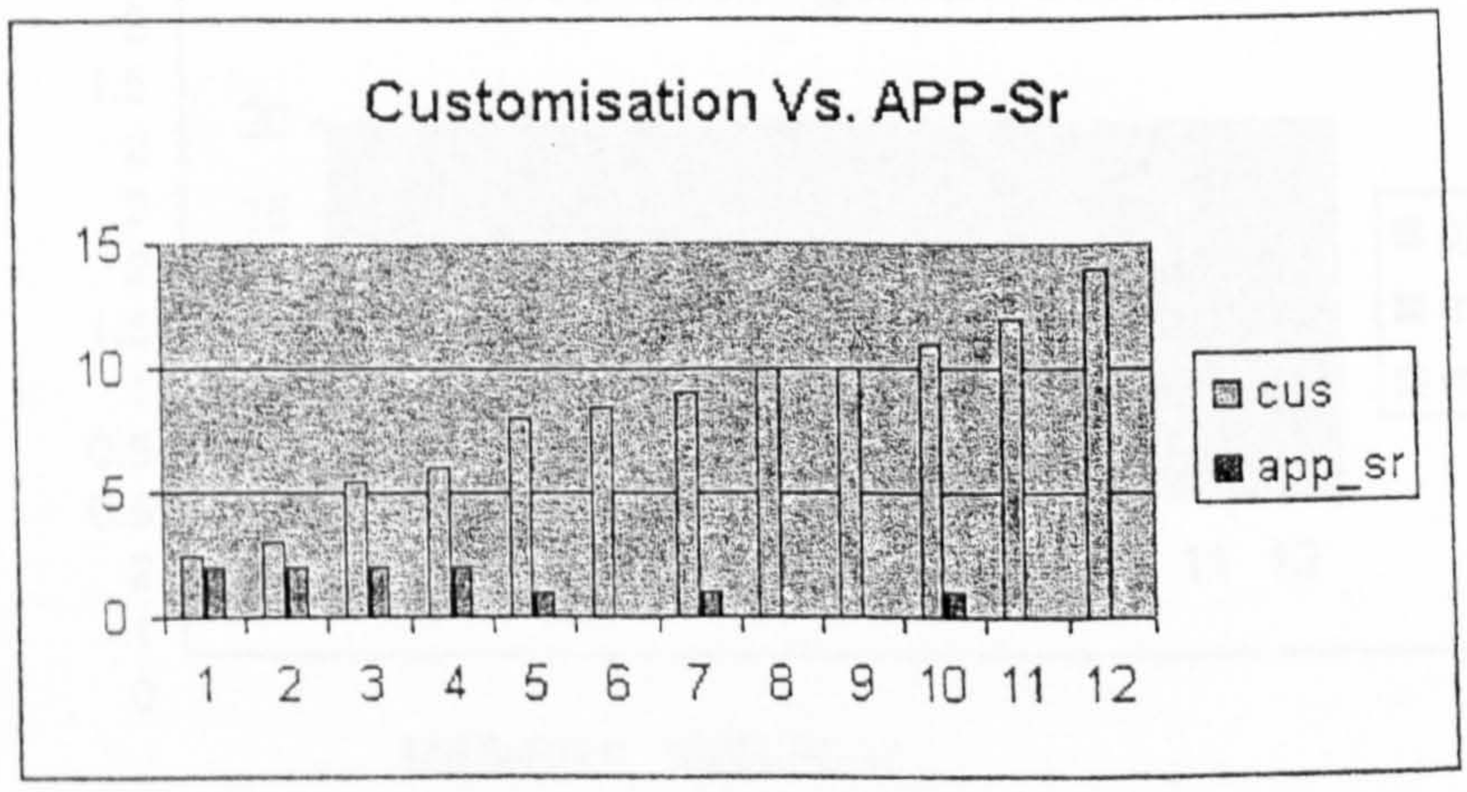
	APP-Pp<2	APP-P=2
CI<9	0.9	0.1
CI>=9	0	1

	prf	app_pp
In	2	0
Ff	3	1
PU	3	1
Rp	3	1
Ds	4	1
TI	4	1
Bn	7	1
Ht	9	2
Lg	9	1
Al	10	1
Cs	10	2
Un	10	2



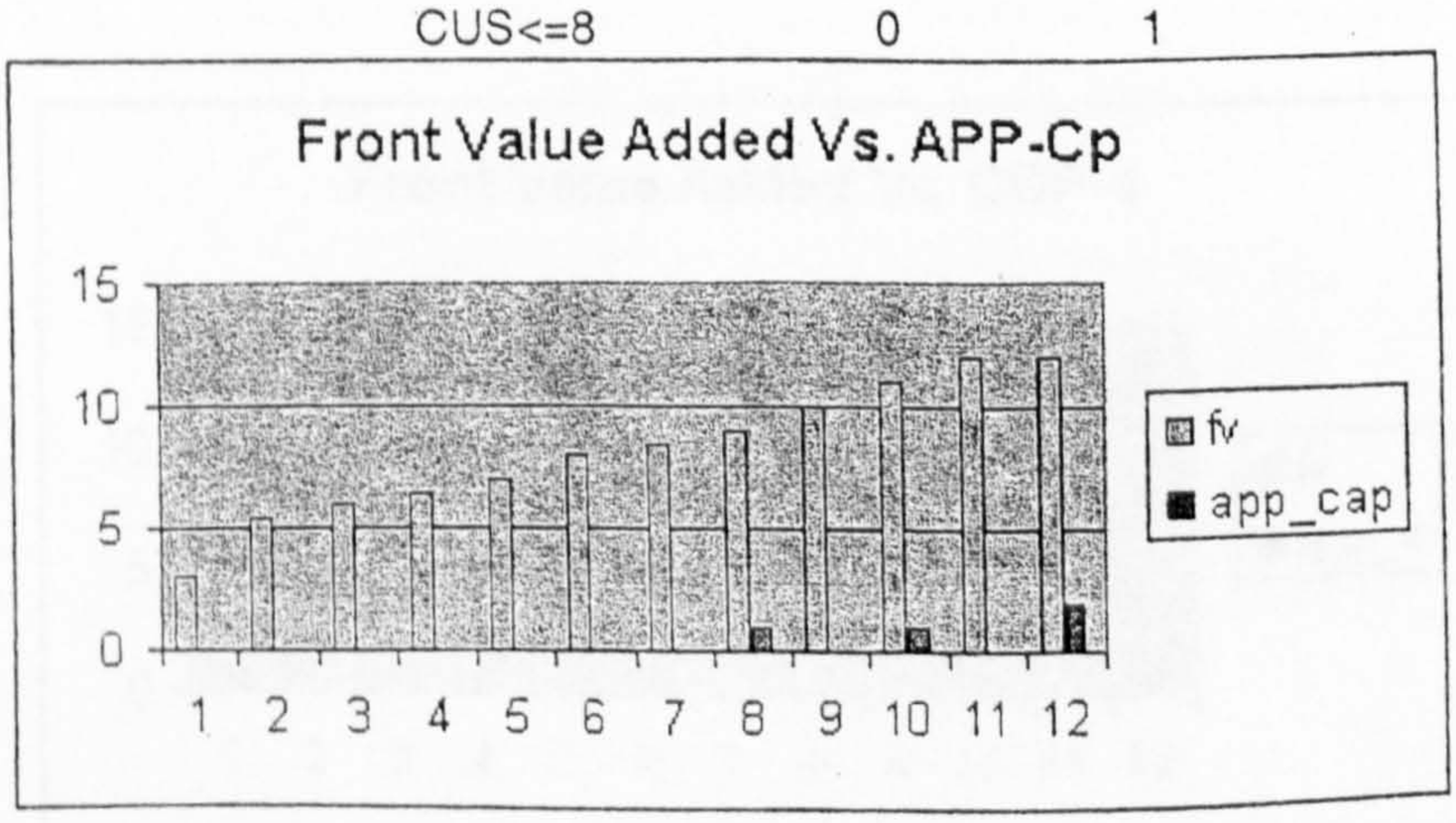
	APP-Pp<2	APP-Pp=2
PF<=7	1	0
PF>=9	0.4	0.6

	cus	app_sr
PU	2.5	2
Lg	3	2
In	5.5	2
Rp	6	2
Al	8	1
TI	8.5	0
Ff	9	1
Bn	10	0
Ds	10	0
Un	11	1
Ht	12	0
Cs	14	0



	APP-Sr<1	APP-Sr>=1
CUS>8	0.714286	0.2857143
CUS<=8	0	1

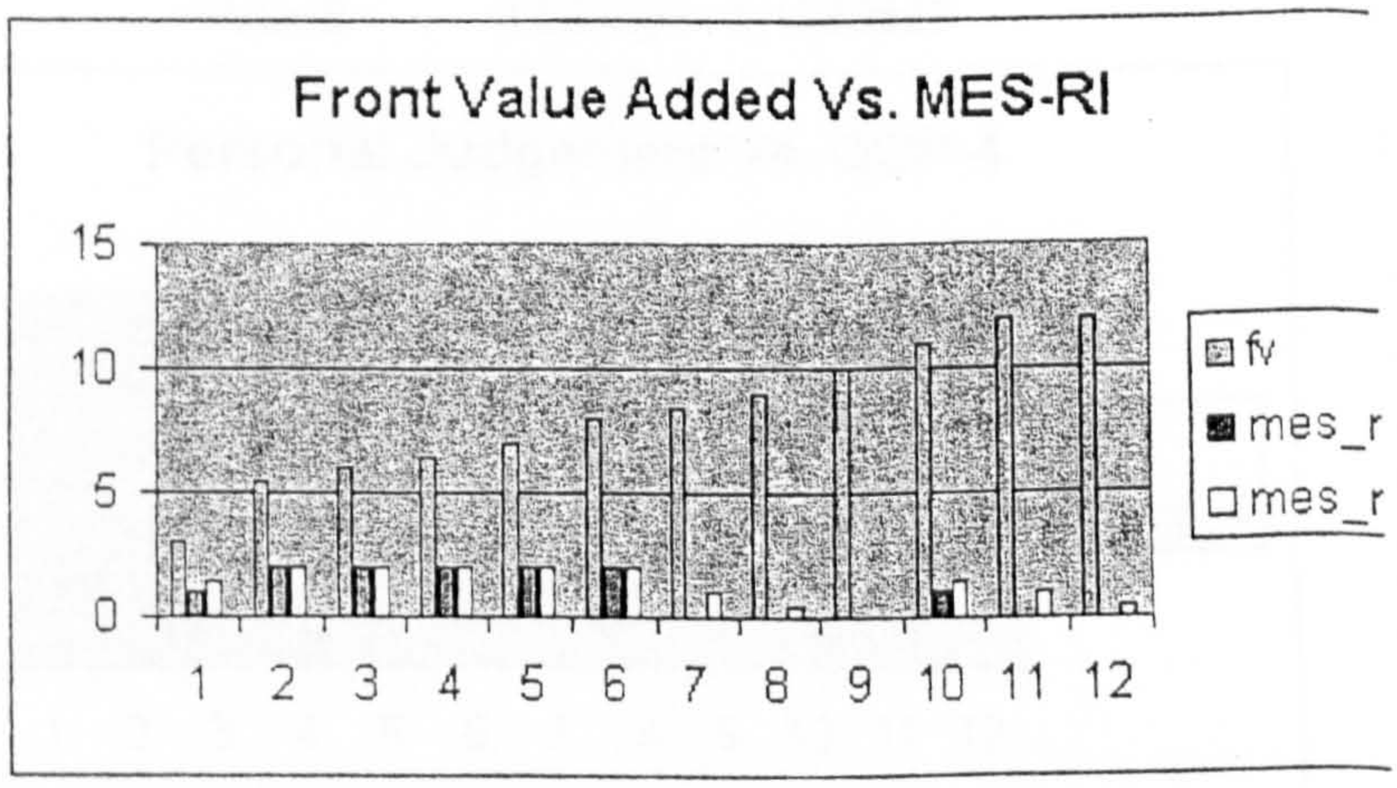
	fv	app_cap
PU	3	0
Bn	5.5	0
Rp	6	0
TI	6.5	0
Ff	7	0
Ds	8	0
In	8.5	0
Al	9	1



Lg	10	0
Un	11	1
Cs	12	0
Ht	12	2

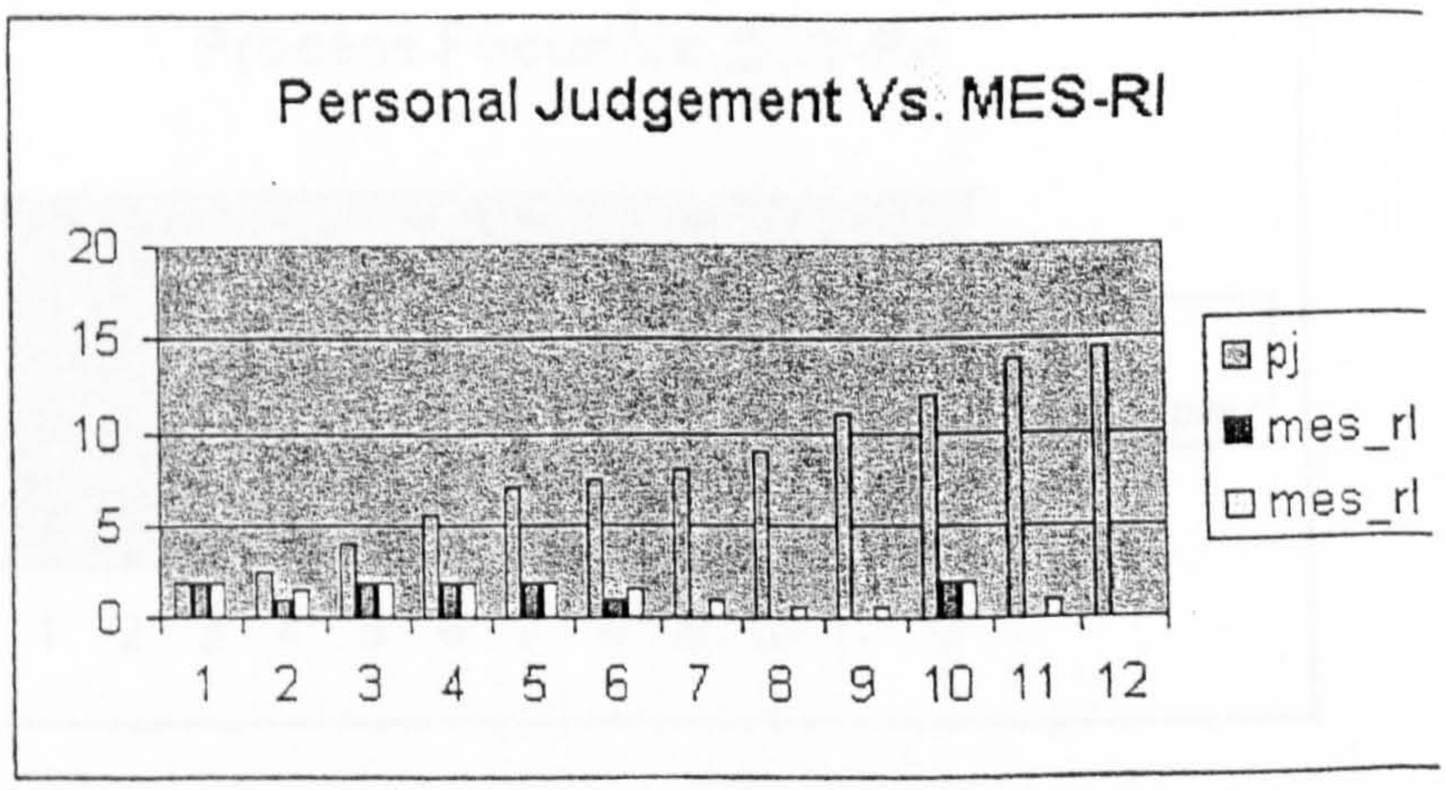
	APP-Cp<1	APP-Cp>=1
FVD>=9	0.4	0.6
FVD<9	1	0

	fv	mes_rl	mes_rl
PU	3	1	1.5
Bn	5.5	2	2
Rp	6	2	2
Tl	6.5	2	2
Ff	7	2	2
Ds	8	2	2
In	8.5	0	1
Al	9	0	0.5
Lg	10	0	0
Un	11	1	1.5
Cs	12	0	1
Ht	12	0	0.5



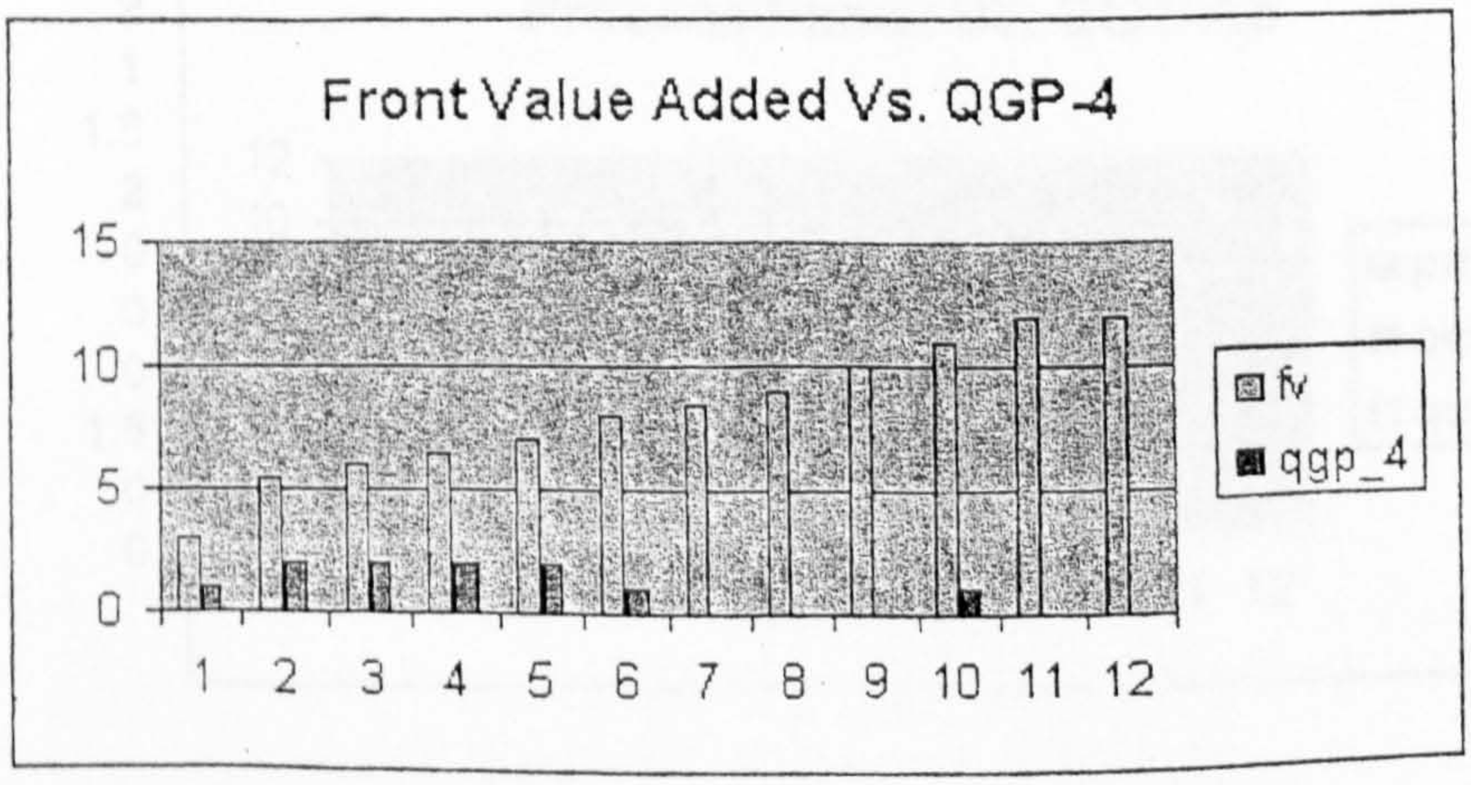
	MES-RI<1	MES-RI>=1
FVD<=8	0	1
FVD>8	0.8333333	0.166667

	pj	mes_rl	mes_rl
Ff	2	2	2
PU	2.5	1	1.5
Ds	4	2	2
Tl	5.5	2	2
Bn	7	2	2
Un	7.5	1	1.5
In	8	0	1
Al	9	0	0.5
Ht	11	0	0.5
Rp	12	2	2
Cs	14	0	1
Lg	14.5	0	0



	MES-RI<1	MES-RI>=1
FVD<8	0	1
FVD>=8	0.8333333	0.166667

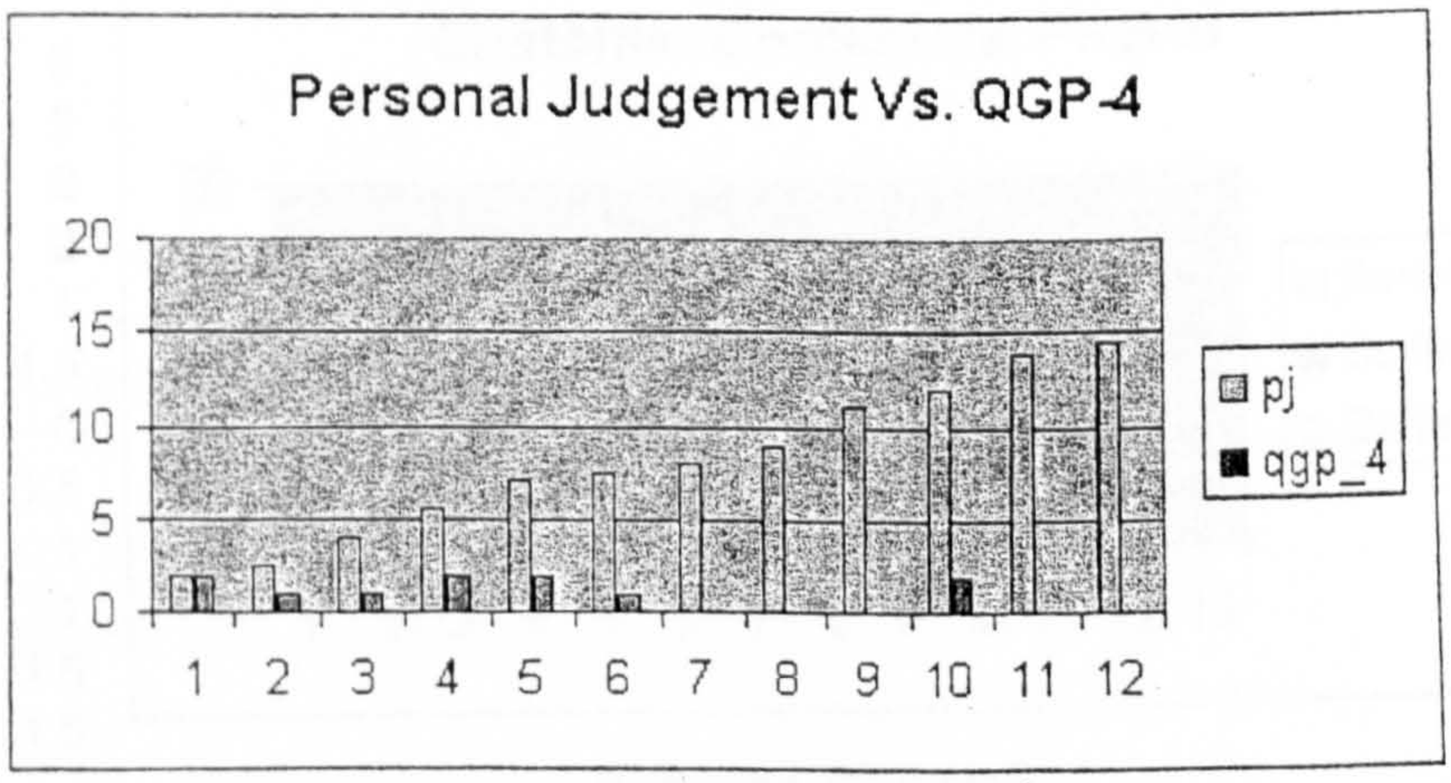
	fv	qgp_4
PU	3	1
Bn	5.5	2
Rp	6	2
Tl	6.5	2
Ff	7	2
Ds	8	1
In	8.5	0
Al	9	0



