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THE ORGANISATIONAL CONTEXT OF RESPONSIBILITY
ACCOUNTING SYSTEMS

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Thesis submitted for the Degree
of Doctor of Philosophy of the
University of Strathclyde

1987

To the two smiles of my life,
my loving daughters, Ola and Aliaa.

UNIVERSITY OF STRATHCLYDE

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DEGREE FOR WHICH SUBMITTED:

DEPARTMENT:

TITLE OF THESIS:

ABSTRACT

This thesis examines responsibility accounting systems (RAS) in the organisational context in theory and in practice. More specifically, it considers how RAS should be structured in the light of the classical and modern theories of organisations, in order to achieve better performance evaluation. The thesis argues that conventional RAS is designed and operated without reference to the organisational context, because it is tied to and influenced by the classical theory of organisations. This theory ignores certain contextual or structural variables which influence today's organisations. Technology, environment, size and interdependencies have been identified by modern theorists as variables having a major influence on organisation structures. The thesis suggests that technology, environment and interdependencies are the most influential contingency variables as far as RAS is concerned.

With respect to RASs in practice, we have conducted an empirical study using the questionnaire method. The questionnaires were sent to organisations in four industries, which were chosen in the belief that they would reflect different technologies, environments and interdependencies. It was hoped that these differences would highlight the relationship between RAS and the organisational context in practice.

In the first part of this study, i.e. the theoretical part, we found evidence from the organisational and accounting literature to support the view that RAS should be related to the organisational context. However, although our research found some evidence that this was, in fact, the case with respect to some issues, it was certainly not the case with many other issues of RAS in practice. Generally, the study found that in practice the similarities (and/or differences) between the organisations with respect to many issues of RAS owed much more to tradition and custom than to the chosen contextual variables, i.e. technology, environment and interdependencies. However, on the basis of the research done in this study, we would conclude that for RAS to be designed in the organisational context in which it operates, tradition and custom must be put aside.

Finally, our research findings indicated that practising accountants are not entirely satisfied with the RASs of their own organisations.

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ACKNOWLEDGEMENTS

I am especially indebted to my supervisor, Mr. David Lyall for his sincere and helpful supervision. Without his encouragement, support and numerous stimulating comments and advice, this study would never have been completed.

My deepest gratitude is due to Professor Peter Pope, the Head of the Department, for his invaluable comments on this study when it was at the early stages, and also for his assistance in facilitating the empirical work.

I wish also to express my sincere thanks to Dr. Bill McInnes for his immense help during the preparation and testing of the first draft of the questionnaire. I owe additional thanks to Dr. Peter Dean who supervised the early stages of the research.

I am grateful to my home country, Egypt, its people and government, who sponsored me during my study in the UK. Without this sponsorship, I would never have been able to undertake this study.

Finally, many thanks to Alannah O'Sullivan who typed this thesis, and for her patience and cooperation.

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1.2 THE PURPOSE OF THE STUDY

1.3 THE SCOPE OF THE STUDY

1.4 THE LIMITATIONS

1.5 RESEARCH METHODOLOGY

1.6 STRUCTURE OF THE STUDY

1.1 GENERAL

The responsibility accounting system (RAS) is a management control system designed to assist the management in performing its control and performance evaluation functions in the first place.⁽¹⁾ RAS is a relatively new system in comparison to other management control systems, e.g. budgetary control and standard costing systems. However, philosophically and structurally, RAS underlies these systems.⁽²⁾ Moreover, it has been argued that RAS has enhanced the usefulness of the latter systems through the calculation of variances which developed with it.⁽³⁾ On the other hand, as a management control system, the evolution of RAS has nevertheless led to an accounting shift of emphasis. Under this system, it has been argued, the accountant emphasises information that is useful to management and deemphasises the traditional bookkeeping aspects as reflected in financial accounting and product costing.⁽⁴⁾ This information should assist the management in controlling costs, and in evaluating managerial performance. In fact, the evolution of RAS and the accounting shift of emphasis together have been regarded as an opportunity for "opening up a new way for the accountant to provide valuable services to his enterprise and to take his place on the management team".⁽⁵⁾ From the accounting literature it seems that RAS has been developed and promoted as a result of the following phenomena:⁽⁶⁾

1. The development of classical organisation theory and its principles of organisation.⁽⁷⁾

2. The decentralisation and delegation of authority to the lower level of management as a means of coping with the complexity of business and increasing motivation.

3. The advent of integrated and centralised data processing which facilitated the preparation and combination of data in numerous ways.

4. The realisation that the techniques and information available to management to exercise its control and performance evaluation functions were far from good.

Given the fact that RAS is a management control system and that the management does not manage in a vacuum but in an organisation, then the necessity of studying RAS in the organisational context can be appreciated. The influence of organisation in many forms on human activity is noticeable and can be described as follows, "modern man has tended to accommodate himself to a world increasingly organised. The trend towards ever more explicit and consciously drawn relationships is profound and sweeping, it is marked by depth no less than by extension".⁽⁸⁾ In effect, organisations represent the dominant form of institution nowadays. They are "a fundamental part of our existence, pervading all aspects of contemporary life".⁽⁹⁾ We would not be wrong to describe this age as the age of organisations.⁽¹⁰⁾ In the organisational context, RAS can generally be studied, examined or designed using one of the following approaches:

1. A traditional approach which is based on classical organisation theory and its principles or doctrines. RAS designed on this basis will be called hereafter conventional RAS.

2. A contingency approach which is based on what we will call the modern organisation theory to distinguish it from the classical one.

3. A proposed approach which reflects our perspective and lies

between the above two approaches.

Using a flight as an analogy, then in this research these three approaches can be regarded as the point of departure; the transit; and the point of arrival respectively. In the accounting literature, however, one is always confronted by conventional RAS. A careful examination of this system will show that it is influenced by and tied to the classical organisation theory. Therefore it is applicable to organisations which operate in circumstances similar to those which are required by the classical theory. But, to a large extent, the internal and external circumstances of organisations have changed since the evolution of the classical theory of organisation and this has led to the development of modern organisation theory. Internally and externally, the circumstances have changed and variables such as technology, size, environment, interdepartmental dependencies, etc, which have previously been overlooked, or at least regarded as stable factors in the classical organisation theory, must be taken into account in studying today's organisations. In terms of the modern theory organisations cannot be understood unless these variables are fully considered. Each has its effect(s) on an organisation. Overlooking any of them in designing RAS, could cause dysfunctions. This, incidentally, may explain why conventional RAS has become subject to criticism.

In fact, in the last fifteen years or so, conventional RAS has come in for considerable criticism and this has highlighted the problems which emerge from applying this system in today's organisation. Consequently, though "not surprisingly, top management frequently dislikes (conventional) responsibility accounting and finds distasteful the (disciplinary) decisions called for by it."⁽¹¹⁾

In this research, we believe that it is possible to remedy this situation if, and only if, RAS is designed in the context of the organisation, and in particular, by taking account of the following three variables: technology; environment; and interdependencies. Otherwise, the situation will remain as it is, i.e. continuing problems from RAS and a continuing management dislike of it. Inevitably, accountants will be blamed because "when we are faced with a complex problem that demands more careful analysis than we are willing to give, we get "practical" about it - that is, we assume away some of the issues simply because we do not know how to deal with them, or because we are unwilling to take the trouble to learn what we ought to know".⁽¹²⁾

Notwithstanding the prevailing view that neither management accounting nor its control systems can be studied in isolation of the organisation context, research in accounting goes in the opposite direction. This research has tended to be focused on what are admittedly important aspects of management accounting and management control systems in isolation of the organisational context in which they operate.⁽¹³⁾ Hopwood states that recent accounting research "invariably take(s) the accounting phenomenon for granted.... Accounting is seen to be a relatively independent art, having its roles and consequences primarily moderated by the cognitive properties of its immediate users rather than the setting in which it is placed."⁽¹⁴⁾ In fact, studying management accounting and its control systems in the organisational context has become inevitable. The advantages of applying an organisational view in studying management accounting and management control systems have been identified by accounting writers. Hopwood, for example, has stated

that, "an organisational view of accounting has enormous potential to illuminate some of the more problematic aspects of accounting craft."⁽¹⁵⁾ This organisational view will:

1) help in understanding the roles which accounting plays in the creation of particular patterns of organisational segmentation and the consequences which this has on the flows of information.

2) assist those who are concerned with the design of more effective information provision in times of change and discontinuity, as it reveals the ways in which accounts of organisational performance provide particular mappings of both the organisational environment and its internal process and outcomes.

3) provide more insights into the role which different and conflicting accounting assessments of organisational performance, both past and prospective, play in the determination of decisions and the allocation of scarce resources.⁽¹⁶⁾

Following the above argument, in this research we will study RAS in the organisational context. In doing so, the study will attempt to establish a link between two subjects, management accounting and its control system, namely RAS, on the one hand, and organisation theories on the other. The link between these two subjects can be viewed in one of two ways. In the first, the relationship can be described as sequential and the direction of the relationship is from organisation theories to management accounting.⁽¹⁷⁾ The other approach is to view the relationship as reciprocal. According to this approach "management accounting (is) viewed not so much as a separate and distinct area of knowledge but rather as being reciprocally interdependent with the general field of organisation theory."⁽¹⁸⁾ However, without denying that this latter approach can,

or rather should, be applied later, for the time being we believe that the first approach is the one which should be followed by us. Our argument is based on two points. First, few studies have been conducted to establish a link between these two subjects.⁽¹⁹⁾ Therefore, we believe that this link has not yet been well established. In other words, there is much that we, as accountants, must know first with respect to organisation theories before we can contribute to it. Second, our purpose, we assume, in establishing this link is to improve our field of expertise, i.e. management accounting and its control system(s). However, for the time being and since the link has not been well established, there is a danger that the accountant may be drawn into the dilemma now facing organisation theorists who are "becoming concerned about being more and more rigorous about more and more trivial issues",⁽²⁰⁾ and forget their main purpose, i.e. to improve their field of expertise. Accepting this argument, we can describe our position in terms of being an accounting researcher and an organisation student pro tem. Our job is not to search for an adequate basis for resolving conflicts of interest and values between organisational theorists, rather our job is to look for areas where conflict is minimised for the purpose of improving management accounting and its control system, namely RAS. Birnberg has suggested three steps to be followed for establishing the link, as follows:⁽²¹⁾

1. A review of what the researcher assesses to be relevant in the organisational literature.
2. A review of what the researcher assesses to be relevant in the accounting literature.
3. A discussion of the areas where the most promising "fit" is

to be found.

What has been stated so far gives us a broad idea of the nature of the present study. After this brief introduction we can move on to discuss the purpose, scope, limitations, methodology, and structure of the study.

1.2 THE PURPOSE OF THE STUDY

Many accounting writers have directed our attention to the need to relate management control systems to the organisational context. Watson, for example, has indicated the shortcoming of the accounting literature as it is often difficult to know "under what organisational conditions is a particular accounting system appropriate?".⁽²²⁾ Or using Brownell's terms, "the more basic question of what control system features are appropriate to manage activities that face differing environmental and technological circumstances still remains largely unanswered."⁽²³⁾ Taking the above viewpoints into consideration and given the fact that we are confronted with two organisation theories, namely classical and modern organisation theories, then the purpose of our study is to find an answer to the following question:

In the light of the two organisation theories how should RAS be structured to achieve a better performance evaluation?

1.3 THE SCOPE OF THE STUDY

There will therefore be three general areas under investigation:

A. Organisation Theories: In particular two theories will concern us here: classical and modern organisation theories. We wish to consider their theoretical basis and the similarities and

differences between them. In performing this task, we will attempt to show how the classical theory has affected what we call conventional RAS and consider the implications of the two theories in structuring RAS for modern organisations.

B. RAS Structure: By this term we mean issues such as the principle of controllability, the classification of cost and revenue items in relation to controllability, the responsibility centres, responsibility and authority within the responsibility centres, etc. In general RAS structure here is intended to embody all the issues other than behavioural or technical issues.

C. Performance Evaluation: Here we are interested in the performance evaluation approach within RAS which can be reflected by the following aspects:

1. The criteria of performance evaluation, that is, single, multiple and composite criteria.
2. The ways of forming these criteria: financial, nonfinancial, and quantitative or qualitative.
3. The source of these criteria, i.e. internal criteria or external criteria or both.
4. The time span of the performance evaluation: short or long, and for the latter how long it should be.
5. The performance evaluation approach, that is, output or process approach and under what circumstance(s) each one should be used.
6. The level at which the performance evaluation should be conducted, that is, at the departmental level, at the group of departments' level or at the organisational level.

However, in order to curtail the scope of the study, we have three

points which will put the study in a manageable framework.

1.4 THE LIMITATIONS

Following the above order of the three areas which constitute the scope of the study we can state the following three limitations:

1. Organisation theories will be examined here for the purpose of carrying back a message to the accounting community explaining the extent to which conventional RAS suits today's organisations. The relationship between organisation theories and RAS in this study will be sequential rather than reciprocal. Using Churchman and Emery's terms, the researcher can be described as doing "research on research".⁽²⁴⁾ This approach has been followed by accounting researchers such as Gordon and Miller,⁽²⁵⁾ Burns and Waterhouse,⁽²⁶⁾ Chenhall and Morris,⁽²⁷⁾ etc. We hope that accounting researchers will later be able to adapt the reciprocal form of relationship between organisation theories and RAS.

2. RAS in general can be examined from one of the following three aspects:

A. Structural aspect: As we have described it above. Waterhouse and Tiessen,⁽²⁸⁾ and Ginzberg⁽²⁹⁾ are examples of studies which adapted the structural perspective in studying management accounting systems.

B. Technical aspect: Here the researcher focuses on the technical matters within RAS such as the way of forming the reports, e.g. forms of aggregating the data, the way of preparing the reports, i.e. manually or computerised, the different methods of calculating the variances, etc. The studies of Chenhall and Morris,⁽³⁰⁾ and Ansari⁽³¹⁾ can be men-

tioned as examples of studies which were concerned with the technical aspect of management accounting systems.

C. Behavioural aspect: Here the behaviourist might be anxious to examine, for example, the effects upon performance where there is participation vs nonparticipation in defining standards or budgets. Also he may be interested in investigating the impact of loose or tight standards on performance, etc. In general the area of concern is the relationship between RAS on the one hand, and the individual attitudes on the other hand, and their effect on performance. The studies of Hopwood,⁽³²⁾ Otley,⁽³³⁾ Schief and Lewin,⁽³⁴⁾ Lowe and Show,⁽³⁵⁾ and Belkaoui⁽³⁶⁾ are examples of the behavioural studies of management control systems.

Ansari⁽³⁷⁾ has pointed out that accounting researchers are used to concentrating on one of these aspects in their examination of management accounting/control systems. Also he has argued that designing control systems requires some consideration of these three aspects. From his point of view these three aspects are interacting aspects. In turn, he proposed "a framework which recognises these interactions and suggests an operational way to combine them in control system".⁽³⁸⁾ The fact is that combining these three aspects and giving them the same weight has complicated the framework and led some accounting writers to question its practical usefulness.⁽³⁹⁾

The viewpoint which will be applied in this research can be stated as follows. First we acknowledge that these three aspects are interrelated. Thus, research which deals with one of these aspects cannot entirely overlook the other two aspects; nevertheless, it is recommended that a researcher chooses one of these three aspects as a point of entry for examining RAS and gives it a relatively high

weight in comparison to the other two aspects.⁽⁴⁰⁾ In this study the structural aspect will be our point of entry for studying and designing RAS.

3. RAS is designed to achieve two central and inescapable functions of management of all organisations, that is, control and performance evaluation. Our primary interest in this study is in performance evaluation through a RAS. This is for two reasons. First, the control function of management has received much attention from accounting researchers. The accounting literature is, in fact, very rich in this area. There are numerous studies on the control aspect of management control systems, e.g. budgetary control, standard costs, etc. On the other hand, there is a relative poverty of research on the performance evaluation aspect of management control systems. Apart from Hopwood,⁽⁴¹⁾ and Otley,⁽⁴²⁾ there are very few studies which have considered the performance evaluation aspect of management control systems. This situation is inconsistent with the fact that the performance evaluation aspect is "both an important organisational function often served by accounting information and one which is of central importance to the individual manager being evaluated".⁽⁴³⁾ Second, though the stress is on performance evaluation, it is considered that research that deals with one of these two aspects, i.e. control or performance evaluation, will indirectly be useful to the other aspect. This can be supported by the following viewpoints:

1. RAS comprises two intertwined components; "one relates to the achievement of effective control over subordinates.... The second relates to the evaluation of the desired outcomes".⁽⁴⁴⁾

2. "To have any control at all over costs, responsibility

accounting must be used for performance evaluation",⁽⁴⁵⁾ and

3. RAS "depends crucially on measures of performance that will be fed-back to those involved and upon which their subsequent actions will be based."⁽⁴⁶⁾

Bearing these three limitations in mind, then we can move to discuss the research methodology.

1.5 RESEARCH METHODOLOGY

The research reported in the following chapters will reflect theoretical as well as empirical work. The theoretical work is a product of a literature survey of organisational and accounting literature with respect to the three dimensions of the study: organisational theories; RAS structure; and performance evaluation. These three dimensions are discussed separately in the accounting and organisational literature. Therefore the theoretical part can be seen as a synthesis of accounting and organisational literature with regard to the above three dimensions and which, in the end, enables us to answer the question posed in the section on the purpose of the study.

The positive aspect of this study will be reflected in the empirical work. We are aware of the gap between the theory and practice of accounting, e.g. Scapens,⁽⁴⁷⁾ Shaw,⁽⁴⁸⁾ McCosh,⁽⁴⁹⁾ etc. It has become evident that accounting researchers and practising accountants are operating as separate cultures, each has its goals, language, and methods. During the last decade or so, many accounting writers have indicated the need for conducting accounting research on both a theoretical as well as an empirical level.⁽⁵⁰⁾ The benefit of the practical dimension, according to Cooper, is to "improve our

understanding of the way management accounting systems operate in reality. Our knowledge of how accounting systems are used in organisations is incomplete."⁽⁵¹⁾ We in fact think, in a way similar to Flint and Shaw, that "accounting research,....., is not the pursuit of some ultimate truth but is concerned to increase knowledge and understanding in order to improve and extend the practice of accounting."⁽⁵²⁾ One condition for achieving this is to know what is going on in practice so that appropriate suggestions and solutions to improve and extend accounting practice can be made. Based on the above arguments, the empirical work of this study concentrated on the collection of information about RAS in practice. There are two reasons why we have conducted an exploratory study⁽⁵³⁾ to gain information about RAS in practice rather than testing a theoretical model of RAS in practice. First, there are very few studies which have investigated RAS in practice. There is much to be discovered about how RAS operates in practice before we can design empirical studies to test a specific model or theory about it. Second, studying RAS in the organisational context will introduce some concepts, terms, and variables, e.g. technology, environment, and interdependencies, etc. Although these have been used in some conceptual accounting studies, they have not been investigated in relation to practising accountants to determine how they perceive them. Thus an exploratory study to perform this task is needed before we can use them in matters relating to accounting.

So far we have explained that RAS will be examined theoretically and empirically. If we envisage RAS as a stick and that one end of this stick represents RAS in theory, and the other end represents RAS in practice, then the gap between the two ends of the RAS' stick is

the gap between theory and practice. No doubt we, as accounting researchers, endeavour to reduce this gap, that is to say, to achieve more convergence between theory and practice. However, we follow different approaches. Some of us advocate theory as a basis for practice, whereas others argue that practice should be the grounds for theory. Our point of view, however, is that there is a need for both approaches to be used simultaneously. The fact is that there are issues which theorists are not aware of in practice and which should be taken into account in developing accounting theory. In the meantime there are some accounting practices whose underlying theory would be difficult to ascertain. This means that there will always be a need for some kind of reconciliation between theory and practice.

In summary, if the objective of a study should be the determinant of the methodology which ought to be followed in carrying out that study, then the above methodology is justified by the need to study RAS in its organisational context. The rest of this chapter will explain the structure of the study and the content of the chapters.

1.6 STRUCTURE OF THE STUDY

The research reported here consists of three interrelated parts. The theoretical issues are discussed in chapters two to eight. The empirical study and its findings are presented in chapters nine and ten. Finally the summary and conclusion are presented in chapter eleven.

In chapter two we discuss conventional RAS. This is as it is normally presented in the accounting literature. The discussion

covers the structure of RAS, and its performance evaluation approach. Two studies are presented which represent attempts to solve the problems of conventional RAS.

In this research, we will argue that conventional RAS is dominated by the classical organisation theory and this theory is explained in chapter three. We examine the work of three organisational scholars who have contributed to the classical organisation theory, and we look at the idea of scientific management, classical management theory, and finally bureaucracy in detail. We argue in this chapter that the similarities between these three sources of classical organisation theory are due to the circumstances which prevailed when these ideas developed, rather than to any information transmission between them.

In chapter four the linkage between classical organisation theory and conventional RAS is established. The theme of the chapter is that conventional RAS is influenced by and tied to, classical organisation theory. This argument is discussed in relation to conventional RAS' structure and performance evaluation. This in turn will raise the question of the applicability of conventional RAS and in particular, the specific conditions under which conventional RAS should operate in order to be effective. We then present two cases of organisations whose operating conditions were suitable for the application of conventional RAS. Contemporary organisational studies, however, show that the possession of the necessary attributes for conventional RAS are not prevalent in practice, and consequently a new way of thinking about organisations has emerged, which we call modern organisation theory.

Chapter five is the first of four chapters which consider modern

organisation theory and its contingency variables. Chapter five begins by identifying the main features of the modern theory and contrasts these with the classical organisation theory. In the modern organisation theory, contrary to the classicists' beliefs, organisational structure is dependent on four variables, which are known as the contingency variables, namely, technology, environment, size and interdependencies. The five pioneer studies which led to the recognition of these contingency variables are reviewed. Contingency theory has tended to dominate organisational work in recent years. The theory has its proponents as well as its opponents. As we intend to apply a contingency perspective for studying and designing RAS we felt that it was useful to illustrate to what extent contingency theory is accepted by accounting writers. The final section of chapter five justifies the three contingency variables we have chosen for studying and designing RAS.

Chapters six, seven and eight give additional insights into technology, environment and interdependencies, respectively. Both the organisational and the accounting literature is reviewed with respect to each of the variables, to provide us with more information about them. This review is the basis for defining how we will perceive each of them for the purpose of studying and designing RAS.

Chapters nine and ten contain the empirical part of this study. Chapter nine explains the research methodology followed in conducting the empirical study. The chapter explains our objectives in performing this part of the study, why we chose the questionnaire method for data collection, the reasons for splitting the original questionnaire into two questionnaires, the nature of the sample and the procedures followed in choosing the sample. Chapter ten presents

and analyses the results of the empirical study. The chapter is divided into a number of sections, each dealing with a particular section of the questionnaire. The final section of the chapter deals with the issue of the level of satisfaction among accountants with the RAS's in their organisation.

Chapter eleven presents the main conclusions of the study.