Lg	10	0
Un	11	1
Cs	12	0
Ht	12	0

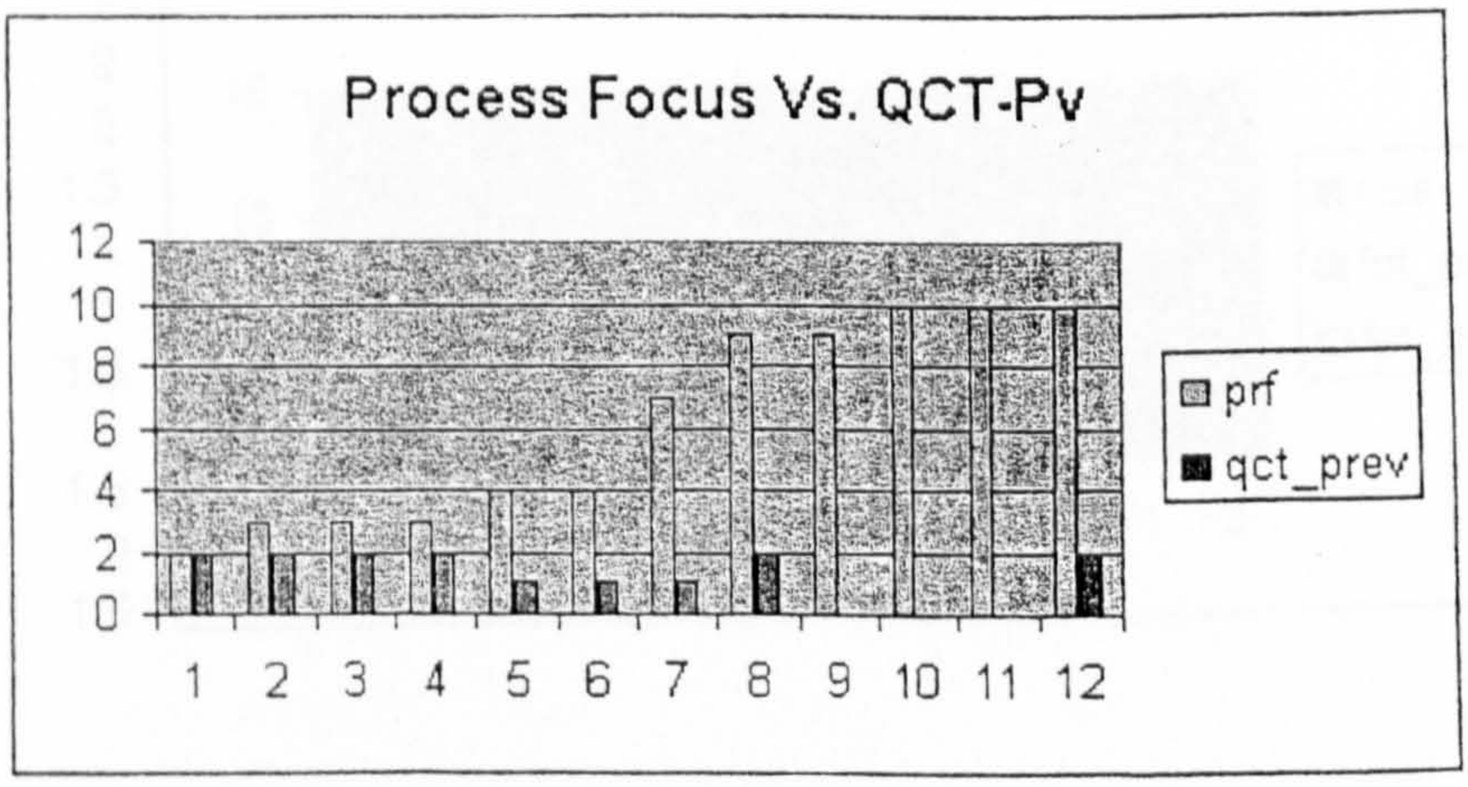
	QGP-4<1	QGP-4>=1
FVD<=8	0	1
FVD>8	0.833333	0.1666667

	pj	qgp_4
Ff	2	2
PU	2.5	1
Ds	4	1
Tl	5.5	2
Bn	7	2
Un	7.5	1
In	8	0
Al	9	0
Ht	11	0
Rp	12	2
Cs	14	0
Lg	14.5	0



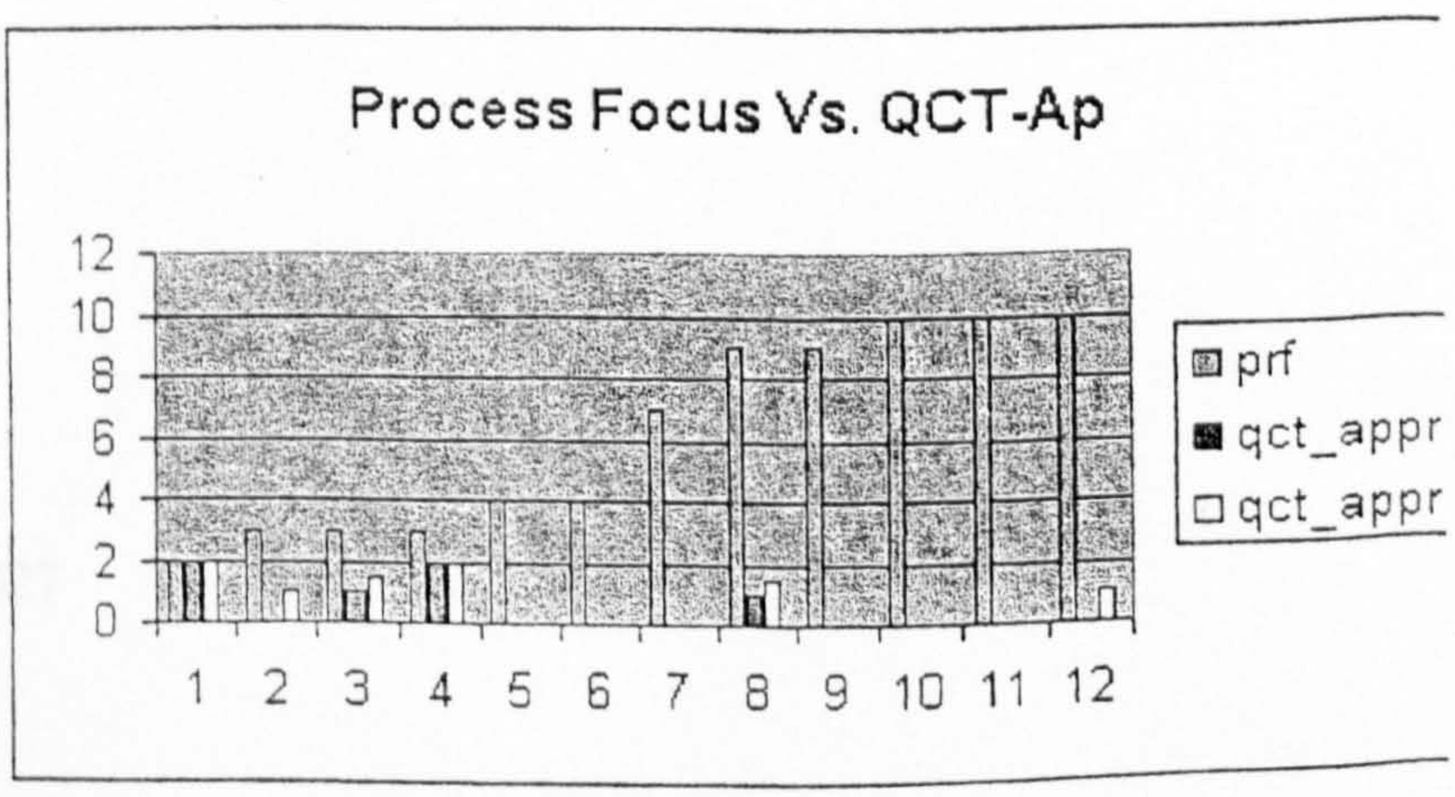
	QGP-4<1	QGP-4>=1
PJD<8	0	1
PJD>=8	0.833333	0.1666667

	prf	qct_prev
In	2	2
Ff	3	2
PU	3	2
Rp	3	2
Ds	4	1
Tl	4	1
Bn	7	1
Ht	9	2
Lg	9	0
Al	10	0
Cs	10	0
Un	10	2



	QCT-Pv<1	QCT-Pv>=1	2
PFC<=7(8)	0	1	
PFC>=9	0.6	0.4	
<=3			1

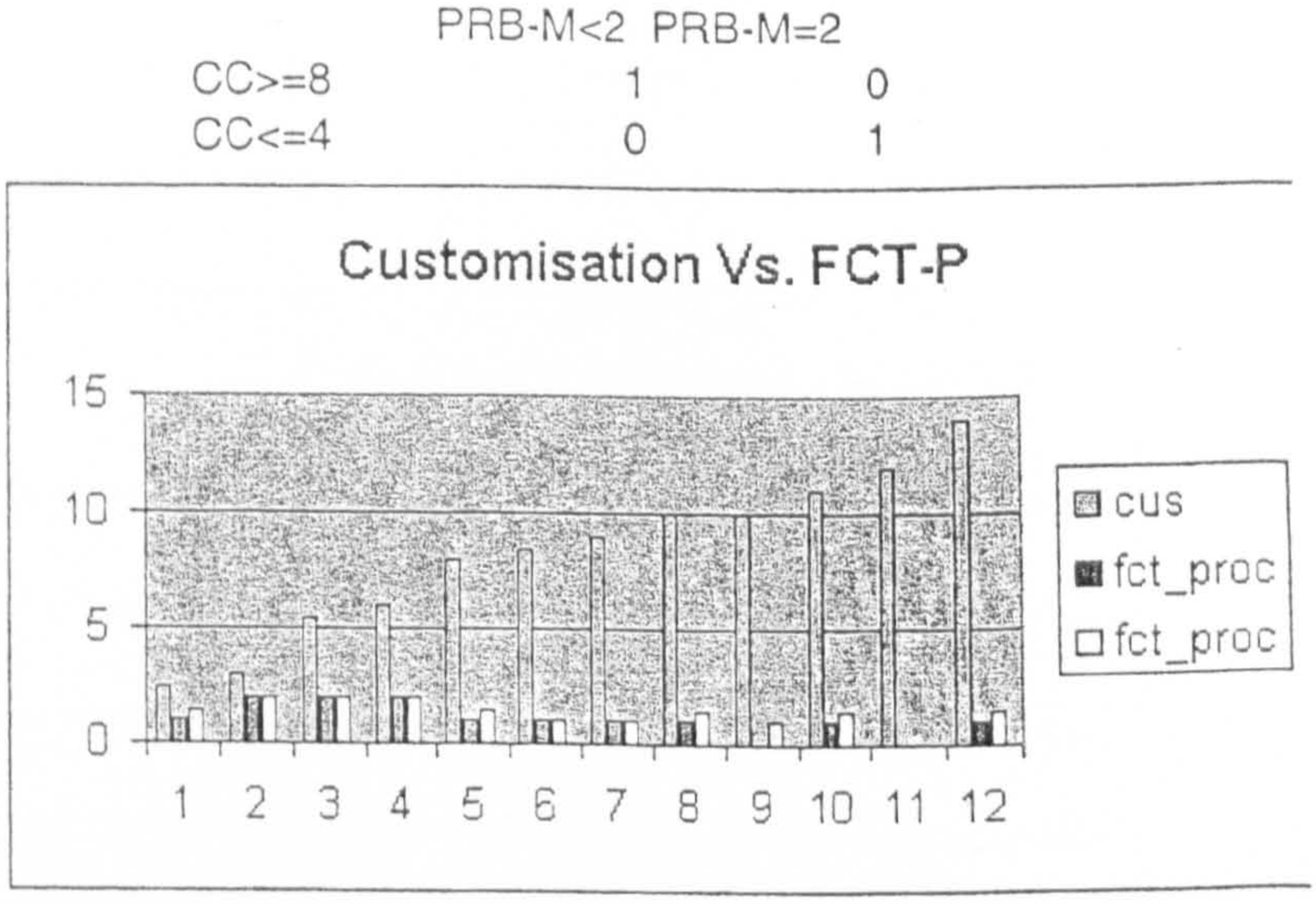
	prf	qct_appr	qct_appr
In	2	2	2
Ff	3	0	1
PU	3	1	1.5
Rp	3	2	2
Ds	4	0	0
Tl	4	0	0
Bn	7	0	0
Ht	9	1	1.5
Lg	9	0	0
Al	10	0	0



Cs	10	0	0
Un	10	0	1

	QCT-Ap<1	QCT-Ap>=1
PF<=3	0.25	0.75
PF>=4	0.875	0.125

cc	prb_met	
2	2	2
3	2	2
4	2	2
4	2	2
8	1	1
11	1	1.5
12	0	0
12	1	1.5
14	1	1
14	1	1
15	1	1.5
15	1	1.5



	PRB-M<2	PRB-M=2
CC>=8	1	0
CC<=4	0	1

cus	fct_proc	fct_proc
PU	2.5	1	1.5
Lg	3	2	2
In	5.5	2	2
Rp	6	2	2
Al	8	1	1.5
Tl	8.5	1	1
Ff	9	1	1
Bn	10	1	1.5
Ds	10	0	1
Un	11	1	1.5
Ht	12	0	0
Cs	14	1	1.5

Appendix 5.8

Table of Comparison between the Selected Service Dimensions, based on the Established Criteria

Selecting the best Service Dimensions for the Productivity Aspects that have more than one indicating service dimension.

P/Q-P	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
INT	-0.580, 0.030	-6.67, 0.001	0.061	½	N
CIV	-0.690, 0.009	-8.89, 0.001	0.018	½	5.1.1 Y
PLC-Q	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
CI	D -0.534, 0.029	-9.00, 0.058	0.045	1/3	5.1.2 X
	C -0.604, 0.017				
PF	D -.0561, 0.027	-5.00, 0.014	0.182	1/3	N
	C -0.536, 0.041				
PRB-P	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
CC	D 0.694, 0.006	0.875, 0.000	0.010	2/4	N
	C 0.644, 0.014				
CUS	D 0.601, 0.015	0.833, 0.000	0.015	¼	5.1.3 Y
	C 0.650, 0.012				
PRB-CI	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
FVD	D -0.580, 0.013	-0.857, 0.000	0.015	¼	5.1.4 X
	C -0.598, 0.015				
PI	D -0.592, 0.011	-0.514, 0.042	0.242	¼	5.1.5 Y
	C -0.482, 0.049				
INT	D -0.509, 0.036	-0.750, 0.001	0.061	¼	N
	C -0.515, 0.044				
PF	D -0.579, 0.017	-0.857, 0.000	0.015	¼	N
	C -0.574, 0.025				
APP-P	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
CI	D 0.513, 0.034	0.900, 0.058	0.045	1/6	Y
	C 0.613, 0.015				
PF	D 0.687, 0.006	0.600, 0.008	0.045	1/6	N
	C 0.666, 0.011				
MES-RI	Strength of Correlation (Kendall's Tau)	Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category	Coverage of the SD Scale

				Value	(Proportion)	
EVD	D	-0.511, 0.030	-0.972, 0.000	0.004	1/5	Y
	C	-0.536, 0.030				
PJ	D	-0.558, 0.018	-0.778, 0.000	0.026	1/5	Y
	C	-0.532, 0.030				
QGP-4	Strength of Correlation (Kendall's Tau)		Strength of Prediction (Somer's d)	Test of Independence (Fisher's Exact Test) – P Value	Coverage of Subjects in the Category (Proportion)	Coverage of the SD Scale
EVD	D	-0.630, 0.008	-0.833, 0.000	0.015	¼	Y
	C	-0.597, 0.015				
PJ	D	-0.524, 0.026	-0.833, 0.000	0.015	¼	Y
	C	-0.485, 0.046				

Appendix 6.1

A Sample of Note-Taking Using Maps

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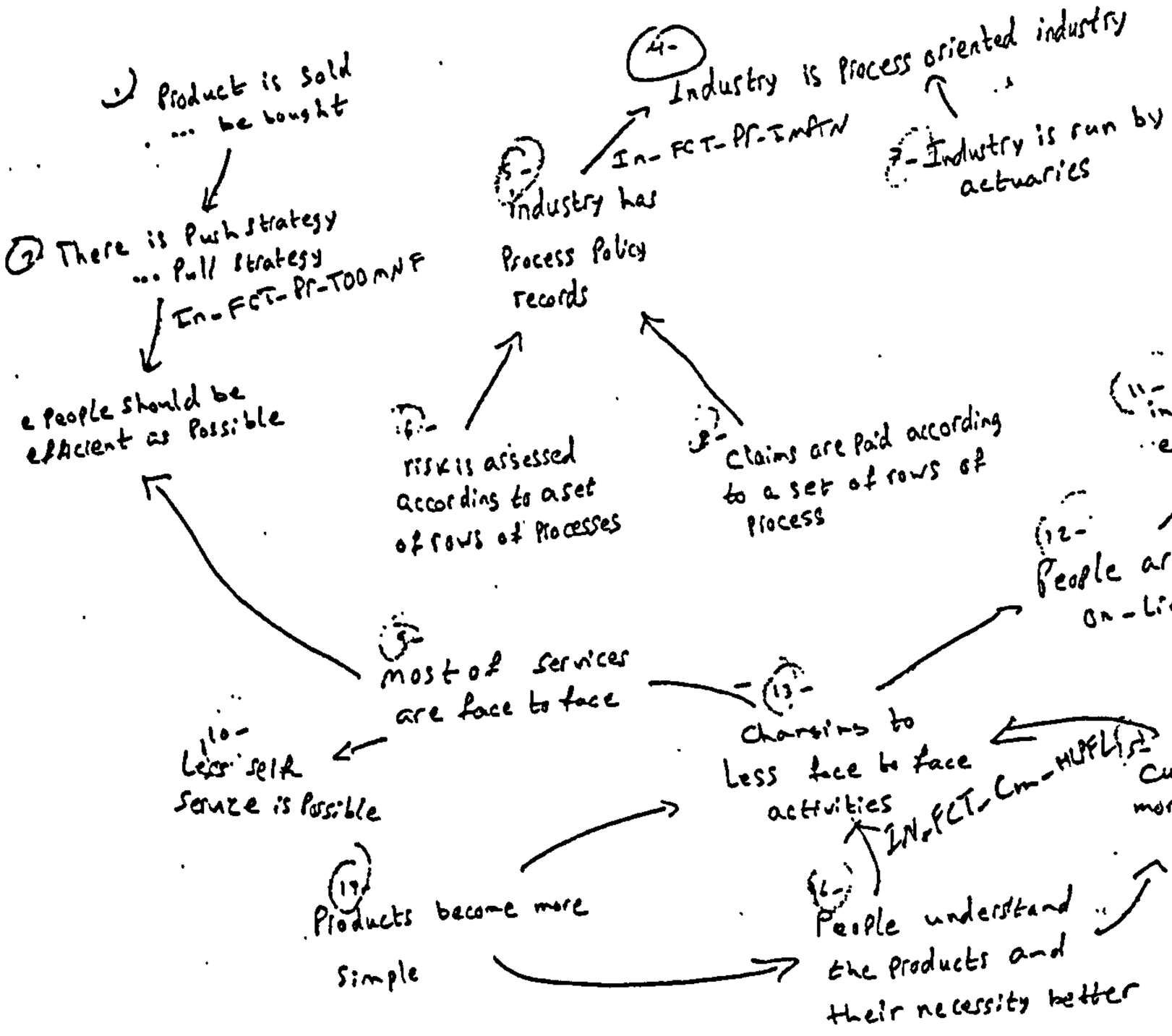
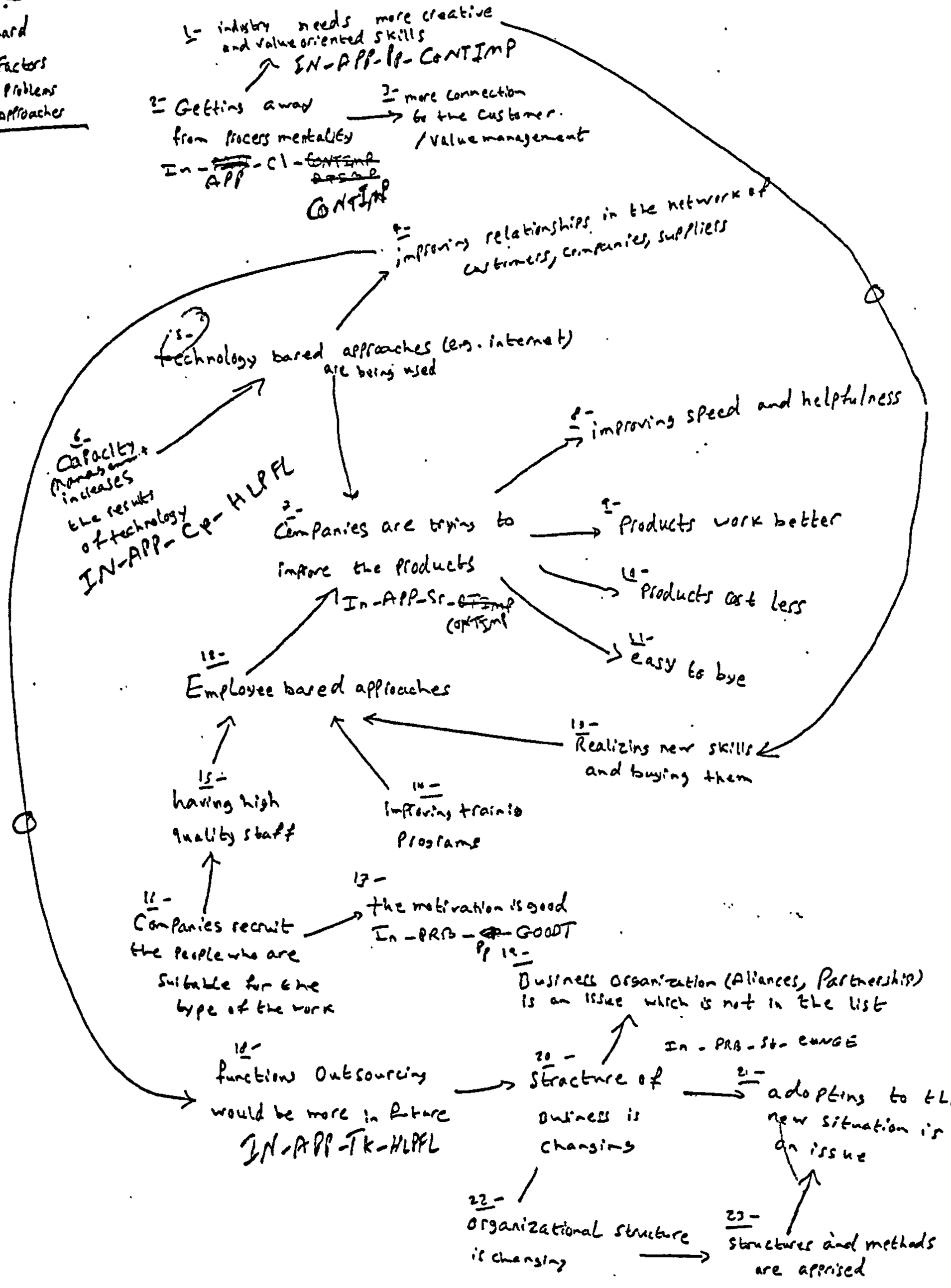
P&Q Factors
- Problems
- approaches



.nsurance

.meynard

?R Q Factors
- Problems
- Approaches



Appendix 6.2

A Sample of the Qualitative Database

Microsoft Access - [MyData3 : Table]

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	NUMBI	SERVI	CATEG	SUBJ	Sub-S	MESSAGI	
	119	AR	MES	RI		DFCLT	Cost is orbitally allocated in measurement.
	120	AR	MES	Ot	Pr	DFCLT	It's difficult to see if a certain route is profitable and productive or not.
	121	AR	MES	MES		NHLPFL	There are certain ways for productivity measurement but they are not very usefu
	122	AR	QCR	Cm	FI	LIKE	Customer wants to control the situation in terms of flexibility.
	123	AR	QGP	Cm	5	LIKE	People still have illusions about the advantages and interesting things of flying w
	124	AR	QGP	CI	3	DFCLT	There are lots of stress between product development people and product delive
	125	AR	QCT	Ex		CSTLY	People remember the failure and make it known to others in this industry and th
	126	AR	APP	Tc		HLPFL	Technology has an extreme role in improving productivity in terms of efficiency c
	127	AR	PQ	Ct	Q	DFCLT	Interaction between quality and unit cost in airlines is very complex, therefore or
	128	AR	QCR	Sn		IMPTN	Peripheral services are very important.
	129	AR	FCT	Cm	Sn	HLPFL	Customer is often very much involved in the service delivery for peripheral servic
	130	AR	FCT	Cm		DFCLT	The (possibility of) customer involvement in all phases of before, during and after
	131	AR	FCT	In	Tc	GODT	Substituting different categories of inputs in each other's place (like people for te
	132	AR	PQ	P	Q	NTRDOF	The theoritical aim is to have productivity and quality together with no trade off.
	133	AR	PQ	P	Q	TRDOF	Economic cycle, short term trade offs in micro levels, forcusing in cost reductio
	134	AR	PQ	Q		ADVQ	In Healthy economy quality is more important than productivity.
	135	AR	PLC	VI	Ct	IMPTN	Both volume and cost are important because of the application of yield manage
	136	AR	FCT	In	Tc	IMPTN	Input includes people and technology like airplanes and is the dominant factor.
	137	AR	PRB	Tc	Cm	CHNGE	Technology changes rapidly particularly in IT and causes all sorts of changes in
	138	AR	PRB	CI		NDFCLT	Ther are no major problems with management and organisational culture
	139	AR	QGP	4		NIMPTN	External Communications are small and customers are not misled
	140	AR	PRB	En		DFCLT	Legislations restrict the abilities which leads to lower productivity.
	141	AR	QGP	1		DFCLT	Multiple customer type makes it difficult to understand the customer's expectati
	142	AR	MES	Pr	Ot	DFCLT	Complexity of the process and the varity of output generate a verity of categorue
	142	AR	PLC	VI	Ct	HLPFL	When cost is reduced the volume can be increased and growth and revenew wil

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Appendix 6.3

Within Case Displays (Tables)

Airlines: (Skilfully Manageable Complexity)

Subject	Features
P/Q-Trade Off	- Quality more important in healthy economy (134). - In theory both should be together but because of economic cycle there is a short term trade off (132-133).
Policy	- Volume and Cost are important because of the application of yield management (135). - Quality: Interaction between quality and cost is very complex (127).
Factors	- Input includes people and technology like airplanes and is the dominant factor (136). - Input: Substituting different categories of input is very easy and the interaction between them (people and technology) causes synergy effects (131). - Output gets more sophisticated over a period of time because of wider range of services and yield management (106). - Process is complex and costly and consumes productivity benefits (102). - Feedback is not very effective in increasing productivity as the procedures are routine factory types (107).
Problems	- Technology changes rapidly particularly in IT and causes all sorts of changes in customer's experience (137). - People are generally competent and loyal however in some airlines there are serious problems with competence of people (114, 115). - Methodology and systems are amazingly good (113). - Climate: No major problems with management and organisational culture (138). - Technology: Technology will provide a better image which will increases the cost and productivity (144).
Approaches	- All are important because of the complexity of getting all operations in different levels to come together, in particular technology is very important (112-126) - Customer: There are attempts to increase the involvement particularly for peripheral services (111,129)
Measurement Problems	- Output: As costs decline with distance, measuring valid volume is an issue (117). - Relation: Rules by which the costs are allocated to particular services are difficult (118, 142). - Relation: It is difficult to see if a route is profitable (120) - Intangibility: Measuring the output and its validity considering the intangibles is the most difficult one in the list with respect to the softer aspects of productivity.(116)
Quality Gaps	- Five: People have illusions about the advantages of flying (123) - Five: Perception of customer about output that contains getting additional services like Taxi or hotel is against productivity (110). - Four: External Communications are small and customers are not misled (139) - Three: Lots of stress is between the product development people and product delivering people (124). - One: Multiple customer type makes it difficult to understand the customer's expectations (141).
Quality Costs	External: Largest without doubt cause people remember it and talk about it (125)
Quality Characteristics	Reliability: Speed - Willingness to Help – Ethics Vs. Flexibility Flexibility: Customer wants to control the situation
Disagreements	None

Banks: (Challenging the Changing Environment)

Subject	Features
P/Q-Trade Off	- There were examples where a bank survived because of high qual. while having low prod.; the other way round is not possible because of standards. - Recently quality is received an extreme emphasis, particularly by executives - P and Q are working together hand in hand with very minor trade-off as the aim is to efficiently deliver a one hundred percent correct service. (232)
Policy	- Depending on the age, first cost is decreased and then volume is increased, quality remains at the standard level (260).
Factors	- Process: Re-engineering is a major factor (201). - Input: Skilful human resource is very important
Problems	- People: Changing environment causes low morals (210) - People: There are problems in keeping paste with new technology (205) - Climate: There are conflicts in team works because of different skills (207) - Climate: People are not necessarily agree with the companies goal (239) - Methodology: There are inefficient methods and systems, often cause late deliveries (2) - Technology is more a problem solver than a problem itself - Climate: Regulatory changes significantly affect the industry and bring lots of problems.
Approaches	- Technology: There are so many improvements via technology as the product is more electronic (206) - People: Lots of training investment is done ( ) (205) - Task: The tasks and systems are changing all the time and there are re-engineering activities (218, 6). - Customer: There are less interaction with Customer (219)
Measurement Problems	- Relations: Difficult to share the global input measures for the outputs and get an overall picture (246, 263). - Input, Output: It is difficult to find appropriate measures of inputs and in particular outputs in all areas and comparing different areas with each other is difficult (245, 247). - Relations: It is not clear how much is gained from each customer (264)
Quality Gaps	- 1: Understanding who is customer and what he/she wants is difficult (230, 222) - 3: Banks are not very good in reacting to quality weaknesses and this increase gap 3 (240) - 4: Banks tend to give only general information in communications while more detailed information is needed by customer. - 5: Customer reacts differently for different products, customers themselves are also of different types therefore gaps could be different (227, 228, 229)
Quality Costs	- Prevention: Technological designs are lot (265), also cost of being apparent to the customer is bigger than internal costs (236) - Appraisal: Checking the measures is very routine and in most of the times computerised - External: Because of the technological procedures and the fact that the routine is that a service cannot be delivered unless the standard quality is met, the external costs are happen less, however when they happen the impact is huge as it damages trust. (266, 285) - Banks are not good at assessing the quality costs, particularly external costs that damage reputation (235).
Quality Characteristics	- Speed: Reliability, Ethics, Willingness to Help - Structural quality is perceived as a guaranteed by customer therefore is not that important in his perception (259)
Disagreements	- 1 had less emphasis on people and looked at environment as the main deriver of people as a factor while 2 looked at people as an important factor itself *[This could be because of the older age of 1 which gives him more historical perspective. As for he research both the above leads to the same conclusion]*

Consultancies: (Professionally Managed with Less Room for Productivity)

Subject	Features
P/Q-Trade Off	- Mission is to deliver a high quality work, while only interested in productivity (371). - Productivity is mostly about balancing between front and back office (372) - Customer is looking for answers for his questions, he won't come back if the quality is low but he may come back if the productivity is low (333) (329). - Difficult to understand and manage productivity in front office (335) (373) - Trade Off: Pressure of the new commercial world demands productivity and quality to go hand in hand (370)
Policy	- There are no relations between volume and cost (302) - Quality always should be in a high level, it is usually not increased once it reaches the level of customer satisfaction (303) (347) - Increasing volume will decrease quality, there are limits in increasing volume (304) (346) - It is intended to save the front office cost to the benefit of the delivered service (342)
Factors	- Feedback: Not lots of time is spending for getting client's views, it is mostly in the background (309) (350). - Input: Enough number of skilful people is needed (374). - Customer involvement is not much applied because of the skills needed (310). - Process: Different types of service need their appropriate type of processes to be delivered (375). - Process: Is being done by experts and in this regard it's less important (376). - Process: Some times you cannot force the process (337).
Problems	- Technological changes have impacts on supporting activities and some of the consultancy subjects (377) - People: Scarcity of material or capacity can be considered for human resource. (313, 355) - People: It's difficult for a consultant to move from one team to another (339) - People: Front line being experts, sometimes training and replacing is difficult (362) - Because of increasing opportunities, recently there are moving away from loyalty (317). - Climate: There is a good culture that maintains motivation and the intellectually challenging work brings a good team working (314, 351, 352). - Methodology: Supporting activities are increasingly left for the front office which leads to low quality and costly supporting works (340, 345)

Approaches	- Customer: Certain kinds of work use customer involvement but not for a cheaper work but for a better results, the interaction is well controlled (319) (356) - Customer: Better relation with customer leads to better success as the result of trust (321). - People skills are to be improved by training and it will increase the staff satisfaction (354) (378) - People: Low cost staff (back office) are replaced by high cost (front office) (353) - Task: Every body is trying to improve the methods (379) - Capacity: Bringing a job and the appropriate people together by on time recruitment or outsourcing is important (357).
Measurement Problems	- Intangible: Giving the customer confidence and right advice cannot be measured directly unless having repeated work with the same client (381) - Output: Estimating output before it is finished for validation and assessing it after it is finished is difficult (382) (363) - Input is easily measured by time, other things are mostly overheads (380) - Relation: External activities are difficult to measure because of the relation problems, internal activities are easily measured, relating the productivity measurements in between the two is difficult. (341) (359)
Quality Gaps	- One: The specifications are not standardised and can be done by negotiation with customer, they can be misunderstood (327). - Three: Not very much since it is necessary to comply with specifications otherwise there will be lots of difficulties with customer (328) - Seven: Customer representative is some times not qualified enough to judge about the quality (366).
Quality Costs	- Internal: Not being able to meet the deadline or need to additional resources with no possibility to charge the customer (332). - External means doing additional work, it can be measured because of the need for customers approval. (331, 367). - External: It shows itself after a while when customer starts using (368). - Staff are expected to have a highly qualified work therefore not much prevention and appraisal costs apply (369, 383).
Quality Characteristics	Reliability incl. Flexibility , ethics and some times speed. Speed: Good service is more important than speed (384) Structural is not predefined (325).
Disagreements	1 believed in taking quality higher than expectations while 2 believed in keeping it at the minimum standard level although admitted the earlier perspective *[this could be because of the difference between the nature of the two consultancies i.e. management vs. design. The rankings are the same]* For 1 technology was less an issue than for 2 *[this is because of the two different subjects of consultancy i.e. management, design]*

Department Stores: (Customer Friendly Management through Continuous Flow of Information)

Subject	Features
P/Q-Trade Off	- Quality is a narrow title as compared to Productivity (401) - No direct pay off between productivity and quality (402) - Increasing quality decreases return rate which in turn increases productivity (440) - Quality expectations of the customer are not restricted to the most productive items and this results in losing customer (405) - Quality is mostly applied to the front line and the quality of front line because of self service has not a significant negative effect on productivity (403, 419).
Policy	- Cost: The nature of the industry makes it impossible to improve productivity without decreasing the cost (422) - Cost decreases easily by replacing people with technology (424) - Volume: Increasing volume means more staff and money (420)
Factors	- Output: Significantly different users make output complex (408) - Process: Process and output are extremely diverse (441) - Input: Information is an important part of input (442) - Feedback is important for value judgement in future (425)
Problems	- Technology: In long term is one of the biggest problems. (443) - Technology: To stay competitive in the market, new and costly technology has to be introduced without necessarily saving in anywhere else (423). - Methodology: Managing demand is not easy in retailing (433). - Methodology: Process is extremely diverse (441). - People: It is easy to destroy employees satisfaction and difficult to reach it (412). - Climate: Operational climate does not affect regularly but when it affects (problems with managers, accountants, IT people) the impact is huge (428) - Climate: Retailers are perceived as low in society and thus not all people are happy about their job (411).
Approaches	- Technology: Using Internet to serve customer is becoming a major improvement (444) - Technology: Managers get report on their best selling lines through IT (430) - Improving encounter time is very important, time equivalents money (409) - Service: There is moving from standardisation (410) - Service: The incomes from advertisement are not worthy. (432) - Customer survey is less by questionnaires and more by analysing reactions to sells and staff (445).
Measurement Problems	- Facing: It is an objective to create empathy between staff and customer and measuring it is difficult. (1) - Facing: Appearance of people is important and difficult to measure (2) - Relation: Because of the diversity of the processes and the products, and the different nature of back and front line, putting the measures of input and output in relation to each other is difficult (446).
Quality Gaps	- One, Two: Customer expectations are not highly tangible (414). - Four: As a result of different types of customer, new services/stores, wrong assumption that things are obvious to the customer, not a right image of service is given to the customer (439)
Quality Costs	- Prevention: Because of very people oriented operating systems in back office and front office prevention cost is high (438) - External: Returning items cause huge costs and still returning itself cannot recover the failure (415). - Internal: Mostly inability to meet the demand (416)
Quality Characteristics	Reliability includes warranty, structural, ethics, willingness to help, sensory One aspect of quality is being able to browse with no shopping (447).
Disagreements	None.

Fast Foods: (Standard Management of Difficulties)

Subject	Features
P/Q-Trade Off	- Speed is a main driver and structural quality is standard (501) - Productivity is mostly applied for speed (534)
Policy	- Volume: While growing volume is the main issue, when market is saturated cost is the main one. (562) - Volume: Increasing volume reduces cost which will result in better quality (561). - Quality increase is not a policy as it is in a standard level and customer does not expect more (536)
Factors	- Operations feedback is important for scheduling and fast foods are good at this (524) - Feedback in terms of quality of the results is being done at every step of the process (539) - Input: People is one of the biggest costs (514) - Input: All the popular issues about human resource are relevant here (563) - Process: The operations are complex and robust (518) - Process: Quick forecasting is needed for right amount of food with lowest possible cost (525) - Output is very standard, easy to be produced and sold, not an issue (504) (564) - Customer: Customer is used for self service (drive through) (565) - Customer: Nature of the business makes the involvement of customer possible which leads to better productivity and quality (537)
Problems	- People: Difficult to find qualified people (509) - People: Difficult to keep people, people lost interest (507, 509) - People: Overspecialisation is the nature of this industry (540) - Climate: Fast food has bad reputation about working conditions (508) - Climate: People are not team working oriented (543). - Methodology: Late deliveries because of inefficiency and peak demand happens (567).
Approaches	- Technology has a vital role in decreasing cost and standardisation (568) - Technology is looked at as an alternative for labour (569) - Service: Nature of fast foods is very much standardisation and advertisement (546, 570) - Service: Demands are managed by advertisement (547)
Measurement Problems	- Relation: Peripheral services make the measurement relation between input and output difficult (571). - Relation: Manufacturing type back office and retail type front office make the relation of input and output difficult (550). - Standard procedures can be measured easily (551). - Historically fast foods only measure the products rather than customer satisfaction and newly there are lots of challenges to quantify the intangible issues in front office (553, 572).
Quality Gaps	- Four: There is a difference between advertisement and what is really delivered (529, 573), External communications have the single influence on expectations (554). - Seven: Perception of customer about speed is not real, it's underestimated (558). - Six: There is a lack of reality check in terms of customer perception (559). - One: speedy day-to-day activity makes it difficult to be customer focus (530).
Quality Costs	- External and Appraisal: Because of standardisation these are less (526, 552), when happen the effects are huge due to the public relations and press (560). - Prevention: Because of standardisation the prevention cost is high (574, 575).
Quality Characteristics	Speed: Reliability, Willingness to Help, Structural Ethical is not very important as the customer do not expect a lot (523)
Disagreements	1 gave less importance to structural quality, 2 however considered it as one of the main quality aspects, they both ranked speed to be the highest any way.

Hotels: (Technical Management of a Close Relation with Customer)

Subject	Features
P/Q-Trade Off	- Productivity is basically to filling the rooms; with no productivity, quality is not relevant.(601) - A productive system provides what cust. wants, i.e. (the basis of) quality (602)
Policy	- 2Volume: The point is to fill the hotel with the best possible rate (607). - Volume: Increasing volume will decrease cost per unit (644) - Because of the high level expectation of quality, increasing quality is not a policy it has to be there any way (642).
Factors	- 2Input: employee is one of the reasons that customer comes back (624) - Input: Input in terms of staff and technology has a significant effect on all the other factors (626). - Output is driven by input (645) - 1.5Feedback: due to the inseperatibility of the service from consumption, it's important to have the feedback during the process (636). - 1Customer: As customer is always there, if something goes wrong it's usually too late to fix it (605).
Problems	- 2People: loyalty is low, considered weak to remain in 1 place for long (640) - People: Untrained people give quality services that are not needed (641) - Climate: There is a culture of being afraid to admit the mistakes, thus the communications and reporting are not good (643). - 1.5Methodology: Traditionally hotels are bad in measurement because of the direct service to customer all the time (614).
Approaches	- People: flexibility in staff usage is a main tool for controlling cost (610). - People: Training is important to have multi skilled people, also satisfies them, untrained people could give quality services that are not needed. (616) (641). - People: People are afraid from admitting their mistakes and therefore they are reluctant to report and communicate the problems with the higher levels and this can easily damage quality (653). - Capacity: Yield management is a big tool and hotels are clustering together for better yield management (622) - Capacity: product cannot be stored, the capacity is everything (623). - Technology is the major cause of productivity, other than facilitating yield management, it brings transparency, managers can then take appropriate actions, look at the individual customers, avoid wasting time for the aspects of quality that do not matter (611). - Customer likes to feel at home, thus he prefers to do the things himself and independently (621).
Measurement Problems	- Output: every service could be unique, difficult to standardised & measure (630). Output is too late to be improved after quality measurement (627). - Intangibility: The measurements are mostly about meeting the budget or customer satisfaction in a very broad term and lacks measures of more specific intangible aspects (646)
Quality Gaps	- 2One drives all the others (647) - 1.5Three: Inseperatability of the service and consumption makes the specifications-delivery gap a significant one 634). - Gap 6 exists, important to have cust. feedback during the process (636).
Quality Costs	- Prevention costs is the main cost of quality including looking to customers and providing the systems (648). - Appraisal: Mystery guest and feedback surveys (649). - External cost might be in a way helpful as it gives some clear picture for repairing and improving the quality (638).
Quality Characteristics	Structural includes all.
Disagreements	None

Subject	Features
P/Q-Trade Off	- Because of the legislation, and competition there is more emphasis on quality (701, 704). - Improving the quality of the standard service is positively coordinated with the productivity improvement in terms of speed, less errors, tuned process (740).
Policy	- 2Quality: Increasing quality of the standard service leads to less error and subsequently less cost (758). - Quality: As the result of the recent emphasis on quality, a suitable culture and value is being tried to be introduced to the company by which less cost is needed for quality improvement which results in less productivity loss after improving quality (707). - Volume: Unit cost is not so sensitive to volume therefore there is less productivity improvement through increased volume (738). - Cost: Traditionally cost is high and difficult to be controlled (705).
Factors	- 2Process: Industry is a process oriented industry; the controls, risk assessments and payment of claims are based on a set of row of processes (708). - 1.5Input: Many people are needed for the business and there are lots of manual interventions (737, 745) - 1Output: Because of the financial technical terms involved, there is a complexity of the product (736). - Feedback: There are no significant activities for receiving customer feedback as customer does not have enough financial knowledge to assess the details of the service (759).
Problems	- 1.5Technology: Because of the complexity of technology and its rapid change the work in IT wasn't coherently fit together so far, the usage was not serious and it was difficult to achieve the desired targets in IT (713, 757). - 1People: Because of lots of manual intervention, human errors are appeared (737). - People: Because of the existence of lots of financial institutions, employee loyalty is a problem (746). - People: Because there are lots of repetitive works, there is the danger of a factory type work that has negative effects in staff satisfaction (747). - 2Methodology: Companies need to throw away the old system and make new investments (714, 720, 742). - Methodology: The industry is too process oriented and this does not allow enough focus on quality and ultimately because of quality problems, productivity also suffers (728). - 1.5Climate: Because of the past scandals and the consequences in the press, the business is not an attractive one and does not have a good reputation (741). - Climate: Many difficulties and complexity emerge because of the regulatory changes (711, 743). - Climate: Managers are too process oriented and less consider the quality aspects of the work which will result in productivity problems (760).

Approaches	- 2Service: Companies are trying to improve the products in terms of speed, helpfulness, work, cost, easiness to buy, also in terms of being simpler for customer to understand it and being standardised (717). - 1Technology: IT is a big issue now and results in better relations with customer and understanding the business better (712). - 1Task: Functions outsourcing would be more in future (721). - Service: As the result of making the product simpler for the customer, there are less face-to-face activities (761). - 1Customer: As customer has more enquiries for instant information, customer contact (not face to face) is more than before (724). - Customer: There are attempts to get away from the process mentality in order to have more connection to the customer (715). - People: The industry needs more creative and value oriented skills (716).
Measurement Problems	- 1Relation: Measurements are not that sensitive particularly when putting them in relation with input.(749) - 2Intangibility: The value of output is not defined, particularly in terms of intangible output.(745).
Quality Gaps	- 2One: There is a low flow of information and contact between the managers and the front office which results in misunderstanding the customer expectations (751). - 1One: There is lack of marketing orientation that leads to difficulty in specifying the desired service (727). - 1Three: Because of poor quality management and too much focus on the process, there are difficulties in delivering the service according to the specifications (728). - Seven: As customer does not understand the technical issues, there can be some misunderstandings about the real service (730).
Quality Costs	- 2Prevention: As there is no good understanding of the concept of quality, more prevention and appraisal costs are taken place (734). - 1External: Being a processed oriented service and because of the lack of quality systems, the failures appear when they are reached to the customer and that causes bad advertising from customer and damages the relationship (735). - Internal: As the process is very standard and routine, there is less internal failure cost (733).
Quality Characteristics	Reliability: Speed, Structural , Commercial
Disagreements	None.

Legal Services: Friendly management of experts by standards

Subject	Features
P/Q-Trade Off	- Quality leads to no rework, which brings more productivity (801). - It is impossible to be productive with low quality (803). - Increasing quality always needs investment so in short term the productivity will be decreased (804).
Policy	- 2Volume: The business needs critical mass of customers to sustain the office staff and capitalisation of the business, increasing volume is a goal (806). - Quality: There is a level where you don't want more quality as people are not seeking quality for more cost, the important thing is sustained quality (807).
Factors	- 2Process: Balancing the work for individuals and particularly between the front and back office is tricky and important (850). - Observing the standard processes is essential and helps to sustain quality and improve productivity (851). - 2Input: The business is a human based business, with right experts and support staff, the chance of success is good (820, 852). - Feedback: There are not serious customer survey, partially because customer does not have the expertise knowledge about the legal procedures (853).
Problems	- 2Methodology: Inability to measure is one of the most difficulties for productivity management (819). - 1.5Climate: Attitudes of lawyers, particularly towards administration staff is sometimes poor and difficult to be changed, this makes difficulties in the work of others and dis-benefits the organisation. (811). - People: Administration staff some times find their work not exciting and this can reduce their motivation (849).
Approaches	- 2Service: Standardisation is vital, particularly in administration process (826). - Service: Branding is important but cannot be achieved by advertisement (827). - 1Task: Loyalty depends on the ability to enjoy the work, loyalty will go if the work is not enjoyable, this is provided by deskilling (825). - 1.5People: Among the different approaches to productivity improvement, if you have the employee based right, the others will be developed (823). - People: There is continuous educ. programmes for deskilling the work (815). - Task: Deskilling the tasks (decreasing the areas of work for each staff) increases the gearing without which it's impossible to increase productivity (805, 809, 815). - Technology: IT helps with meeting the deadlines, a difficult task (836).
Measurement Problems	- 2Intangibility: It is easy to measure damages of losing a case but not easy to measure the benefits of winning a case, particularly the intang. benefits (831). - Intangibility: Other than the customer you have other contacts as well (e.g. advocacy, other agencies) so you need to measure the outcomes and their intangible aspects individually (834). - 1.5Facing Customer: The one to one contact of the solicitor and the customer is difficult to be monitored and measured (837).
Quality Gaps	- 1.5Three: It is not always possible to completely meet the specifications due to the unexpected barriers and difficulties throughout the work (848). - One: The expectation of customer is not standard and known and you need to ask the customer about it but it is easy to understand customer expectations (afterwards) (842). - Seven: Customer cannot judge professionally about the service (830).
Quality Costs	- 1.5Internal: Human error is inevitable (832) - 2External: The external quality failure cannot be easily rectify (846).
Quality Characteristics	Structural: Speed, Willingness to Help, Reliability, Ethical. Flexibility is limited to expertise and mostly applies to non-core elements, it is also controlled by ethical issues (839, 840).
Disagreements	None.

Power Utilities: Managing an Integrated System by Attempting Technological Advances:

Subject	Features
P/Q-Trade Off	- Historically the aim is more productivity for controlling the cost per transactions and this limits quality improvement (1051). - Recently there are more willingness to have better quality with higher cost but not much (1052).
Policy	- 2.5Volume: Large-scale companies can have better quality with less cost (1053). - It's easy to serve group of customers with relatively low cost (1065). - 1.5Quality: As quality mostly means the perception (not necessarily added value) and reputation it is possible to increase qual. without much cost (1054) - Small margin business, less dealing with cutting cost (1001).
Factors	- 1.5Input: Most of the efforts are in managing input (1009). - IT is an important and influential element of input (1057). - Process: Due to demand fluct. and multiple cust. types with multiple payment types, there are difficulties in managing the cost of the processes (1010). - Output: Corporate image and branding is a crucial part of output (1058).
Problems	- 2Methodology: Systems are not yet productive enough to work well in the complexity and it is costly to improve them (1038, 1059). - 1People: Problems of adopting with the new system for old staff (1021). - People: There are many call centres in other businesses, there were organisational changes in the industry, the loyalty of staff is not high (1020). - 1.5Climate: There are increasing regulations for keeping the confidentiality of the customer information that influences the flow of information and needs investment on access systems (1022). - Technology: There is continues development of technology in PC systems that causes complexity of IT systems (1014).
Approaches	- 2Service: To seek quality accreditation there are increasing attempts for standard. which also results in significant improvement in productivity (1025). - Service: brand recognition is very important, there are ads for brand (1002). - IT sys. can allow signif. improve. in transaction without cost increase (1056). - 2Technology: There are huge investments for technological improvements and developments for ISs (1060). - 1.5Task: There are significant plans to adapt and improve the methods in line with the standardisation (1061). - 1.5People: Because of the organisational changes and the required skills in call centres, there are lots of investment for training the staff (1019). - There is pressure for recruiting for less skilful jobs to be closer to market rate and for making skilful staff to become multi skilled (1031).
Measurement Problems	- 1.5Relation: It is difficult to relate the benefits and loss to a particular item of input due to the complexity of systems (1062). - 1.5Intangibility: There are difficulties in measuring cust. related tasks (1043).
Quality Gaps	- 1.5One: Cust. expect. change rapidly due to compet., unlike their percep. (1049). - 1.5Four: There is a traditional gap in marketing (that causes in communication failures in terms of productivity) (1048). - 2Three: Complexity of the systems caused by IT and legislation does not allow a service delivery that is 100% according to the specifications (1063)
Quality Costs	- 2Prevention: Lots of money is being spent to build and develop prevention and appraisal systems, particularly to meet new regulations and standards (1064). - 1Internal: Due to emerg. of new processes the int. failure cost is high (1034).
Quality Characteristics	Reliability: Flexibility – Ethical Flexibility: As lots of the concern of customer for quality is about non core service issues, flexibility in payments has increasingly becoming an issue (1036).
Disagreements	Nothing significant, the elder expert had more historical view and was more interested in the effect of changes while the younger expert was more interested in routine day to day issues.

Auto-Repair; (Easily Manageable Standards)

Subject	Features
P/Q-Trade Off	- Increasing quality decreases productivity in short term as staff are not complement with the task and competence, in long term it is increased because of training and new staff (901). - The business is at customer's demand, it is not known that what is the exact work needed till customer arrives so quality becomes very important to be able to do a right and satisfactory job (902). - Losing productivity makes things difficult but losing quality makes things impossible (926).
Policy	- 2Volume, Cost: Because quality is very standardised it won't be affected by changing volume or cost (904). - Quality: In this industry any increase in quality would affect cost or volume (903).
Factors	- 2Process: There are lots of standards in the business and if these being done right with right input, you will get customer satisfaction and productivity (906). - 2Input: The business has very adaptable workforce (905). - 1Output: There is a simple (in terms of expectations) but professional (in terms of quality) type demand from this industry (925). - 1Feedback: Customer perception survey is very serious (911).
Problems	- 2People: Because of the long hours of working even in holidays, motivation is a problem (907). - People: Most people leave their companies for social hours and money and they often get very good positions in competitor companies (916). - People: Adopting with new technology is mainly on IT and is one of the biggest problems in productivity, people are not skilful with computer (909). - 1Methodology: Some times there are late delivery problems because of high demand or the material not available (927). - 1Climate: The teams are small and human conflicts is inevitable (908).
Approaches	- 2Service: Standardised service is the main driver of productivity (928) - 1Customer: Interaction with customer is being encouraged (912). - Customer perception survey is very serious (911). - 1People: Spending a lot of money to train and improve people is definite in this industry (914). - People: The career ladder works well for motivation (915).
Measurement Problems	- 2Relation: Standardisation helps to measure productivity very well although it does not help in reasonable interpretation of the relationship between input and output in the measurements (917).
Quality Gaps	- 2Four: As marketing do not consult with the field for the availability of stocks, some times customers cannot get what they expect according to the advertisements (922) - Because of the standards and not high technical level of the work, the expectations can be put easily into standard specifications and can easily be followed (923). - As the required services are routine, it is easy to understand what customer wants (921).
Quality Costs	- Prevention and appraisal costs are high because of maintaining the standards (919). - 1External: Some times difficulties in dealing with suppliers result in external failure costs that usually is about warranties (929). - Because of the established standards the internal costs are not very high (920).
Quality Characteristics	Reliability: Willingness to Help, Commercial, Ethical. Flexibility is more for peripheral services (930) Speed: Customer has more concern for reliability rather than speed (918).
Disagreements	(Not Applicable)

Telecommunications: (Managing in the Speed of Change)

Subject	Features
P/Q-Trade Off	- In most cases, particularly when demand is high, it's productivity that follows quality (1141, 1118). - Low quality in front end causes productivity decrease in back office and high quality saves productivity in back office (1126).
Policy	- 1.5Volume: There is an effort to get more job to decrease the cost but the quality standards must also be kept (1107). - As the number of residential areas is restricted, increasing volume works mostly in terms of giving variety of services to a customer rather than only a phone line, number of basic services (customers) are not increasing significantly (1128). - 2Cost: There is a culture of decreasing the cost which leads to productivity (1129). - Quality: For the main services like phone, a certain level of quality is assumed thus cost reduction and then increasing volume are more applied (1156). - Cost: As the price is regulated, there are more needs to bring the costs down (1122).
Factors	- 1Process: Quality determines and dictates every thing in the process (1146). - 1.5Input: Continuous training is needed otherwise when a new product arrives, staff are not ready (1103). - 1.5Feedback: There are lots of quality audits and measurements in front and back office (in each procedure) (1106). - 1Customer: Different customers have different requirements (1145).
Problems	- 1Technology: Scarcity of material is major issue for the engineers in front line and this is being increased by introducing of new technology (1115). - The speed of introducing new technologies to the market is very fast and can result in ignoring more fundamental issues (1109, 1110, 1147). - 2Methodology: Many problems of quality and productivity come out of the systems in the back office (1150). - 1People: Front end people do not have in-depth knowledge, it is difficult for one person to know every thing, these bring the problem of responsiveness (1111). - Field workers have to understand how the system is working to satisfy the customer, otherwise the quality and productivity of system could be affected (1114). - People: There is a squeeze culture in the industry which means managers have realised that as the result of the technological advantage, people in fields can work harder, therefore they push them to work harder (1130). - People in front line always complain about the need to travel (1116) - Climate: Local geographical issues is one of the biggest problems and this causes a culture of the feel of being undervalued because of some particular local factors (1117). - Human conflicts and team problems exist (1120).