FOOTNOTES

1. Some writers have argued that the main function of RAS is to achieve control. See for example, Rosen, L.S. and R.E. Schneck, "Some Behavioural Consequences of Accounting Measurement Systems", *Cost and Management*, October, 1967. See also, Craig, Quiester, "Cost Control: Whose Job?", *Management Accounting*, N.Y., March 1975.
Other writers have stressed the Performance evaluation as a function of RAS. See for example, Dittman, D.A. and K.R. Ferris, "Profit Centre: A Satisfaction Generating Concept", *Accounting and Business Research*; vol. 8, No. 32, 1978. Also, Fisher, J. "Responsibility Accounting a Bank Management Tool", *The Scottish Banker Magazine*, May 1984. Finally see, Eilon, Samuel, "A Classification of Administrative Control Systems", *The Journal of Management Studies*, February 1966.
On the other hand, there are some writers who do not follow any of the above viewpoints, but rather have argued for different function or purpose of RAS. Among those are Emmanuel and Otley who argued that "RAS is designed to promote behaviour congruence by distinguishing financial results that are controllable by the divisional manager from those that are uncontrollable, although this is difficult to apply in practice". See Emmanuel, Clive R. and David T. Otley, "Accounting for Management Control", Van Nostrand Reinhold Co., Ltd., UK. 1985, P170.
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6. Netten, Ibid.; Kellogg, op. cit.; Pick, John, "Is Responsibility Accounting Irresponsible?", *The New York Certified Public Accountant*, July 1971; Liao, S.S., "Responsibility Centers", *Management Accounting (NY)*, July 1973.
7. Organisation theory and organisation behaviour are synonymous terms. However, Weick has argued that the term "organisational

behaviour, should not be used as it tends to confuse rather than clarify the questions that theorists ask." Otley has used the term of "organisation theory" in his survey paper as he considered it to include work in organisational behaviour. For details, see Otley, David T., "Management Accounting and Organisation Theory: A Review of Their Interrelationship", in Scapens et al
op. cit.

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10. Duncan, W. Jack, "Organisational Behaviour", Houghton Mifflin Co., Boston, 1978.
11. Pick, op. cit., P.493
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13. Flamholtz, E.G., "Accounting, Budgeting and Control Systems in their Organisational Context: Theoretical and Empirical Perspectives", Accounting, Organisations and Society. Vol. 8, No. 2/3, 1983.
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15. Ibid., P.291
16. Ibid. See also Emmanuel and Otley, op. cit.
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CHAPTER 2 CONVENTIONAL RESPONSIBILITY ACCOUNTING SYSTEM

2.1 GENERAL

2.2 THE STRUCTURE OF RESPONSIBILITY ACCOUNTING SYSTEM

2.3 THE PERFORMANCE EVALUATION

2.4 PROBLEMS AND CRITICISM

2.5 THE PRIOR STUDIES

2.1 GENERAL

Basically, RAS was developed to control costs and this led to the creation of cost centres. Later RAS was extended to cover revenues, and so revenue centres were identified. When managers became responsible for both costs and revenues, the accountant began to regard the responsibility centre as a profit centre. Finally, as managers were delegated the authority to make investment decisions, the related evolution in RAS was the establishment of investment centres.

In the accounting literature there is substantial consensus in the way RAS is defined and designed. For example, Phillippe has described RA as "a system of reports for all levels of management, designed to provide information which can be used to control expenditure most effectively and which directly relates the reporting of expenditure to the individual responsible for their control".⁽¹⁾ Horngren defines RASs as systems which "recognise various decision centres throughout the organisation and trace costs (revenues, assets and liabilities where pertinent) to the individual managers who are primarily responsible for making decisions about the costs in question".⁽²⁾ Finally Pick has, in a short but similar way, seen it as a system that intends "...to tag each official (in a company) as a centre of authority, responsibility and accountability".⁽³⁾ In general two major features of RAS are discussed in the accounting literature. These are as follows:

1. The structure of RAS
2. The performance evaluation which is achieved through it.

2.2. THE STRUCTURE OF RESPONSIBILITY ACCOUNTING SYSTEM

Generally speaking, the structure of RAS can be constructed "where a well defined and standardised organisation exists. (However), whether or not the organisation is standardised..... certain principles of good organisation must be followed".⁽⁴⁾ Consequently, the RAS' structure can be established as follows:

1. By dividing the organisation into responsibility centres, each centre under the direction of an individual manager. In doing so it is recommended that such a division should be based on the organisation chart which "is the backbone of any responsibility accounting system",⁽⁵⁾ and "is a prerequisite for an effective responsibility accounting system".⁽⁶⁾

2. By determining the costs/revenues which can be traced to these centres. In the accounting literature such tracing is traditionally made on the functional basis,⁽⁷⁾ where "each function is designed to one, and only one unit of the organisation".⁽⁸⁾ Thus there will be production centres and production costs, sales centres and sales revenues, etc.

3. By categorising the costs/revenues into controllable and uncontrollable on the level of each responsibility centre. This categorisation or classification "is always a point of controversy in establishing cost responsibilities".⁽⁹⁾ However, this controversy can be resolved if one or more of the following guides is applied:

- a. That costs are controlled by those who originate and approve them.⁽¹⁰⁾
- b. That costs are controlled by a person who has power to take relevant decisions,⁽¹¹⁾ and
- c. That costs are controlled by persons whom the

management and/or its accountant hold completely and directly responsible.⁽¹²⁾

4. By preparing the responsibility accounting reports to take the form of functional aggregation or accumulation from bottom to top; for example, from the foreman, through the production manager to the chief executive. The general viewpoint is that the reports should include the controllable and uncontrollable items. The idea of the inclusion of the latter is that "the individual and groups would at least be aware of the fact that there is a useful and necessary organisation behind them which is costly to operate".⁽¹³⁾

Following the above principles will lead to a RAS' structure where all costs are controllable by a person at some point in time, that is, "there is no place in the framework of responsibility accounting for the idea of noncontrollable costs... Within an individual firm there is a responsibility "slot" for each and every cost element".⁽¹⁴⁾

2.3 THE PERFORMANCE EVALUATION

This is the second issue which is discussed in the accounting literature in relation to RAS. In general terms, this performance evaluation can be achieved by comparing actual costs/revenues against targets, such as standard costs or budget. The deviations may show whether the manager will be subject to reward or penalty. The main features of this performance evaluation can be summarised as follows:

1. It is conducted within the boundaries of each responsibility centre, that is, in isolation from the other responsibility centres.
2. Only controllable cost or revenue items are used for managerial performance evaluation because these are items "that are

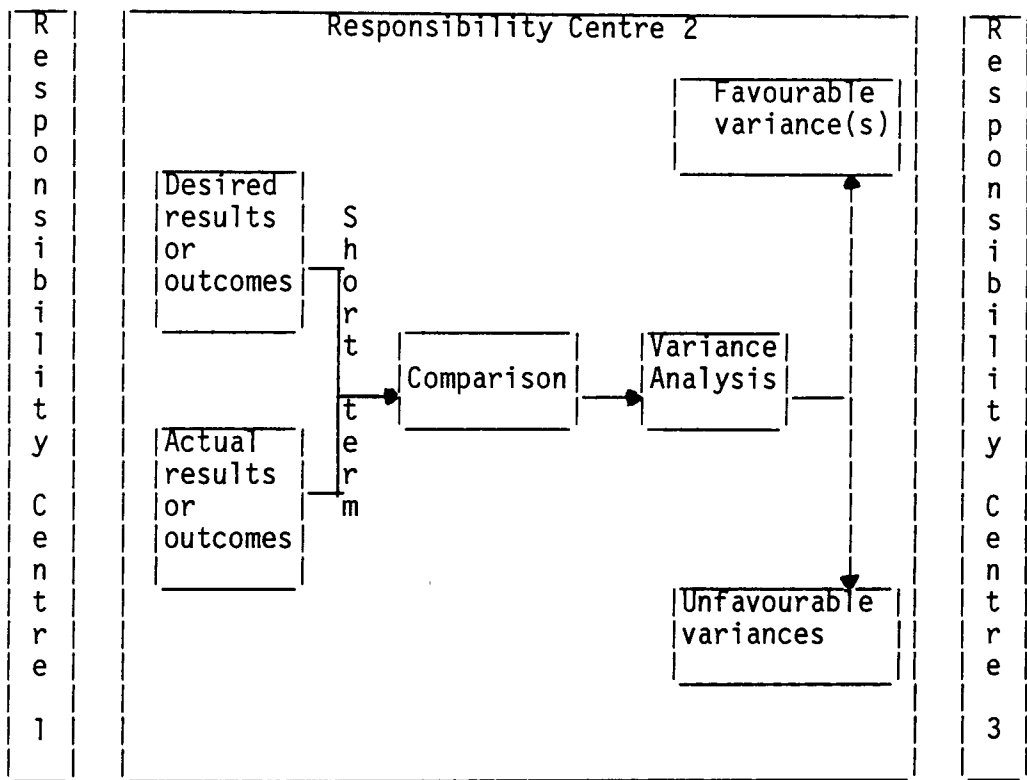
directly influenced by a manager within a given time span".⁽¹⁵⁾

3. It is output-oriented. That is, it concentrates on the managerial results in terms of what has been achieved against what should have been achieved.

4. It uses a single performance criterion, and it is always stated in quantitative and/or financial terms.

5. It concentrates on the short term only.

The following figure depicts the above features:



In the last two decades problems of conventional RAS have become apparent and these have led to some criticisms of the system. In the next section we will deal with these problems and criticisms. These will be presented in two main groups, the first dealing with RAS' structure and the principle of controllability which underlies it, and the second with conventional performance evaluation. However, these two groups

are not completely distinct; rather they are interrelated. Thus a problem might produce its effect(s) on RAS' structure as well as on performance evaluation. For example, a problem arises with respect to RAS' structure as it relies on an organisational chart for creating responsibility centres and this reliance on an organisational chart leads to the performance evaluation being conducted for each responsibility centre in isolation from the others. In fact, most of the problems, in particular with respect to the problems of the principle of controllability, can be connected with RAS' structure and at the same time with performance evaluation. This might be a reason for readers to question why a problem is included in one group and not in the other. However, grouping is a matter of personal judgement.

2.4 PROBLEMS AND CRITICISMS

2.4.1 RAS' Structure

McNally has identified two causes of the dysfunctional nature of conventional RAS. First, "it relies on the formal organisation systems, charts and manuals to identify responsibility centres, and (second), RASs are oriented to individuals."⁽¹⁶⁾ With reference to the first point, conventional RAS relies very strongly on the formal organisational system and therefore, charts become the only means of defining the formal relationships between the executive roles,⁽¹⁷⁾ the lines of authority, and therefore the individual areas of responsibility concerning the control of cost/revenue items,⁽¹⁸⁾ otherwise the control of the latter is difficult if not impossible. Many organisations, however, do not have organisational charts and this could cause a problem as a result

of the reliance of RAS on organisational chart. But the main problem with organisational charts, however, is that they show only one kind of relationship within the organisation, that is, the vertical relationship. However, in today's organisation a unit, in order to perform its task, needs to be linked vertically as well as horizontally with the other units. Dubin⁽¹⁹⁾ has shown that performing different functions or tasks will need different linkage systems. He demonstrated the linkage systems in relation to four functions or tasks which can be performed by a unit in an organisation, namely, direction, coordination, control, and innovation functions. Given the fact that in today's organisations all these functions are performed in every organisation, then there will be, at least, four different linkage systems between the organisational units. But the charts show only one kind of linkage, i.e. vertical linkage. This was, in effect, the reason for Dubin to state that "organisation chart is a lie, for it can never simultaneously display the full array of linkages among units".⁽²⁰⁾ Notwithstanding, there are writers who think that the organisational chart can provide us with sufficient information. Perrow, for example, has defended the organisational chart. Ironically, he argues that we should not criticise the organisational chart because, for example, "it does not reflect the growing power of a subordinate who will be promoted over his boss in a year or two",⁽²¹⁾ or because it does not show that "when the head office cannot get enough information about a division's operations, it sends in a spy, etc.". ⁽²²⁾ In fact Perrow's defence did not touch the essence of the criticism against organisational charts. That is, it does not display the horizontal relationships or interdependencies in an

organisation. However, and apart from Perrow's defence, the modest and contemporary viewpoint, which is taken by most of the organisational theorists, is to view the organisational chart as a means of providing the initial information needed when examining an organisation. Pugh and Hickson, for example, referred to this viewpoint when they stated that "it is reckless to believe that an organisational chart is all there is to know about an organisation, and also, reckless to believe that its existence can be ignored as if it told nothing about an organisation."⁽²³⁾ In the same vein, Mintzberg stated that "the (organisational chart) should not be rejected, but rather placed in context; it tells us some useful things, even though it hides others."⁽²⁴⁾

The second dysfunctional aspect of RAS discussed by McNally is that conventional RAS is oriented towards individuals. Flamholtz also made the same point when he stated that conventional RAS is "typically based either explicitly or implicitly upon assumptions about individual-to-formal organisational relations."⁽²⁵⁾ In fact it does not require much effort to discover that, in conventional RAS, the individual is the unit around which RAS seeks to establish responsibility centres. He has the authority to exercise control; he receives reports; and he is responsible for the results; consequently he should receive a reward or penalty. On the other hand this orientation is coupled with an entire disregard for the group as a basis for RAS. In fact no one can deny that the number of tasks which require interdependent (group) behaviour is growing more and more. However the accountant neglects this fact, though the existence of interdependence is inevitable in an organisation.⁽²⁶⁾ Moreover the accountant assumes that a manager can behave as if the

various forms of interdependencies do not exist.⁽²⁷⁾ For Scapens this disregard is based on an assumption that a group decision is a trivial extension of individual decisions. In other words, what the group will achieve can be achieved independently by the individuals of the group.⁽²⁸⁾ Nevertheless this assumption is not valid, at least with respect to the control over cost/revenue items, as will be clear from the following analysis of the principle of controllability of the conventional RAS.

We might recall that the principle of controllability is concerned with classifying cost/revenue items as controllable and uncontrollable at the responsibility centre level, and finding a manager or a person who will be responsible for each item. By and large, by following some of the guidelines which we have mentioned above,⁽²⁹⁾ all costs and revenues should be controllable by a person at some point in time. In fact this principle is one of the issues of conventional RAS which has been subject to much attack and criticism from organisational, as well as accounting, writers and researchers. As Anthony states, "what, as a practical matter, is meant by personal responsibility since there are few, if any, cost elements that are completely and solely the responsibility of a single person."⁽³⁰⁾ Anthony, and Scapens have also remarked on the difficulty of determining who is responsible and therefore who should be held accountable for particular events in practice.⁽³¹⁾ In addition, this principle assumes that the control held by a person is an absolute, that is, he has 100% control over a cost/revenue item or no control at all. In other words, no explicit recognition is given to the degree of control over an item, which can be a point on a continuum from full control to no control.⁽³²⁾ Moreover, the

principle perceives control to be a fixed amount as well as a zero sum game. That is, control for one responsibility centre manager means no control for another. In fact control theory and its applications⁽³³⁾ demonstrate that the total amount of control in an organisation may grow as a result of sharing information between top and lower level managers which, in turn, will enhance their power jointly. On the other hand, total control may also decline, and the different managerial levels may suffer corresponding decreases as a result of their tendency to behave independently where they should behave as a group. Thus what a group can achieve or suffer from is not the same as what the individuals of the group can independently achieve or suffer from. Moreover, control theory, through its control graph, shows that the worst model of its four models of control distribution, i.e. the autocratic model, is the one which traditionally underlies the principle of controllability where control decreases the further down the hierarchy one goes.

The basis upon which cost/revenue items are classified as controllable and uncontrollable has been questioned by many writers. Lowe and Tinker, for example, have applied a systems theory perspective and proposed that this distinction should be made in relation to the external environment. In other words, what can be and cannot be controlled is dependent upon environmental factors. Furthermore, they argued that "uncontrollable factors are often critical because of their influence on the firm's well-being... (and) if the firm's objectives imply its survival, the uncontrollable factor requires to be controlled by appropriate adaptation of the organisation."⁽³⁴⁾ Thus, it is not a cost/revenue item as such we should be interested in; rather the factors that cause certain

cost/revenue items to occur.⁽³⁵⁾ On the other hand, it can be argued that the principle of controllability is based on the assumption that the environment is static, and any person in authority over a responsibility centre will have the ability to control the cost/revenue items of his centre. In reality, however, the environment in which most of today's organisations operate is described as dynamic and sometimes as turbulent.⁽³⁶⁾ In this environment, "the accelerating rate and complexity of interactive effects exceeds the component systems' capacities for prediction and, hence, for control of the compounding consequences of their actions".⁽³⁷⁾ Of course, this type of environment has a direct implication for the amount of control which can be exercised by a responsibility centre manager.

Also, there is no recognition of the impact of technology and its different production systems on what can be regarded as controllable and uncontrollable. That is, in conventional RAS we might gain an impression that controllable items within mass production technology are also controllable items in process production technology. Moreover, no consideration has been given to the fact that the ability to control is dependent, in addition to what has been stated above, on the quantity and quality of information available to the responsibility centre managers, their personalities, the sociological factors, etc. These as well as other variables might lead to a deviation between perceived control, i.e. through conventional RAS, and actual control.⁽³⁸⁾ In fact, the circumstances, e.g. environment, technology, availability of information, etc, in which cost/revenue items are more (less) likely to be controllable have been neglected by conventional RAS.⁽³⁹⁾

So far we have pointed out some of the problems with the principle of controllability and RAS' structure. Let us now examine the criticisms directed at the second issue of RAS, that is, its performance evaluation approach.

2.4.2 Conventional Performance Evaluation

The first criticism is that conventional performance evaluation is conducted for each responsibility centre in isolation from the others. That is to say, it does not reflect the interdependencies and the interactions between the responsibility centres and their effects on managerial performance. This closed system viewpoint can, in fact, be attributed to the following two reasons among others. First, the insistence on using an organisational chart which, by definition, shows only one kind of relationship, that is, the vertical relationship. Second, the insistence on establishing clear cut lines of authority and responsibility. No doubt these two reasons have simplified the interactions and interdependencies of a problem that "concerns expenditure made in one area but benefiting another area".⁽⁴⁰⁾ This problem has first been treated as a cost allocation problem, and "it is simply a matter of determining who is to be charged with the cost involving dual responsibility and to what extent".⁽⁴¹⁾ Later, and for a motivational purpose(s), the problem has been examined in relation to transfer pricing. However, neither of these two solutions has led to a real reflection of the effect of interdependencies and interactions on performance evaluation. This is in addition to the fact that there is no single cost allocation method or transfer pricing technique that is universally acceptable. With respect to cost allocation methods, Bodnar showed that this

disagreement is due to two points. First, the simplification of the cause-effect relationship between a cost element and an allocation base, which is the common feature of the allocation methods. Second, no method of allocation is better than any other as all methods are arbitrary.⁽⁴²⁾ Turning our attention to the transfer prices, we will find a large body of literature which discusses the different bases of these prices, e.g. incremental costs, full costs, negotiation, market prices, etc. A large part of this literature, however, reflects the debate about the usefulness, and the reliability of these prices. An example of this debate can be found between Goetz, Wells, and Lemke.⁽⁴³⁾ However, the controversy regarding transfer prices has not settled down yet in the accounting literature. Emmanuel and Otley, on the other hand, have argued that the common attribute of transfer pricing techniques is that they reflect zero-sum game, and "the potential for divisional managers to indulge in opportunistic behaviour to improve their individual performance at the expense of overall company performance is difficult to ignore".⁽⁴⁴⁾ Notwithstanding, one is very likely to find accounting writers, e.g. Tucker and Zivan⁽⁴⁵⁾, Watson,⁽⁴⁶⁾ who encourage organisations to employ the transfer pricing technique by creating pseudo-profit centres, even for responsibility centres whose nature necessitates their being regarded as cost centres, e.g. service centres, research and development centres, etc. No doubt these writers complicated the matter by regarding transfer prices not as means but as ends in themselves, that is, to increase managerial motivation. Empirically, however, it has been found that "managerial attitudes are not significantly altered by artificially designating a responsibility centre as a profit centre when the manager does not

have control over his subunit's ability to influence its reported profit".⁽⁴⁷⁾ To summarise, we can say that accountants in their endeavour to deal with the interdependencies and interactions within an organisation have invented, and are still inventing, different cost allocation and transfer pricing methods which created more problems than they solved. In fact one might wonder why accountants have not thought the other way around. That is to say, instead of thinking about developing techniques for using transfer prices, they could think of developing techniques which avoid the need to use transfer prices.

Second, the conventional performance evaluation approach is based on the controllable cost and revenue items for managerial performance evaluation. This seems sound. However, the problems inherent in the principle of controllability make defining what is controllable a difficult, if not impossible, task.⁽⁴⁸⁾ The failure to define controllable items might lead to dysfunctional performance. On one hand, treating some items over which the responsibility centre manager can exert some control as uncontrollable might direct the manager "not to exert effort on those (items) and eventually to jeopardize the accomplishment of the organisation's goals".⁽⁴⁹⁾ On the other hand, treating some items as controllable which are uncontrollable will lead the responsibility centre manager to lower "his expectancy that effort will lead to work accomplishment".⁽⁵⁰⁾ However, the problem with classifying items as controllable and uncontrollable is not with the classification per se, but with its arbitrariness. As we have argued, this classification will be meaningful if it is related to one or more variables, e.g. technology, environment, etc., for the purpose of managerial

performance evaluation. For example, what cost items will be fully controllable, somewhat controllable, and uncontrollable in relation to each of the production technologies, that is, mass production, process production, and continuous production? Also, what items are controllable when the environment is static but are uncontrollable when the environment turns out to be dynamic?

The third problem with respect to the conventional performance evaluation is that it is output-oriented. Hopwood has argued that the process approach is the one which should be used for managerial performance evaluation on the ground that "managerial activity is concerned with the detailed process giving rise to final outcomes".⁽⁵¹⁾ The consistent viewpoint is that they are "distinct but complementary approaches to performance evaluation".⁽⁵²⁾ However defining whether one of these approaches or both should be used is not a question which can be answered in isolation from the organisational context. This type of question can only be answered in relation to factors such as technology, interdependencies, competition, scarcity of resources, etc.

The reliance of conventional performance evaluation on a single criterion represents the fourth problem with this approach. Vancil has stated that "no single measurement, no matter how carefully constructed, can accurately reflect how well a manager has done his job."⁽⁵³⁾ In fact, the single criterion approach has universal dysfunctions in its application to performance evaluation, regardless of the kind of organisation, i.e. profit or nonprofit; the kind of activity, i.e. production, sales, research and development, etc; and the ideology or political environment, i.e. capitalism or socialism. These dysfunctions have led "the writers in the field of management

(to stress) the importance of multiple criteria in evaluating performance of management".⁽⁵⁴⁾ For example, in addition to profit, Liao has suggested market position, research and development, productivity, and employee morale, as multiple criteria for performance evaluation.⁽⁵⁵⁾

Finally, the conventional performance evaluation procedures associated with RAS are criticised for their concentration on the short term. Hopwood's viewpoint is that managerial performance should be concerned with long term considerations.⁽⁵⁶⁾ The fact is that some of a manager's decisions influence the long term performance, such as the trade-off between the maintenance programme and the production schedule. On the other hand, there are some decisions which affect the results only in the short term, for example, hiring more employees to accomplish the production schedule. In effect, determining when each time span, i.e. short or long term, should be applied is not an independent issue, rather it is dependent or contingent on, for example, the kind of activity, e.g. production or research and development; or the kind of decision, e.g. an investment such as a promotion programme or a routine such as hiring more salesmen within the limit of the budget, etc.

So far, this and the previous sections have dealt with conventional RAS and the criticisms which are directed at it. The logical sequence of examining RAS requires us to review the prior studies in the area of RAS and to investigate to what extent these studies provide us with a solution to the problems of RAS. The investigation of the prior studies will be the subject of the next section.

2.5 THE PRIOR STUDIES

As the heading indicates one might expect to find many studies in the area of RAS. However, this is not the case. A literature survey conducted by the researcher revealed a relative scarcity of publications in the area of RAS in comparison with other management control systems, e.g. standard costs, budgetary control, inventory control, etc. In general, the literature of RAS can be classified into two categories:

1. Textbooks, e.g. Horngren, Glautier and Underdown, Shillinglaw, and
2. Journal articles.

The former category deals with RAS in a highly conventional way, as do many of the journal articles on RAS. As far as the literature survey is concerned, there are some studies which deviated from the traditional approach and, two of them will be mentioned here. Both studies have recognised and dealt with the problems of conventional RAS.