Approaches	- 1People: Continuous training is needed otherwise when a new product arrives, staff are not ready (1103). - People: As the industry is growing and well paid, motivation is reasonably high (1121). - 2Technology: Taking the most benefit from technology in terms of productivity and quality is inevitable (1157). - 1Task: There is a continues re-engineering in the systems to use new technology (1125). - Each procedure is a chain of tasks and each task in the procedures needs to be done with an accepted level of quality before it could go to the next task which is considered as an internal customer (1104, 1142).
Measurement Problems	- 1.5Output: You want to measure value that generates revenue and it depends on customer retention as an important element of output so measuring usual KPIs is not enough for understanding what is going on (1153). - The product could be very simple or very complicated and different levels of individuals or teams are needed to do it, this makes measurement less standard and easy (1132). - Output: There are operational and sustainable values and this makes output more complicated in terms of measurement (1158). - 2Relation: Measurements that relate input to output are difficult and crucial (1151). - Relation: It is difficult to isolate a cost item for the job (1131).
Quality Gaps	- 1One: There is a too broad view of the customer's expectation (1135). - One: Managers think that following standards makes customer satisfied but customer some times expect more than the standards (1136). - Understanding can be standardised but customer views are changing (1155). - 2Four: There is a low level of information flow between the business and the market (1137).
Quality Costs	- 1.5Prevention: There are lots of standard systems to provide the acceptable level of quality in the process (1159). - 2Internal: The assumption is that certain products can be delivered in standard lead times but this does not always happen and causes big deal of effort to fix it before reaching customer (1134).
Quality Characteristics	Reliability: Commercial, Ethical, Flexibility, Willingness to Help, Structural. Sensory: According to the surveys, customers' message is that have the basics right, forget about the fancy aspects (1140). Structural: The expected belief is that the phone always works so quality has to be produced from that level of expectation, this is not true though for the data service (1144).
Disagreements	None.

Universities: (Managing trade offs to satisfy all the Customers)

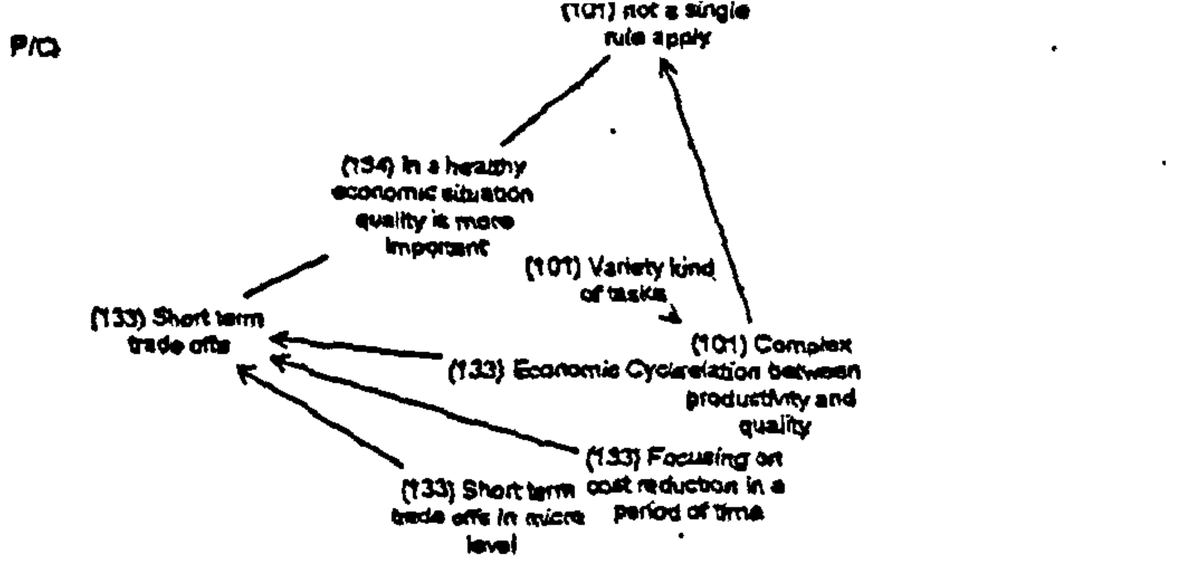
Subject	Features
P/Q-Trade Off	- We are in pressure by our graduates to preserve and higher up the quality of our profile (1230). - High quality brings more students and that increases productivity (1232, 1262). - Productivity can be driven up only by cutting cost and that might result in losing quality but in long term brings positive (1261).
Policy	- 1Volume: The need in labour market is limited so it is not necessary to push the market up, although a certain level of students must be achieved (1238). - In some respects if volume is increased then quality needs to be developed to make sure about degree qualification, therefore increasing volume might cause extra cost (1264). - 2Cost: As a routine practice we are trying to reduce the cost (1207). - Old universities tend to reduce the cost to save money on administration, then the priority is to increase the volume (1263).
Factors	- 1.5Process - 1.5Input: Managers need to decide about the criteria and the balance in terms of input (1233). - People: The quality of the work sometimes is very subjective to individuals and can be affected with their absents or personal difficulties (1226). - 2Output/Input: The output should be very valuable with very low profit and a low input (1239). - Output/Process: Various outputs necessarily have to be delivered through certain processes because of the funding so there is a trade off in using funding (1234). - Customer has significant contribution on the process (1). - Feedback: Student's feedback is for measuring employees facing customer although it is not an absolute measure (1214). - Feedback: The students do not always know what is the best for them and their perception changes in the later years this makes difficult to evaluate the feedback results (1219). - Feedback: There is increasing dependence of inputs (funding) on measurement of results and of feedbacks (1237).
Problems	- 2People: There is a gap between the capabilities of people and positions, many times capabilities are higher (1255). - People: The quality of the work sometimes is very subjective to individuals and can be affected with their absents or personal difficulties (1226). - People: It is difficult to get the staff to be versatile in delivering their skills (1209). - Competence of people is a critical issue, this is more applied to academic staff (rather than support staff), they stay for long time and lots of cost is being invested for them (1208). - it is difficult to motivate all the staff (1242). - 1.5Methodology: New comers need to wait a long time for the old ones to move or retire to be able to move up (1256). - Methodology: There are continual review of the programme to cope with the requirements of the time and this takes lots of efforts (1221). - Methodology: Insufficient management information to be able to have a clear picture and make right decisions, costly hidden operations because of being infrequent and not measured (1258).

Approaches	- 1.5Service: Need to be standardised at particular quality levels as the graduates need to have standard qualifications (1202). - Service: There are increasing procedures of standardisation to accredit non-creditable courses to contribute to degree (1245). - 2People: The quality of interaction between staff and students is very important and much more than the physical condition, it all depends on the staff (1204). - 1.5Task: As the task is not restrictive and has a free range there are no need for restrict job design and this helps productivity better (1203, 1225). - 1.5Customer: Big research organisations are increasingly become customers and this increases productivity (1247). - Customer has significant contribution on the process (1266). - 1.5Capacity management is a crucial element both in terms of meeting the demand and balancing the sources where the demand is decreased (1267).
Measurement Problems	- 1.5Input: Different financial sources are involved in some of the tasks that make helpful measurement difficult (1268). - 1.5Relation: Difficult to relate the value added and the profit to the different parts of capital and employee input. (1269) - 1Facing Customer: Student's feedback is for measuring employees facing customer although it is not an absolute measure (1214). - 1Intangibility: Lots of value added or damages are intangible and difficult to be measured. (1249, 1270)
Quality Gaps	- 1Two: The dependence of high level people to the lower levels in terms of quality gaps affects the specifications for quality (1223, 1265). - Two: There are some inabilities to translate all the feedback reports to action plans because of resource limitations (1257). - Three: The person who read the objectives of a class might have different understanding of the statements from the one who wrote them (1224). - 1Four: There is a lack of communication with students to let them know what effort is required from them (1251). - Seven: The students do not always know what is the best for them and their perception changes in the later years (1219). - One: As the students do not know exactly what is the best for them, knowing customer expectation is not very important, we tell our customer what they need to do (1220). - Five: There is a gap in between the available resources of knowledge like library and what students are interested in (1254).
Quality Costs	- 2Prevention: All the efforts are directed to prevention cost (1227). - 1Appraisal: Appraisal cost is high but should be kept to limits otherwise all the money will be wasted for it (1228). - 1.5Internal: Not always happen but when happens it could be very difficult (1271).
Quality Characteristics	Reliability: Structural, Willingness to Help, Flexibility, Ethical, Commercial Willingness to help is costly but important and is limited otherwise students as a whole will be sacrificed (1218). Speedy and/or flexible service is not always feasible (1217).
Disagreements	None

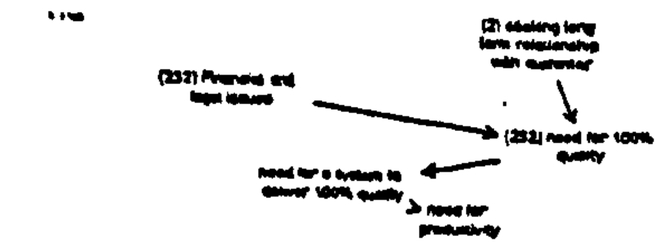
Appendix 6.4

Within Case Displays (Causal Maps)

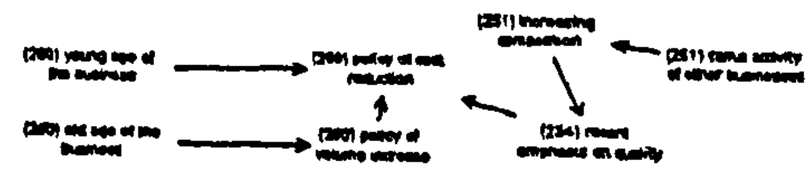
Airlines


P/Q
(101) not a single rule apply
(134) In a healthy economic situation quality is more important
(101) Variety kind of tasks
(133) Short term trade offs
(133) Economic Cyclerelation between productivity and quality
(101) Complex
(133) Focusing on cost reduction in a period of time
(133) Short term trade offs in micro level
POLICY
(143) Focusing on cost
(143) Saturated market
(143) legislation issues
(142) growth
(142) increasing volume
(135) Technology, particularly yield management
(135) Cost reduction
(142) revenue
(127) Focusing on quality only in some airlines
(127) Complexity of interaction between quality and cost
FACTORS
(144) better image
(144) income increase
(144) Input in terms of Technology
(144, 131, 108, 108) productivity
(131) substituting different categories of input (technology & people) is easy
(102) consuming productivity benefits
(108) increasing sophistication of product over a period of time
(102) coplexity of process
(130) possibility of customer involvemnet in all phases of delivering the service
(108) Multiple customer type
(107) routine and factory type procedures
(107) less activeness of customer feedback in productivity
PROBLEMS
(137) changes in customer's experience
(137) monitoring and controlling tactics
(137) technological changes
(140) less productivity
(140) legislation
(140) restricting abilities
APPROACHES
(112) complexity of operations
(112) applicability of all the productivity improvement approaches
MEASUREMENT
(117) cost declines with amount of service (distance)
(117) difficulty of measuring valid volume
(116, 142) difficulty of the rules by which costs are allocated to particular services
(119) arbitrary allocation of cost in measurement
(120) difficult to see if a certain robot is productive
(142) complexity of process
(142) variety of output
(142) variety of categories of cost and revenue
QUALITY CHARACTERISTICS
reliability
willingness to help
ethics
flexibility
speed
(129) involvement of customer in service delivery particularly for peripheral services
(129) importance of peripheral services
QUALITY GAPS
(141) multiple customer type
(141) difficult to understand customer's expectations
QUALITY COSTS
(125) lack of loyalty
(125) external failure costs is the largest quality cost
(125) customer remember the failure and make it known to others

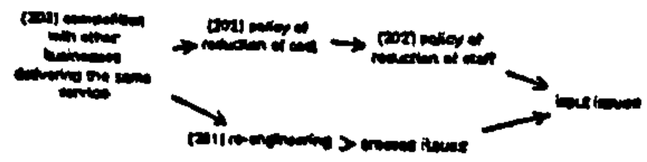
Banks



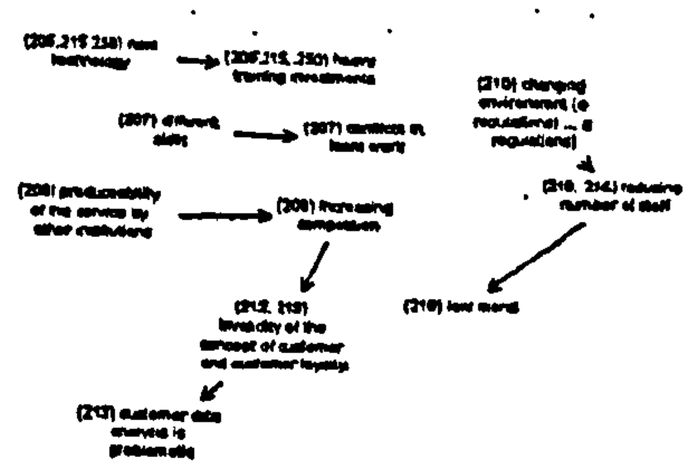
POLICY



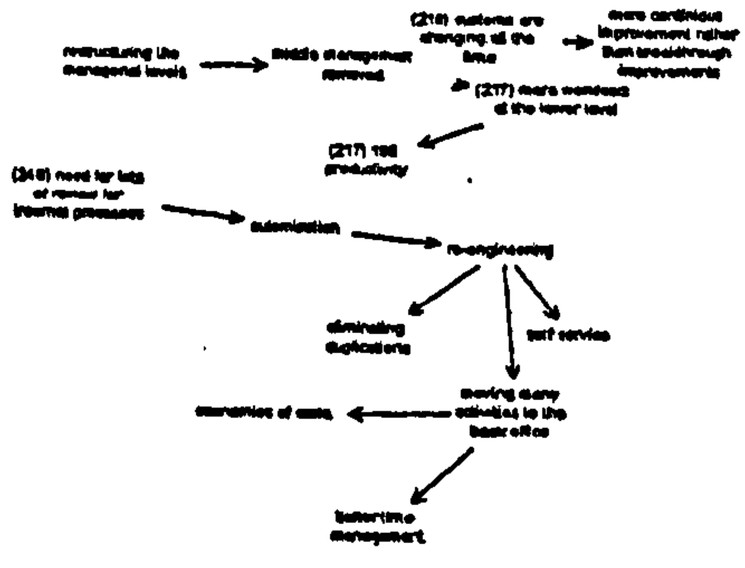
FACTORS



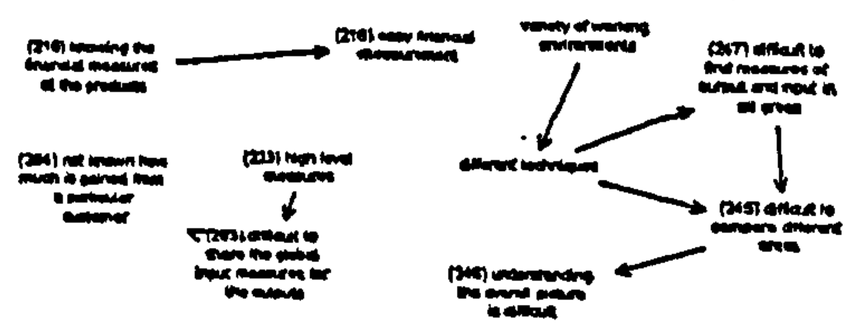
PROBLEMS (11)



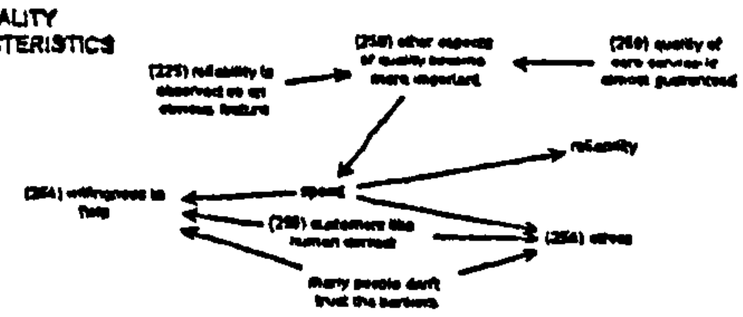
APPROACHES (14)



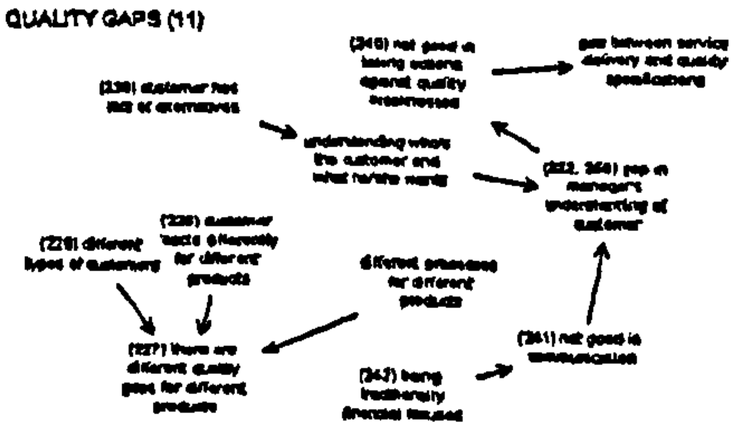
MEASUREMENT



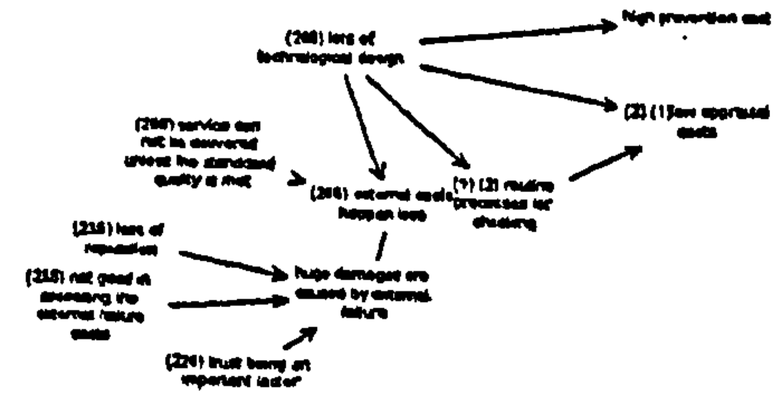
QUALITY CHARACTERISTICS

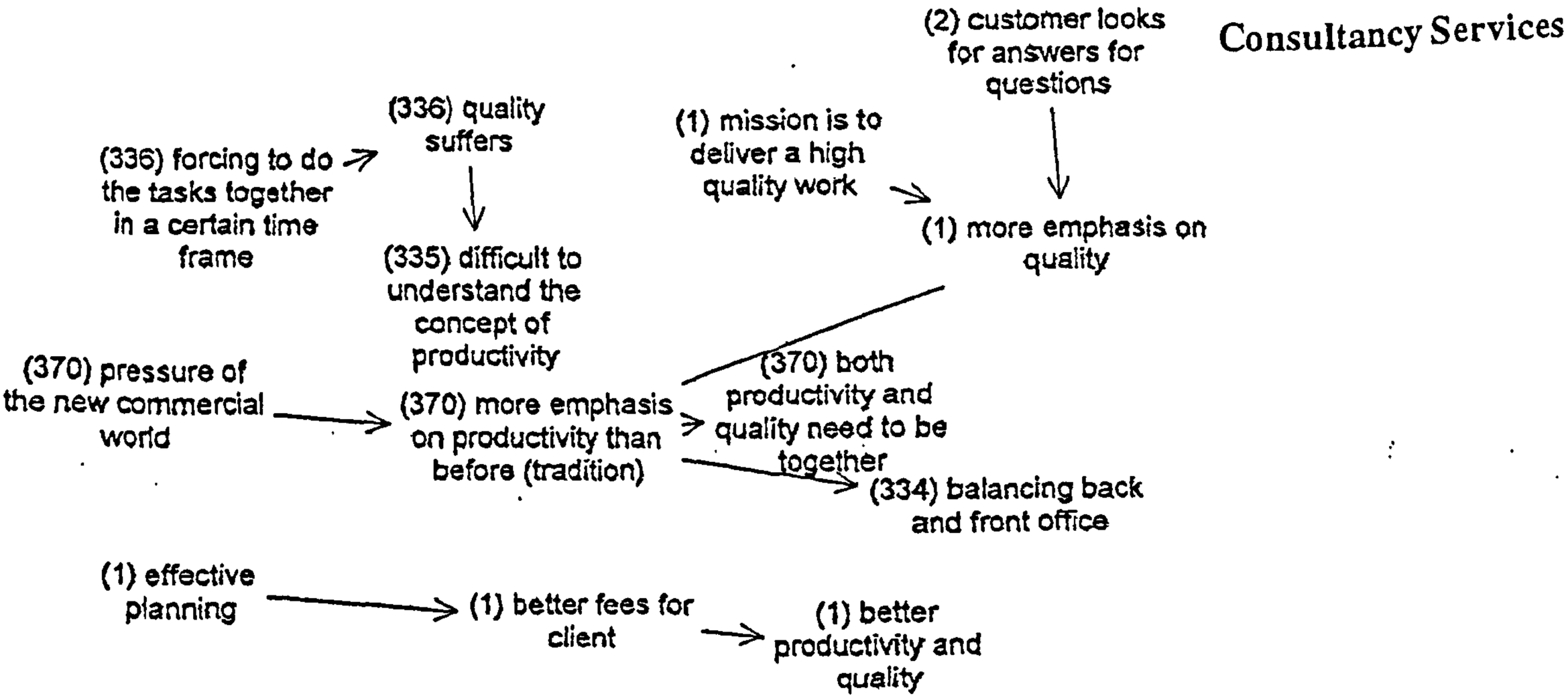


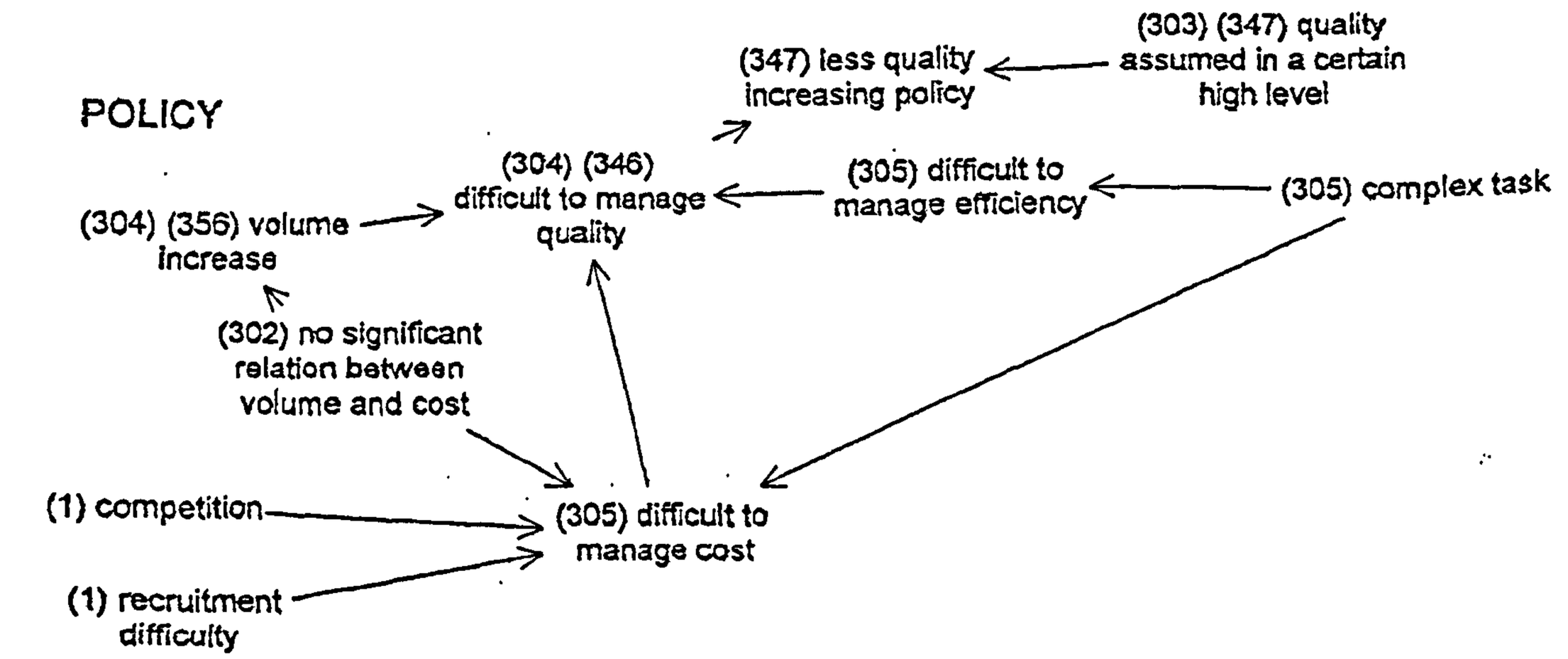
QUALITY GAPS (11)



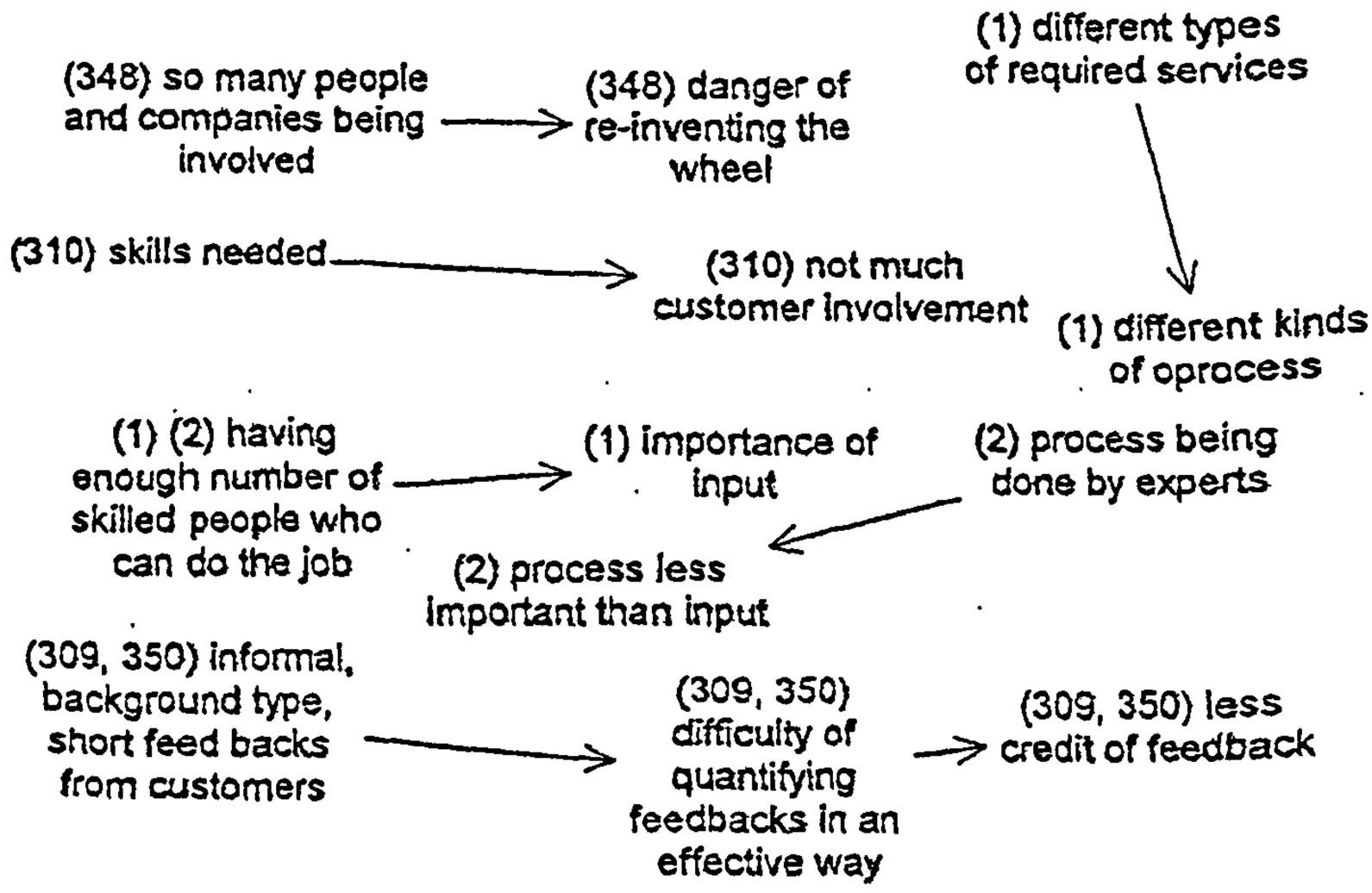
QUALITY COSTS



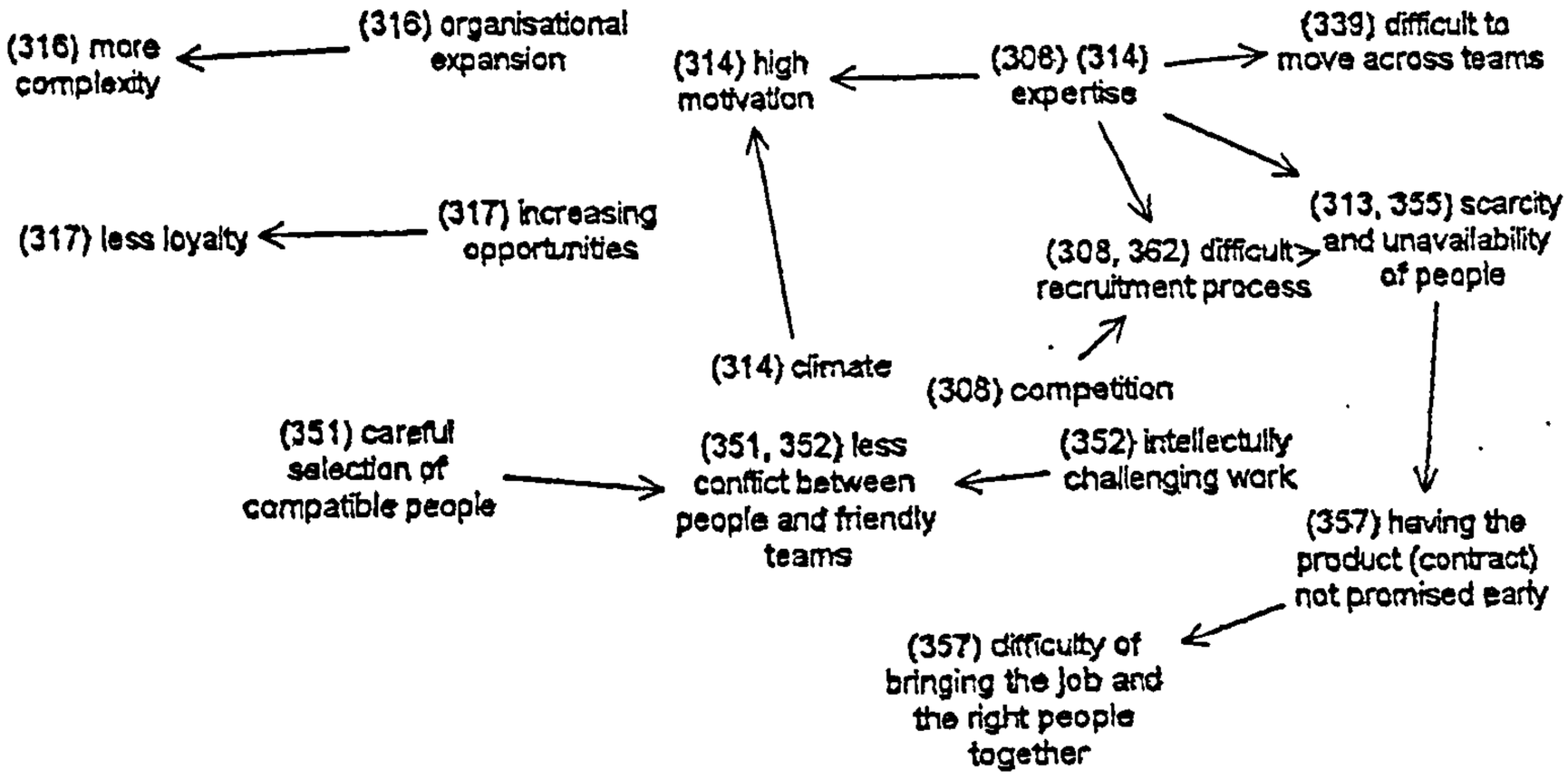

(2) customer looks for answers for questions
(336) quality suffers
(1) mission is to deliver a high quality work
(336) forcing to do the tasks together in a certain time frame
(1) more emphasis on quality
(335) difficult to understand the concept of productivity
(370) pressure of the new commercial world
(370) more emphasis on productivity than before (tradition)
(370) both productivity and quality need to be together
(334) balancing back and front office
(1) effective planning
(1) better fees for client
(1) better productivity and quality


POLICY
(303) (347) quality assumed in a certain high level
(347) less quality increasing policy
(304) (346) difficult to manage quality
(305) difficult to manage efficiency
(305) complex task
(304) (356) volume increase
(302) no significant relation between volume and cost
(1) competition
(305) difficult to manage cost
(1) recruitment difficulty

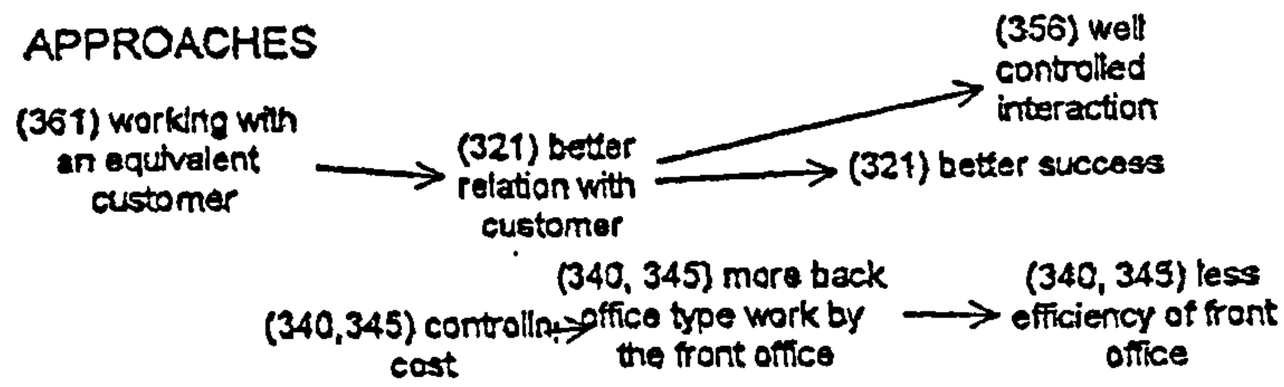
FACTORS (13)


(1) different types of required services
(348) so many people and companies being involved
(348) danger of re-inventing the wheel
(310) skills needed
(310) not much customer involvement
(1) different kinds of oprocess
(1) (2) having enough number of skilled people who can do the job
(1) importance of input
(2) process being done by experts
(2) process less important than input
(309, 350) informal, background type, short feed backs from customers
(309, 350) difficulty of quantifying feedbacks in an effective way
(309, 350) less credit of feedback

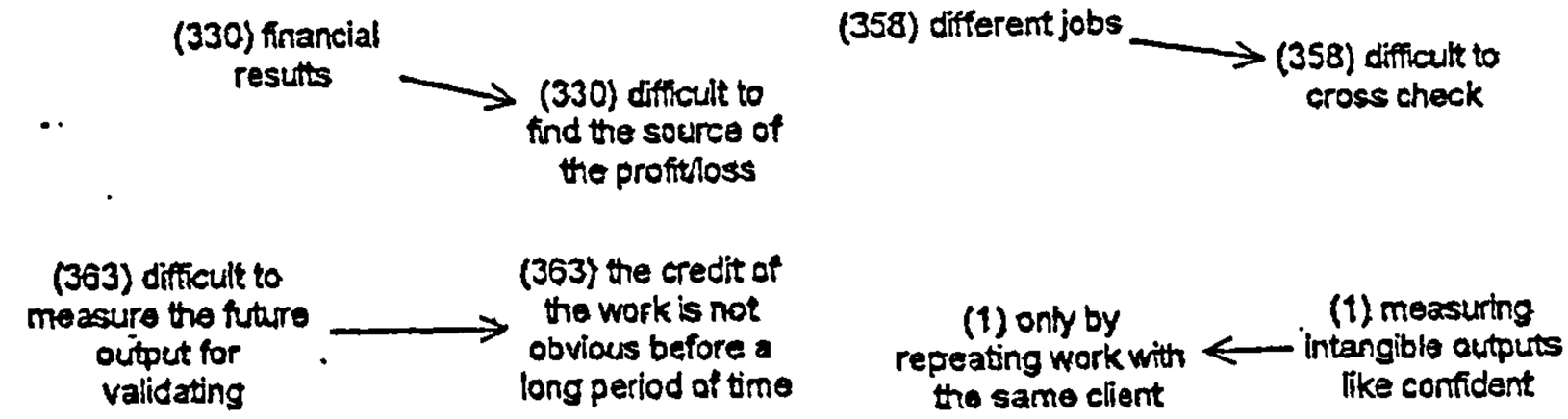
PROBLEMS (16)



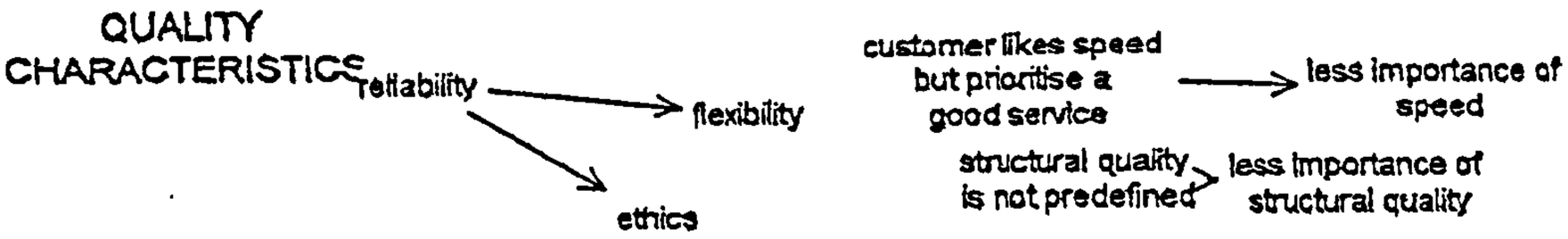
APPROACHES



MEASUREMENT

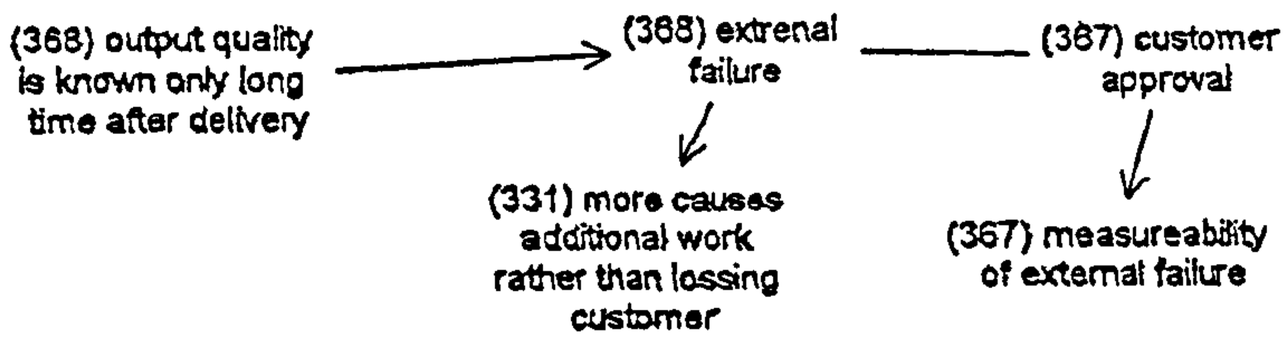


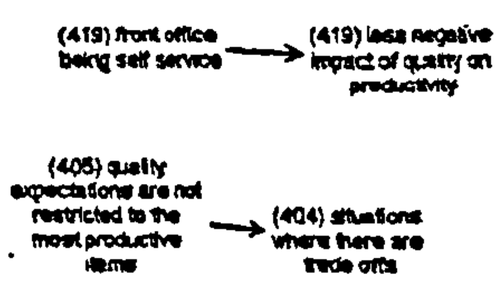
QUALITY CHARACTERISTICS



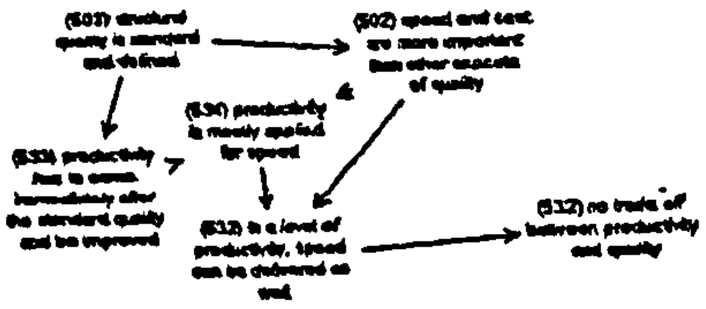
QUALITY GAPS (None)

QUALITY COSTS

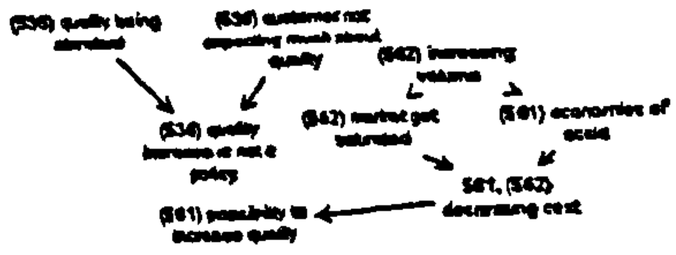



(419) front office being self service
(419) less negative impact of quality on productivity
(405) quality expectations are not restricted to the most productive items
(404) situations where there are trade offs
POLICY
(420) increasing volume
(420) more staff
(420) extra cost
(422) nature of the business
(422) impossible to improve productivity without decreasing cost
(421) reducing cost is the main issue in the whole business
(424) replacing people with technology
(424) cost will be easily decreased
FACTORS
(407) time scales
(407) more complexity
(426) technology
(425) product is bought to be sold
(425) value judgement is necessary
(426) more self service in future
(425) customer feedback is needed
(1) information is important part of input
(1) cannot operate if the right input is not there
(408) output has significantly different users
PROBLEMS
(411) retailers are perceived low in society
(411) not every body happy with his/her job
(426) difficult to keep the motivation of staff
(412) it's easy to destroy people's satisfaction and difficult to reach it
(1) internet
(1) technology is one of the biggest problems in future
APPROACHES
(431) introduction of technology in shop floor
(431) increasing training
(409) time equivalents money
(409) improving encounter time
sell and market information
continious review of capacity
(432) university incomes from advertisements
(432) use of advertisement only on sell times
MEASUREMENT
(2) technology
(2) standardisation
(2) trying that input appear the same in front line
(2) easier to measure
QUALITY CHARACTERISTICS
structural
reliability
willingness to help
warranty
ethics
sensory
(447) customer wants to see a nice place
(447) customer go to department stores many times just to wondering about
QUALITY GAPS
(414) less tangibility of customer expectations
(414) difficult to specify the expectations
(439) different types of customers
(438) past experiences
(439) wrong image of service is given
QUALITY COSTS
(438) being very people oriented
(438) high prevention cost
(415) even returning the item cannot cover the failure
(415) huge cost of external quality costs
(415) making returning items ready for sell
(416) inability to satisfy the demand
(416) internal failure cost
(416) loss of the opportunity

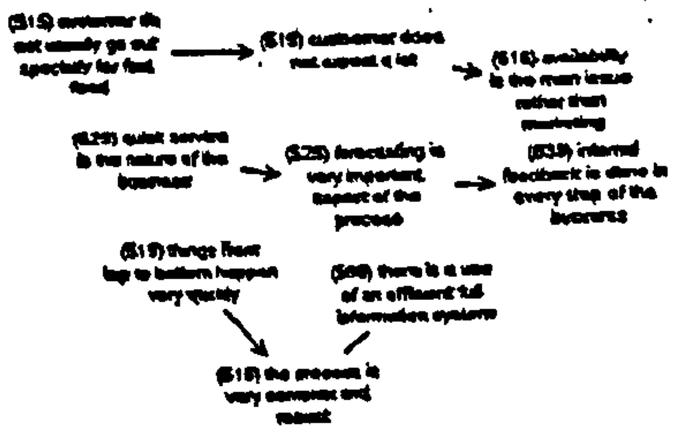
Fast Food



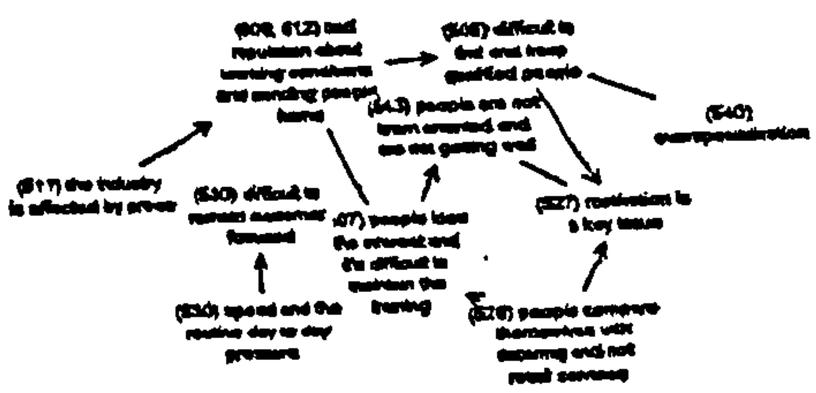
POLICY



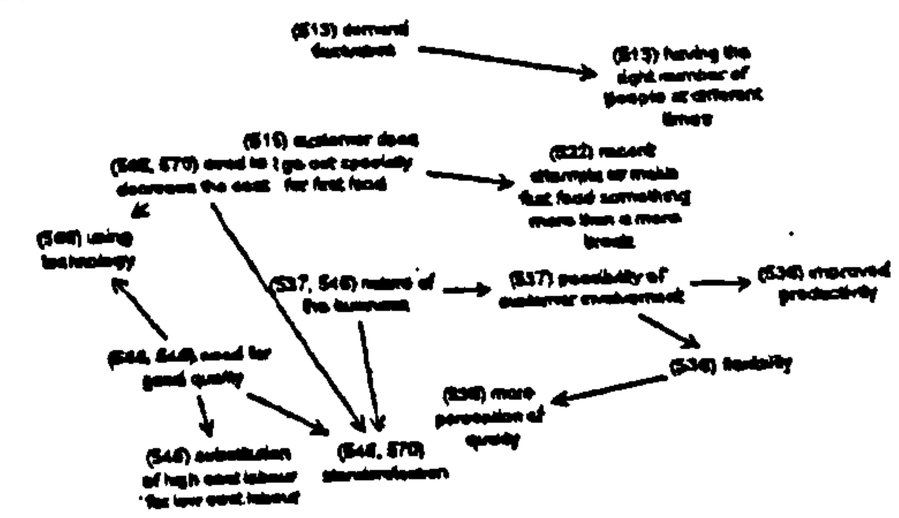
FACTOR



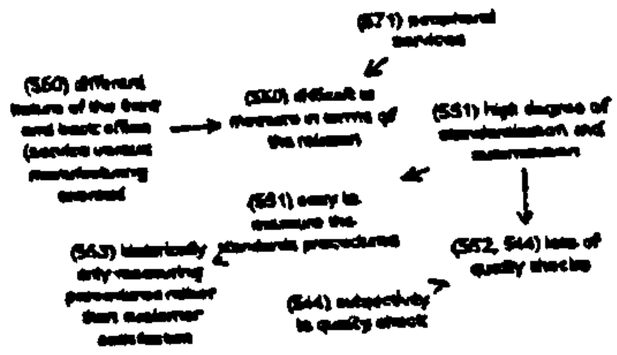
PROBLEMS



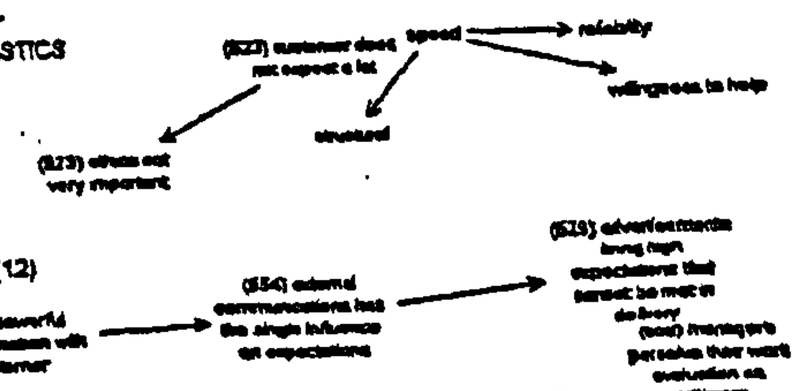
APPROACHES (14)