McNally, in a way similar to our study, has not restricted himself within the boundaries of the accounting discipline; rather he has crossed these boundaries and has gone to administrative science and social psychology for the purposes of examining conventional RAS. His main purpose was "to eliminate some of the dysfunctional effects which originate from the accounting interpretation of control and its distribution in organisation".⁽⁵⁷⁾ He has anticipated three possible structural modifications to RAS:

- "1. recognition of degree of control on a scale from no control to full control,
2. designing a RAS which is oriented to control over area of

- activity or decision rather than costs and revenues, and
3. extending the interpretation of control from authority to incorporate informal organisational influences."⁽⁵⁸⁾

Using the individual manager as a unit of analysis, McNally's concern was to define the degree of control that a manager has over different items of costs and revenues for different activities which the manager might engage in, formally or informally, and to incorporate these items in a report to the manager. For this purpose, and as a result of the limitations in the accounting discipline, he proposes a technique which involves the periodic opinion polling of an organisation's members. The procedures for polling include obtaining information, e.g. about the level of control the managers have over activities, by obtaining it directly from the participants; seeking information from their superiors; obtaining it from other organisational members or using multilateral communications amongst an organisation's members to obtain a consensus regarding the level of control a manager has over an activity. Also he identifies the expected operational problems which could emerge from applying the opinion polling technique, and he suggests solutions to them.⁽⁵⁹⁾

In fact, this technique could be highly subjective and one can raise many questions which are not answered in McNally's study, such as the following three points which are related to his study in general. First, the study has been conducted in a closed system framework. That is, there is no reference to the environment and its effect on the control of managers. Second, McNally takes the conventional RAS' viewpoint regarding the internal factors of an organisation, e.g. technology, interdepartmental dependencies, as he assumes that they have no effect on the control of a manager. Third, he follows conventional RAS and uses the individual manager as a unit

of analysis, rather than the group. Despite recognising the impact of a group on controllability "where the group (of managers) may present different attitudes and behaviour than individuals comprising the group".⁽⁶⁰⁾ McNally, however, concentrates on individual managers and avoids a group of managers as a level of analysis in his study.

As we have seen, McNally ignores interdependencies and interactions between responsibility centres, a task which is undertaken by Clancy. He summarises the problems of the responsibility accounting approach in the lack of recognition which is given to interactions between responsibility centres. Using his words, "the problem with the responsibility accounting approach is not control of costs, within the responsibility centres, but the lack of control over interactions between the centres."⁽⁶¹⁾ He proposed three approaches to this problem; the third is of interest to this study. Under this approach "management would examine the existing organisation and determine the critical interactions between responsibility centres,....(then) management should decide what types of behaviour are desirable and undesirable. The emphasis in this analysis would be on determining what types of team action should be controlled. The desirable behaviour would then become part of the formal plan and performance evaluation procedure".⁽⁶²⁾ Although it is not stated explicitly, Clancy implies that the critical interactions between responsibility centres would be determined in the light of the internal and external factors, e.g. technology, environment, etc. How else can desirable and undesirable behaviour be determined? Based on this assumption the approach seems to be conceptually sound. However, further explanation to show how factors

such as these can affect behaviour, and how the approach can be put into practice is desirable, but cannot be satisfied from Clancy's study.

With the above two studies we conclude our discussion of conventional RAS. In addition, we have previously examined the structure and principle of controllability, the performance evaluation approach, and the problems and criticisms of conventional RAS. A careful examination of conventional RAS leads us to conclude that it is tied to and dominated by the classical organisation theory. Other writers have also reached this conclusion. But these writers fail to provide answers to the following two important questions: first, what does classical theory mean and second, how does classical theory influence conventional RAS? These two questions will be the subject of the next two chapters.

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CHAPTER 3 CLASSICAL ORGANISATION THEORY

3.1 GENERAL

3.2 THE SOURCES

3.3 COMMENT

3.1 GENERAL

This chapter and chapter five will review organisation theories. In particular they will review the classical organisation theory which was originally developed around the end of last century and the beginning of this century.⁽¹⁾ The other theory is the modern organisation theory which was evolved in the last thirty years or so. These two theories represent two different ways of thinking about organisations and reveal the two extremes of organisational theory. Scott⁽²⁾ argues that organisational theory has proceeded through the classic, neoclassic, and modern process, and developed in a similar way to economics and physics, i.e. through a sequence of macro-micro-macro views. He classified classical and modern organisation theories as macro-organisational theories; however, the former theory is concerned with the principles common to all organisations whereas the latter is concerned with the variables which explain the differences between organisations. This difference in concern is partly due to the fact that classical theorists viewed organisations mainly as vehicles for rational achievement, "organisation is a means to an end,.... the organisation should exist in order to carry out some specific purpose, etc.,"⁽³⁾ whereas the modern organisational theorists attempt to understand organisations per se.⁽⁴⁾ As a result we might expect some variations between the two theories.

As we have argued, conventional RAS is dependent on only one of these theories, that is the classical organisation theory. In explaining our argument, three specific issues will be discussed. First, we will examine classical organisation theory, its sources and way of thinking. Second, we will look at the relationship between

the classical theory and conventional RAS. Third, we shall demonstrate the circumstances under which conventional RAS can operate through the presentation and analysis of case studies of real organisations. In this chapter we will discuss the first issue, and the other two issues will be discussed in chapter 4.

3.2 THE CLASSICAL ORGANISATION THEORY: THE SOURCES

In this research classical organisation theory will be regarded as a combination of the following three sources:

1. Scientific management, e.g. Taylor
2. Classical management theory, e.g. Fayol, Gulick, Urwick, etc.
3. Bureaucracy, e.g. Weber

However, in the organisational literature, these three sources are not always given equal weight. For example, Woodward has referred to the first two sources as "the systematic body of knowledge to which the term "organisation theory" could be applied".⁽⁵⁾ On the other hand, Lawrence and Lorsch regarded the last two sources as representative of the classical theory.⁽⁶⁾ Finally there are writers who combined the three sources to form the classical theory.⁽⁷⁾ In this research we are following the last group of writers and when we use the term "classical theory" we refer to these three sources unless there is a need to refer to a specific source. In the next three subsections we will briefly review each of the above sources. In doing so, we will attempt to show, 1) that they reflect the idea that there is always one best way to structure an organisation, 2) that they reflect the closed system viewpoint, and 3) that improving efficiency is their main concern.

3.2.1 The Scientific Management

Historically, according to the literature, scientific management was evolved before the other two sources. Taylor was an engineer who was interested mainly in the workshop. From his observation and experience he gained the impression that there is always one best way to do a job. In describing scientific management principles he began with a description of the pig-iron handler for the only reason that "pig-iron handling is the simplest kind of human effort, (he knows) of nothing that is quite so simple as handling pig-iron".⁽⁸⁾ Nevertheless from this very simple example he developed the principles of scientific management and stated that "whenever these four principles are correctly applied to work, whether large or small, to work which is either of the most elementary or the most intricate character, inevitably results follow."⁽⁹⁾ These four principles can be summarised as follows:

1. The development of the science: by this Taylor anticipates a kind of transfer of all the knowledge regarding a job from the minds of workmen to the minds of the management. The latter should record, tabulate and reduce this knowledge to laws, rules and even mathematical formulae. The application of the laws, rules and formulae by the management will lead to greatly improved efficiency, higher wages and larger profit. As can be imagined, the development of the science leads to a division of labour into management and workers. However, this division of labour has been based on a naive assumption about the nature of human beings. In Taylor's terms, "without the slightest hesitation,..... the man who is physically able to handle pig-iron and is sufficiently phlegmatic and stupid to choose this for his occupation is rarely able to comprehend the

science of handling pig-iron." (10)

2. The scientific selection and the progressive development of the workers. This principle refers to the management responsibility for choosing the worker for the job, following his performance, discovering the limitation(s) in his performance and training and developing him to achieve the highest degree of efficiency in performing his job. Otley has referred to this principle as the golden rule of scientific management, which states, "Get the situation right and the appropriate human behaviour and organisational performance will follow". (11) The behaviour deficiencies of this principle are no doubt clear and have been subject to much investigation; however, what concerns us here is to use it to illustrate the closed system of logic which underlies scientific management. As can be appreciated, the worker in this situation is regarded as simply obedient, (12) and for the worker to obey these procedures is to consider the worker as a deterministic machine, since a machine with this attribute has no option but to obey. However this kind of machine does not represent human nature which can, in systems' language, be described as a purposive machine. On the other hand, this principle assumes that there is a convergence in the interests of the management and the worker, which leads to obedience. These are the common interests of both the management and the workers; the former are interested in higher profit and the latter are interested in higher wages. The relation between the two and therefore the closed system of logic is obvious, whether you look at the relation from one side or the other. Thus, higher profit according to Taylor's way of thinking leads to higher wages. In other words, the workers will not be given higher wages unless their

contribution leads to higher profit. Clearly, Taylor failed to realise that higher wages could lead to higher profit, or that workers might seek other aims, e.g. job satisfaction, job security, improved working conditions, etc. Also he failed to realise other aims of management apart from higher profit, e.g. social acceptance, social prestige, etc. However, to introduce the above issues, i.e. the purposive machine and the divergence of interests, into the analysis means moving from the scientific management and its closed system view to the modern organisation theory and its open system view.

3. The bringing of science and scientifically trained workmen together. The application of this principle is aimed at the foremen who perform a link role between the management and the scientifically selected and trained workmen. This principle creates a managerial hierarchy, where the foremen are placed between management and workers. Also it illustrates what is known as a scalar chain (or line of authority) where the orders go from the management downward and the information comes from the workers upward, through the foremen.

4. The equal division of work between workers and management. This principle in fact is vague and it is not surprising that Taylor described it as "the most difficult of all the four principles of scientific management for the average man to understand".⁽¹³⁾ The principles describe how the work should be shared between the workers and management, and that the work which was performed by workers in an engineering shop, before the development of scientific management, will be shared between one man on the management's side and three workmen. From his point of view "it is due to the actual sharing of

work between the two sides more than to any other one element that there has never been a single strike under scientific management."(14)

Applying these principles in conjunction with time and motion study, Taylor was able to demonstrate that there was always one best way of performing a job. Mostly he was concerned with routine jobs. Consequently, scientific management was applied to production jobs or tasks despite the general applicability which Taylor has claimed for it. Only in these jobs can time and motion study be used, standards set, and the bonuses over day rates given. March and Simon in their evaluation of scientific management stated that these principles are not "a set of general principles for organising work efficiently, but a set of operating procedures that could be employed in each concrete situation to discover the methods that would be efficient in that situation and to secure their application."(15)

3.2.2 The Classical Management Theory.

When we move to the second source of classical organisation theory, we find two differences in comparison with scientific management. First, in scientific management the contribution came mainly from one person, i.e. Taylor, but in the classical management theory, although the initiation came from Fayol, there are many other well known contributors such as Urwick, Gulick, Mooney, etc. Second, in scientific management the area of concern was the individual worker and the individual task in the workshop. Management per se was not given much attention from Taylor but became the area of concern of classical management theory.

Although the contributors to classical management theory had different backgrounds and had different countries of origin, e.g.

Fayol (France), Urwick (U.K.), Mooney (USA), they were nevertheless similar in their way of thinking. They all were interested in describing what principles should be followed by the management of an organisation. What is noticeable is that they were, intentionally, concerned to use the word "principle" to refer to the general applicability of their work. As Mooney argued, "a principle, if it be truly such, must of necessity be universal in its own sphere, and so it is with the principles of organisation."⁽¹⁶⁾ Urwick also made the same point when he stated that "there are principles which can be arrived at inductively from the study of human experience of organisation, which should govern arrangements for human association of any kind. These principles can be studied as a technical question, irrespective of the purpose of the enterprise, the personnel comprising it, or any constitutional, political or social theory underlying its creation."⁽¹⁷⁾ However, there are two differences between the classicists as far as the principles of management are concerned. The first is that they differ in the number of principles which each writer believes governs the management of an organisation. These range between four, e.g. Follet,⁽¹⁸⁾ and fifteen principles, e.g. Fayol.⁽¹⁹⁾ The second is that they have used different terms to describe these principles. Nevertheless, the similarities between their principles were remarkable even between writers who did not know each other, and regardless of the variations in their own experience, the time during which they were writing their principles and finally, the methods they used for arriving at these principles. Using Urwick's words, "it is particularly interesting to note that while Fayol's work was entirely unknown to Mooney and Reiley when they wrote their

comparative study of organisation..... and while Fayol is impatient of logic in this field, in his aspects of administration and in his empirical lists of principles of administrative duties, there are statements exactly corresponding to each of Mooney and Reiley's nine principles."⁽²⁰⁾ The inclusive list of these principles can be found in Fayol's work. He explicitly mentioned fourteen principles. These are as follows:

1. Division of work
2. Authority
3. Discipline
4. Unity of command
5. Unity of direction
6. Subordination of individual interest to the general interest.
7. Remuneration
8. Centralisation
9. Scalar chain (line of authority)
10. Order
11. Equity
12. Stability of tenure of personnel
13. Initiative
14. Esprit de corps

However, there is one principle not mentioned in the above list, and which was stated by Fayol in the context of the management functions. This principle is known as the span of control principle. Miner in his examination of the classicist's work has stated that Fayol's statements "in respect of the span of control fits best with the principles, and it has become increasingly common practice to speak of the span of control principle."⁽²¹⁾ In this work as far as conventional RAS is concerned we think that some of these principles have an influence upon this conventional RAS. From the researcher's

point of view, we can establish a direct relationship between principles 1, 2, 4, 5, 6, 8 and 9 on the one hand and conventional RAS on the other. This will be the subject of the next chapter. However what concerns us are the following four points:

1. That the classicists believe that these principles are applicable in general. This general applicability has been seen in the context of scientific management and will be seen again in 'bureaucracy'.

2. That the principles are inductively arrived at. On the one hand the approach is similar to the scientific management approach; however the illustrative examples are different. The classical management theorists used very primitive organisations in developing these principles. One of their favourite organisations is one which involves two men who combine their effort to lift and move a stone that is too heavy to be moved by one.⁽²²⁾ From this very simple organisation, they inductively arrived at the very complex principles of division of work, the determination of authority and responsibility, etc. The application of these principles also creates a management structure which, as one would expect, will be the same in all organisations regardless of their purposes, the personal characteristics of the members, etc. This is a result of the classicist's belief that there is always one best way to structure an organisation's management. According to the classicists, e.g. Urwick, the management structure should be designed first, following their principles, then individuals can be used to fill in the assignment, and not vice versa. However, "the number of human institutions which do put correct structure first, and politics second is very limited. The majority of social groups being left to

grow like Topsy to find, sooner rather than later, that Topsy has married Turvy."⁽²³⁾

3. That the closed system framework and the closed system of logic underlie the classical management theory. In fact, these principles are intentionally formed to manage an organisation internally. The external factors, i.e. environmental factors, have not been given any consideration by the classicists. However, this is not to say that they have not recognised the interaction between an organisation and its environment. Urwick, for example, has acknowledged the fact that organisations are social groups and consist of human beings: "the correct analogy in considering such groups must be the analogy with the living organism - the biological parallel. But men and women are still, as yet, unaccustomed to thinking scientifically about themselves and one another. For this reason, the mechanistic parallel (or the engineering approach) can be very helpful in discussing organisation".⁽²⁴⁾ It is very clear from Urwick as well as other writers that structuring the management of an organisation can be viewed in a way similar to designing a machine.⁽²⁵⁾

4. That improving efficiency was the only objective or purpose of the classicists. This, as Thompson argues, explains why the classical principles were deliberately chosen and why management was deliberately structured in this way.⁽²⁶⁾

3.2.3. Bureaucracy

Weber, who was, incidentally, a sociologist, was interested in studying the historical development of organisations in society. He invented an organisational structure which he called "bureaucracy". Two reasons can explain his interest and his

invention. First, as a sociologist, he was interested in studying the growth of large organisations and to account for that growth, and second, "he was impressed with the frailty of human beings and the unreliability of human judgement and emotion".⁽²⁷⁾ In fact the latter was the reason behind his insistence that bureaucratic organisations should be highly structured.

Weber regarded bureaucracy as a superior organisational structure which was "applicable with equal facility to a wide variety of different fields. It may be applied in profit-making business or in charitable organisations, or in any number of other types of private enterprises serving ideal or material ends. It is equally applicable to political and to religious organisations".⁽²⁸⁾ In relation to environment, Weber perceived bureaucracy as a closed system, since he regarded an organisation as a "particular type of social relationship that is either closed to outsiders or limits their admission and has its regulations enforced by a chief, usually with the assistance of an administrative staff".⁽²⁹⁾ This and other attributes which will be mentioned later had the effect of turning bureaucracy into a machine. He saw bureaucracy as "a modern judge who is a vending machine into which the pleadings are inserted together with the fee and which then disgorges the judgement together with its reasons mechanically derived from the code".⁽³⁰⁾

Authority is one of the main themes of bureaucracy to which Weber devoted more attention than did the previous two sources. It therefore needs to be given some consideration in this subsection. He distinguished between three kinds of legitimate authority, and illustrated that the validity of their claim to legitimacy may be based on:

"1. Charismatic grounds - resting on devotion to the specific and exceptional sanctity, heroism or exemplary character of an individual person, and of normative patterns or order revealed or ordained by him,

2. Traditional grounds - resting on an established belief in the sanctity of immemorial traditions and the legitimacy of the status of those exercising authority under them (traditional authority), or finally,

3. Rational grounds - resting on a belief in the "legality" of patterns of normative rules and the right of those elevated to authority under such rules to issue commands (legal authority)".⁽³¹⁾

These three kinds of authority represent the ideal types. That is, bureaucracy in practice can be based on any of the above grounds or combinations.⁽³²⁾

However, it seems obvious from Weber's analysis that the purity of bureaucracy will increase if it is based on traditional authority rather than on charismatic grounds; and if it is based on legal authority rather than the other two bases. Using legal authority and establishing the administrative staff will result in the pure bureaucratic type of administrative organisation. This type of organisation "is from a purely technical point of view, capable of attaining the highest degree of efficiency and is in this sense formally the most rational known means of carrying out imperative control over human beings."⁽³³⁾

However, for legal authority to be effective as a grounds for bureaucracy, it should rest on the acceptance of some mutually interdependent ideas which could assist in demonstrating that bureaucracy is synonymous with a very highly structured organisation. These mutually interdependent ideas are as follows:

- "1. That any given legal norm may be established by agreement or by imposition, on grounds of expediency or traditional values or both, with a claim to obedience at least on the part of the members of the corporate group.
2. That every body of law consists essentially in a consistent system of abstract rules which have normally been intentionally established.
3. That.... the typical person in authority occupies an office. In the action associated with his status, including the commands he issues to others, he is subject to an impersonal order to which his actions are oriented.
4. That the person who obeys authority does so,.... only in his capacity as a 'member' of the corporate group and what he obeys is only "the law".
5. That.... the members of the corporate group, in so far as they obey a person in authority, do not owe this obedience to him as an individual, but to the impersonal order." (34)

In addition to the above attributes, Weber was motivated to show that bureaucratic organisations have distinct attributes in comparison to other organisations and in respect of the following:

- "1. Labour is divided so that authority and responsibility of each member are clearly defined and are legitimatised as official duties.
2. The offices or positions are organised in a hierarchy of authority resulting in a chain of command (the scalar principle).
3. The administrative official is not an owner of the unit

being administered.

4. The administrator is subject to strict rules, discipline, and control regarding the conduct of his official duties. These rules and controls are impersonal and uniformly applied in all cases".⁽³⁵⁾

The above is a brief description of bureaucracy. In this discussion we tried to cover different attributes which characterise this kind of organisation. The fact is that bureaucracy as a normative and mental theory cannot be explained in one study. Therefore, usually in the organisational literature, bureaucracy is discussed from different aspects and according to the particular attribute(s) which the writer wants to stress.⁽³⁶⁾ In this subsection on bureaucracy we have attempted to show that:

1. In bureaucracy there is an assumption that there is always one best way to organise and that is the bureaucratic organisation which is, indeed, a very highly structured organisation.

2. Bureaucracy seeks to achieve higher efficiency, and

3. Bureaucracy is a closed system.

If these three features, and in particular features 1 and 3, can be recognised in bureaucracy, then it could be difficult to argue, as some writers have argued, that "Weber's central consideration was the design of organisational form which (is) capable of administering increasingly dynamic environments".⁽³⁷⁾

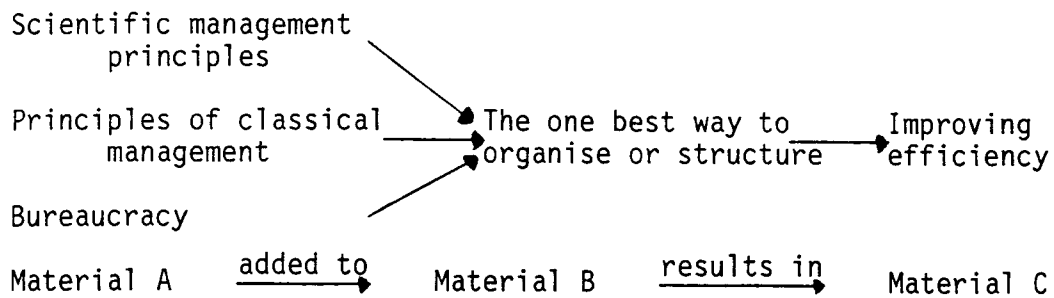
Finally and before finishing this subsection let us consider the shape of the bureaucratic structure. As we might expect, following scientific management or classical management principles will lead to a pyramid structure whether in the level of workshop or the level of an organisation's management. Weber has not, explicitly, referred to

the structural shape of bureaucracy; however he appears to assume that bureaucracy takes a pyramid form. There are two reasons for suggesting this. First, Weber has anticipated a kind of hierarchy for the offices or positions. Second, this hierarchy is arranged by the "law of small number" which is similar to the span of control principle of classical management theory.⁽³⁸⁾

3.3 COMMENT

So far, we have discussed the three sources of the classical organisation theory and have shown that they are similar with respect to three issues. First, that they are based on the assumption that there is always one best way to organise and in turn they consider the organisational structure as an independent variable. Second, that their general objective is to improve efficiency. That is, following this one best way to organise, whether in the workshop, i.e. Taylor, or in managing the organisation, i.e. Fayol, or in structuring the organisation, i.e. Weber, will always lead to higher efficiency. Finally, the framework of analysis is, in one way or another, conducted within the closed system.

It is not difficult to notice that the relationships which connect the principles of scientific management, classical management, and bureaucracy with the notion of one best way to organise in order to improve efficiency represent a closed system of logic. An analogy can be found in chemical interactions where the addition of material A to material B will result in material C. This can be depicted as follows:



These similarities between the three sources lead us to ask what influence each source has on the other two sources. In fact this part of our inquiry is very important in order to show that his kind of thought, i.e. the classical organisation theory, was not a result of information transmission from one source to another. Rather it was a result of the influences of certain circumstances which prevailed at the time when Taylor, Fayol and Weber were formulating their thoughts.