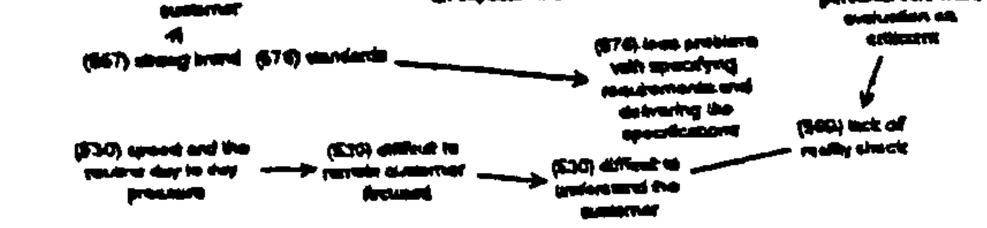
MEASUREMENT



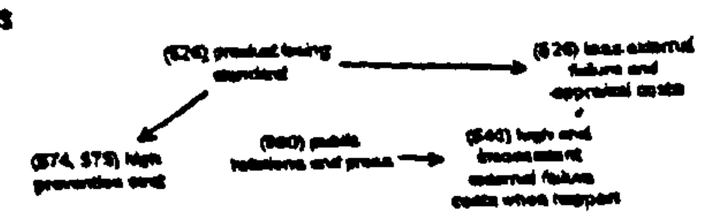
QUALITY CHARACTERISTICS

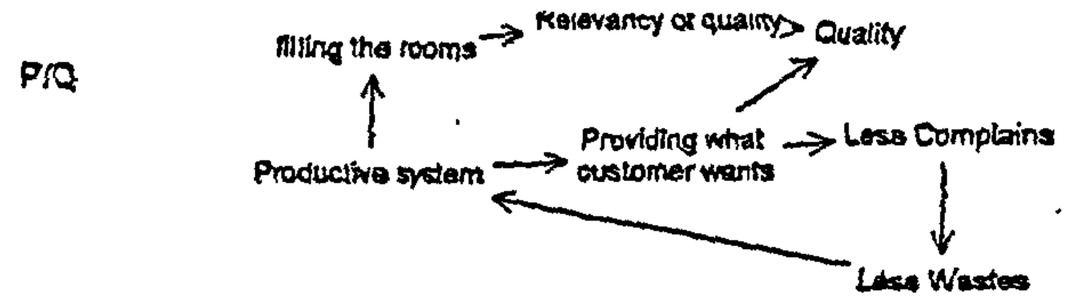


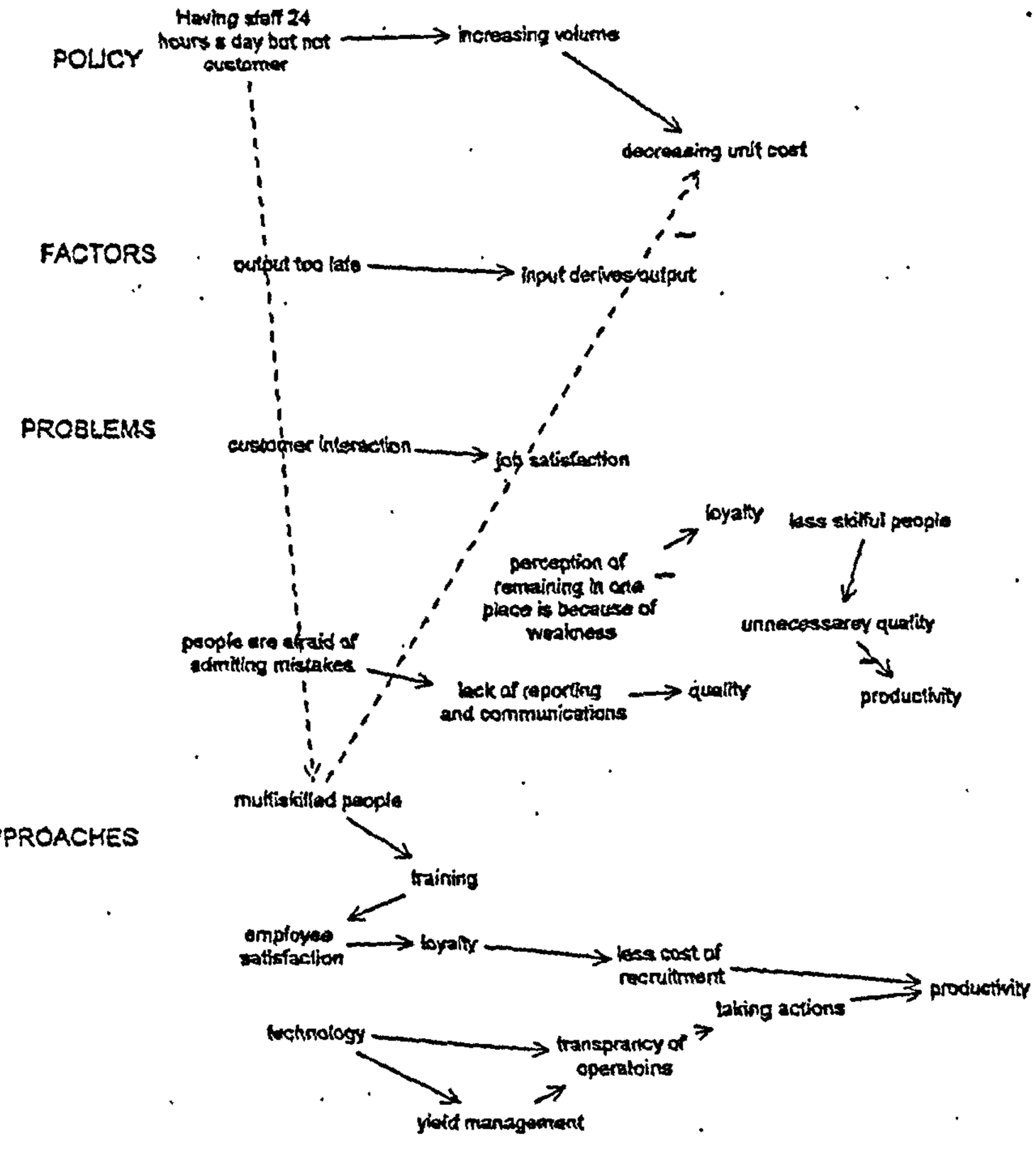
QUALITY GAPS (12)

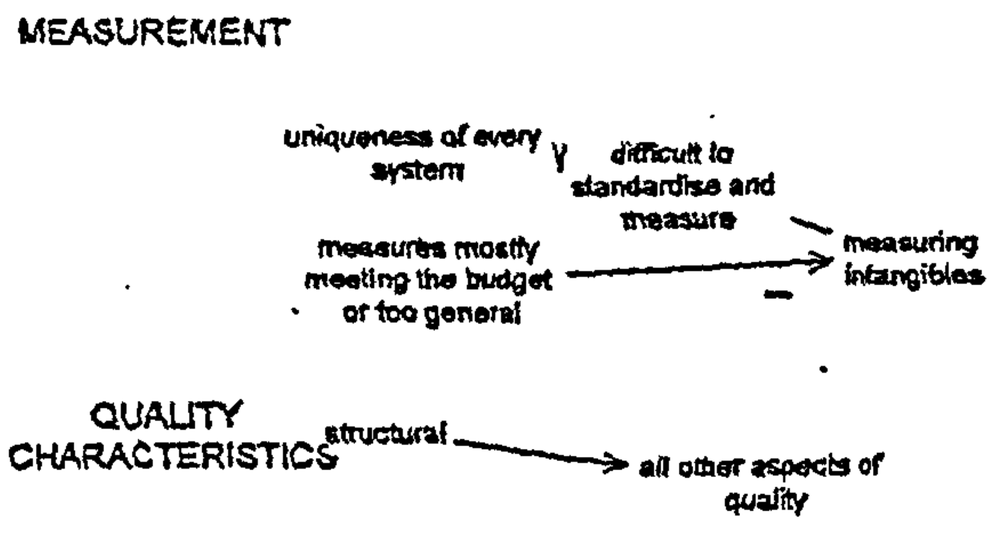


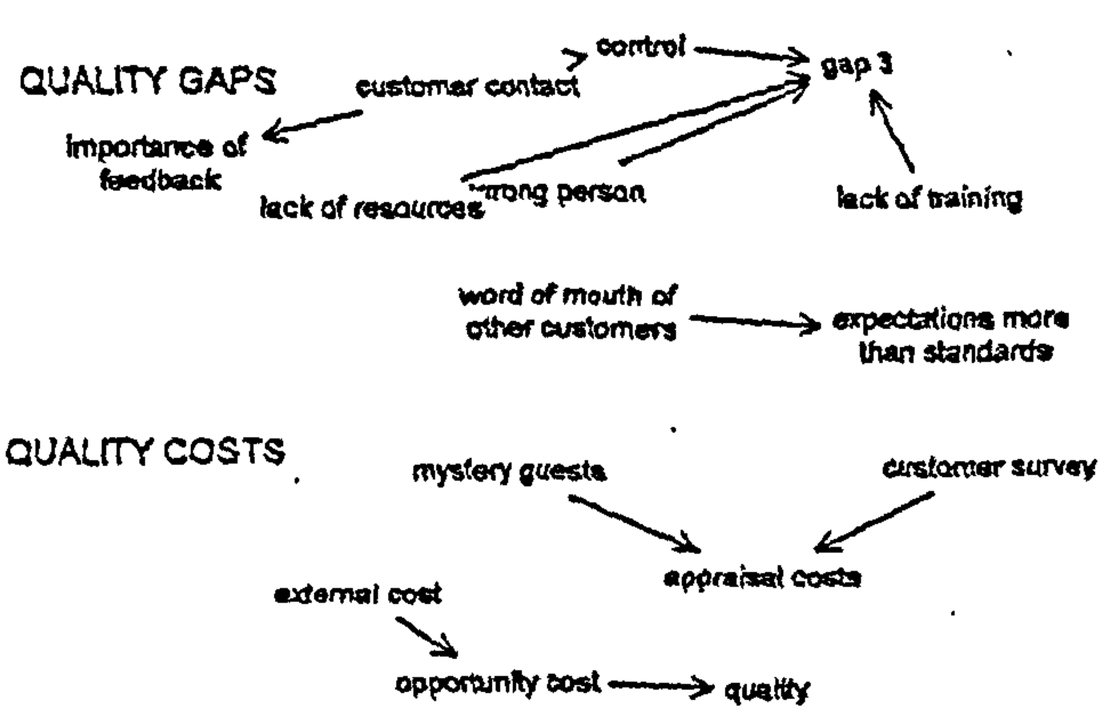
QUALITY COSTS



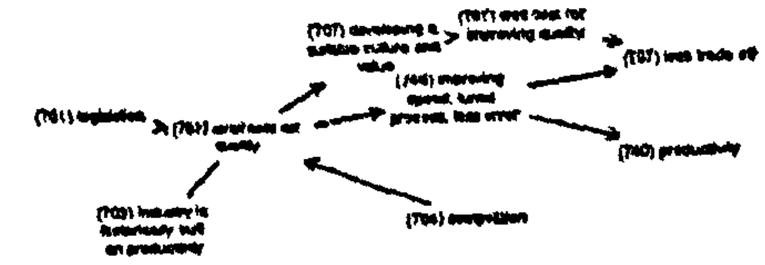

P/Q
filling the rooms
Relevancy of quality
Quality
Productive system
Providing what customer wants
Less Complains
Less Wastes

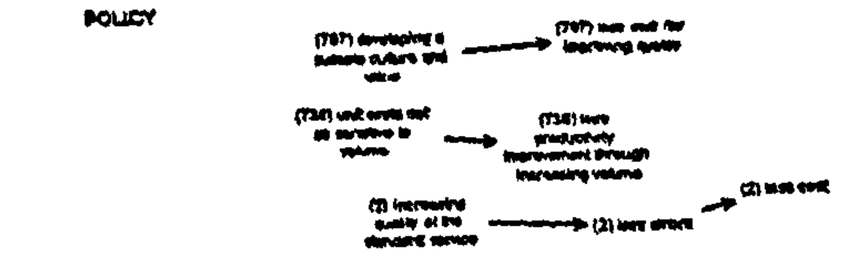

POLICY
Having staff 24 hours a day but not customer
increasing volume
decreasing unit cost
FACTORS
output too late
input derives output
PROBLEMS
customer interaction
job satisfaction
loyalty
less skilful people
perception of remaining in one place is because of weakness
unnecessarey quality
people are afraid of admitting mistakes
lack of reporting and communications
quality
productivity
multiskilled people
APPROACHES
training
employee satisfaction
loyalty
less cost of recruitment
productivity
taking actions
technology
transpraricy of operatoins
yield management

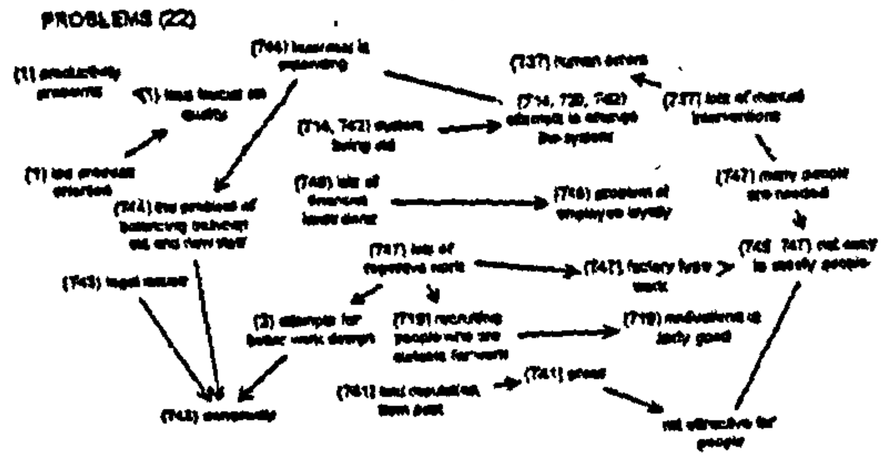

MEASUREMENT
uniqueness of every system
difficult to standardise and treasure
measures mostly meeting the budget or too general
measuring intangibles
QUALITY CHARACTERISTICS
structural
all other aspects of quality

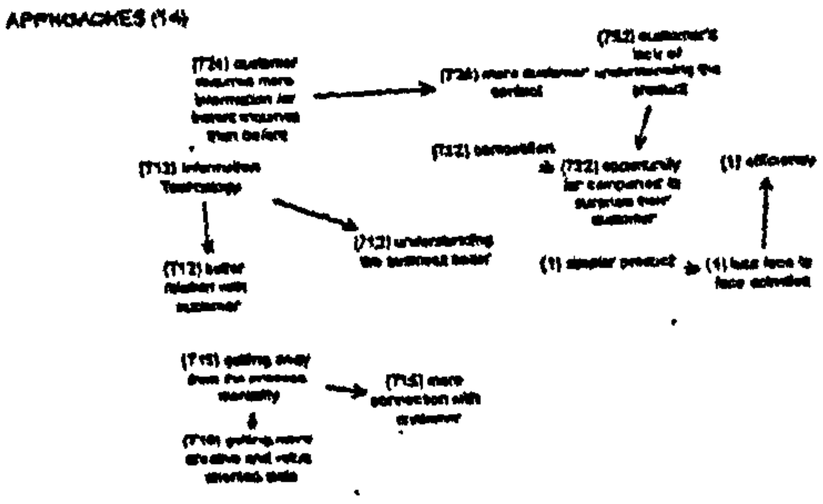

QUALITY GAPS
control
customer contact
gap 3
importance of feedback
lack of resources
wrong person
lack of training
word of mouth of other customers
expectations more than standards
QUALITY COSTS
mystery guests
customer survey
appraisal costs
external cost
opportunity cost
quality

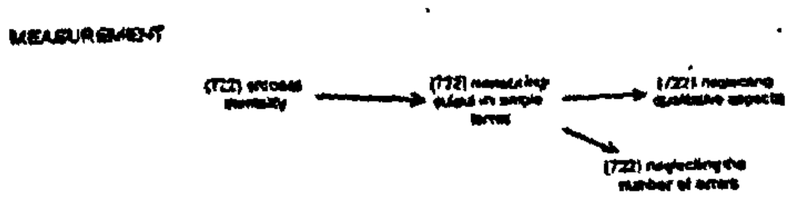
Insurance Services

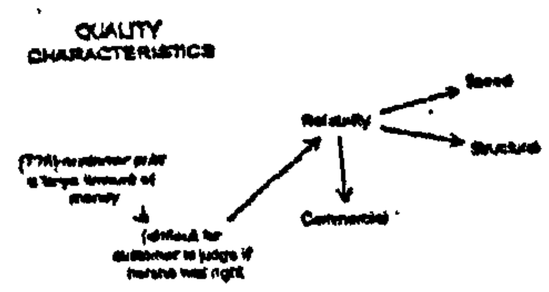


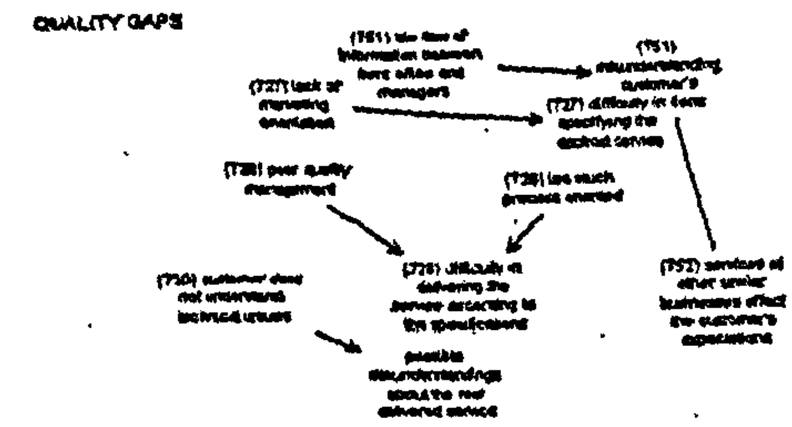


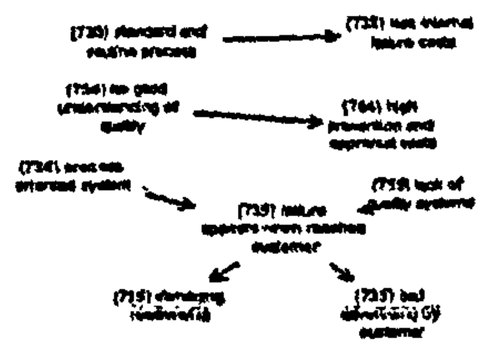




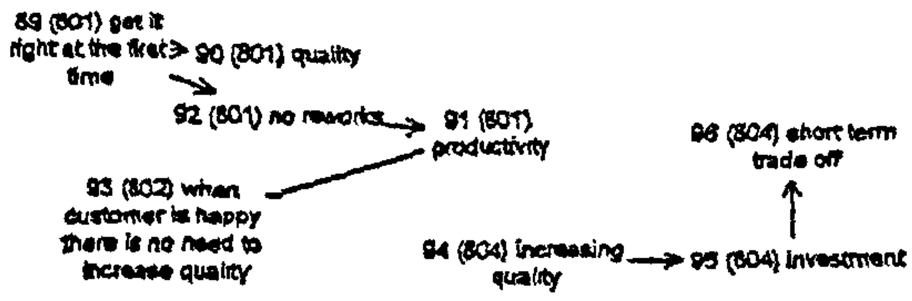




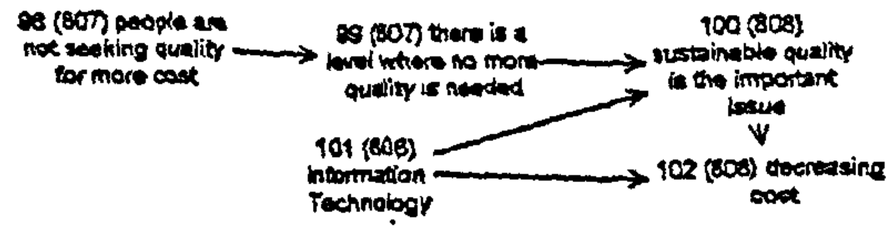




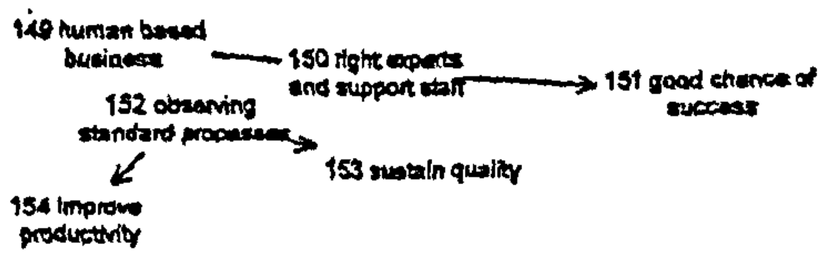
88 P/Q



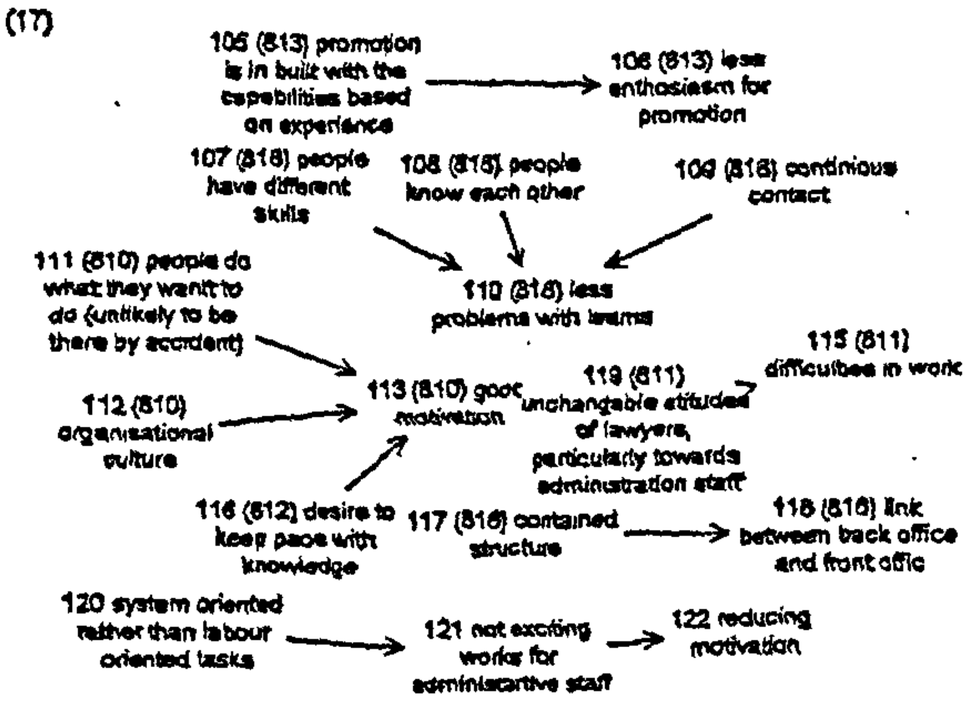
97 POLICY



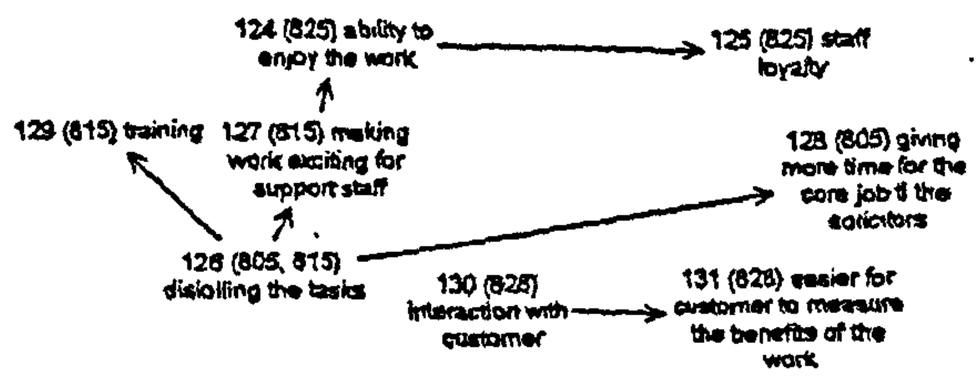
103 FACTORS



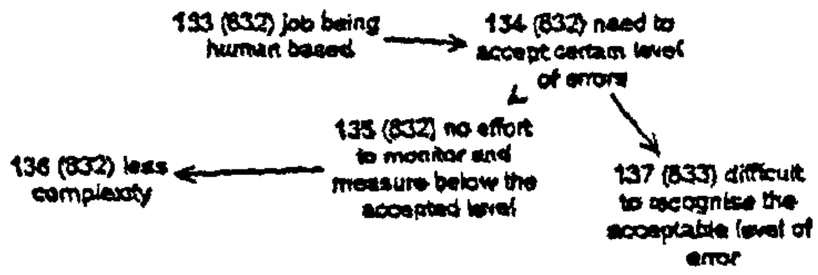
104 PROBLEMS (17)