Taylor was American, Fayol was French, and Weber was German. Their work was published in 1910, 1916 and 1920, and they died in 1917, 1925 and 1920 respectively. Taylor was not, presumably, aware of the work of the other two writers as the first English translation of their work was in 1949 in Fayol's case and 1949 in Weber's. Concerning the impact of Weber upon Fayol and vice versa, there is some evidence to indicate that Weber's work "contains no reference to the writing of Henri Fayol, just as Fayol did not consider Weber".⁽³⁹⁾ The remaining direction of influence seems to be from Taylor to the other two writers. On the one hand, Fayol made no reference to Taylor, or to any other writer when he formulated his principles. Considering that Fayol was not an academic but a practitioner, and that he formulated his principles on the belief that there was a gap in management education,⁽⁴⁰⁾ it is likely that he was unaware that there was prior work in the field. Thus we might

be assured that Taylor's work had no impact on Fayol. However, and later, when he became aware of it, he rejected the attempts which were made to represent his doctrine as in some way in competition with Taylor's studies. Rather he was keen to indicate that his work and Taylor's work were essentially more complementary than conflicting.⁽⁴¹⁾ This is true since Taylor was concerned with managing the workshop and Fayol was concerned with managing the organisation as a whole. On the other hand, Weber did make two references to Taylor's work. First, in the context of the importance of using money in an economy and therefore in an enterprise for making calculations and decisions, he stated that a system which is dependent on money "might be disputed, though naturally not with arguments drawn from the Taylor system, nor from the possibility of achieving improvements in efficiency by making use of a system of premium or points without the use of money".⁽⁴²⁾ Second, he referred to Taylor's system as an attempt to work out rational methods to determine, "a) the optimum of aptitude for the function; b) the optimum of skill acquired though practice; c) the optimum of incentive for the work..... (which are the) three primary conditions affecting the maximisation of calculable performance by labour in carrying out specifications".⁽⁴³⁾ This kind of reference may be difficult to accept as an example of the influence of Taylor's work on Weber.

Thus, the similarity between the three sources of classical organisation theory was not a result of information transmission. However, we think that the similarity can be explained if we consider the circumstances which prevailed at the time when the three writers produced their work. First of all, their works were published around

the first two decades of this century; this means that the experience of Taylor and Fayol, and the logical thought of Weber had initially been generated in all likelihood during the last century, and the first decade of this century. During this period, the technology of producing products or services, and the environment were very stable. On the one hand, this period represented the interval between two industrial revolutions: the conventional one which all of us are familiar with, and the new one which started as a consequence of the depression of the 1930's and the Second World War.⁽⁴⁴⁾ This interval, in fact, was an intermediate stage where the technical inventions and innovations of the first industrial revolution were applied. Also it was during this period that the shortcomings of the technical methods of the first industrial revolution started to emerge and this led to the recent industrial revolution. The technical stability of this period was a necessary condition for Taylor to think of setting up a fixed work system for production or service through his four scientific management principles.

When we investigate the prevailing environment at that time we find, first, that there was no competition such as we have today; rather the situation was very close to oligopoly. Also there was no governmental interference in business as there is today. Customers were in a weak position, which created a buyer's market. Last and not least, there was no scarcity of natural resources, capital resources or human resources similar to what we encounter in these days. This is in addition to the fact that social values were changing slowly from one generation to another, and were similar among the managers of organisations and the vast majority of other citizens in their relevant environment.⁽⁴⁵⁾ In fact, as Ewusi-Mensah

has argued, there were no variations in the environment during the classicists' days which should have led them to recognise or to claim the need for different management and/or organisation structures. Rather it was natural, as a result of the nonexistence of environmental variations, that the classicists ignored environment. Thus in this stable environment, and specially when it is coupled with stability in technology, Fayol and his followers were able to describe management in terms of principles and to claim that they had general applicability.

The same may be the case with respect to Weber. That is, only in a stable technology and environment can bureaucratic organisation be structured. Only in these circumstances can bureaucracy work as it "emerged out of the need for more predictability, order and precision. It was an organisation ideally suited to the values of Victorian Empire".⁽⁴⁶⁾ When technology becomes nonroutine and the environment becomes dynamic, authority and responsibility ought to be diffused rather than clearly defined. Moreover, authority should increase as one goes further down the hierarchy rather than decrease. This is because authority will be located where the problems emerge and decisions ought to be taken. Also when there is uncertainty to be faced from technology and/or environment, no one expects there to be rules which can cover all possible situations. There will be exceptions to the rules. Furthermore, in an uncertain technology and environment it might not be extreme to say that the exceptional situations could be more numerous than the situations covered by the rules.

In circumstances where there was stability in technology and environment which could assist in achieving the one best way to

perform a production job or task (Taylor), to manage (Fayol), and to structure (Weber), the only feasible objective is to improve efficiency or performance, and this represents the objective of the three sources of the classical organisation theory.

So far, we have reviewed the classical organisation theory. As we have argued, conventional RAS is tied to and dependent on this theory. Thus the issue now is to investigate the relationship between this theory and conventional RAS. This will be the subject of the next chapter.

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CHAPTER 4 CLASSICAL ORGANISATIONAL THEORY AND CONVENTIONAL
RESPONSIBILITY ACCOUNTING SYSTEM - AN INFLUENTIAL
RELATIONSHIP.

4.1 GENERAL

4.2 ESTABLISHING THE INFLUENTIAL RELATIONSHIP

4.3 THE INFLUENCES ON THE STRUCTURE OF RESPONSIBILITY
ACCOUNTING SYSTEM

4.4. THE INFLUENCES ON PERFORMANCE EVALUATION

4.5 CONVENTIONAL RESPONSIBILITY ACCOUNTING SYSTEM
IN PRACTICE.

4.1 GENERAL

In this part we will examine the extent to which the conventional RAS has been influenced by the classical organisation theory. In doing so, we should appreciate the following:

1. That the classical organisation theory and conventional RAS are, by definition, subjects within the boundaries of the social sciences. In these sciences we are concerned with conceptual issues rather than with laws, facts, and equations as in the case of natural or physical sciences.

2. That the influence of one subject on the other in the social sciences can be partial in contrast with the natural sciences where the influence is total or non-existent. For example, it has been argued that management accounting has been partially influenced by developments, in economics, e.g. full and marginal costing. On the other hand, the thermodynamic laws, for example, which have been developed in physics have total influence on electrical engineering subjects but have no influence on mathematics.

3. That the influence of one subject on another in the social sciences can be either explicit or implicit, because the influence is conceptual in nature, whereas influence in natural sciences, if it exists, is clearly recognisable.

Taking the above three points into consideration we will first examine the influence of the classical organisation theory on conventional RAS in a general way in order to establish the connection between them and then look at some particular aspects of the influences of the former on the latter, i.e. with respect to RAS' structure and performance evaluation.

4.2 ESTABLISHING THE INFLUENTIAL RELATIONSHIP

Scapens has surveyed the management accounting literature and found that RAS represents one of the major topics in the field of conventional management accounting. In his discussion on the roots of these topics he has stated that, "the topics which have become accepted as part of management accounting literature developed in journals of other disciplines such as.... organisation theory."⁽¹⁾

Although Scapens informs us of the sources of RA as a management accounting topic, he does not clarify the nature of the influence which this source has upon RA, that is, whether it is in its classical nature or not. The answer to this question is clearly provided by Pick in an article entitled, "Is responsibility accounting irresponsible?" He stated that in conventional RAS and "in all cases, the aim is the promotion of efficiency and profitability through the control of operations, (and therefore) historically is tied to the traditional organisation theory with its hierarchical patterns and should not be judged without regard to it."⁽²⁾ Emmanuel and Otley have also indicated that conventional

RAS, as a management control system, is based on the classical theory of organisation.⁽³⁾ The connection between conventional RAS and each of the three sources of classical organisation theory has been noticed by Otley, and Otley and Berry. The former referred to the scientific management and administrative theory as the two sources of classical organisation theory which have influenced conventional RAS.⁽⁴⁾ The latter stated that conventional RAS is based on bureaucratic and scientific management models of organisation.⁽⁵⁾

The above writers demonstrate explicitly the connection between the classical organisation theory and conventional RAS. The same

connection is apparent from other writers, though implicitly rather than explicitly. For example, Kellogg in his statement regarding the components of a RAS stated that, "organisation principles, cost accounting systems and budgetary cost control were developed to a highly useful status. With the techniques so developed.... it has been possible to (gather) the whole system under the title of responsibility accounting."⁽⁶⁾ Also Netten in his discussion on responsibility accounting has implied this connection by stating that "sound organisation principles must be followed if responsibility accounting is to work."⁽⁷⁾ As might be apparent through the examination of the classical organisation sources the word "principles" was frequently used. When we discuss modern organisation theory, it will be apparent that modern organisation theorists do not speak of specific principles to be followed in organisation. Moreover, the word "principles" might not be used in the context of modern theory. Thus what Kellogg and Netten were referring to is, in fact, the classical organisation theory.

4.3. THE INFLUENCES ON THE STRUCTURE OF RESPONSIBILITY ACCOUNTING SYSTEM

Very few writers have examined the specific influence of classical organisation theory on conventional RAS. Emmanuel and Otley,⁽⁸⁾ as well as this researcher, have noticed the influence of classical theory on conventional RAS in the tendency of the latter to have general applicability. As we have explained, this general applicability is noticeable in scientific management, in classical management theory and in bureaucracy. Influenced by this belief, accountants regard conventional RAS to be applicable in all forms of

organisations. For example, Phillippe in his discussion of RAS illustrates and explains "a system of responsibility accounting and reporting for a medium-sized lumber manufacturing concern. However, these general procedures..... could be applied to any type of organisation",⁽⁹⁾ that is to say organisations "big and small, centralised or decentralised, business, nonprofit or government".⁽¹⁰⁾ The same viewpoint has been taken by Vancil who was convinced that conventional RAS is applicable to different organisation structures, i.e. simple, complex and matrix structures. For the complex structure he has justified it by stating "as long as the business continues to be functionally organised, much of the discussion in the preceding section about the design of management control system (RAS) is applicable."⁽¹¹⁾ This simplification will be more recognisable when we review his idea about the matrix structure and the appropriate RAS. He stated that, "the matrix design does not really represent a structural change; it is simply a more realistic, comprehensive description of organisational relationships. From the point of view of the designer of management control systems (RAS) a matrix organisation poses no special problem."⁽¹²⁾ This general applicability of conventional RAS is due to the influence of the classical organisation theory on accountants who are apparently convinced that there is always one best way to structure an organisation and its RAS. At this stage it could be useful to discuss another aspect of the influence of classical theory on conventional RAS.

As accountants believe that there is always one best way to structure an organisation, they regarded the organisation structure as given.⁽¹³⁾ More specifically, Graese has viewed responsibility

accounting as "a means of improving the usefulness of the accounting system by establishing an accounting structure directly related to the organisational structure of the company".⁽¹⁴⁾ Moreover, as an accountant, he is not, presumably, required to think beyond the organisation structure. In other words, "restructuring the organisation merely to facilitate the management accounting system (RAS) is not recommended",⁽¹⁵⁾ even if this restructuring were to lead to a better or more efficient RAS. This recommendation, we argue, follows from the belief that the existing organisational structure represents the best way to structure the organisation.

When we direct the discussion to the principles which underlie conventional RAS we might discover other forms of influence. The first of these principles is connected with the establishment of responsibility centres. In general, these are functional responsibility centres, that is, production centres, sales centres, purchasing centres, etc. This is a reflection of the division of labour principle of the classical organisation theory. According to this division, the accountant classifies costs and revenues functionally, and if there is a cost item which could be located between two functions, then the accountant should allocate it. In every case, costs and revenues should be traceable to the functions. However, as we have argued, most, if not all, of the cost allocations are conducted on an arbitrary basis.

Also, the conventional RAS has been influenced by the idea of authority and responsibility of the classical organisation theory.⁽¹⁶⁾ The central idea of conventional RAS is the assignment of responsibility and authorities regarding cost and revenue items, in line with the relationship defined by the organisational

structure.⁽¹⁷⁾ This assignment should be specific and understood with no overlapping,⁽¹⁸⁾ otherwise the control of cost and revenues is difficult if not impossible.⁽¹⁹⁾ On the one hand, the accountant assumes, as it is assumed in the classical organisation theory, that there are clear cut lines of authority and responsibility along the management hierarchy of an organisation. Therefore, costs and revenues can, in general, be classified as controllable and uncontrollable. On the other hand, controllability is seen "as a corollary of authority, it is its natural consequence and essential counterpart".⁽²⁰⁾ So that, controllability of costs and revenues is with those who originate and approve them, or with those who have power to take relevant decisions, or with those who are held completely and directly responsible by the management. In fact, the influence of the idea of authority and responsibility of the classical organisation theory, and, in particular, that there are clear cut lines of authority and responsibility, has led accountants to simplify their objectives regarding the principle of controllability in the following two objectives. First, to find the person who should be assigned as the controller for a particular cost or revenue item. Second, that there is a controllability "slot" for each cost and revenue item within an organisation at some point in time. Naturally, these two simple objectives when they are achieved, and if they can be achieved, will lead to a situation where all costs and revenues are controllable. Thus, there is, as accountants assume, a rational ground for believing that there is no place in conventional RAS for the idea of noncontrollable costs or revenues.⁽²¹⁾ In addition, the principle of controllability of conventional RAS is influenced by the classical theory in respect of

the following:

1. It is only applicable to line managers as occupants of roles in the chain of command, and therefore they receive delegated authority and responsibility. On the other hand, since staff managers do not occupy roles in this chain of command, they are not subject to the principle of controllability.

2. A manager is assumed to have either full control or no control over a cost and/or revenue item.

3. Each manager exercises control over his cost and revenue items independent of other managers, and

4. Controllability automatically coincides with the position occupied and any person in authority over a responsibility centre will have the ability to exercise control regardless of personal factors (e.g. the manager's knowledge and experience), the internal factors (e.g. the interdependencies), the external factors (e.g. competition, availability of resources, etc.).

The reporting of conventional RAS and in particular the way the reports are prepared and those people to whom they are distributed, reflects another influence of the classical organisation theory. Traditionally, responsibility centres should be the various functional units, and each of these may be further divided into sub-responsibility centres along the line of the vertical chain of command specified by a firm's organisational chart. For example, the production unit will be subdivided into departments and each of the latter into workshops. Finally, there will be one person in charge of each of these responsibility centres. This is the person who should have the authority to exercise control over the costs and revenues of the centre; who should give orders and expect obedience

from the employees; and who should receive the responsibility accounting reports. Taking the production unit as an example, there will be responsibility accounting reports for the general production manager, and for each of the department managers and foremen. Influenced by the classical organisation theory, and in particular the principles such as unity of command, unity of direction, and scalar chain (or chain of command), accountants prepare the responsibility accounting reports in aggregate from the first responsibility level, i.e. the foreman, to the highest responsibility level, i.e. the chief executive. Following the organisation chart, "the totals on each report appear in the detail on the report to the next higher level".⁽²²⁾ This way of reporting is assumed to achieve the following: (1) the unity of command of the higher levels of responsibility, (2) as a way of transmission it makes it "easy to trace variations at any level back to their roots",⁽²³⁾ and (3) stimulating the higher level to take control action towards the lower level of responsibility. In summary we can state that this way of presenting responsibility accounting reports has been influenced by the classical organisation theory, or alternatively, this way is nothing more than an application of the principles of unity of command, unity of direction, and the scalar chain (chain of command). Golembiewski, on the other hand, in his investigation into for whom RAS' reports are prepared and to whom they are distributed, found that the procedure was intended to fit the traditional principle of specialisation between staff and line.⁽²⁴⁾

4.4 INFLUENCES ON PERFORMANCE EVALUATION

In addition to the above influences, we can recognise other

influences of classical organisation theory on performance evaluation in conventional RAS. In section 2.3 we mentioned the features of conventional performance evaluation. In fact each of these features can be seen as a reflection of classical thought. First, conventional performance evaluation is conducted within the boundaries of each responsibility centre and in isolation from the other centres. This rests on two issues. On the one hand, since responsibility centres are established on the functional basis, there is no reason to assume that there should be interference between them; that is, the purchasing centre will be interested in purchasing and the production centre will be interested in production. On the other hand, since there are clear cut lines of authority and responsibility between the centres, each centre can work in isolation from other centres, and there is no reason for a conflict to emerge; that is, the purchase centre will buy the raw materials and the production centre will convert them to products. What follows from this mechanism is that each responsibility centre should be evaluated in isolation since it does not affect and is not affected by the other centres.

The second feature is that only controllable cost or revenue items are used in managerial performance evaluation. Elsewhere in the previous section we have shown that controllability is seen as a corollary of authority in the conventional RAS. Following this view, fairness and justice require that a responsibility centre manager should be evaluated using those costs and revenues over which he has authority. This means that performance evaluation for the purchasing centre manager should not take into account, for example, the costs of waste since he has no authority over the production centre, even

though the waste might be due to the low quality of raw materials.

Also, conventional performance evaluation is oriented towards managerial results, in terms of what has been achieved against what should have been achieved. This comparison can be made for the inputs or outputs, or for the former in relation to the latter. In all these cases evaluation through comparison will reflect the efficiency of a manager and nothing more, and this represents the objective of the classical theory. On the other hand for a meaningful evaluation of efficiency, comparison should be tangible. In other words, efficiency cannot be measured in statements but in numbers. Performance evaluation in conventional RAS, therefore, is always restricted to financially quantifiable data.⁽²⁵⁾ Finally, as has been argued by Belkaoui,⁽²⁶⁾ efficiency, by definition, is a short range objective, so that the performance evaluation of conventional RAS concentrates on the short term.

So far we have argued that conventional RAS is tied to the classical organisation theory. This theory was originally evolved around the end of last century and the beginning of this century. One might question therefore the applicability of conventional RAS in today's organisation. In other words under what circumstances can, or should, conventional RAS operate, and how many organisations operate under these circumstances? This will be the subject of the next section.

4.5. CONVENTIONAL RESPONSIBILITY ACCOUNTING SYSTEM IN PRACTICE

From the previous discussion we can state that accountants have not defined the appropriate organisational conditions under which conventional RAS can operate. Instead, they have, as a result of the

influence of classical organisation theory, regarded conventional RAS as having general applicability. However, contrary to the accountants' belief, conventional RAS has no such general applicability. Rather it is a system which can be useful in only certain circumstances. These circumstances are as follows:

1. The existence of a perfectly structured hierarchy of managerial authority.
2. The managers can be seen as isolated individuals.
3. The controllable items are clearly defined and sole control is the criterion of responsibility.
4. The managers are not influenced by the environment. That is to say that the environment is stable, and the closed system perspective governs the relationship between the organisation and its environment.
5. The technical aspect of the work, function, or job can be described as routine.

The implication of the above is as follows. As long as these circumstances can be satisfied conventional RAS is appropriate. However, a deviation from these circumstances means that conventional RAS is no longer appropriate for an organisation. Emmanuel and Otley have argued that the circumstances which are required by conventional RAS are never found.⁽²⁷⁾ However, our viewpoint is, as we will show later, that these circumstances do exist and there are real organisations operating under these conditions. Nevertheless, the issue is how prevalent organisations such as these are in today's world. Two cases taken from the literature survey will be presented as examples of organisations which operate in circumstances suitable for conventional RAS.

4.5.1. Case One.

The first study is reported by Klein.⁽²⁸⁾ Empirically, the study was carried out in two phases, interview and observation. Klein was interested in examining the control system of the organisation. Since the organisation was too large to be wholly examined, "one product was isolated and all the planning, decision making and control procedures of the firm were analysed, as they affected this particular tracer".⁽²⁹⁾ The product which was chosen was a well known household product which is produced through a number of physical and chemical processes, extruded in solid form, cut into tablets, stored on racks, dried, stamped, packed, and then despatched to a warehouse. Technically and environmentally the situation could be described as stable, "(the) market is well-established, steady and predictable, and methods of production also long-established and seldom changing".⁽³⁰⁾ There is little doubt that this situation led to authority which was highly structured at "different levels of the organisation, according to the size and importance of the issue involved".⁽³¹⁾ Moreover, in a situation such as this one it became feasible to provide "every manager and senior manager (with) a book-shelf full of manuals describing and prescribing the different aspects of his job".⁽³²⁾ These documents are supposed to provide the manager with a guide to follow in every imaginable circumstance. One might be surprised that these documents cover, in detail, situations such as "what to say to an employee who asked whether he should join the trade union".⁽³³⁾ Apparently, issues such as these, i.e. answering a question regarding joining a trade union, could not be considered by a manager unless the manager had been satisfied with the issues which were more important or essential to the

organisation, e.g. targets, methods of achieving the target, etc. This was, in fact, the case in the organisation under study. Klein showed that:

1. Targets were clear and well assigned to organisational subunits.
2. Methods for arriving at targets were laid down with no conflict or interference.
3. Methods for measuring actual performance were laid down.
4. Comparison between the targets and actual results was possible, and it was feasible to yield a performance factor.

Given the above circumstances, Klein's interest was to find out the main concern of the management of the organisation under study. He proposed three general functions of management in an organisation:

- "a. The setting up of a workable system for production or service.
- b. The maintaining of the system by planning the work, coordinating the material and services needed, keeping quality and costs within acceptable limits.
- c. Improving the performance of the system and improving the system itself."⁽³⁴⁾

Of course, these three functions should be performed by any management. But the point is that in reality what other function(s), as well as how many of these three functions can be performed by any management is, to a great extent, determined by the circumstances which surround an organisation. For example, Klein previously found that in an organisation of multi-products, "functions (a) and (b) were so great that they took up all the energy and initiative of the

manager",⁽³⁵⁾ and therefore there was no opportunity to undertake function (c). In the organisation under study there was no question that the stability in technology and environment was the main reason why the problems of function (a) "had been largely resolved. The challenge to management ability no longer lay in working out how to make it".⁽³⁶⁾ Also function (b) "still required attention and ability, and a little initiative..... but **the solving of problems could be handled in a routine manner since the problems which arose were hardly ever new ones**".⁽³⁷⁾ Certainly, this had left plenty of room for the management to give attention to function (c), and, therefore, to focus on the actual performance and to regard the performance factor (see item 4 above) as the main control tool. In Klein's words, "the importance attached to "performance factors" supports this as does the fact that the flurries of activity which took up a large part of the day-to-day happenings around the tracer during the observation period were nearly all concerned with changes in performance".⁽³⁸⁾

In fact this empirical study is clear and obvious enough to need no further comment. The circumstances were very similar, if not identical, to the ones required in order to apply conventional RAS. In these circumstances, there is no doubt that conventional RAS produces the best results since the main objective is to improve performance and most of the problems stated in Chapter 2 do not emerge. To conclude, we might state that this organisation provides a yardstick against which others may be compared for the purpose of applying conventional RAS.

4.5.2. Case Two

The second case is stated by Graese.⁽³⁹⁾ As a professional

consultant he examined the reporting system of a firm to find out the solution to its problem. As he was convinced that "management requires that accounting reports be as effective as possible in helping them to evaluate and control their operation,"⁽⁴⁰⁾ he found the solution to the firm's reporting system by establishing a responsibility reporting system which was designed to help accomplish this objective. Thus, the study represents an attempt to establish RAS in a real organisation.

The organisation's product was flour and the organisation consisted of a number of milling plants. The old reporting system was based on providing each mill or plant with its own complete profit and loss statement. This statement was used to evaluate the manager, and a bonus was paid to the manager based on the mill's net income. The problem with this financial reporting system emerged when the "corporate executives found.... that the statements were not effective as management tools (and that) managers were always quick to enumerate reasons why the statement did not represent fairly their management effort, and their reasons usually seemed valid".⁽⁴¹⁾ From the following discussion we might perceive that this organisation represents a good example of the types of organisation in which a conventional RAS could be established.

Traditionally, RAS is based on organisational structure. This viewpoint was taken by Graese who stated that it is "the first and usually most difficult step in the design of any responsibility reporting system, because very few companies have clearly defined organisational structures or responsibilities."⁽⁴²⁾ From this structural analysis he found the following:

1. There was a central sales department distributing the orders

among the mills and plants, defining the deliveries according to the bookings which it made, and pricing the orders. In distributing the orders, the department was interested in equalising the production and minimising the freight costs. The export sales had, for example, been given to one mill because of its export shipping facilities.

2. There was, also, a central grain department which purchased the company's requirements of wheat from a central terminal market. The department defined the mill or plant which should receive individual lorry-loads of grain. In doing so the department was also interested in minimising freight costs.