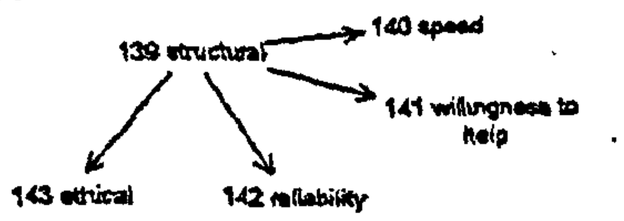
123 APROACHES



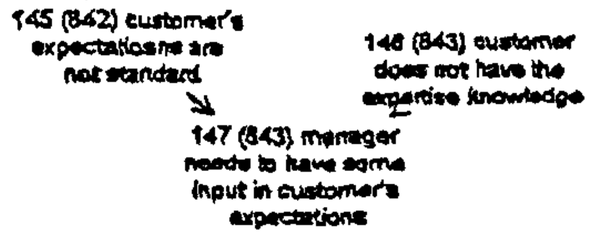
132 MEASUREMENT



138 QUALITY CHARACTERISTICS



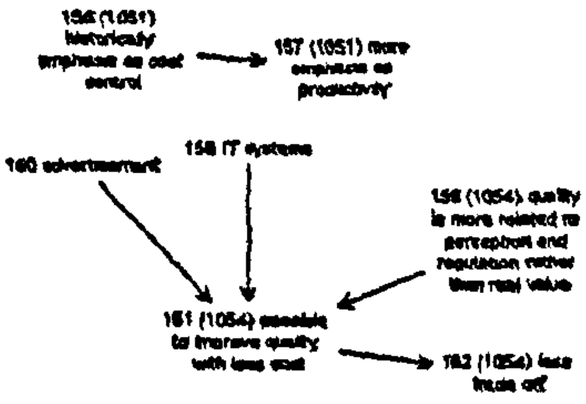
144 QUALITY GAPS



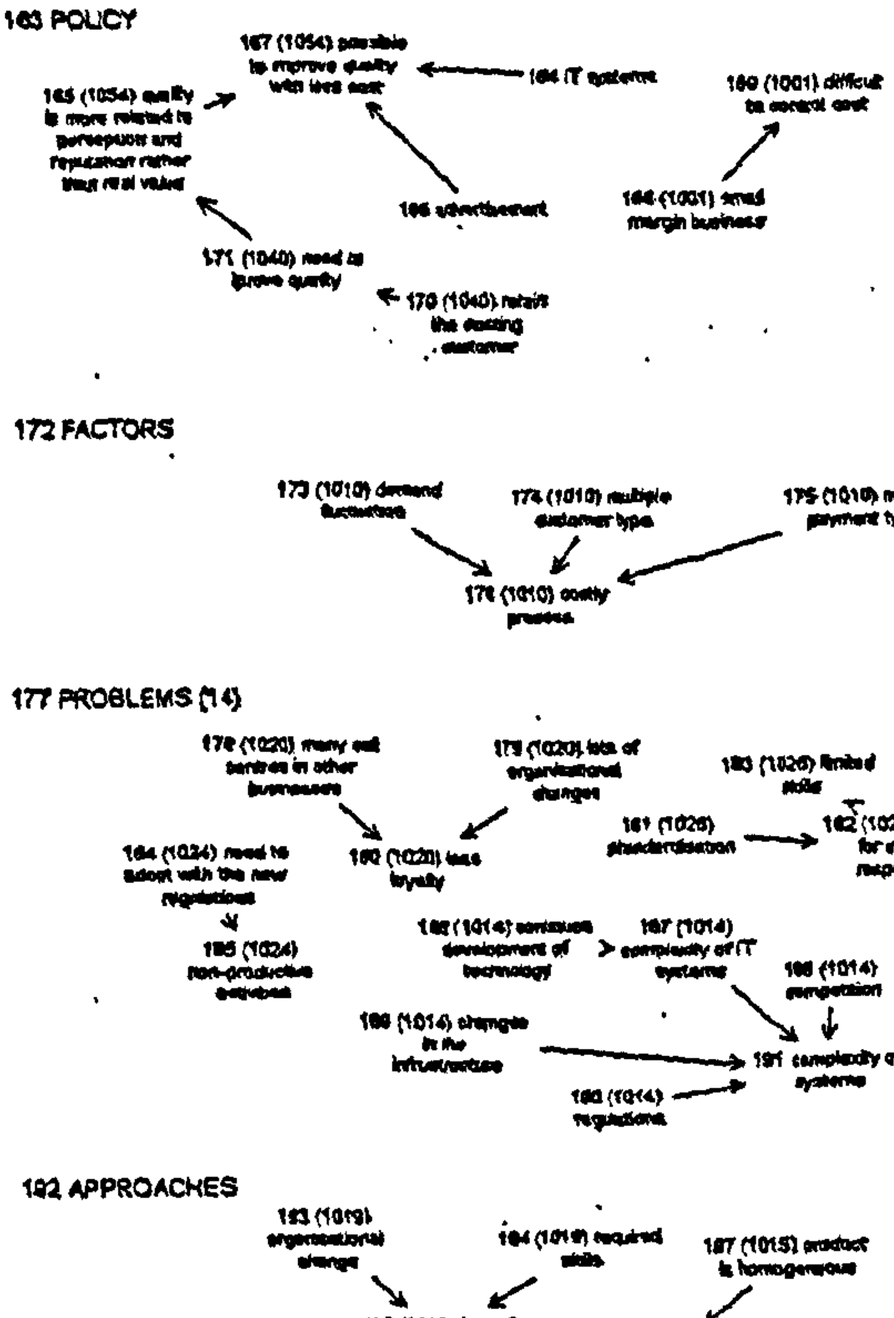
148 QUALITY COSTS:
(NONE)

Power Utility

155 PIQ

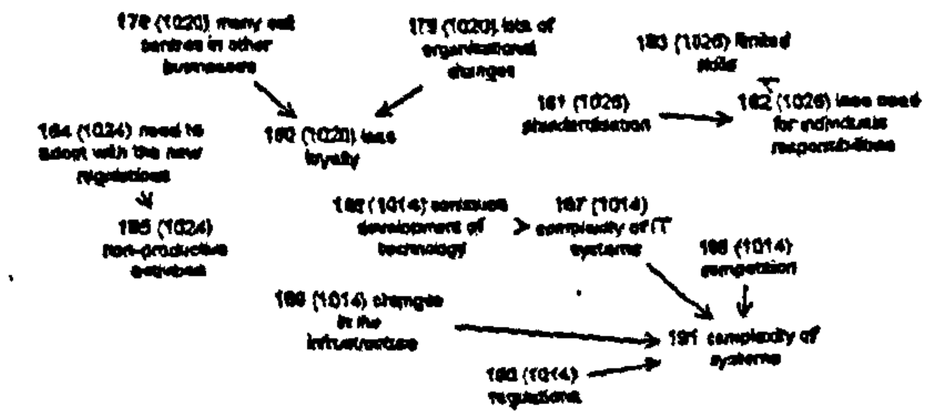


163 POLICY

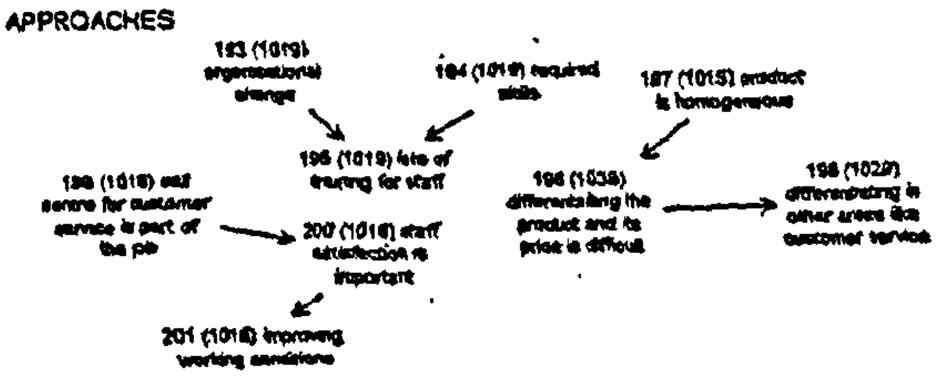


172 FACTORS

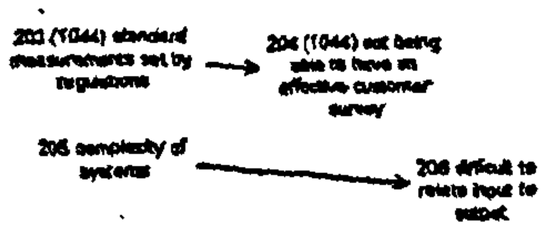
177 PROBLEMS (14)



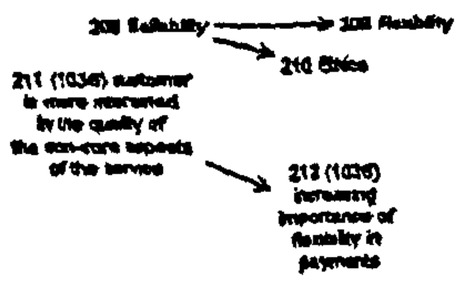
192 APPROACHES



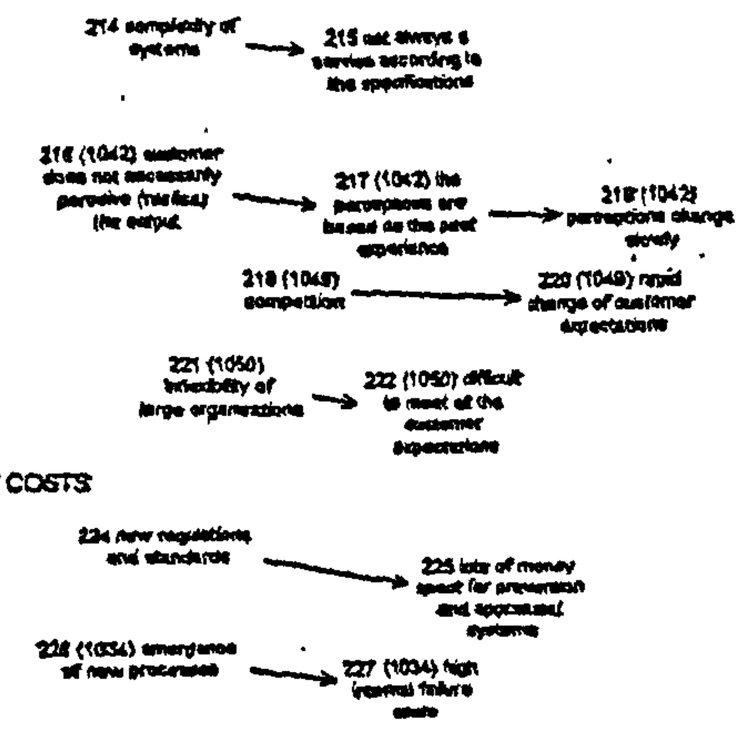
202 MEASUREMENT



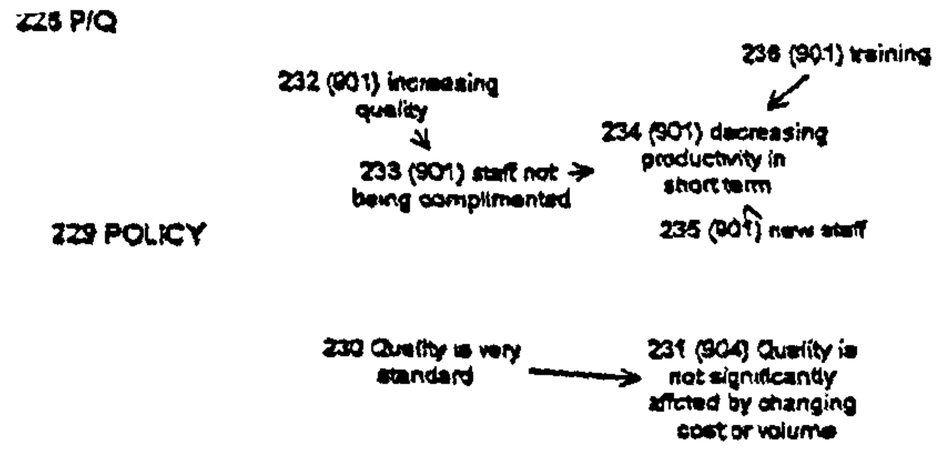
207 QUALITY CHARACTERISTICS

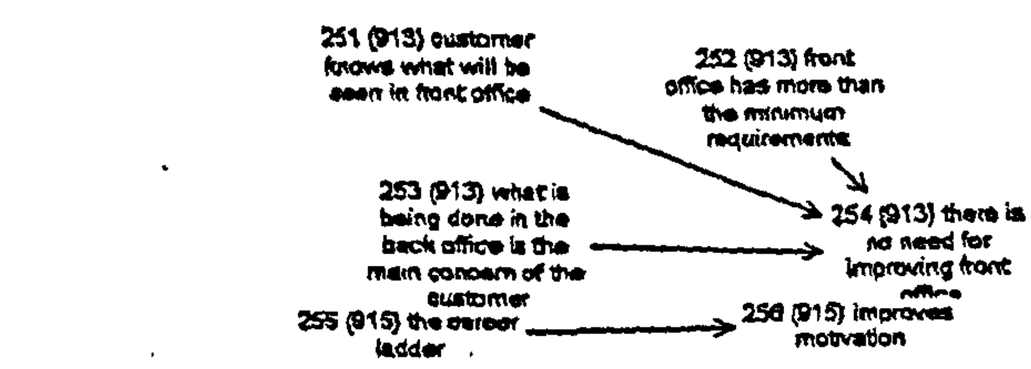


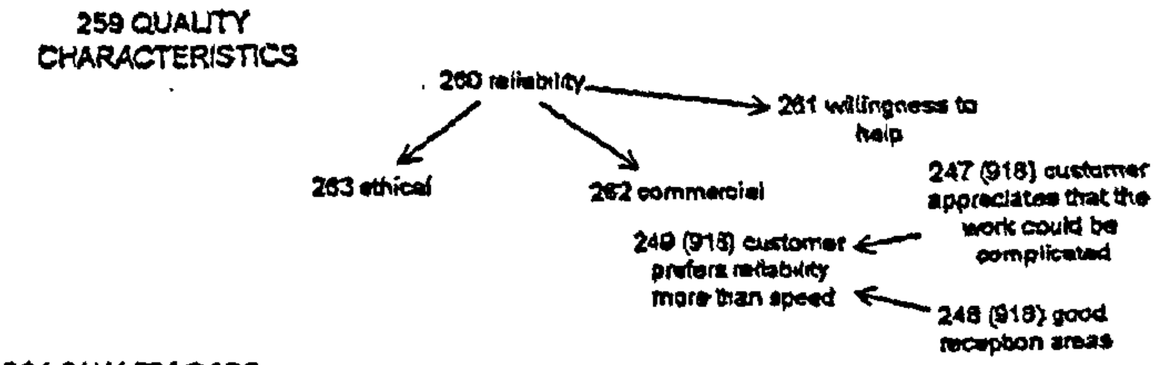
213 QUALITY GAPS

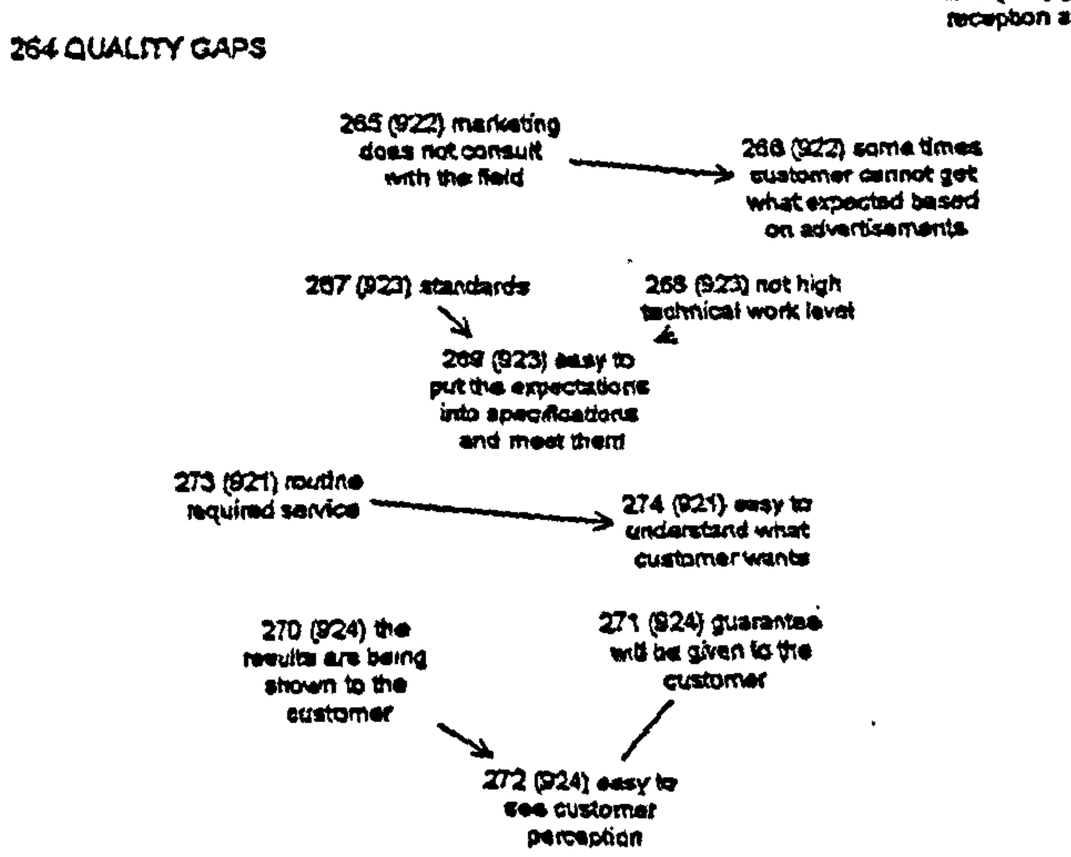


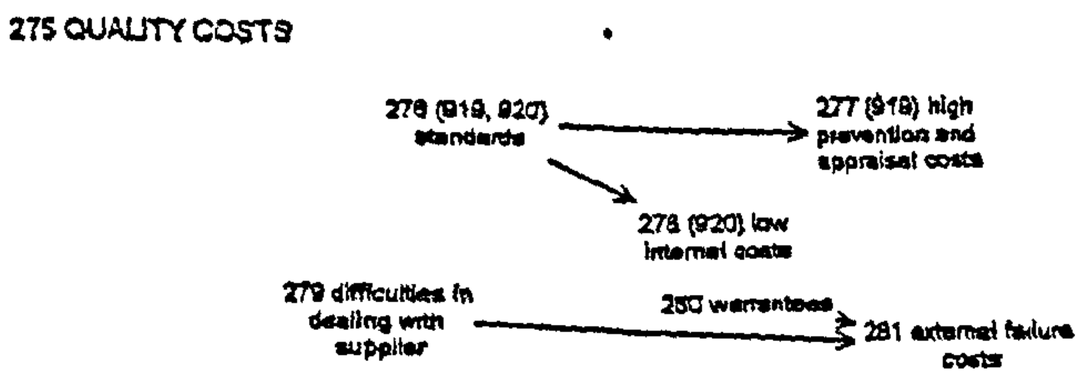
223 QUALITY COSTS


225 P/Q
232 (901) increasing quality
236 (901) training
234 (901) decreasing productivity in short term
233 (901) staff not being complimented
235 (901) new staff
229 POLICY
230 Quality is very standard
231 (904) Quality is not significantly affected by changing cost or volume
237 FACTORS (None)
239 (906) observing standards processes
241 (906) customer satisfaction
240 (906) right input
242 (906) productivity
238 PROBLEMS
243 (907) long hours of working
244 (907, 916) problem with motivation and loyalty
247 depends on regions
245 (908) small teams
246 (908) inevitable human conflicts


250 APPROACHES
251 (913) customer knows what will be seen in front office
252 (913) front office has more than the minimum requirements
253 (913) what is being done in the back office is the main concern of the customer
254 (913) there is no need for improving front office
255 (915) the career ladder
256 (915) improves motivation
258 MEASUREMENT
(None)

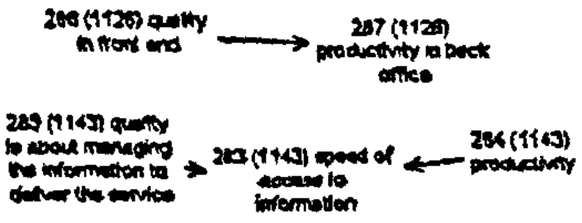

259 QUALITY CHARACTERISTICS
260 reliability
261 willingness to help
263 ethical
262 commercial
247 (918) customer appreciates that the work could be complicated
249 (918) customer prefers reliability more than speed
248 (918) good reception areas


264 QUALITY GAPS
265 (922) marketing does not consult with the field
266 (922) some times customer cannot get what expected based on advertisements
267 (923) standards
268 (923) not high technical work level
269 (923) easy to put the expectations into specifications and meet them
273 (921) routine required service
274 (921) easy to understand what customer wants
270 (924) the results are being shown to the customer
271 (924) guarantee will be given to the customer
272 (924) easy to see customer perception

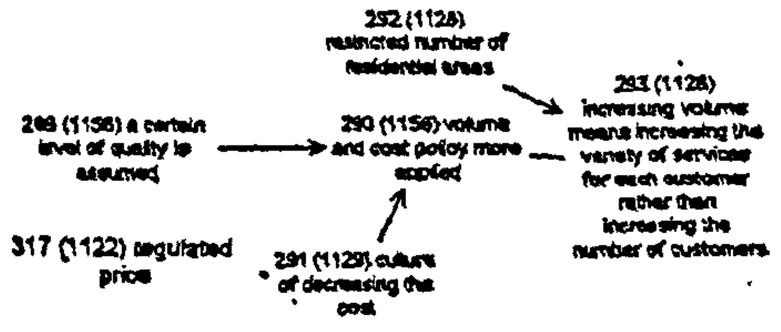

275 QUALITY COSTS
276 (919, 920) standards
277 (919) high prevention and appraisal costs
278 (920) low internal costs
279 difficulties in dealing with supplier
280 warrantees
281 external failure costs

Telecommunication

282 P/Q

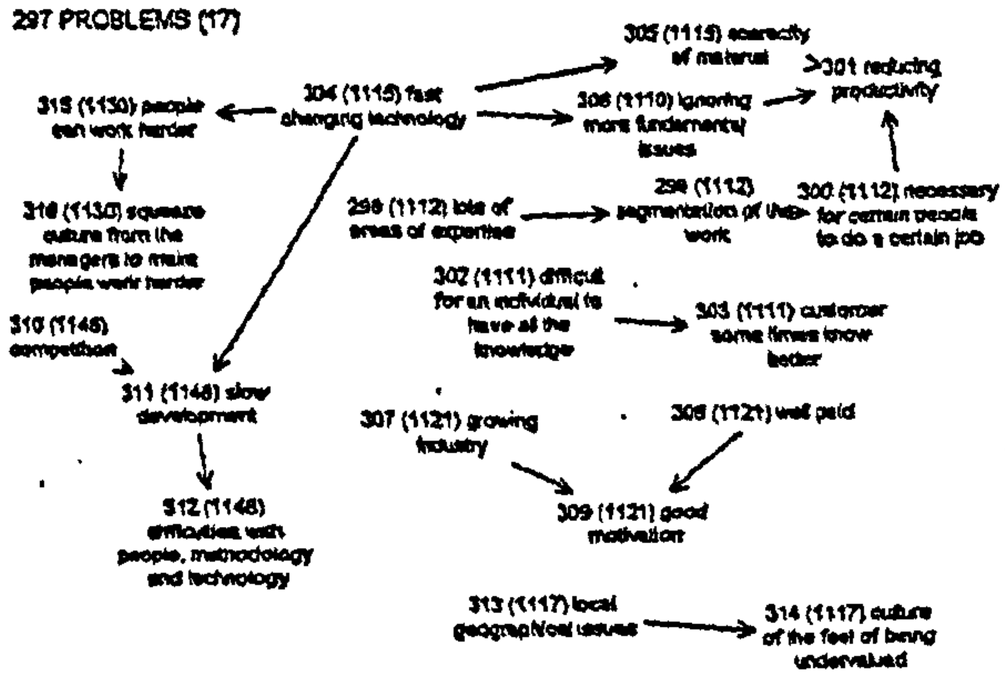


288 POLICY

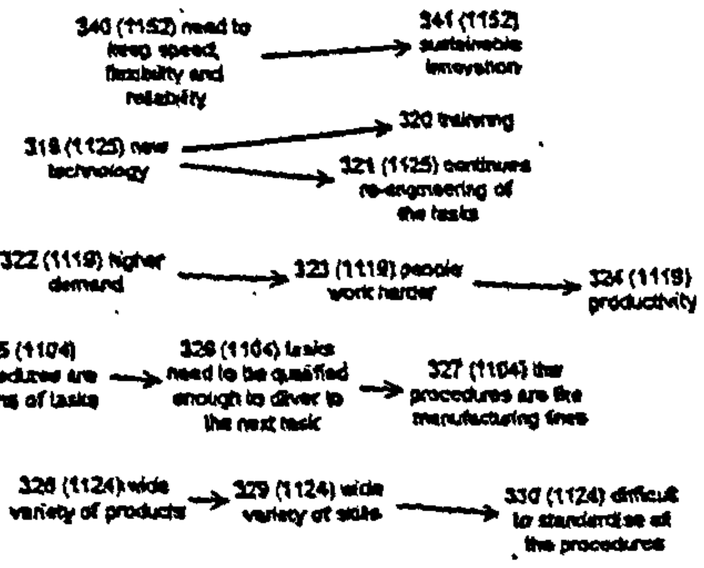


294 FACTORS

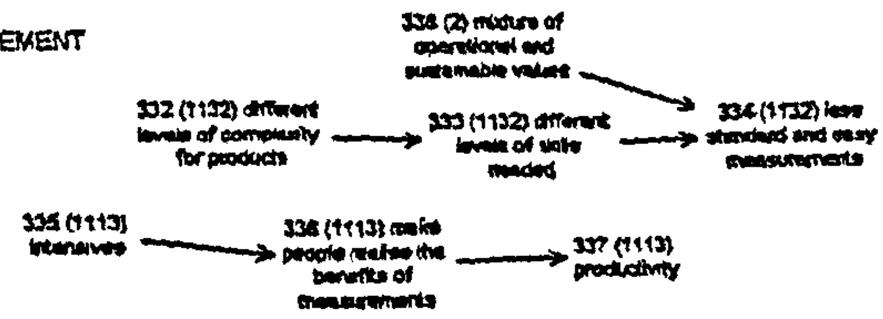
297 PROBLEMS (17)