In contrast with the old reporting system, Graese found that "mill managers could really only control, and therefore, should only be held responsible for, the actual milling costs and the conversion or grinding yield."⁽⁴³⁾ Thus Graese's analysis showed the possibility of depicting clear cut lines of authority and responsibility between the three main functions, i.e. purchasing, production and marketing. However, before proceeding with Graese's study it is reasonable to inquire about the reasons which had facilitated this clear assignment of authorities and responsibilities between the three functions. Three reasons can be mentioned:

1. The interdependencies between the purchasing department, sales department, and plants and mills are pooled interdependencies. Each has its own objective which is distinct from the other departments' objectives; however, they are interdependent in the sense that a failure of any one can threaten the whole and thus the other parts. Notwithstanding, action in any of the above units can be taken without regard to action in other units as long as the overall organisation remains viable.⁽⁴⁴⁾

2. The stability of the technology. The technical processes of converting wheat to flour have been well established for a long time. In a technology such as milling technology, the work can be assigned in advance and in detail and the only exceptions can be due to machine stoppages or breakdown.

3. The environment factors for both supply and demand are well known and can be accounted for in advance. The supply of wheat, which is an agricultural crop, is to a great extent inelastic. The wheat production is repetitive, and in a country such as the USA, the supply is, always, more than the demand. An extreme case of shortage of supply is faced only if there is a natural disaster in the crop. However, there are always signals preceding this disaster. This gives the purchasing department sufficient time to find other sources to provide the corporation with its requirements of wheat. In summary, the purchasing department does not face a new or sudden environmental situation. This argument is valid for the sales department, that is, the demand for flour is stable. On the one hand, the products which can be made using flour are known and their demand is inelastic. On the other hand, the distributors of the flour are recognisable and can be contacted in advance to obtain short and long orders.

The above three reasons contributed to the establishment of clear cut lines of authority and responsibility. If we recall the three functions of management stated by Klein in the previous study,⁽⁴⁵⁾ we can argue that the above reasons facilitated the achievement of functions (a) and (b), and gave the management the opportunity to think about function (c), i.e. improving the efficiency, which was supposed to be achieved by the new reporting

system. This was, in fact, the situation, as Graese ended his study by explaining the performance criteria which the new system had introduced. For the purchasing department, a measurement of performance was established which compared actual costs of wheat purchased in total with the wheat requirements for flour orders booked by the sales department, priced at the market price at time of booking. For production, "the mill managers ceased being concerned with sales prices and wheat costs of the individual orders and shipments.... (and) they were being evaluated on conversion cost and yield and concentrated on this responsibility."⁽⁴⁶⁾ Regarding the sales department "a new emphasis was placed on getting profitable business at minimum selling cost".⁽⁴⁷⁾ Finally and most important, "the reports received by management could be used directly to evaluate performance at each responsibility level, without fear of being challenged on the basis of arbitrary accounting allocations."⁽⁴⁸⁾

So far two organisations have been analysed. Although there are differences between these two organisations with respect to their products, technologies, environments, and locations, i.e. UK vs. USA, they were nevertheless very similar in their circumstances, which allowed the classical organisation theory to be applied and conventional RAS to be effective. If this is the case and there are organisations which operate in circumstances similar to the ones required by conventional RAS then the related issue is, how prevalent is this type of organisation in practice? In fact, and despite the examples of the above two organisations, we might share Pick's impression that there could be few organisations which have circumstances similar to the above. This impression can be confirmed

by the fact that Burns and Stalker identified two extreme types of organisations, i.e. mechanistic and organic. Only mechanistic organisations reflects the above circumstances. Moreover, Woodward classified a sample of organisations according to technology and found that only one third of these organisations were structured in a way similar to that required for conventional RAS. Similarly, Pugh et al's study indicates that in practice only one out of seven types of organisations can be described as bureaucracy and appropriate for the application of conventional RAS. Last and not least, Lawrence and Lorsch's study investigated the circumstances of three industries and demonstrated that the circumstances of only one industry might correspond with the circumstances required by conventional RAS. This suggests that the majority of today's organisations do not operate under circumstances which are required by conventional RAS. Also, the attempt of accountants to impose conventional RAS on an organisation which does not display the required circumstances will sooner or later fail due to the dissatisfaction among subordinates with the arbitrariness in measuring performance and the ignoring of interdependencies.⁽⁴⁹⁾ In such a situation "not surprisingly, top management frequently dislikes responsibility accounting and finds distasteful the (disciplinary) decision called for by it".⁽⁵⁰⁾

The studies which we have mentioned above were not undertaken to answer the question of the prevalence of conventional RAS. Basically, these studies were conducted by organisational researchers to examine today's organisations. Though there were different reasons for conducting these studies, nevertheless, their work has in general led to two important consequences. First, empirically, it has become apparent that much of the classical doctrines are not

applicable in today's organisations. Also, classical organisation theory is not the solution to the problems of today's organisations; applying the classical theory in today's organisations could create numerous difficulties.⁽⁵¹⁾ Second, a new way of thinking in studying organisations has been evolved which is called the modern organisation theory. It represents the second organisation theory we are interested in in this research.

FOOTNOTES

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CHAPTER 5 MODERN ORGANISATION THEORY

5.1 GENERAL

5.2 TECHNOLOGY

5.3 ENVIRONMENT

5.4 SIZE

5.5 INTERDEPENDENCIES

5.6 CONTINGENCY THEORY: AN ACCOUNTING SUPPORT

5.7 THE CHOSEN CONTINGENT VARIABLES: A JUSTIFICATION

5.1 GENERAL

In this chapter we will discuss the second of the organisation theories we are interested in in this research. The purpose of reviewing this theory is to investigate the extent to which it is useful in designing a RAS for an organisation. This can be achieved from an examination of the way of thinking which underlies this theory for studying organisations. What is interesting is that the theory was developed as a consequence of research, mostly empirical, which was conducted to support the classical doctrines, i.e. the classical organisation theory. However, as we have stated in the previous chapter, this research showed that most of the classical doctrines are not applicable in today's organisations. This research also revealed some variables which were not taken into account by classicists, and which might explain many of the variations among today's organisations. Variables such as technology, size, environment, interdependencies, etc., are thought to have influence upon organisational structures. These variables were not considered, or at least were regarded as constant variables, in the framework of the classical organisation theory.

The first use of the term "modern organisation theory" was, according to our literature survey, the title of a book edited by Mason Haire. The term was used to refer to "a group of conceptual developments bear on the problem of industrial organisation".⁽¹⁾ Also the term was used by Caplan to indicate the source of behavioural assumptions which should underlie management accounting instead of the recent assumptions which are derived from the classical organisation theory.⁽²⁾ Following this trend, we will use the term "modern organisation theory" in this research to refer to

developments which have evolved in "the study of structure and functioning of organisations, and the behaviour of groups and individuals within them", ⁽³⁾ or more precisely to refer to developments which involve "consideration of interactions among the formal structure, the tasks to be undertaken, the technology employed and methods of carrying out work,....., the process of management and the external environment".⁽⁴⁾ Thus the term will imply a new approach in studying organisations and not just raise the wrath of some traditionalists.⁽⁵⁾

Though modern and classical organisation theories are similar in that their area of concern is the study of organisations, three differences can nevertheless be recognised. First, in contrast with the classical theory which is based mainly on engineering with some contribution from sociology, the modern theory draws on psychology, sociology, economics, political sciences, social anthropology, and production engineering, and therefore it is described as an interdisciplinary quasi-independent science.⁽⁶⁾ Second, classical organisation theory can be seen as a unified way of thinking, which, as Scott has argued, is built around four key pillars: the division of labour; the scalar and functional processes; structure; and span of control.⁽⁷⁾ With modern organisation theory there is no unified thought; rather each writer and researcher has his own area of interest when he considers organisations. However, we might classify these interests into four general areas: organisational design; organisational leadership; organisational motivation; and organisational decision-making.⁽⁸⁾ Within each of these areas we might find a contribution from the different disciplines. Third, modern organisation theory has shifted the conceptual level of

organisation study above the classical theory by asking a range of interrelated questions which are not considered by the latter, such as, (1) What are the strategic parts of the organisation? (2) What is the nature of their mutual dependency? (3) What are the main processes in the organisation which link the parts together, and facilitate their adjustment to each other? (4) What are the goals sought by the organisation? (5) What research tools should be used for the study of the organisation?⁽⁹⁾ (6) What kind of relationship is there between the organisation and its environment? In fact, these and other questions bring modern organisation theory closer to general systems theory, where the systems analysis in general and the open system viewpoint in particular have been found to be useful in studying organisations.⁽¹⁰⁾

From this brief introduction to modern organisation theory we might proceed to describe the purpose and structure of this chapter. Our intention is to demonstrate that, contrary to classical organisation theory, there is no one best way to structure or to organise; rather there are different structures for different organisations operating in different circumstances. We will attempt to show that organisational structure is dependent on four variables:

1. Technology
2. Environment
3. Size
4. Interdependencies

The chapter will, first, examine the five pioneer studies which have led to the recognition of the above contingency variables and their effect on organisational structure. This will lead us to identify what is known as contingency theory. Applying a contingency viewpoint or framework in studying and designing RAS will be

supported by the accounting writers. In the final section we will choose the contingency variables which we think should be considered in designing RAS. However, this chapter per se will not provide adequate information regarding the chosen variables and the way they will be conceptualised for the purpose of structuring RAS. A discussion of this issue will be postponed until the next three chapters. We will start our investigation of the pioneer studies with Woodward's study which demonstrated the effect of technology on structure. However, before we start one point needs to be clarified.

As we mentioned earlier, we propose to use contingency theory as a basis for structuring a RAS and conducting a managerial performance evaluation. We argued that contingency theory is more relevant for responsibility accounting than other approaches, which might appear to be equally relevant to this study. One of these is agency theory. The main concern of agency theory is the relationship between two persons, the principal and the agent. Agency theory attempts to explain: "how a principal, i.e. the owner, who has less than perfect information about the day-to-day running of the business can motivate his agent, i.e. the employed manager, to take decisions that are in the principal's best interest?"⁽¹¹⁾ This is what Scapens called the performance evaluation role of agency theory. In this sense, the information provided by the management accounting systems, e.g. RAS, is used to evaluate the outcomes of decisions already taken in order to facilitate the allocation of those outcomes between the principal and the agent according to the terms agreed in the employment contract.⁽¹²⁾ The aim is to develop an optimal employment contract which reduces moral hazard and adverse selection problems. The relationship between the principal and his agent within the agency

theory framework is expressed in the form of mathematical economic models. The analysis of these quantitative agency models to date has been entirely at the theoretical level. Although the quantitative agency models can be stated to reflect the optimality of certain observed practice, i.e. the relationship between a principal and an agent, they are usually without empirical support. This is, in fact, the reason why Scapens has included the quantitative models of agency theory in the category of normative models. On the other hand, Puxty in his work on "The critiques of agency theory in accounting" states that the following aspects of agency theory can be criticised; 1) the theory's presuppositions; 2) the way it works within its framework; and 3) its conclusions, and its predictions and factual analysis.⁽¹³⁾

He further states that "within economics itself, it seems that the theory has not as yet apparently become overwhelmingly important, as it apparently has in many accounting schools in the USA. This in itself may be seen as an implicit criticism."⁽¹⁴⁾ He concluded his review of agency theory by stating that, "the theory is poor and economists are right to reject it".⁽¹⁵⁾ In addition there are other reasons why agency theory has been rejected in the present research. First, the mathematical models of agency theory cannot provide the basis upon which the questions regarding RAS structure can be answered. For example, whether responsibility centres should be designated in terms of cost, profit, or investment cannot be determined mathematically. Also, it is difficult to argue that we can mathematically calculate when the branch sales manager will be delegated the authority to change prices. Second, agency theory is concerned with the relationship between two persons: the principal and the agent. Therefore, it is a two-person analysis. No consideration is given to cases where there are multiple principals

and agents. In that sense, agency theory has the same shortcoming which conventional performance evaluation has with regard to ignoring the interdependencies between individuals when they perform their work. Third, as with conventional performance evaluation, agency models examine the relationship between the principal and the agent in a single period behaviour which may not hold in a multi-period world. This could be a reason, as is the case with conventional RAS, for the agent to overemphasise the results in the short term at the expense of the long term. Taking the above comments into consideration leads us to conclude that the use of an agency theory framework for studying and designing RAS will lead to a situation similar to the one we have with conventional RAS as described in the previous three chapters, particularly with respect to managerial performance evaluation.

This leaves the comparison to be made between contingency theory on the one hand and the organisational failures framework (OFF) on the other. Both seek to identify the variables that influence and explain the organisation's choices of internal structure. In that sense, both can be regarded as structural approaches. While contingency theory suggests that organisational structure is dependent on some contextual variables, as will be seen later, OFF claims that an organisational structure is dependent on the differential costs of completing transactions. In other words, OFF considers the economics of internal organisation and whether particular tasks are better handled by markets or hierarchies.⁽¹⁶⁾ The purpose is to achieve transactional efficiency. Achieving the transactional efficiency will dictate the internal structure of an organisation, line-staff structure, functional structure,

multidivisional structure, etc. The similarities between OFF and contingency theory have been highlighted by Spicer and Ballew,⁽¹⁷⁾ and Emmanuel and Otley.⁽¹⁸⁾ As far as the present study is concerned, we can state two differences between the two theories which have led us to favour contingency theory. First, the theory is, by definition, an economic theory and uses economic concepts. Puxty illustrated the point by stating that "economic theories and concepts taken up by accountants have included.....transaction cost theory".⁽¹⁹⁾ Based on this, then the theory is not a counterpart to the classical organisation theory which we argue underlies conventional RAS. In other words, the theory has not addressed itself to an examination of the doctrines of classical organisation theory, as we will see later when we present the contingency studies. Transaction cost theory may be regarded as focusing on one variable which may influence organisational design and as such, may be regarded as part of a much wider contingency theory approach. Therefore, using OFF will not provide us with a basis to determine the extent to which the classical doctrines are valid for structuring and designing RAS. Second, as we will illustrate, contingency theory is derived from empirical research. Based on this research we are able to speak of some contextual factors and their impact on the organisational structure. On the other hand, OFF as an explanatory theory might find its support in the history of organisations as reflected by the work of business and accounting historians,⁽²⁰⁾ more so than from empirical research. This last point in fact is the one which strengthens the case for contingency theory in comparison to the other two theories.

The greater relevance of contingency theory over the other two theories for the purpose of designing RAS is supported by Emmanuel and Otley who in the preface to their book state that "the primary focus of the book is to study how accounting systems should be **designed** so as to enable effective management control of organisational activities to be achieved."⁽²¹⁾ Achieving this purpose has required them to use contingency theory to a greater extent than the other two theories.

5.2 TECHNOLOGY

In many instances, and in particular with Fayol, one feels that classicists are sure of the relation between success and the strict adherence to their principles. This assurance led Woodward to conduct a first study in Britain "to discover whether the principles of organisation laid down by an expanding body of management theory correlate with business success when put into practice."⁽²²⁾ The initial sample included 203 manufacturing firms in South Essex. The pilot study showed that for firms employing 100 or fewer employees there was no clear-cut level of management between board and operators. Therefore, she concentrated on firms which employed over 100 employees, and of these 100 firms were willing to cooperate in the study.

To examine the relationship between the application of the principles of organisation and business success, she first classified the 100 firms into three categories according to success: average; below average; and above average. In doing so she used objective as well as subjective criteria.⁽²³⁾ Then she looked for the firms within the sample which might have been influenced by the classical

theory and she found that "in only about half did the principles and concepts of management theory appear to have had much influence on organisational development".⁽²⁴⁾ Thus, on the one hand, the principles had no general applicability in practice as had been assumed. On the other hand, when she looked at those firms which had been influenced by the classical theory within the success categories identified above, she found that "of the twenty firms assessed as "above average" in success only nine had a clearly defined organisational pattern of the orthodox kind".⁽²⁵⁾ Based on that, and with respect to the association between the application of the principles of the classical theory and business success, she concluded that "conformity with the "rules" of management did not necessarily result in success, or non-conformity in commercial failure."⁽²⁶⁾

This result, naturally, was not expected from Woodward given the assurance of the classicists about the correlation between the principles of organisation and success. However, what was strange was what she observed from variations in structuring the firms, even within the firms which were influenced by the classical theory. She found structural variations with respect to, for example: 1) the division of labour, i.e. functional structure embodied specialists or line-staff structure; 2) number of management levels between higher management level and first line supervisor; 3) the span of control of the first line supervisor as well as the chief executives, etc. These variations, as might be expected, cannot be explained by the classical theory of organisation which assumes that there is always one best way to structure an organisation. Consequently, she directed her attention to find out the factors behind these

variations. As we will see, this change led to her contribution to the modern theory of organisation. Woodward identified five factors and she thought that one or more of them could explain the variations in the structures of these firms. These factors are as follows:

1. The firm's size or industry.
2. The different personalities of the senior managers of the firms.
3. The background of the firms.
4. The objectives of the firms.
5. The technology employed by the firms.

The first factor failed to provide an explanation of the differences between the firms' structures as she found variations between the firms of the same size and in the same industry. She came to the conclusion that the "differences in organisational structures... did not appear to be related either to size or type of industry".⁽²⁷⁾

The second and third factors were found to influence the firm's structure. However, "they did not adequately explain it; they were not always associated with differences in organisational patterns."⁽²⁸⁾ The objective(s) of the firm, i.e. the fourth factor, though it was not the explanatory factor, nevertheless, was the door which guided her to the key factor which explains the variations between the firms' structures. In the South Essex's sample all the firms were manufacturing goods for sale. But she found that their detailed objectives were dependent on the nature of the product, type of customer, and marketing conditions which were different from one firm to another. An insight into this factor led her to identify the relationship between it and the fifth factor, that is, technology. She noticed that "the differences in objectives controlled and limited the techniques of production that could be employed".⁽²⁹⁾

For example a firm whose objective was to produce electronic equipment could not employ the technical methods of mass production engineering. Based on this she was able to put her finger on one of the obvious shortcomings of classical organisation theory. As she argued, the appropriateness of an organisational structure should not be judged on its conformity to prescribed patterns as is the case with classical organisation theory, but on the extent to which it furthers the objectives of the firm. Consequently, "there can be no one best way of organising a business."⁽³⁰⁾ Rather, and based on the firm's objective(s), technology could be the key factor in structuring an organisation.

In order to investigate the impact of technology in more detail, she classified the firms, according to their technical methods, into three groups which combined ten categories as follows:

Group 1: Small batch and unit production (35 firms in five categories).

Group 2: Large batch and mass production (31 firms in two categories).

Group 3: Continuous - process production (34 firms in three categories).

By this grouping she anticipated a scale of technical complexity which reflected "the extent to which the production is controllable and its results predictable".⁽³¹⁾ She found that firms within each group had similar organisational structures. This observation led her to conclude that "different technologies imposed different kinds of demands on individuals and organisations, and that these demands had to be met through an appropriate form of organisation."⁽³²⁾ When she examined the relation between technology and success she found

that successful firms within each group were those firms where, "their organisational characteristics approximated to the median of their production group.... (and) conversely the firms graded on below average in most cases diverged widely from the median."⁽³³⁾ Finally and more interestingly, she found that successful firms which matched the median of group two approximated to the pattern of organisation advocated by the classical organisation theory, but outside this group, i.e. groups 1 and 3, "it appears that new "rules" are needed and it should be recognised that an alternative kind of organisational structure might be more appropriate".⁽³⁴⁾

Woodward's study, though "now more than two decades old (is) still one of the pillars in the field of (modern) organisation theory".⁽³⁵⁾ In fact Woodward's study is one of the pioneer studies in the area of modern organisation theory not only because it revealed technology as a contingency factor affecting organisational structure, but also because it opened the door for other researchers to think about and find other factor(s) which can play a role in structuring an organisation. One of these new factors is environment.

5.3 ENVIRONMENT

In identifying this variable we are, in fact, indebted to two empirical studies. The first is British and the second is American.

Burns and Stalker's study usually is considered as one of the studies which investigated the effect of technology on structure. However, they also investigated the effect of environment on structure, and their study provides a link between studies which examined technology on the one hand, and studies which examined

environment on the other hand, with respect to organisational structure. In other words, their study was an investigation of the technological environment of an organisation and its impact on its structure.⁽³⁶⁾ Burns and Stalker attempted "to analyse the experience of the firms which entered the Scottish Council's electronic scheme".⁽³⁷⁾ Recognising that this new industry might have brought new technical and commercial circumstances, they were interested in observing how the firms' managements "change in accordance with changes in the technical and commercial tasks of the firms".⁽³⁸⁾ Though the study started with Scottish firms, it was extended later to include English firms as well to make a total of 20 firms.

As they encountered different methods and procedures in managing these firms, they were able to distinguish between two extreme organisational structures, which they called a "mechanistic structure" and an "organic structure". The mechanistic structure is "appropriate to an enterprise operating under relatively stable conditions",⁽³⁹⁾ and is characterised by the following:

- a. "Tasks..... are broken down into specialisms.
- b. The technical methods, duties, and power attached to each functional role are precisely defined.
- c. Interaction.... tends to be vertical.
- d. (The) command hierarchy is maintained by the implicit assumption that all knowledge about the situation of the firm and its tasks is or should be available only to the head of the firm."⁽⁴⁰⁾

As can be seen, this organisational structure, to some extent, corre-

sponds to the anticipated structure in the classical organisation theory. The organic structure, on the other hand, is proposed for conditions of change or unstable conditions. The attributes of this structure are as follows:

1. Tasks "cannot be broken down....among specialist roles within a clearly defined hierarchy.
2. Jobs lose much of their formal definition.... which have to be defined continually by interaction with others participating in a task.
3. Interaction runs laterally as much as vertically.
4. Omniscience can no longer be imputed to the head of the concern." (41)

They identified and proposed these two structures as "the extreme points of a continuum along which any organisation may be placed". (42) The implication of this, as Woodward demonstrated in her study, is that there is no one best way to structure an organisation. Also, and similar to Woodward's approach, they related these two structures to the performance of the firms. They examined the technical and marketing difficulties which were faced by unsuccessful firms, and the procedures which were followed by the managements of these firms. They noticed that failures were due to the inability of these firms to adapt their structures to the type of structure which is "appropriate to conditions of more rapid technical and commercial change". (43) That is to say that they adopted the mechanistic structure, whereas the circumstances dictated the organic one.

Also in the 1960's, Lawrence and Lorsch carried out another empirical study which produced results that contradicted the

classical theory of organisation. There are two differences between this study and the above studies. First, they did not examine the classical doctrines in totality as was the case with Woodward's study. Rather they concentrated on two organisational states, that is differentiation and integration, or alternatively, division of work and coordination, using the terms of the classical theory of organisation. Second, they chose the main functional departments to be the locus of their study rather than the organisation as a whole. In the light of these two differences, their study was an endeavour to answer the following question; "what pattern of differentiation and integration of the parts of a large organisational system is associated with the organisation's coping effectively with a given external environment".⁽⁴⁴⁾

Conceptually they saw the organisation's environment as consisting of segments or subenvironments (scientific, market and techno-economic), which are supposed to face the main functional departments in an organisation; namely research and development, marketing, and production respectively. With this division they became interested in knowing to what extent these subenvironments differ with respect to their uncertainty. To investigate this they started with the plastic industry's environment by comparing its three subenvironments along the following lines:

- a. Clarity of information: This refers to the extent to which information from the subenvironment is clear and certain to produce a specific action. For example, information regarding machinery breakdown is, surely, more certain and clear and will lead to a specific decision than information regarding future behaviour of competitors which could lead

to different decisions, e.g. reducing the prices, developing new products, promotion programmes, etc.

- b. Uncertainty of causal relationship: To what extent can the result of a decision be predicted? For example, "the result of a price change would be predicted with some accuracy".⁽⁴⁵⁾ However, the result of searching for a new product in a plastic firm's laboratory is highly uncertain. On the one hand, there is uncertainty at the beginning since the search might or might not lead to a result. On the other hand, even after reaching a result, there is still uncertainty since the result might not be applicable. That is to say, economically, it cannot be produced and distributed as a new product.
- c. Time span of definitive feedback: That is the time span between taking an action and collecting information about its results or outcomes.

The comparison between the three subenvironments, through the above three variables of environmental uncertainty, showed that the scientific environment is the most uncertain one, then the market, and the least uncertain or the most certain subenvironment was the techno-economic environment.

Related to their conceptual division of the organisation's environment is the fact that an organisation in order to deal and cope with these subenvironments, assigns different functional parts to each subenvironment. In the six plastics companies which were included in this first phase of the study, they found four basic functional departments; sales, production, applied research, and fundamental research. The latter two were found to be assigned to

the scientific environment; however, "the fundamental research departments were generally supposed to relate to the less certain aspects or relevant scientific knowledge".⁽⁴⁶⁾ At this stage they became interested in knowing to what extent the uncertainty of a specific subenvironment affects the functional department which is assigned to it. They examined these influences with respect to four dimensions:⁽⁴⁷⁾

1. Formality of Structure: This reflects the routineness of procedures and tightness of controls within a functional unit as a consequence of the certainty/uncertainty of its environment. They found that when environment becomes more certain, the procedures and controls became more routine and tighter, as is the case with the production department. The opposite was found in the fundamental research department. The other two departments came in between but, "in general the sales units were more structured than applied research laboratories".⁽⁴⁸⁾

2. Interpersonal Orientation: Their concern here was to define whether the members of each department are task-oriented or relationship-oriented. As they expected, the study showed that sales managers were relationship-oriented whereas production managers were task-oriented. People in the other two departments fell between these two extremes, "the applied people.... leaned towards the relationship orientation of sales and the fundamental researchers tended more toward the task orientation".⁽⁴⁹⁾

3. Time Orientation: The issue here was to find out whether functional managers differ in the attention they give to short-term and long-term matters. Generally, sales and production managers were found to focus their attention on short-term matters that would

affect profits in a period less than one month. On the other hand, the attention of personnel in the scientific department was directed to long-term matters, which was consistent with their environment since the final evidence of success or failure in their activities was available only when a project was completed, which usually requires a period from one to several years.⁽⁵⁰⁾

4. Goal Orientation: They proposed this dimension to investigate "whether the members of each unity had their attention tightly focused on the specific goals of their departments, or whether their concerns were more diffused."⁽⁵¹⁾ Their expectation was that the manager, in order to be effective, would concentrate on the goals proposed by his department's environment. Their expectation was supported in two cases. The sales managers were found to be concerned with customer problems, competitive activities, and other events in the market place. The production managers were essentially interested in problems of cost reduction, process efficiency, etc. On the other hand, and contrary to their expectation, the orientation of the scientific managers toward scientific objectives was not so strong.

Up to this point Lawrence and Lorsch have shown that differentiation in an organisation is achieved as a response to the environment rather than as a principle or doctrine to be followed, as was the case in the classical organisation theory. This study pointed out that differentiation in reality means, "the difference in cognitive and emotional orientation among managers in different functional departments (and) not just the simple fact of segmentation and specialised knowledge".⁽⁵²⁾ Among the six plastic companies, they found that high performing companies achieved the highest degree

of differentiation. This, in fact, led them to state that "the achievement of a degree of differentiation consistent with the requirement of the environment is related to the organisation's ability to cope effectively with its environment".⁽⁵³⁾

However, it is not only with respect to differentiation as an organisational state that there has been a contradiction between classical organisation theory and practice, but also with respect to integration which represents the second organisational state they were interested in, in this study. For Lawrence and Lorsch, integration means, "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demand of environment".⁽⁵⁴⁾ We might recall that classical organisation theory assumes that coordination between departments will be hierarchical in nature and through the chain of command. That is, "if trouble develops between a representative (X) of one department and the representative (A) of another department, that the solution will be found by carrying the matter up the line from inferior to superior until the complaint of Mr (X) and the complaint of Mr (A) finally reach their common superior."⁽⁵⁵⁾ Also it is assumed that the amount of effort which is needed to coordinate will be little, when an organisation displays a high degree of specialisation between its departments.⁽⁵⁶⁾ Lawrence and Lorsch have a different argument. They argued that in a differentiated organisation, regardless of its degree of differentiation, the fact that there will always be a need for making a joint decision remains. In this case, managers from different departments will deal with the problem from different frames of reference and the need for integration will emerge. The question becomes whether there is a

systematic relationship between the degree of differentiation in an organisation and its ability to achieve effective integration when both are consistent with the demands of the environment.⁽⁵⁷⁾ In the plastic companies they noticed that the focus on innovations created critical interdependencies between departments. Some of these interdependencies needed collaboration between persons in the same managerial level in the departments, whereas others might need the involvement of persons in different managerial levels. Examining these interdependencies with respect to the state of differentiation between the departments and the achieved integration they found a clear inverse relationship between differentiation and integration. That is to say, "the more similar two departments were in structure and in the orientation of their personnel, the more effective was the integration between them"⁽⁵⁸⁾ and vice versa. Similarly, when they related the degree of integration achieved to the companies' performance, they found that high performing companies achieved a better level of collaboration in the interdependencies between their departments than the medium and low performing companies. What they concluded from their examination of the states of differentiation and integration of the whole sample of plastic companies is that an organisation, in order to be effective, should be structured to reflect the states of differentiation and integration which match the demand of its environments.

In the second phase of their study, the above result was confirmed through their examination of the environments and structures of four other companies in two industries, i.e. packed food and container industries. In addition, they were interested in knowing what differences there were between the plastic industry's

environment and the packed food and container industries' environments, and the impact of these differences on the companies' structures. The plastic industry's environment was characterised by swift technological, scientific, and market changes and the main issue was process and product innovation. Consequently, the basic departments were interdependent. Relative to this environment they regarded the container industry's environment as stable. The rate of growth of the demand was stable, no significant new product has been introduced in the 20 years prior to the study, and major competitive factors were related to prompt delivery and consistent product quality while minimising operating costs. Finally, concerning the food industry, the rate of growth in sales and the rate of introduction of new products were greater than in the container industry but slower than in the plastic industry. Innovation was, also, a major issue in the food industry. Similar to the innovations in the plastic industry, food innovations were a response to market demand, but were not accompanied by changes in scientific knowledge or in the technological processes.⁽⁵⁹⁾ Using their uncertainty measures mentioned previously to measure the uncertainty of the three subenvironments of each industry's environment, they found that the plastic industry's environment was the most uncertain, and that the container industry's environment was the most certain. When they compared the degree of differentiation and integration achieved by the high performing companies of these industries, they found that plastic companies scored the highest in their degree of differentiation, then the packed food, and finally the container companies. However, these companies scored the same in their degree of integration. This means that integration appeared to be essential

regardless of the degree of differentiation achieved. By this finding they provided yet another rejection of the classical doctrines.⁽⁶⁰⁾

Although they noticed that there is a need for a high level of integration, the issues which required integration, the managerial level which dealt with these issues, the form of influences needed for dealing with them, the departments which should be integrated, etc., differed from one industry to another. For example, in the container company "the integration centred on more routine problems and was less frequent and less complicated... (and) conflicts could be resolved and integration (could be) achieved by the upper managers, who had the positional influence and could acquire all the knowledge to do so".⁽⁶¹⁾ The opposite was the case in the plastic and packed food industries. Since innovation was the major issue in an uncertain environment, "the integration had to be brought about in relation to some very complex and uncertain problems..... and must be carried out at the lower level of the organisation where the required knowledge and information were available".⁽⁶²⁾

To summarise, Lawrence and Lorsch were interested in examining the effects of environment upon an organisation's structure, particularly in terms of examining the states of differentiation and integration achieved within the organisational structure. First, they showed that environment, contrary to the classical theory of organisation, no longer can be regarded as certain, and therefore can no longer be overlooked. Rather there is a continuum of environmental uncertainty, i.e. a certain/uncertain continuum, where an organisation's environment can be located. Second, the effective organisation is the one which is structurally differentiated and

integrated in a way that meets the demands of its environment. Finally, and most importantly, the states of differentiation and integration differ from one organisation to another depending on the demands of the environment. That is to say, in contrast to the classical theory, there is no one best way to structure an organisation. Thus this study, as did the Burns and Stalker study, highlighted the impact of environment on organisational structure. Also, as was the case in Burns and Stalker, and Woodward, they showed that there is no one best way to structure an organisation. This agrees with the results of Pugh et al, albeit with a different contingent variable, namely organisation size.

5.4 SIZE

Pugh and his colleagues from the University of Aston (and therefore known as the Aston Group research) also conducted a series of empirical studies in the 1960s. Similar to the studies of Woodward, and Lawrence and Lorsch, their study was performed to investigate empirically the classical organisation theory and in particular bureaucracy. In doing so they proposed a research scheme which started by isolating the conceptually distinct elements that went into Weber's formulation of bureaucracy. Then the relationships between these elements were investigated. The insights of Weber were then translated into a set of empirically testable hypotheses.⁽⁶³⁾ They argued that bureaucracy can, conceptually, be reflected by the following six primary dimensions:

- 1) Specialisation.
- 2) Standardisation.
- 3) Formalisation.
- 4) Centralisation.

5) Configuration.

6) Flexibility.

However, only the first five dimensions were empirically investigated. 46 organisations employing over 250 employees were randomly chosen. Of these 31 were manufacturing organisations, and 15 were service organisations. Within each subsample there was a wide variety of activities.

Our concern with this study is to show that there are different bureaucratic structures and that size is the explanatory variable of these differences. Pugh et al reached this finding in the following way. First, they formed scales to reflect the above dimensions which were found to be highly interrelated. These interrelations led them to think of extracting four variables by using factor analysis. From their viewpoint these variables will be more useful than the above five dimensions in describing organisational structure.⁽⁶⁴⁾ Three of these four variables will serve our purpose of illustrating that there is no one best way to structure a bureaucratic organisation. These three structural variables are as follows:

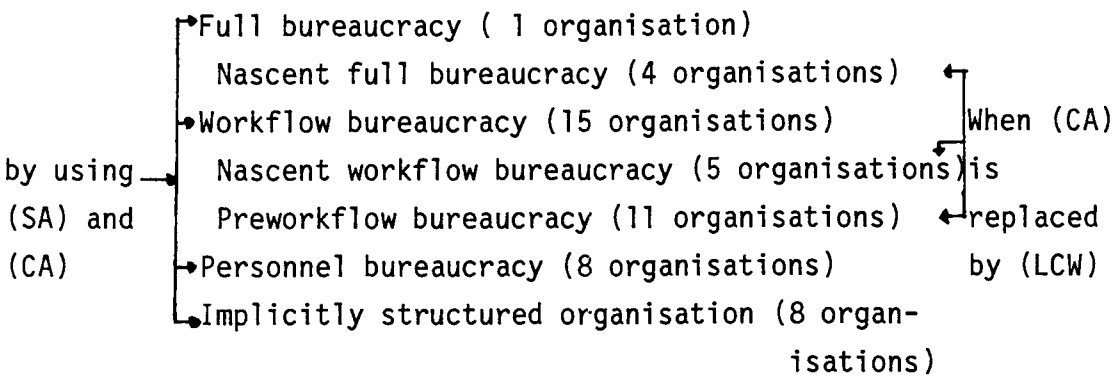
1. Structuring of activities (SA): this variable is highly loaded on standardisation, specialisation and formalisation, and was proposed to describe "the degree to which the behaviour of employees was overtly defined".⁽⁶⁵⁾

2. Concentration of authority (CA): this variable was concerned with the opposition of centralisation and autonomy, and determines "the degree to which authority for decisions rested in controlling units outside the organisations and was centralised at the higher hierarchical level within it".⁽⁶⁶⁾ Within the organisation, the variable indicated a positive correlation between specialisation and

authority "as would be expected, with more specialisation, authority is likely to be distributed to the specialists."⁽⁶⁷⁾

3. Line control of workflow (LCW): "the degree to which control was exercised by line personnel as against its exercise through impersonal procedures."⁽⁶⁸⁾ The variable is loaded in the first place on the components of the configuration dimension stated above.

They found that these variables are mutually independent and "an organisation structure may display all these characteristics to a pronounced degree, or virtually none at all, or display some but not others".⁽⁶⁹⁾ In fact this gave them the ground for concluding that "bureaucracy is not unitary, but that organisation may be bureaucratic in any of a number of ways".⁽⁷⁰⁾ Based on this the issue was, how many ways can the organisation be bureaucratic? To answer this they attempted to establish a taxonomy of organisation structures derived from a correlational analysis. To accomplish this taxonomy they clustered the organisation using the first two variables, i.e. (SA) and (CA), and then they clustered them once more by using the first and third variables, i.e. (SA) and (LCW). By comparing the clusters of the organisations they were able to identify different bureaucratic structures with different characteristics as follows:⁽⁷¹⁾



Thus, bureaucracy takes different forms in different settings, a finding which Weber did not suspect.⁽⁷²⁾

Consistent with Woodward, they were anxious to find out the reasons behind these different organisation structures. As they argued, "the structure of an organisation is closely related to the context within which it functions, and much of the variation in organisation structures might be explained by contextual factors".⁽⁷³⁾ For this purpose they identified eight factors. On the one hand, though some of these factors had already been examined, e.g. technology, size, charter, etc, Pugh et al provided us with the most inclusive list of factors that have been investigated. On the other hand, though the factors which were examined before Pugh et al's study, were found to be relevant to the organisation structure, there was no assessment of their relative importance, which Pugh et al attempted to achieve in their study. Their eight contextual variables are as follows:

1. Origin and history.
2. Ownership and control.
3. Size.
4. Charter.
5. Technology.
6. Location.
7. Resources.
8. Dependence.

Fourteen scales were formed to reflect only seven contextual variables as the resources variable was excluded. They then related these scales to their structural variables, i.e. (SA), (CA), and (LCW). The result showed a clear relationship between the structural variables and size, dependence, and to some extent technology. These were, in fact, the grounds upon which they argued that size is the

most influential variable upon the organisation structure and not technology as Woodward's study had suggested. (74)

So far, Pugh et al have shown that there is no one best way to structure an organisation. Rather there are different ways depending on the organisational context and, in particular, size. However before leaving this study, one point needs to be mentioned. As can be noticed, Pugh et al were not interested in examining the relationship between structure and the organisation's performance as in the studies by Woodward, Burns and Stalker, and Lawrence and Lorsch. In fact, their sample might prevent a comparison such as this, since it includes different kinds of organisations; e.g. manufacturing firms, profit service organisations, public service organisations, etc. These organisations have, of course, different objectives and different performance criteria which might make comparison between structure and performance unfeasible.

Based on the studies of Pugh et al, we can include size as a determinant of an organisation's structure along with the previous determinants, namely technology and environment, which were revealed by Woodward, Burns and Stalker, and Lawrence and Lorsch. These studies, apart from Lawrence and Lorsch's study, did not examine the kinds or types of interdependencies which can exist between the organisational parts or subunits, and how these can effect an organisation's structure. As we have shown, the integration state as explained by Lawrence and Lorsch emerges as a result of the interdependencies within an organisation. Though the issue did not receive much attention from them, we might infer what follows from their study. As there were different environments which required different degrees of differentiation, we might expect different types

of interdependencies which, in turn, will necessitate different types of integration. Note that it is not a matter of different degrees of integration as they showed that a high degree of integration was required whatever the degree of differentiation. If this is true, then the implication is that there will be different organisation structures. This theme was, in fact, the main interest of Thompson which led him to identify interdependencies as a contingency variable of an organisation structure. This will represent the last variable in this analysis.

5.5 INTERDEPENDENCIES

Thompson, similar to the above writers, believes that there is no one best way to structure an organisation. In his conceptual framework of structuring an organisation, interdependencies is the factor which determines the shape of the structure. However, interdependencies cannot be regarded in a vacuum; rather it is a function of both technology and environment.⁽⁷⁵⁾ He distinguished between three kinds of interdependencies:

1. Pooled interdependencies: in this type, there is no direct interaction between the organisational units. However, "they may be interrelated in the sense that unless each performs adequately, the total organisation is jeopardised, failure of any one can threaten the whole and thus the other parts. (In this situation) each part renders a discrete contribution to the whole and each is supported by the whole".⁽⁷⁶⁾ In this kind of interdependence, action in one organisational department or unit can be taken without regard to action in the other as long as the overall organisation remains viable.

2. Sequential interdependencies: in this form, the interdependencies are serial, where the output of the preceding unit is an input to the successive unit. The direction of the interdependencies can be pinpointed and their order can be specified as well. Assuming that there are two units, (A) and (B), and that the interdependencies are sequential from (A) to (B), then (A) must act properly before (B) can act. Also unless (B) acts, (A) cannot solve its output problem. As a result of this relationship, each unit "in the set must be readjusted if any one of them acts improperly or fails to meet expectations".⁽⁷⁷⁾

3. Reciprocal interdependencies: here each unit exports its outputs to the others and imports inputs from the others. Using the above example, then A's output will be input to B, and B's output will be input to A. In this situation "each unit involved is penetrated by the other..... and (imposes) contingency for the other."⁽⁷⁸⁾ This requires that "the action of each (unit) in the set must be adjusted to the actions of one or more others in the set".⁽⁷⁹⁾

As the above order shows, sequential interdependence is more complicated than pooled interdependence, and reciprocal interdependence is the most complex of all. In fact, Thompson has intentionally ordered them in this way to reflect two points. First, that each successive type of these interdependencies, by definition, includes the preceding types, "thus all organisations have pooled interdependence; more complicated organisations have sequential as well as pooled; and the most complex have reciprocal, sequential, and pooled".⁽⁸⁰⁾ Second, coordination becomes increasingly difficult as the organisation moves from pooled, to sequential, and finally to

reciprocal interdependencies.

Thompson proposes three methods of coordination for the three types of interdependencies. Since in the pooled interdependence there is, by definition, no interaction between the units, coordination can be achieved through standardisation. The establishment of routines or rules will constrain action at each unit into courses consistent with those taken by others in the pooled interdependencies. On the other hand, this requires the environment to be relatively stable, repetitive, and the situations to which the rules are applied should be few enough to permit matching of situation with appropriate rules. In sequential interdependence, though the interaction is in one direction, there is still the possibility that an action in one unit might directly affect the other. This can be avoided by the establishment of schedules for the interdependent units by which their actions may be governed.⁽⁸¹⁾ The existence of this interaction is an indication that the environment is no longer stable; rather it is dynamic. Finally, for reciprocal interdependence the appropriate device is coordination by mutual adjustment to reflect the need for transmitting new information during the process of action. This kind of interdependence and therefore its device is a reflection of the environment which is more variable and unpredictable.⁽⁸²⁾ We might appreciate that the costs of coordination are increasing with the shift from the first to the second, and finally to the third method of coordination. The reason, as Thompson argues, is that "the three types of coordination place increasingly heavy burdens on communication and decision".⁽⁸³⁾

For Thompson, as well as the classicists, departmentalisation is the base upon which organisational structure

is established. However, as we will see, they have different approaches. The classical approach, in general, sees departmentalisation of components of an organisation as a natural sequence of functional specialisation within an organisation. Here the purpose is to gather the functional specialists in one place, i.e. in a department, for improving efficiency. In doing so the classicists usually use one of the following criteria; 1) common purpose or contribution to the larger organisation; 2) common processes; 3) a particular clientele, or 4) a particular geographic area. Thompson, in fact, argues that an organisation creates departments in order to minimise coordination costs between its positions or components. He criticises the classical approach with respect to the above criteria when they are used in relation to real organisations. This is because components of complex organisations are not unidimensional, and therefore, "homogenising them on one dimension does not homogenise them on all dimensions".⁽⁸⁴⁾ He described his approach which we might call the tangible approach, as follows, "the question of the grouping of positions to be **tangent** to one another. Shall position A be placed tangent to position B or to position H? Should positions A, B, and H all be tangent to one another, or is it imperative that position H be placed tangent to position X, which requires that it be removed from direct linkage with position A and B?"⁽⁸⁵⁾ As Thompson's objective from departmentalisation is to minimise coordination costs, thus the grouping of positions will be applied first to the positions which have reciprocal interdependence, and which require coordination by mutual adjustment. In the absence of this type of interdependence, the approach will be applied to sequentially interdependent posi-

tions. Finally, in the absence of the above two types of interdependencies, that is to say, when interdependencies are pooled, grouping positions should reflect a common aspect between them in order to be homogeneous for the purpose of achieving coordination through standardisation, which is the least costly manner. In this respect "homogeneity facilitates coordination because one set of rules applies to all positions in the group; and when changes in rules are necessary, one set of changes applies to all".⁽⁸⁶⁾ Here Thompson argued that a common or similar process is the base which can be used for grouping positions which have neither reciprocal nor sequential interdependencies.

However, since the positions which have reciprocal or sequential interdependencies cannot be included in one group or this will overtax communication mechanisms, those positions with "the greatest intercontingency form a group, and the resulting groups are then clustered into an overarching second-order group".⁽⁸⁷⁾ Here Thompson has two points to clarify. First, that clustering groups should also follow the above pattern; that is, clustering groups which have reciprocal interdependencies, then those which have sequential interdependencies and finally those which have common processes. This is, of course, for minimising coordination costs which Thompson, always, anticipates. Second, as can be noticed, this clustering will create a hierarchy which will not reflect degrees of functional or specialised highness or lowness as is the case with the hierarchy of the classical theory. According to Thompson, with respect to organisational hierarchy, "each level is not simply higher than the one below, but is a more inclusive clustering, or combination of interdependent groups, to handle those aspects of

coordination which are beyond the scope of any of its components".(88)

Following the above conceptual framework, though it might, at first glance, suggest that it will lead to one structure as is the case with classical organisation theory, this is not the case. In fact, it is the opposite which Thompson attempts to show by proposing this conceptual framework. However, we might clarify this point further. We might recall that Thompson has identified three kinds of inter dependencies, and that each successive kind of interdependence includes the preceding types. Also he showed that in establishing departments and an organisational hierarchy we should start with the most complex type of interdependence, i.e. the reciprocal, then the less complex interdependence, i.e. the sequential, and finally the least complex interdependence, i.e. the pooled. Consequently we might expect that the structure which will be based only on pooled interdependence will differ from the one which reflects sequential as well as pooled. Both these structures will differ from the one which represents reciprocal, sequential, and pooled interdependence. In turn, the more kinds of interdependencies reflected by a structure the more complicated is the structure. This can be depicted as follows.

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On the other hand, Lorsch and Lawrence have argued that the difference in the interdependencies was a reason for structural differences between the companies of the three industries they investigated in their former study.⁽⁸⁹⁾

Thus, we can state that since interdependencies are functions of technology and environment, there is no reason to expect that organisations operating in different circumstances will have the same structure; rather they will have different structures. However, the point is, should two organisations operating in similar technological and environmental circumstances have the same structure? This point has not been discussed by Thompson, nor has it been investigated empirically by others. Nevertheless, we might gain the impression that even in this case, organisation structures might not be similar provided that the interdependencies in the first organisation are between roles or components which are different from the roles or components in the second organisation. That is, in the first organisation we might find that there is a reciprocally interdependent relationship between positions or components A and B. In other organisations operating in similar technological and environmental circumstances we might find the same type of interdependence, i.e. the reciprocal one, but between other positions or components, for example X and Z. If grouping of positions and components is the basis for departmentalisation, then we might be right to expect structural differences between these two organisations.

We have finished our examination of the fourth and last contingency variable identified at the beginning of this chapter. We might recall that our purpose in examining the above studies was to

show that, contrary to the classical organisation theory, there is no one best way to structure an organisation. Rather, there are different structures for different organisations. This way of thinking in studying organisations within the context of modern organisation theory is known as contingency theory. The term "contingency theory" was introduced in the organisational literature by Lawrence and Lorsch in their study which we have discussed above. They used this term as a tentative label to refer to a new research-based approach.⁽⁹⁰⁾ The basic assumption underlying this theory, as they pointed out, "is that organisational variables are in a complex interrelationship with one another and with conditions in the environment".⁽⁹¹⁾ Later, it became the usual practice to use this term to refer to the way of thinking which perceives organisational structure as a dependent variable and that the independent variables are technology, environment, size and independencies.