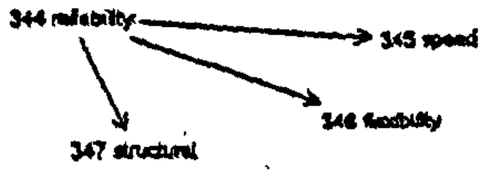
316 APPROACHES



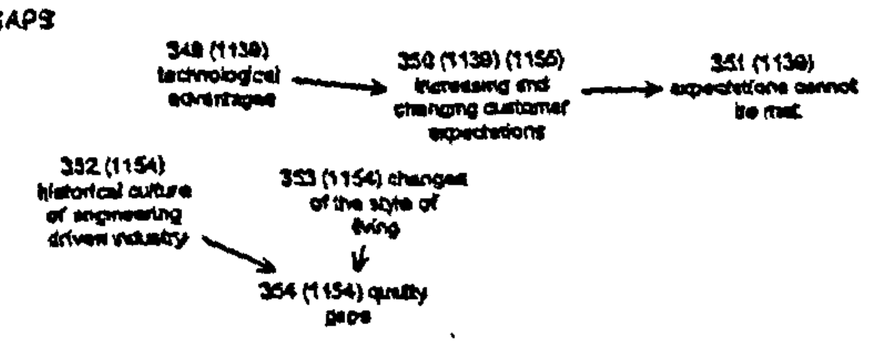
331 MEASUREMENT



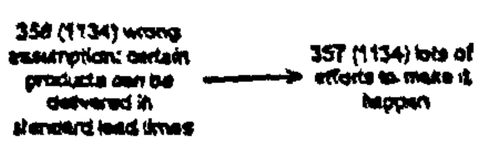
339 QUALITY CHARACTERISTICS

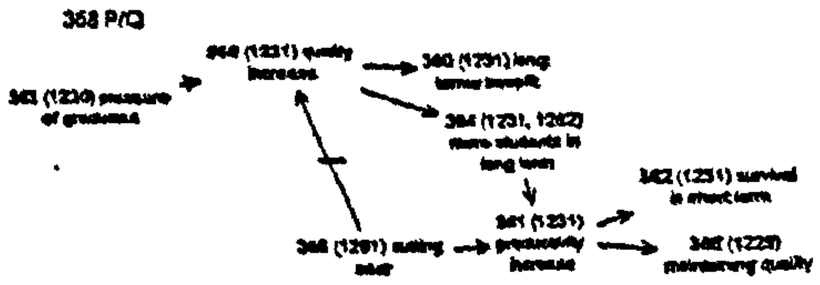


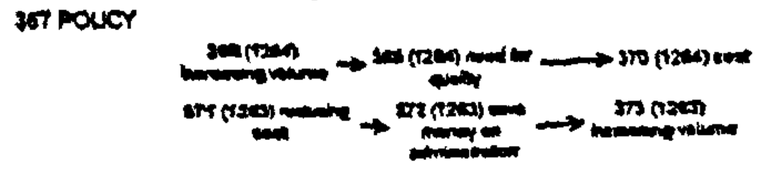
348 QUALITY GAPS

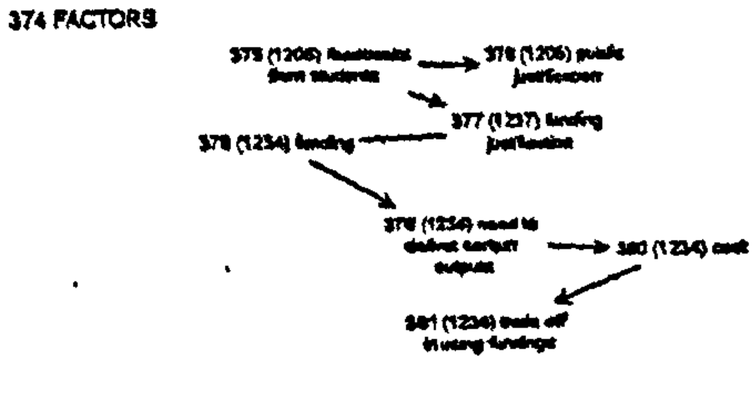


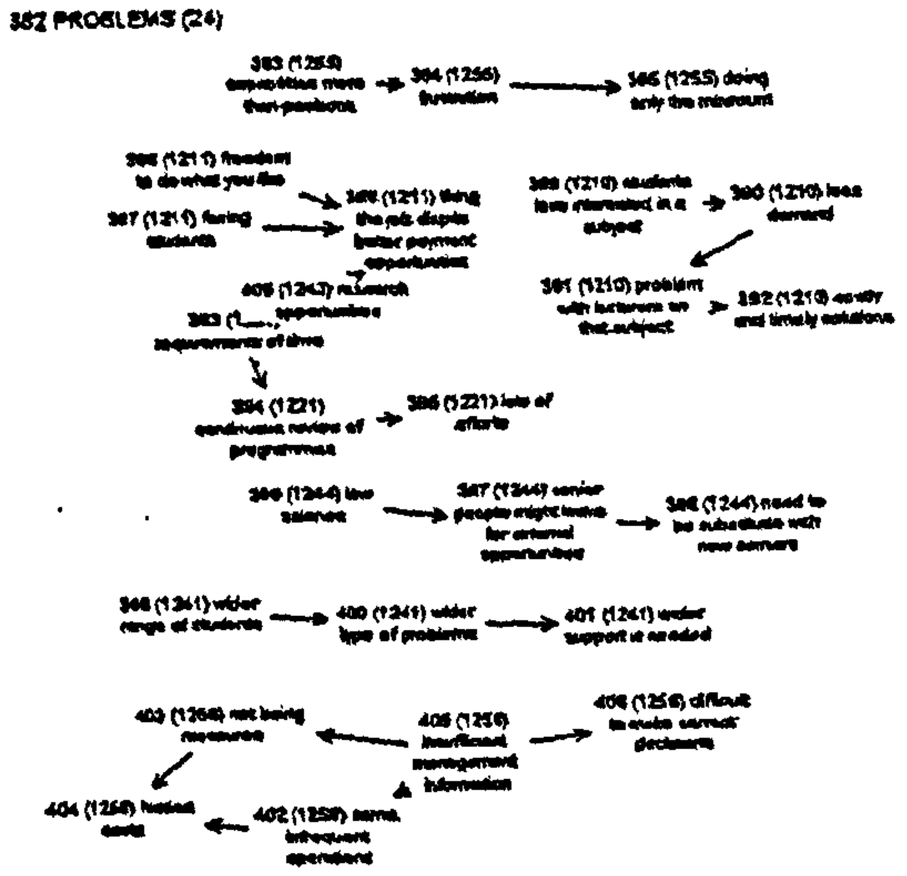
355 QUALITY COSTS

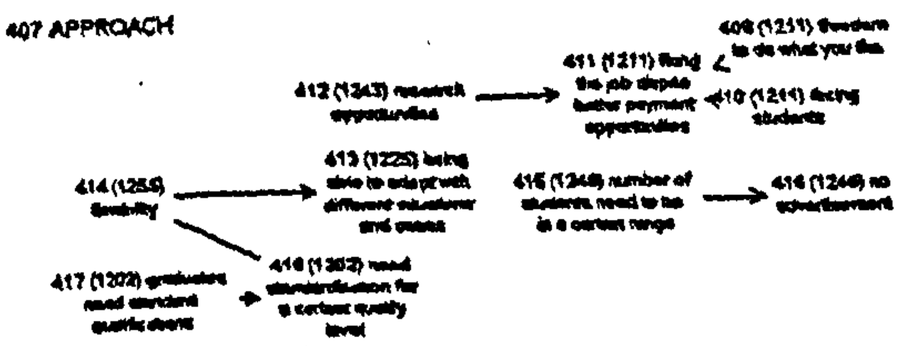


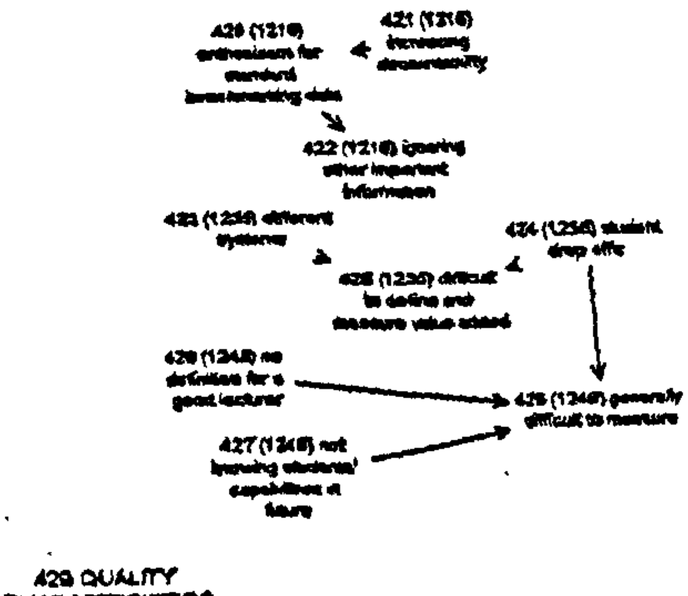


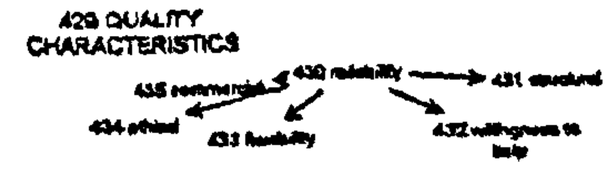






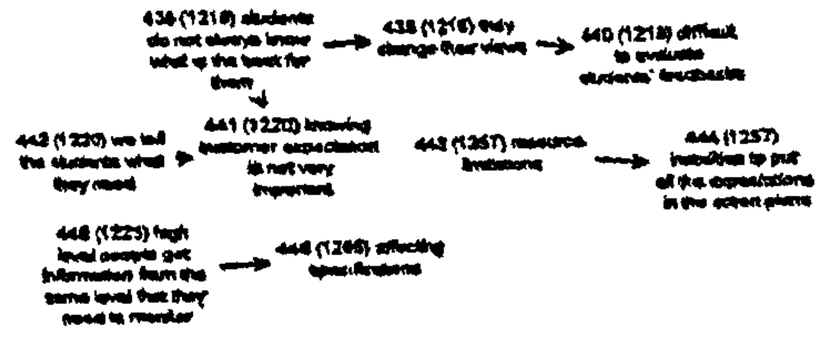






436 QUALITY COSTS
(None)

437 QUALITY GAPS



Appendix 6.5

Cross Case Displays

Cross Case Analysis

Productivity or Quality:

Reasons/conditions where Quality is prioritised:

- Healthy economy
- Customer looking for high quality
- Force of legislation
- High Competition
- Quality is pre-requirement of productivity

Reasons/conditions where Productivity is prioritised:

- Quality too narrow title compared to productivity
- Productivity directly results in quality
- Productivity is pre-requirement of quality
- Controlling potentially high costs

Productivity and Quality Trade Off:

Reasons/conditions where there is No significant trade off between Productivity and Quality:

- Productivity and quality are same concepts
- Productivity and quality are targeting same point
- Productivity is mostly balancing front office with back office where quality is mostly a concern for front office

Reasons/conditions where there is a Short-term trade off between Productivity and Quality:

- Economic cycle
- Customer's expectations not directed to productive items
- Quality needs investments
- Quality needs staff competence
- Productivity can be raised only by cutting costs

Productivity Improvement Policy:

Reasons/conditions where Increasing Volume is preferred over decreasing cost as the major policy:

- Small margin business, less dealing with cutting costs
- Age of the business demands volume
- Volume is the main objective of the business
- Standardisation allows volume (and cost) policies without affecting quality
- Volume increase leads to less cost and better quality in large companies

Reasons/conditions where Decreasing Cost is preferred over increasing Volume as the major policy:

- Applicability of Yield Management
- Age of the business demands cost reduction
- Cost per unit will not be less by increasing volume
- The nature of the business allows no productivity without decreasing cost
- No more than certain number of customers are required
- Quality will suffer by increasing volume

Reasons/conditions where quality increase policy is not applicable:

- Quality is standard and customer is satisfied with it
- Quality needs to be in a high level any way
- There is a complex interaction between quality and cost
- Quality increase cannot be reached without affecting cost or volume

Reasons/conditions where Quality increase policy is also applicable:

- Quality applies in the areas where self service is possible
- Quality has a significant intangible aspect like reputation (branding)
- Existence of a cultural support for increasing quality
- Quality increase results in less errors and less costs

Productivity Factors:

Reasons/conditions where Customer Feedback is less used for productivity improvement:

- The processes are routine factory type
- Customer does not have the expertise knowledge

Reasons/conditions where Customer Feedback is used significantly for productivity improvement:

- Needed for scheduling
- Needed for value judgement for future
- Inseparability of deliver and consumption of the service
- Multiple customer type
- High customer contribution in the delivery

Productivity Problems:

Reasons/conditions where Competence of People is a major problem in productivity improvement:

- Subjectivity of work to the individuals
- Delivering overqualified services
- Low motivation
- Scarcity of qualified people to be recruited
- Low morals
- Staff keeping paste with new technology
- Unavailability of experts
- Inflexibility of experts
- Difficulty to deal with experts
- Overspecialisation
- Low loyalty (losing interest or taking better opportunities)
- Human error because of lots of manual intervention
- Old staff adapting with the new systems

Reasons/conditions where Methodology and Systems are major problems in productivity improvement:

- Old system
- Inability to measure
- Complexity of the processes
- Back office faults
- Not being able to meet peak demands
- Unavailability of material
- Front office doing the supporting works
- Staff promotion barriers
- Energy consuming reviewing programmes for the systems
- Diversity of the processes
- Insufficient management information systems

Reasons/conditions where Organisational Climate is a major problem in productivity improvement:

- People are not agree with companies goal
- Bad public reputation for the organisation
- Conflict in working teams
- Side effects of the regulatory changes
- Too process oriented management
- Being afraid to admit mistakes
- Local geographical/cultural issues

Reasons/conditions where Technology is a major problem in productivity improvement:

- Rapid technological changes that results on:
    - Costly introduction of the new technology
    - Changes of customer expectations
    - Complexity of adaptation of the new technology
    - Scarcity of material

Productivity Improvement Approaches:

Reasons/conditions where Technology-based approaches are one of the major approaches in productivity improvement:

- Electronic improvements
- Use of Internet
- Standardisation
- Alternative to labour
- Technology being the core process and product

Reasons/conditions where People-based approaches are one of the major approaches in productivity improvement:

- Training
- Multi-skill people
- Creativity and value oriented
- Interacting with customer
- Front office people being able to the back office work
- Career ladder
- Adapting recruitments with the market

Reasons/conditions where Service-based approaches are one of the major approaches in productivity improvement:

- Making product simpler for customer
- Cutting costs by standardisation
- Branding
- Managing demand by advertisement

Reasons/conditions where Task-based approaches are one of the major approaches in productivity improvement:

- Flexibility
- Re-engineering
- Managing time
- Task are capable of being improved by individuals
- Manufacturing type back office

- Deskilling
- Outsourcing
- Less face to face tasks with customers
- Making tasks enjoyable

Reasons/conditions where Customer-based approaches are one of the major approaches in productivity improvement:

- Contribution in the process
- Involvement in peripheral services
- Customer relation
- Self service
- Customer perception survey

Reasons/conditions where Capacity-based approaches are one of the major approaches in productivity improvement:

- Yield management
- On time allocation of labour
- Managing peak and low demand (techniques other than yield management)

Productivity Measurement Problems:

Reasons/conditions where Output is a major problem in productivity measurement:

- Difficult to estimate the value of output before it is finished
- Unique output for each customer
- Output is too late to be measured
- Different levels of complexity of the output
- Not known what is the valid volume
- Different to compare the output of different areas
- Mixture of operational and sustainable types of measurement
- Ordinary measures of output are not enough for measuring the real value

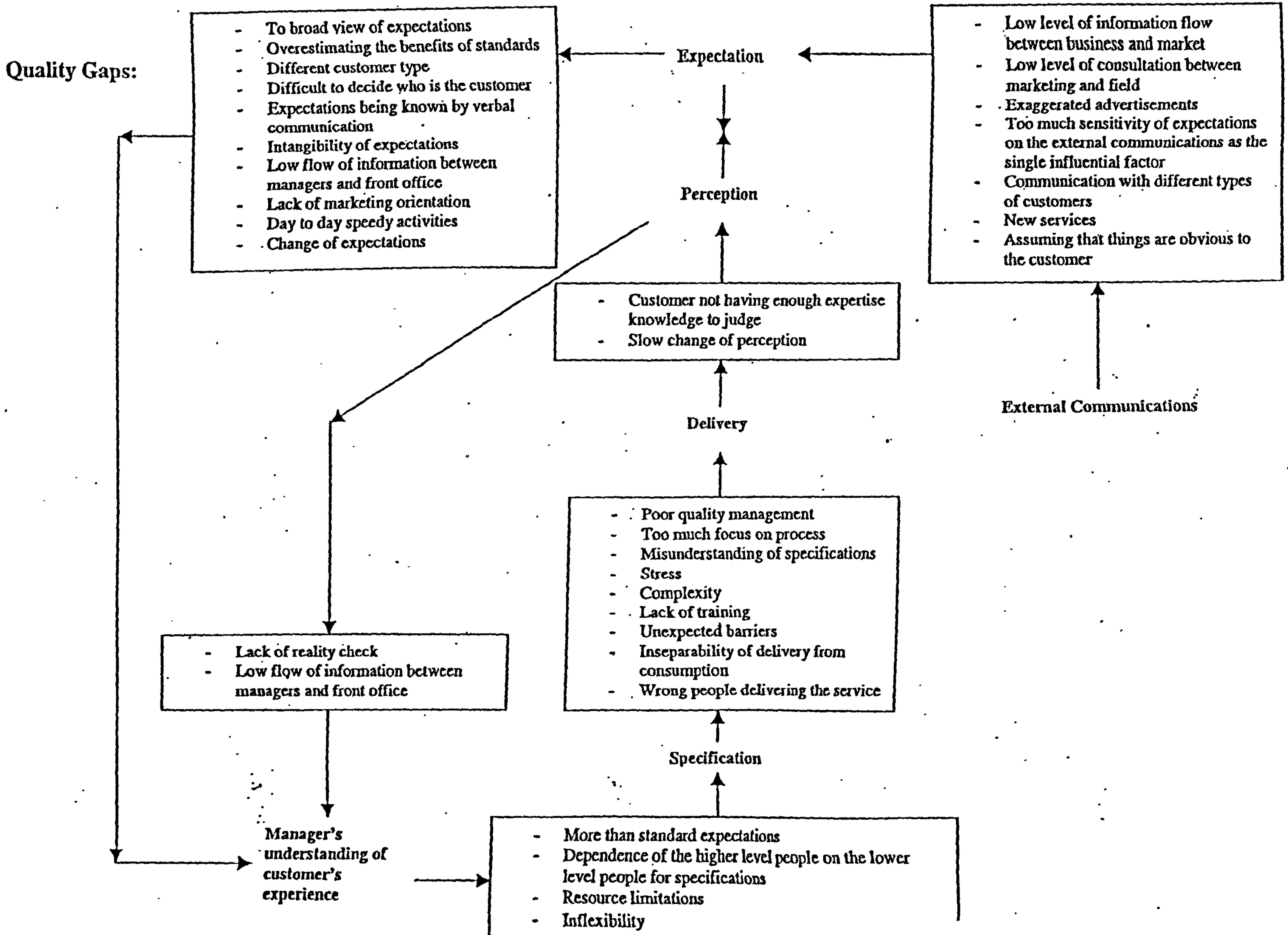
Reasons/conditions where the Relation between output and input is a major problem in productivity measurement:

- Difficult to relate the value added and profit to the different parts of capital and employee
- Sharing the global input measure for output is difficult
- Counting the measures related to peripheral services in the relation is difficult
- Difficult to isolate a cost item for the job
- The mix of manufacturing type back office and service type front office
- Difficult to interpret the measures of relation
- Not clear if a particular service package is profitable
- Not clear how much is gained from each customer
- Relating internal and external measures if difficult

- The relation measures are not sensitive enough

Reasons/conditions where Intangibility of output is a major problem in productivity measurement:

- Value of intangible output is not defined
- Intangible aspects of output for all the stake holders need to be considered
- Intangible value added or damage is not clear
- Measuring customer related tasks


Quality Gaps:
- To broad view of expectations
- Overestimating the benefits of standards
- Different customer type
- Difficult to decide who is the customer
- Expectations being known by verbal communication
- Intangibility of expectations
- Low flow of information between managers and front office
- Lack of marketing orientation
- Day to day speedy activities
- Change of expectations
Expectation
- Low level of information flow between business and market
- Low level of consultation between marketing and field
- Exaggerated advertisements
- Too much sensitivity of expectations on the external communications as the single influential factor
- Communication with different types of customers
- New services
- Assuming that things are obvious to the customer
Perception
- Customer not having enough expertise knowledge to judge
- Slow change of perception
External Communications
Delivery
- Poor quality management
- Too much focus on process
- Misunderstanding of specifications
- Stress
- Complexity
- Lack of training
- Unexpected barriers
- Inseparability of delivery from consumption
- Wrong people delivering the service
Specification
- Lack of reality check
- Low flow of information between managers and front office
Manager's understanding of customer's experience
- More than standard expectations
- Dependence of the higher level people on the lower level people for specifications
- Resource limitations
- Inflexibility

Appendices:

6.6. Count of Expressions about Difficulties

6.7. Comparing the Productivity Problems

Calculation of the count of positive and negative comments

	Percentage of Negative comments (Total)	Percentage of Positive comments (Total)	Deduction
Al	36.4	13.6	22.8
Bn	36.5	9.4	27.1
Cs	38.1	9.5	28.6
Ds	23.4	2.1	21.3
Ff	26.3	19.7	6.6
Ht	28.3	5.7	22.6
In	36.1	3.3	32.8
Lg	20.8	15.1	5.7
Pu	23.4	9.4	14
Rp	22.6	25.8	-3.2
Tl	34.5	1.7	32.8
Un	36.6	5.6	31

Count of total negative and positive comments about the four Subjects in the category of Productivity Problems.

	People	Methodology	Technology	Climate
Negative	44	13	8	20
Positive	18	6	2	2
Difference	26	7	6	18

Appendix 6.8

Changes of the Measurements of the Service Dimensions

Comments of experts on anticipated changes in the degrees of service dimensions.

Key to the table:

+ : The degree of the service dimension is increasing.

- : The degree of the service dimension is decreasing.

0 : The degree of the service dimension seems stable.

	Al1	Al2	Al	Bn1	Bn2	Bn	Cs1	Cs2	Cs	Ds1	Ds2	Ds	Ff
LI	+	+	+	-	-	-	+	-	?	0	0	0	-
FV	0	-	?	-	-	-	-	-	-	0	0	0	0
CC	+	+	+	-	-	-	-	+	?	0	0	0	0
CI	0	+	?	-	-	-	-	0	?	0	-	?	-
CUS	+	+	+	+	0	?	+	-	?	+	+	+	0
PJ	+	0	?	-	0	?	+	+	+	0	-	?	-
	Ht1	Ht2	Ht	In1	In2	In	Lg1	Lg2	Lg	Pu1	Pu2	Pu	Rp
LI	-	0	?	-	-	-	+	+	+	+	0	?	0
FV	-	-	-	-	+	?	+	0	?	0	-	?	0
CC	-	0	?	0	+	?	-	0	?	0	0	0	0
CI	-	-	-	0	+	?	0	0	0	0	0	0	0
CUS	+	+	+	+	+	+	-	-	-	0	0	0	0
PJ	+	0	?	0	+	?	+	0	?	0	0	0	-
	Tl1	Tl2	Tl	Un1	Un2	Un							
LI	-	-	-	-	-	-							
FV	+	0	?	0	-	?							
CC	0	0	0	-	-	-							
CI	0	0	0	-	-	-							
CUS	+	+	+	+	+	+							
PJ	+	+	+	-	-	-							

In the above table, the first two columns for each service sector is the comment of the first two experts, respectively, about the possible changes of each of the service dimensions in the following five years.

The third column for each service sector is what the author thought was a reasonable representation of what the two experts are agreed on. This is based on a simple rule of accepting the proposed changes only If they are proposed by both of the experts. This means where the experts are not agreed about the future changes, no conclusion is derived, thus the "?" sign.

Appendix 7.1

Applying the SPM to the Studied Services

	Al1	Al2	Al	Bn1	Bn2	Bn	Cs1	Cs2	Cs	Ds1	Ds2	Ds	Ff1	Ff	Ht1	Ht2	Ht
	Service Factory Service Shop			Service Shop			Profes. Services			Service Shop			Service Factory Service Shop		Profes. Services		
Zone 1. Service Factory & Service Shop (Low LI)																	
Capital Decisions		*	*	*		*				*	*	*				*	
Technological advances	*		*	*	*	*	*	*	*	*					*		
Managing demand to avoid …	*	*	*	*		*	*	*	*		*	*	*	*	*	*	*
Scheduling service delivery	*	*	*				*	*	*				*	*		*	
Zone 2. Service Shops & Professional Service (High Interaction & Customisation)																	
Fighting cost increases	*	*	*	*	*	*	*		*	*	*	*			*	*	*
Maintaining quality	*		*	*	*	*	*	*	*	*	*	*			*	*	*
Reacting to consumer intervent.							*		*						*	*	*
Managing advanc. of people …							*		*						*		*
Managing flat hierarchy with ...															*		*
Gaining employee loyalty	*		*		*	*	*	*	*				*	*	*	*	*
Zone 3. Mass Service & Professional Service (high Labour Intensity)																	
Hiring								*	*		*		*	*	*	*	*
Training		*		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Methods development and con.		*			*		*	*	*				*	*	*	*	*
Employee welfare													*	*	*		*
Scheduling workforces	*	*	*							*			*	*	*	*	*
Control of far-flung geograp. ...	*	*	*				*	*	*							*	*
Start up of new units											*		*	*			
Managing growth	*						*	*	*				*	*			
Zone 4. Service Factory & Mass Service (low Int.& Custom.)																	
Marketing		*	*	*	*	*	*			*	*	*					
Making service "warm"	*		*							*	*	*					
Attention to physical surround.										*	*	*			*	*	*
Managing fairly rigid hierarchy	*	*	*	*	*	*	*						*	*			

	In1	In2	In	Lg1	Lg2	Lg	Pu1	Pu2	Pu	Rp1	Rp	Tl1	Tl2	Tl	Un1	Un2	Un
	Mass Service			Mass Service			Service Factory			Service Factory		Mass Service Profes. Service			Profes. Service		
Zone 1. Service Factory & Service Shop (Low LI)																	
Capital Decisions	*						*	*	*			*	*	*			
Technological advances	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Managing demand to …							*	*	*			*	*	*			
Scheduling service delivery							*	*	*							*	
Zone 2. Service Shops & Profes. Service (High Int. & Cust.)																	
Fighting cost increases	*	*	*				*	*	*				*	*	*	*	*
Maintaining quality	*	*	*		*		*	*	*			*	*	*	*	*	*
Reacting to consumer …								*					*	*		*	*
Managing advan. of …				*						*	*					*	*
Managing flat hierarchy …				*	*	*	*	*	*								
Gaining employee loyalty				*	*	*	*			*	*	*		*			
Zone 3. Mass Service & Profes. Service (high LI)																	
Hiring				*		*				*	*				*		*
Training	*	*	*	*	*	*	*			*	*		*	*			
Methods development …					*	*	*	*	*	*	*				*	*	*
Employee welfare										*	*				*	*	*
Scheduling workforces							*	*	*								
Control of far-flung geograp. …							*	*	*	*	*						

Start up of new units		*	*							*	*	*	*	*				
Managing growth		*	*	*	*	*	*	*	*				*	*				
Zone 4. Service Factory & Mass Service (low Int.& Cust.)																		
Marketing	*	*	*				*		*	*	*	*	*	*				
Making service "warm"	*	*	*				*	*	*	*	*	*		*				
Attention to physical surround.																		
Managing fairly rigid hierarchy															*	*	*	