Since the mid 1960s, contingency theory has dominated organisational studies. Many studies were carried out using similar methodology, and produced similar results. However, other studies failed to confirm them. In fact, the latter phenomenon was a reason to shed some doubts or shadows on the usefulness of contingency theory to underpin organisational studies. This point will be clarified when we further examine contingency variables in the next three chapters. However, before we proceed with the theory and its variables, it could be reasonable to illustrate to what extent contingency theory is accepted by accounting writers.

5.6 CONTINGENCY THEORY: AN ACCOUNTING SUPPORT

In general, we can state that no accounting writer has rejected contingency theory in total. Some writers accept it unconditionally, others accept it with some reservations. Among the first category of writers is Watson who is one of the first accounting writers who referred to the future impact of contingency theory on accounting research. Though contingency theory was fairly new he expected that "just as managerial accounting has been greatly influenced by the traditional theories of organisation so too this latest revolution in organisation theory (i.e. contingency theory) is sure to have its impact".⁽⁹²⁾ Gordon and Miller were, probably, the first two accounting writers to demonstrate the usefulness of contingency theory and to establish the point that a contingency approach must be taken in designing accounting systems.⁽⁹³⁾ Sathe also indicates clearly the relevance of contingency theory to the management accounting and management control systems. Although he was aware that contingency theory was, and presumably is, still being refined and tested, he noted that "the basic approach appears to have relevance for management accounting in at least two ways. First the design of an organisation has important implications for its ability to gather and process information, a task also performed by management accounting. Second, several elements relevant to organisation design are related to management accounting."⁽⁹⁴⁾ Waterhouse and Tiessen regarded it as a convenient point-of-departure for discussing the management control system in its organisational context.⁽⁹⁵⁾ Finally, Resenzweig after reviewing the critics of contingency theory has concluded that these critics have not rejected the proposition of contingency theory that contextual variables along

with other factors are important considerations in the structural design of management control systems.⁽⁹⁶⁾

When we examine the second category of writers who have reservations about contingency theory and management accounting research we find writers such as Otley, Emmanuel and Cooper. The main reservation of Otley after his review of the theoretical and empirical accounting studies which were based on contingency theory, was that "all the work reviewed has implicitly utilised an inappropriate simple model".⁽⁹⁷⁾ Thus Otley has a reservation regarding the way contingency theory was reflected and utilised in accounting studies. Later Otley modified his viewpoint, from the need to consider a wider range of contingent variables, as reflected by his proposed model,⁽⁹⁸⁾ to the need to identify what features of a management accounting system are related to various contingent variables.⁽⁹⁹⁾ Also, he argued that, what he called, traditional contingent variables might have little impact on management accounting systems compared with new contingent variables, e.g. ownership and overall financial accounting practice. In fact, however, these two variables might not be totally new, as at least one of them was considered in the contingency studies, e.g. Pugh et al's study, which examined ownership as one of the contextual variables behind the variations between the organisational structures. In order not to be misunderstood or to be regarded as an opponent of contingency theory, Otley stated that, "despite these problems I still consider that the contingent framework is valuable."⁽¹⁰⁰⁾ In a similar vein Emmanuel and Otley have argued that "the contingency framework seems to have been uncritically accepted by management accounting researchers at a time when it was

being seriously criticised in the organisation theory literature."⁽¹⁰¹⁾ However, they acknowledged the soundness of its underlying premise and that it "provides valuable guidance for conceptualising important issues in accounting systems design".⁽¹⁰²⁾ The latter part of their book uses contingency framework to think through the impact of various factors on accounting system design and use. Finally, Cooper has taken a political and social perspective in his discussion of contingency theory and its application in management accounting. From this perspective he found an opportunity to criticise contingency theory for not addressing issues such as; 1) the imbalance in distributing power in an organisation; 2) who dictates the rules in the organisation and are they inviolate; 3) in whose interests the management works etc. No doubt these issues are interesting, but they are outside the domain of contingency theory which is essentially concerned with organisational structures and why there are differences or variations between them, and to which variable(s) these differences can be attributed. Nevertheless, if the above issues are taken into consideration by contingency theorists, i.e. organisational as well as accounting theorists, this will widen the scope of contingency theory and introduce more muddle into its current state of muddle which Cooper argues exists. He stated that "contingency theory is, in short, rather muddled."⁽¹⁰³⁾ Nevertheless, despite its muddle he did not reject contingency theory; rather he considered it "to be useful for the accounting researcher not only to develop a better theory for the design of accounting system, but also to investigate the nature and the uses of management accounting as a preliminary to the development of theory which may form the basis of information system design."⁽¹⁰⁴⁾

So far, we have examined the arguments against and in favour of contingency theory. We have tried to show in this section that the criticisms which have been directed at contingency theory do not affect its soundness. Also we have tried to show that contingency theory, if not accepted unconditionally by accounting writers, is, at least, not rejected by them. We may therefore confidently proceed to use contingency theory as a framework for examining and designing RAS. Our task in this research is not to search for an adequate basis for resolving conflicts of interest and values between organisational theorists; rather our job is to look for areas where conflict is minimised for the purpose of improving RAS. We therefore do not intend to get involved in the controversy between the opponents, e.g. Schreyogg,⁽¹⁰⁵⁾ and the proponents, e.g. Donaldson⁽¹⁰⁶⁾, of contingency theory. Nevertheless, given the nature of our study one issue is worth discussing and that is what is meant by organisational effectiveness? The contingency studies which we presented indicated that effective organisations are those which achieved better performance in comparison to other organisations. This better performance was measured in terms of conventional accounting measures, e.g. profit, sales turnover, etc., or in terms of non-accounting measures, e.g. the number of new products introduced in the last five years as a percentage to the current sales, the quality and attitudes of the organisational managers and supervisors towards each other and towards the organisation, the rate of turnover among the organisation's staff, etc. The result of this better performance in one organisation in comparison to others, is that it will survive and will achieve its objectives. No doubt the variety of measures which can be used to reflect the concept of

organisational effectiveness has led to a situation where organisational effectiveness should be regarded as a multidimensional concept rather than a unidimensional concept. For this reason, to avoid confusion, we have used the phrase "for **better** performance evaluation", instead of "for **effective** performance evaluation", as one would expect under the contingency approach. In this study "better performance evaluation" means an evaluation that is conducted by superiors and does not lead to hostility, tension, fear, mistrust, etc. on the part of the subordinates. This we think can be achieved when RAS is structured in the light of the organisational context and in particular when the impact of contingency variables is taken into account. However, we must decide which of the contingent variables to take into account. This is discussed next.

5.7 CHOSEN CONTINGENT VARIABLES: A JUSTIFICATION

As we have argued, contingency theorists advocate that there is no one best way to structure an organisation. Rather there are different ways depending on technology, size, environment and interdependencies. Since the 1960's, contingency theory has become the base for many organisational studies. A review of any one of the leading journals in the area of organisation theory, e.g. Administrative Science Quarterly (1960-1986), shows the importance which has been given to this theory as a framework for many organisational studies. However, there is some debate about the relative significance of some of the contingent variables, and in particular technology and size, in influencing organisational structure. Though there is no doubt about their effect, the question is which of them is more influential than the other (i.e. technology

as Woodward showed, or size as Pugh et al claimed), in structuring an organisation. In this research, as far as the design of RAS is concerned, we might choose technology, environment, and interdependencies as contingent variables in structuring RAS. We think that these three variables have a greater role to play than size in structuring RAS. In fact we can give three reasons to explain why size is excluded from the contingency variables selected in this study. These reasons are as follows:

1. Pugh et al's study is characterised by some methodological problems which in turn might shed some doubts on their results which favour size over technology.

2. Based on some studies which examined both technology and size, we might argue that size does not have such a great influence as claimed by Pugh et al, in comparison to other contingent variables, in particular technology.

3. Though we might expect some kind of relationship between size and the use of RAS in an organisation, in the sense that large organisations are more likely to operate and use RASs than small organisations, we would not expect this relationship to be extended to determine the structural issues within RAS. For example, what kind(s) of responsibility centre(s), i.e. cost, profit, or investment centres, should be established; what cost and revenue items are controllable and uncontrollable, etc. These as well as other structural issues within RAS can, we think, be determined with regard to technology, environment, and interdependencies rather than with regard to size.

Firstly, Pugh et al's study was, in fact, one of the studies which has extensively been replicated within and outside the UK.

These replicated studies were carried out using the original scales used in Pugh et al's study or the abbreviated scales proposed by Inkson et al.⁽¹⁰⁷⁾ The original study and, therefore, its replications have become subject to criticism for some methodological problems which have been recognised by other organisational students. Grinyer and Yasai-Ardekani have described this situation as follows. "Aston methodology has come under attack since the early 1970s. A number of researchers have questioned the adequacy of particular operational measures. Still others have challenged the usefulness of the whole Aston approach".⁽¹⁰⁸⁾ This climate has led them to think that there is a need for an objective balanced assessment of problems associated with the use of Aston psychometrically based measures, and the associated methodology".⁽¹⁰⁹⁾ To achieve this, they applied Aston methodology to the findings of an empirical study and found that there were problems with the Aston methodology and they addressed them as follows:⁽¹¹⁰⁾

1. Problems of summing up items to form scales which measure the structural dimensions, such as standardisation, specialisation, etc.

2. Problems associated with the interpretation of the true meaning of the resulting scales. Two problems have been identified. First, items have sometimes been aggregated to form a composite scale with which they have little common variance, for example, their scale of technology. Second, some of their scales, as a result of the process of aggregation they followed in constructing these scales, suggest wider implications than was the case in reality. One example is the dependency scale which was originally intended to examine the dependency of an organisation on other organisations in its

environment. However, after the process of aggregation, this was reduced to reflect the relationship between an organisation and its parent. Nonetheless, they labelled the scale 'dependence' with its wider implication.

3. Problems associated with the statistical techniques which they used.

4. Problems of time and costs needed for the application of the full Aston research methodology and which led many of the replications to be carried out using abbreviated versions of certain scales.

Aldrich, on the other hand, concentrated his analysis on a particular variable and scale to clarify the methodological problems inherent in the Aston research. Aldrich was concerned about "the construction of their variable called workflow integration or, in some cases, simply technology".⁽¹¹¹⁾ Aldrich recognised that their sample included a variety of organisations, i.e. manufacturing, public, distributive, and professional organisations, so he raised a question as to "whether the technology measure is not simply acting as a dummy variable for manufacturing /nonmanufacturing".⁽¹¹²⁾ He supported his impression by classifying the organisations according to their scores on technology into two groups. He found that 76% of the organisations in the first group were service organisations, and 93% of the organisations in the second group were manufacturing organisations. Given the fact that these two types of organisations use different technologies, it is difficult to believe that there is an overlap which produces a general measure of technology as was assumed by Hickson et al;⁽¹¹³⁾ rather as Aldrich argued it is "so severe to warrant a separate analysis for each industry type",⁽¹¹⁴⁾

which was not done by Pugh et al or their successors. What is more important is that Aldrich showed how they were biased in their interpretation, a point which has been mentioned by Grinyer and Yasai-Ardekani. In particular he showed the bias of their results in favour of size and at the expense of technology. Using path analysis and data from Hickson et al in respect of the causal relationships among size, technology, and structure, he showed the possibility of constructing eighteen different models each with a unique causal ordering of variables.⁽¹¹⁵⁾ By analysing the logic behind these causal relationships, he was able to reduce them to one which is congruent with the actual developmental sequence of an organisation and also has a plausible substantive interpretation.⁽¹¹⁶⁾ In this model, technology has a positive direct impact on structure and a negative impact on size. On the other hand, structure has a direct effect on size and this is due to "the fact that firms which are highly structured,. have a highly differentiated and specialised set of work roles to fill etc. That is, as the division of labour in an organisation increases, the number of employees, by definition, must necessarily increase".⁽¹¹⁷⁾

What has been stated so far covers the first reason for excluding size. The second reason states that size, in general, was shown to be relatively less important than the other contingent variables and in particular technology. First of all, Mileti et al, after examining most of the size measures which were used in the organisational studies, have combined them into three basic dimensions; capacity, volume, and success. They investigated these dimensions in relation to organisational structure and then they concluded the following:

1. Size per se is not a viable concept for organisational theory.
2. Size is a multidimensional rather than unidimensional concept, and therefore it can be used as a surrogate for different aspects of organisations.
3. Organisational size is best recast theoretically along different dimensions as indicative of organisational technology (work flow) and levels of goal attainment (profits and assets).

In addition to that there are some studies which showed that size is less influential than technology on organisational structure. Thompson, for example, has argued that size alone does not result in structural complexity, that is, "so long as an organisation employs simple technologies and faces simple task environments, it can be large and still employ a relatively simple structure"⁽¹¹⁸⁾ and vice versa. He explained this by comparing Cooper companies with hospitals or universities. The former organisations are very large with a simple structure whereas the latter are very small with a complex structure and this is regardless of whether the measure of size is in terms of number of employees, size of budget, etc. In a similar vein, Miller in his discussion of the transition of a simple production system to a complex system has stated that, "size by itself is not a critical factor".⁽¹¹⁹⁾ From his viewpoint, the forces which result in a simple production system for gathering together role-relationships and creating an internal differentiation (that is, the simple production system becomes a complex one), can be attributed to one or more of the following variables; technology, territory, and time.⁽¹²⁰⁾ However to demonstrate the superiority of

technology over size in this transition he said that an "increase in technological complexity or diversity tends to have this effect (i.e. the transition from simple to complex structure), even though the quantum of input and output remains unchanged. It may even occur where the size of the system, in terms of roles, is reduced." (121)

On the other hand, Comstock and Scott have, empirically, examined the effect of both technology and size on the structure of subunits. They found that both technology and size have their effect on structure; however, the effects of size ^{were} smaller than those of technology. Moreover, they argued that if they had demonstrated the effects of technical differences in their sample of wards instead of concentrating on patient care only "then we would expect to find even larger effects of technology in studies encompassing a more diverse set of organisational subunits. It is possible that with improved measures and increased variance of technological (dimension), the effects of workgroup size might be relatively insignificant". (122)

However, if what has been stated above is not yet sufficient to convince us that size is not a superior influential variable in the way suggested by Pugh et al, then we can provide two more pieces of evidence taken from replications of the Aston research. Badran and Hinings, using the abbreviated scales, examined the administrative control and contextual constraints in Egyptian public enterprises. (123)

The study showed a significant positive relationship between technology and structure and contradicted the findings of Pugh et al. What is interesting is that Badran and Hinings started to give an explanation for this deviation between their findings and Pugh et al's findings, though the same deviation was found in another study. (124)

This deviation in the findings can

be supported by the second piece of evidence from Aston's sample of organisations. Inkson et al conducted a follow-up investigation of fourteen of the organisations which were included in the original sample over a period of five years. They found changes in organisational size. However, they did not find an association between changes in size and changes in the structural variables of these organisations, e.g. structuring of activities. As Aldrich argued, "these findings are difficult to reconcile with the assumption that size is a key factor in organisational (structure)."(125)

Some accounting writers excluded size as a variable when they used a contingency framework for management accounting/management control systems. Among those writers are Waterhouse and Tiessen who stated that "the causation between size and structure is not clear." (126) The viewpoint which will be adopted here is that size will be utilised where it is likely to have some predictive significance. Finding out this predictive significance will involve the investigation of a theory of organisational development which is outlined by Aldrich as follows:

1. An initial setting up and capitalisation of an organisation in response to perceived market opportunities (environment variable).
2. A design of an organisation based on coping and modifying existing technology (technological variable).
3. The design of an appropriate structure in the light of 1 and 2 (interdependencies as a function to 1 and 2).
4. The employment of a workforce to staff the nearly completed organisation (size).

It can be appreciated that thinking about designing and operating RAS will start with step four. However to employ a workforce does not per se require RAS, rather this will be required: 1) when the workforce increases to a limit which necessitates a shift from first order control to second order control, i.e. a replacement of direct supervision by impersonal supervision through management control systems;⁽¹²⁷⁾ 2) when divergence in objectives starts to appear and there is a need to achieve convergence by applying budget and/or standard cost systems; 3) when the employees for all practical reasons have to be grouped, each group under a manager charged with a formally defined set of responsibilities directed towards the attainment of the organisational goals; and 4) when performance evaluation of these groups cannot be conducted immediately through direct observation but through reports which show what should have been achieved in comparison to what has been achieved, etc. Thus, as organisational size increases more and more, the likelihood of designing and operating RAS increases. Having recognised this fact, the related question is then, on what basis is this system structured? In this respect we think that size has very little impact on structuring RAS. Size is not the reason for giving the sales manager the authority to change sales prices but rather it is the environment, e.g. the competition. In a dynamic environment in terms of high competition, the sales manager should be given this authority in order to react to the pricing decisions of competitors. The speed which will be needed to take the pricing decision(s) and the high frequency of the changes of prices in this environment requires the sales manager to be delegated the authority to change prices, not to refer the matter each time to higher managerial level.

No doubt this delegation is required in this environment regardless of the volume of sales, the number of customers, clients, salesmen, etc. The opposite is true in a stable environment. Here the authority for changing prices can be retained by the higher level of management, regardless of the volume of sales, the number of salesmen, etc.

Also, size does not affect our perception of a production centre as a cost centre. Assume that (A) and (B) are two production processes, and A's outputs are B's inputs. Technically neither of these two managers has complete control over the whole production system, but each is responsible for a part of it. Logically, each of them should be responsible only for the costs of converting or transforming the inputs to outputs, that is to say each has to be regarded as a cost centre. Assume that both processes are combined in one division under the supervision of one of these two managers. Technically, this manager becomes responsible for the whole production system. Moreover, assume that the manager is given the authority to sell the division's product(s) in the market, then the division from the point of view of RAS will be regarded as a profit centre not a cost centre as above. What impact does the number of production workers or production volume have on this decision? None.

Finally, when we examine the effect of interdependencies on structuring RAS we will find that it is greater than the impact of size. Assume that we have three products A, B and C. Assume also that A and B each can be produced through one process, that is process (1) for A and process (2) for B. But product C should be produced through two sequential processes (3) and (4). As can be seen there are no interdependencies between (1) and (2) on the one

hand and between them and (3) and (4) processes on the other. The managers of processes (1) and (2) can be evaluated in isolation, as there is no effect of one on the other, i.e. pooled interdependencies in terms of Thompson's typology of interdependencies. But with regard to the managers of processes (3) and (4), it might not be fair to evaluate each of them, without taking into consideration the effect of each on the other. Here the performance of each is dependent on the performance of the other. Thus if we accept that the managers of processes (1) and (2) should be evaluated on an individual basis, we might argue that managers of processes (3) and (4) should be evaluated on a group basis. The size of each of the above centres, i.e. 1, 2, 3, and 4, will not change the basis of performance evaluation to a group basis for centres (1) and (2) instead of an individual basis, and to an individual basis for centres (3) and (4) instead of a group basis.

These examples help to clarify where size can affect the structure of RAS and where it does not. The expected relationship between size and RAS as outlined here can be supported empirically. Jones in his survey of the practices of financial planning and control in UK companies has found a positive relationship between the organisational size and forecasting practice.⁽¹²⁸⁾ Rosenzweig on the other hand was interested in examining the relationship between organisational size and the controller's departments and the sophistication of techniques used by the controller's department.⁽¹²⁹⁾ On the one hand there was a lack of significant correlation between overall organisational size and the size of the controller's department. This implies that an increase in the size of the latter is due to factors other than size, for example,

operating new technology,⁽¹³⁰⁾ dealing with overseas markets, or introducing a more complicated kind of interdependencies in the company. On the other hand, he found a positive relationship between the overall organisation size and the sophistication of techniques which are used by the controller's department, for example, the completeness of the budgeting system. Given the fact that RAS is one of the most sophisticated management control systems, as it combines other systems, e.g. budget, standard costs, quality control, etc., we can appreciate that RAS will be used when the company's size is large enough to warrant this system. In fact these and other pieces of empirical evidence support our argument which states that using RAS in an organisation is dependent on its size, but structuring this system is dependent on its technology, environment and interdependencies. By and large, size has not been recognised by most accounting writers as an influential factor, in comparison with the other factors we have chosen, with respect to designing accounting systems in general and management control systems in particular.

So far, the chapter has examined modern organisation theory and its contingent way of thinking, which states that there is no one best way to structure an organisation, rather there are different structures for different organisations as a result of differences in their technologies, environments, size and interdepartmental dependencies. In this chapter we have argued that technology, environment and interdependencies are the three contingency variables which should be regarded in studying and designing a RAS in the organisational context. This chapter, by the nature of its purpose, has not given more information about each of these three contingency

variables; how they are perceived in the organisational and accounting literature; and how we perceive them for the purpose of studying and designing RAS. These two issues are answered in the next three chapters.

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CHAPTER 6 TECHNOLOGY: MORE INSIGHTS

6.1 GENERAL

6.2 TECHNOLOGY: A REVISIT

6.3 CONCEPTUAL STUDIES

6.4 EMPIRICAL STUDIES: CATEGORY (1)

6.5 EMPIRICAL STUDIES: CATEGORY (2)

6.6 A FINAL WORD

6.1 GENERAL

The previous chapter indicated our intention to use a contingency framework for the study of RAS. Also the previous chapter introduced the three contingent variables which we believe should be taken into account in studying and designing RAS. We explained why we chose these three variables, but the chapter merely introduced us to these variables. More information about these variables will be provided in the following three chapters. There are two reasons for providing further information about these variables: 1) to increase our knowledge of these variables and 2) to determine the way these variables should be perceived and conceptualised for the purpose of studying and structuring RAS.

6.2 TECHNOLOGY: A REVISIT

As with other terms in the social sciences, there is no one definition of the term technology. Perrow, for example, noticed that technology nowadays has two uses, "its common-place sense of machine or sophisticated devices for achieving high efficiency, as in the term "technologically advanced society", (and) its generic sense of the study of techniques or tasks".⁽¹⁾ This generic sense, according to Dubin, can be further subdivided into two major phases; first, the tools, instruments, machines, and technical formulas basic to the performance of the work, and secondly, the body of ideas which express the goals of the work, its functional importance, and the rationale of the methods- employed.⁽²⁾ In defining technology, writers have taken different perspectives. Some of them have defined it to reflect what Dubin has called the first phase, whereas others have concentrated in their definitions on the second phase. Harvey,

among the first group of writers, perceives technology in terms of "the mechanism of processes by which an organisation turns out its products or services".⁽³⁾ Perrow also defines it as "the action that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make some change in that object. The object..... may be a living being, human or otherwise, a symbol or an inanimate object".⁽⁴⁾ Comstock and Scott, among others in the second group of writers, have concentrated on what Dubin has referred to as the second phase of technology. They called this phase the technological predictability which reflects "the degree to which raw materials and the transformation process (are) all understood so that they present few unexpected contingencies for performers".⁽⁵⁾

Technology in the organisational context has been examined conceptually as well as empirically. The latter studies can be further classified into two subgroups; studies that have found a relationship between technology and organisational structure; and studies that have not found this relationship.

6.3 CONCEPTUAL STUDIES

Among this group of studies are Thompson's typology, and Perrow's framework of study. Thompson has distinguished between three types of technology based on the degree of standardisation which can be achieved by each of them as follows:⁽⁶⁾

A. Long-linked technology: here the technology involves serial interdependent operations. That is, operation or act Z can be performed only after successful completion of operation Y which in turn depends on act X and so on. In terms of Woodward's

classification this type of technology can be presented by assembly line and mass production technology. This technology becomes perfect "when it produces a single kind of standard product, repetitively, and at a constant rate".⁽⁷⁾ The production of one product will assist in standardising machines and tools, workflow arrangements, raw materials, and skills of operators. Repetition of the productive process means that experience can be generated so that preventive maintenance can be scheduled accurately, and operators can be trained and their motion can be specified, so that energy losses and errors are minimised. Finally, with a constant rate of production, the proportions of resources involved can be standardised, so that each contributes to its capacity and none need be underemployed. As will be seen, this type of technology can achieve the highest level of standardisation in comparison with the next two types.

B. Mediating technology: this type of technology is used by commercial banks, telephone companies, insurance companies, etc. As can be appreciated, the organisation in this type performs a linkage role between two different groups of people, whether because they do not know each other, e.g. depositors and borrowers in the case of banks, or because they exist in different places at the same time, e.g. senders and receivers in the case of the telephone company. This divergence makes the standardisation more difficult in this type of technology than in the previous type. As the organisation cannot standardise the two groups of people, then the alternative is to standardise the procedures through which these two groups are linked. Thus "the commercial bank must find and aggregate deposits from diverse depositors; but however diverse the transaction, it must conform to standard terms and to uniform bookkeeping and accounting

procedures. It must also find borrowers; but no matter how varied their needs or desires, loans must be made according to standardised criteria and on terms uniformly applied to the category appropriate to the particular borrower".⁽⁸⁾ The same logic can be found behind the standardised network of communications of the telephone company, standardised categories of risk in insurance companies, etc. With this type of standardisation, mediating technology can be performed over time and through space by assuring each segment of organisation that other segments are operating in compatible ways.⁽⁹⁾

C. Intensive technology: this is the last type of technology where the least level of standardisation is achieved. Thompson perceives this type as custom technology, i.e. small batch and unit production in terms of Woodward's classification, where "a variety of techniques is drawn upon in order to achieve a change in some specific object; but the selection, combination, and order of application are determined by feedback from the object itself".⁽¹⁰⁾ This object can be human as in a general hospital, or nonhuman as in a construction firm or a research site. Based on this, "organised or team research may draw from a variety of scientific or technical skills, but the particular combination and the order of application depend on the nature of the problem defined."⁽¹¹⁾ The success of this technology "rests in part on the availability of all the capacities potentially needed, but equally on the appropriate custom combination of selected capacities as required by the individual case or project".⁽¹²⁾

However, and as will be seen later from Perrow's framework,⁽¹³⁾ it can be argued that types of organisation, e.g. schools, hospitals, banks, manufacturing firms, etc, will vary as much within each type,

e.g. manufacturing firms, as between types, e.g. manufacturing firms and schools, depending on whether technology is routine or nonroutine. The routineness of technology, according to Perrow, can be viewed through two dimensions:

1. The number of exceptional cases encountered in the work. He conceptualised this as the "degree to which stimuli are perceived as familiar or unfamiliar. This varies on a scale from low to high".⁽¹⁴⁾

2. "The nature of the search process which is undertaken by the individual when exceptions occur."⁽¹⁵⁾ From his point of view, and without overlooking the fact that search processes are always exceptional actions undertaken by the individual, the search process can be one of the following two kinds:

- a. the search may be logical, systematic and analytical, and when this search process can be applied to problems, he regards them as analysable problems, or
- b. the search process may draw upon the residue of unanalysed experience or intuition, or rely upon chance and guesswork.

This research is used for unanalysable problems.

Using the above two dimensions he depicted a four-fold table, and within it a one dimensional scheme can follow, from routine to nonroutine technology.⁽¹⁶⁾ But whether routine or nonroutine technology will be used is likely to be determined on the basis of the state of the art of analysing the characteristics of the raw materials. In this respect, Perrow has not restricted the use of the term "raw materials" to manufacturing raw materials, but for him "people are raw materials in people-changing or people-processing organisations; symbols are materials in bank, advertising agencies

and some research organisations; the interactions of people are raw materials to be manipulated by administrators in organisations, etc."⁽¹⁷⁾ Two characteristics, which will be the determinants of technology, are of interest as far as raw materials are concerned:

1. The understandability of its nature: "to understand the nature of the material means to be able to control it better and achieve more predictability and efficiency in transformation."⁽¹⁸⁾

2. The stability and variability of its nature: here he is concerned with "whether the material can be treated in a standardised fashion or whether continual adjustment to it is necessary."⁽¹⁹⁾

As one would expect these two characteristics interact. Thus, moving from nonroutine technology to routine, one of them can be achieved "either by reducing the variability of the material and thus the number of exceptional cases that occur, or by increasing the knowledge of the material and thus allowing more analytical techniques to be used, or both."⁽²⁰⁾

Based on Perrow's framework identified above, it becomes common practice in the organisational literature to speak of routine and nonroutine technology. Hunt has considered that an organisational technology may be viewed as routine to the extent that:

- "1. The signals that initiate its processes are unambiguous;
2. The performance processes so cued are programmed; and
3. When faced with exceptions not covered by regular performance routine, search process and problem-solving methods are programmed."⁽²¹⁾

In reconciling his work with Woodward's study which we presented in the previous chapter, Perrow has pointed out that "small batch and unit" are probably involved in nonroutine production, those in the

"large batch and mass production category have a mixture of routine and nonroutine technologies but are predominantly routine..... however, continuous process firms unfortunately cannot easily be incorporated"⁽²²⁾ in the scheme. We might recall that Woodward has considered technology as an important factor for studying organisations. In the same vein, Perrow has regarded technology as a powerful tool for comparing organisations. The implications of this are as follows:

"1. We cannot expect a particular relationship found in one organisation to be found in another unless we know these organisations are in fact similar with respect to their technology.

2. Types of organisations (for example, schools, hospitals, manufacturing firms, etc.) will vary as much within each type as between types,

3. there is little point in testing the effect of a parameter variable, such as size, age, auspices, geographical dispersion, or even national culture, unless we control for technology,

4. (among organisational structures an organisation) is to call for a type of structure that can be realised by (its) type of technology, unless we are willing to pay a high cost in terms of output."⁽²³⁾

6.4 EMPIRICAL STUDIES: CATEGORY (1)

With this first category of empirical studies on organisational technology, we will find that Woodward's study and Perrow's framework of technology have been incentives to most of the studies. One of the studies conducted following Woodward's methodology was carried out by Zwerman. His purpose in doing so was twofold. First, to

replicate Woodward's study in the USA, as a new area of application which would assist in determining the level of confidence in her findings, and second, to introduce new variables into the analysis which would permit an extension to Woodward's findings.⁽²⁴⁾ The study was carried out in Minneapolis-St. Paul metropolitan area where 55 manufacturing firms were chosen. There were some differences between the two studies regarding the sample; data gathering, and analysis.⁽²⁵⁾ However, apart from these differences, the two studies were very similar with regard to examining the relationship between a typology of production systems and some structural variables and factors. Most of Woodward's findings regarding these relationships were confirmed by Zwerman's study, in particular the following:

1. There was no association between success and the type of production system. That is, the organisations which use mass production technology are not necessarily more successful or less successful than organisations which use process production technology.

2. There was an association between the type of production technology and management system, that is

Unit and process production

technologies _____ Organic management system

Large batch and mass production

technology _____ Mechanistic management system

This association was maintained regardless of the size of labour force, and the kind of relationship between ownership and management, i.e. combined or separated.⁽²⁶⁾

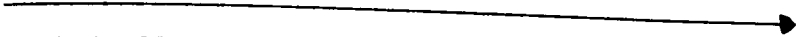
3. There was a relationship between technology in terms of 1) unit and small batch, 2) large batch and mass production, and 3)

process production, and the shape and form of structure. (27)

The 55 manufacturing firms which participated in this study were classified according to success, into very successful and less successful firms. He found that the above relationships were stronger and greater between the very successful firms. No doubt Zwerman's study provides an ample support to Woodward's findings regarding the importance of technology as a determinant of organisational structure despite the differences between the two studies. Indeed, as he argued, "the general effect of these differences - sample, setting, and data - is to enhance our confidence in Woodward's findings in the cases where confirmation of English findings was observed in the Minneapolis study. The use of different data-gathering and analysis techniques increases the validity of the findings while differences in sample and setting enhance the probable generality of the original findings." (28)

Similar to Woodward and Zwerman, Harvey examined the relationship between organisational technology and structure through a cross-sectional sample of manufacturing firms. (29) He formed a scale of technology which reflects a continuum from technical diffuseness to technical specificity and where, "technical diffuseness implies a firm in which a number of technical processes yield a wide range of products..... The more technically diffuse a firm, then the greater the degree of "made to orderness" in its products..... Some firms, however,..... are characterised by much less product variation and change. The more in this direction (means) increasing technical specificity". (30) This scale might be seen as different from Woodward's scale, however, the fact is that it is not different, and the two scales can be viewed as compatible

rather than as contradictory. This can be seen from the figure below.

Harvey's Scale			
	Technically diffuse firms	Technically intermediate firms	Technically specific firms
Woodward's Scale	Unit and small batch production	Large batch and Mass production	Continuous Process production

He examined this technical diffuseness scale in relation to four structural variables:

a) specialisation within organisation: his concern was with the basic specialisation established within an organisation on the sub-unit level, i.e. production, marketing, research and development.

b) levels of authority within an organisational hierarchy.

c) the ratio of managers and supervisors to total personnel.

d) program specification in an organisation; by programs he meant the mechanism or rules in terms of which an attempt is made to give direction to organisational activity. In this respect he was interested in three kinds of programming: role programming, output programming, and communication programming. He found a positive relationship between technology and each of the above six structural variables, and that the relationships "do show a tendency to increase with technical specificity".⁽³¹⁾ Moreover, there was a high degree of consistency on the level of the firms studied regarding the scores on all six structural variables; that is "a firm which had a greater number of levels of authority (for example) would also tend to be higher on all other dimensions".⁽³²⁾

So far the above studies have shown the impact of technology on organisations, mainly through cross-sectional samples of organisations which covered almost all the types of production systems identified by Woodward's classification. In addition, some organisational students have examined the influence of technology on a segment of organisations which employ a particular production system. Among these organisational students are Khandwalla and Keller, who examined technology in mass production organisations and continuous-process production organisations respectively. Khandwalla, as an organisational student, was aware of the debate in the literature regarding the relationship between technology and organisational structure.⁽³³⁾ His main concern was that prior research, e.g. Woodward, Harvey, Hickson et al, was not based on propositions which might explain the relationship between technology and structure before carrying out the empirical study; and the findings may best be described as serendipitous.⁽³⁴⁾ He constructed a model which combined nine propositions regarding the relationships between technology and the following three dependent variables: vertical integration; decentralisation in decision making; and integration through the use of sophisticated control systems, e.g. statistical quality control, standard costing, inventory control, internal audit, etc. Testing the model and the propositions within 79 manufacturing firms, all of them using mass production technology showed direct and positive relationships between technology and vertical integration. With respect to the other two structural variables, i.e. decentralisation and the use of sophisticated controls, the relationships were indirect through vertical integration.⁽³⁵⁾ Based on these results he revised the model. Then

he split the sample into two subsamples, the first including 38 highly profitable firms and the second including 41 with low profitability. Interestingly, the model and the incorporated relationships were supported among the highly profitable firms more than among those with low profitability. On the other hand, Keller chose organisations which operated continuous-process production technology as the area of his investigation.⁽³⁶⁾ He was interested in knowing whether, as Woodward's study implies, firms using continuous-process technology are structured in such a way as to reflect the organic form of structure or not. Keller perceived organic structure in terms of the following three dimensions:

1. less reliance on impersonal hierarchy.
2. using group decision making.
3. less conformity to specific rules for decision making.

If Woodward's implication is valid, then we might expect an association between the organic structure of a firm and its profitability. In other words, high performance firms should display a higher degree of organic structure than firms with a poorer performance. By splitting his sample of forty-four firms into two categories, high and low performance firms, he found that using organic structure was positively related to the performance of continuous-process firms, and "specifically, a deemphasis on both an impersonal hierarchy with a chain of command and the use of rules for decision making was significantly related to higher performance for (the) sample".⁽³⁷⁾ He concluded his study by confirming Woodward's findings that the use of organic structure was best suited to continuous-process operations.

As we have stated above, Perrow's framework has also been a

motivation for other empirical studies. We might recall that Perrow's framework is basically conceptual. In turn Lynch conducted an empirical assessment of Perrow's technology construct.⁽³⁸⁾ He argues that Perrow's conception is sufficiently broad, in comparison with Woodward's conception which is limited to industrial organisations. From his point of view, Perrow's framework permits the technologies of different types of organisations, i.e. industrial or nonindustrial, to be studied and compared. In order to test Perrow's technology construct empirically, he formed a seven-item scale to measure the three aspects of Perrow's technology conception. That is, the presence of exceptional cases; the search process; and the knowledge regarding the raw materials in terms of understandability of their nature and their stability or variability. The scale was empirically examined among the staff of fifteen library departments, and the results showed that the scale achieved the two conditions of validity: convergent validity and discriminant validity.⁽³⁹⁾ The issue which concerned Lynch was whether the scale which is based on Perrow's conception of technology can differentiate between the technologies of the different departments in a meaningful way or not. To examine this he computed the score each department achieved on the technology scale, and he found that the functional departments with similar technologies cluster together on the scale.⁽⁴⁰⁾ What is more important, however, is that the results showed that Perrow's construct of technology and Lynch's scale which reflects it are valid regardless of whether the department deals primarily with clients or materials, whether a person is superior or not, and whether the person is highly educated or not, i.e. has a higher degree or not. The ability of Perrow's conception to

distinguish between the different technologies has also been confirmed by other researchers. Overton et al, for example, used the conception for studying technology on the level of a nursing subunit.⁽⁴¹⁾ As we have pointed out, within the framework people are raw materials in people-changing or people-processing organisations and this can be represented by the nursing subunits. Using two aspects of Perrow's model of technology, i.e. raw materials characteristics, and the search process, they were able to categorise 71 nursing subunits into three categories based on their technological similarities.⁽⁴²⁾ The relationship between Perrow's technology conception and organisational structure has been examined by Leatt and Schneck.⁽⁴³⁾ They used Overton et al's perception of Perrow's conception of technology and then related it to the structure of nursing subunits. The latter was reflected by the following three dimensions: complexity of the types of position within the nursing subunit; the formalisation of roles; and the degree of decentralisation in decision making. They found that the more nonroutine the technology the greater the proportion of specialists employed; the less the role specificity, the more decentralisation there was from superiors. Based on this we can state that their findings of association between technology and structure are in keeping with previous research which examined this relationship, e.g. Woodward, Zwerman, Keller, etc.⁽⁴⁴⁾

Unfortunately not all of the studies which examined the issue of organisational technology have produced results consistent with the above studies as will be seen from the next section.

6.5 EMPIRICAL STUDIES: CATEGORY (2)

Hickson et al's study is one of these studies, and probably the first study which has questioned the importance of technology in studying organisations.⁽⁴⁵⁾ Therefore this study will be given a little more consideration compared to the other studies which comprise the second category of empirical studies.

Hickson et al argued that technology as a concept has three facets: operations technology, material technology, and knowledge technology.⁽⁴⁶⁾ As we might recall the last two facets reflect Perrow's concept of technology. However, in their study they used only operations technology to reflect the issue of organisations technology. Operations technology was defined as **"equipping and sequencing of activities in the workflow"**.⁽⁴⁷⁾ In this definition workflow was used to mean producing and distributing the output. Also workflow has been used in a wide sense, that is, "it is not only factories that have workflows, but also public utilities and service organisations".⁽⁴⁸⁾ The concept of operations technology was seen to consist of four subconcepts:⁽⁴⁹⁾

1. Automation of equipment: to refer to the degree to which human attributes are performed by a machine.
2. Workflow rigidity: which reflects the extent to which the appropriate machines, knowledge, skills, and raw materials can be used for other products and the extent to which operations are linked in series.
3. Specificity of evaluation of operations: to indicate the means which are used to assess the operations performed, whether against standards or merely by personal opinion.
4. Continuity of the units of throughput (work in process): by

this they proposed to determine whether the production system is in terms of a single-unit jobbing, batch, mass, or continuous-flow production.

They argued that the first three subconcepts are applicable to all working organisations, manufacturing or nonmanufacturing, but the last one is applicable to manufacturing organisations only. The next procedure for them was to form measures for the above subconcepts. Five scales were formed which were called: automaticity mode; automaticity range; workflow rigidity scale; interdependence of workflow segments scale; and specificity of evaluation of operations scale. Summing an organisation's scores on the above five scales provides an overall measure of technology in the organisation and this they called workflow integration. This represents, "the degree of automated, continuous, fixed-sequence operation in the technology"⁽⁵⁰⁾ of an organisation. However, and before proceeding with the study, we have some observations regarding their workflow integration as a reflection of organisational technology:

First: although they identified three facets of technology, they concentrated on one facet only. One might wonder, however, if an examination of one third of a phenomenon, i.e. organisational technology, is adequate to reflect the phenomenon as a whole, and to use as a base for rejecting or even confirming other studies' findings.

Second: some of their scales were not precise enough to reflect the phenomenon under investigation. For example, it was supposed that each organisation would score only one of the five items which comprised the automaticity scale. However, they found that organisations scored more than one item.⁽⁵¹⁾ It might be reasonable

to ask whether the high or low score from the automaticity scale ought to be taken for the purposes of measuring the workflow integration of the organisation. In fact, this question cannot be answered from Hickson et al. Consequently, how the phenomenon, i.e. the organisational technology, was measured is not clear and this in turn might have an impact on the validity of their findings.

Third: their viewpoint that different technologies might require different approaches for evaluating the operations seems reasonable. They stated that evaluation by personal judgement is the only available assessment of service rendered in retail stores or a research division, but in factories the assessment is against blueprint standards achieved at some stage.⁽⁵²⁾ We in fact support this viewpoint. Nevertheless, what we do object to is that they considered the evaluation of operations as a component of organisational technology. This we think might result in confusion regarding the phenomenon under investigation. However, to be sure about this, let us discuss it a little more. They gave evaluation by personal judgement used by retail stores a score of one, and assessment against blueprint standards used by factories a score of three. Now if their expectation holds in reality, then the workflow integration, i.e. technology, in their terms, of the factory will be higher than the workflow integration of a retail store. But what if they found that in reality both organisations, i.e. the retail store and the factory, use personal judgement. Does that mean that a retail store is technologically more integrated than a factory, since the former met their expectation regarding the evaluation of operation more than the factory, and what implication does that have for studying organisations? In fact, it is not clear from their

study what implication(s) it might have for a local authority baths department to score 14 on their workflow integration scale and a metal components company to score 11.

Fourth: this workflow integration can, in fact, be described as a conceptually elusive index of a bizarre collective means for unclearly linked sets of variables.⁽⁵³⁾

Relating this workflow integration scale and size, in terms of the log of number of employees, to some structural dimensions and structural variables showed that though technology and structure were related the correlations were overwhelmed by those with size. Based on this they concluded that **"the broad "technological imperative" hypothesis that operations technology is of primary importance to structure, is not supported"**.⁽⁵⁴⁾ They confirmed this by examining the relationships between technology, in terms of their workflow integration, and size and structure within 31 manufacturing organisations as a subsample out of 46 organisations of the whole sample. In both cases, i.e. with the whole sample and/or with the subsample of organisations, they found relationships between technology and some structural variables which they called job-count variables of configuration, e.g. subordinate-supervisor ratio, the percentage of total personnel who are workflow superordinates, or who are in design, or inspection, etc.

This striking lack of association, as they argued, between technology and structure led them to attempt to examine the relationship in terms of Woodward's classification of production technologies, but based on their data. Since the initial data were collected without reference to Woodward's classification, there were, as can be expected, two possible ways of carrying out the test.

First they could collect new data to match Woodward's classification of technology, or second, they could adapt the classification to suit their data. In fact, they chose the second option and interpreted, modified, and neglected some aspects of the classification in order to match the collected data. First, they interpreted Woodward's classification "as denoting the degree of continuity of throughput units present in the production".⁽⁵⁵⁾ This interpretation was, of course, to cope with one of their subconcepts of operations technology upon which the data were collected. This is despite the fact that Woodward's classification was intended to demonstrate "the extent to which the production process is controlled and its results predictable".⁽⁵⁶⁾ Secondly, they argued that Woodward did not define how small is a small batch, how large is a large batch, and where small and large batches represent two production technologies in her classification. They covered this shortcoming by distinguishing between them but in terms of time, and "batch size was defined by time units selected to discriminate within the particular sample.... This distinction between small batch and large batch at weekly resetting of equipment was appropriate to the data available here, etc."⁽⁵⁷⁾ Thirdly, since they interpreted Woodward's classification in terms of production continuity, which did not cover all the aspect of the classification, thus, "criteria mentioned in Woodward's categories but extraneous to the continuity concept were excluded".⁽⁵⁸⁾ With the above interpretation, modification, and exclusion, one should not expect that their scale of production continuity could be compared with, or would be similar to, Woodward's classification. However this is not their belief, since they argued that "the operationalisation in the form of the production continuity

scale might categorise **slightly differently** from the way Woodward may have applied her categories."⁽⁵⁹⁾ Once more when they related this new measure of technology to structural dimensions and variables they obtained the same results which they had before. That is, though there might be a relationship between technology and structure, this relationship disappeared when size was controlled.⁽⁶⁰⁾

Based on the analysis presented above, it would be strange if their study had shown a positive and strong relationship between technology and structure which other studies had shown. As we have argued, their original scale of workflow integration did not reflect the organisational technology as a phenomenon under investigation which others were able to conceptualise, (e.g. Perrow), and operationalise, (e.g. Lynch, Khandwalla, Keller, etc.). This divergence in studying the same phenomenon naturally leads to divergence in the findings. And this is true whether the test of the relationship was on the level of the whole sample or on the level of the manufacturing organisations as a subsample, as long as the scale of workflow integration was used in both cases as a reference to technology. On the other hand, their findings were not similar to Woodward's findings regarding the technological imperative, simply because their scale of production continuity was a strange creation in relation to Woodward's classification of production technology. However, they regarded Woodward's study and their study "to be mutually inconsistent in their results; but they are not necessarily contradictory."⁽⁶¹⁾ They proposed a reconciliation between the two studies which stated that **"variables of operations technology will be related only to those structural variables that are centred in the workflow.** The smaller the organisation, the wider the structural

effects of technology, the larger the organisation, the more such effects are confined to particular variables, and size.... make(s) the greater overall impact." (62)

This underestimation of the influence of technology on structure should be expected from the studies which were carried out following the methodology of the Aston research, since technology was conceptualised and operationalised in terms of workflow integration. Some of these studies, e.g. Child, (63) Child and Mansfield, (64) reached the same conclusions as Hickson et al with respect to technology. Others, e.g. Badran and Hinings, (65), Ayoubi, (66) found a stronger relationship than the one which was reported by Hickson et al; however, it is still less significant than the relationship between size and structure. These studies need not be reviewed since Hickson et al's study is representative of these studies and it has been reviewed in detail here. However, not all the studies which rejected the technological imperative have used Aston research's methodology. Two of these studies are presented here.

Blau et al carried out a study of 110 manufacturing organisations in New Jersey, to examine the relationship between technology and structure. (67) As they recognised the contradiction between Woodward's findings and Hickson et al's findings, they attempted in their study to show whether there is or is not a relationship between technology and structure. They formed two measures to reflect production technology. The first was intended to reflect the level of automaticity of the production technology; and the second was a seven-point version of Woodward's classification of production technologies. (68) They examined these two measures in relation to some structural variables which were combined under three

general headings: (69)

1. Structural differentiation: both vertical differentiation, e.g. number of levels of management hierarchy, etc, and horizontal differentiation, e.g. number of divisions or departments, etc.

2. Personnel components: which shows the percentage of, for example, direct production workers, supervisors to nonsupervisor workers, college graduates, etc.

3. Span of control: which includes the span of control of the chief executive, the division head, etc.

When they related these structural variables to the above two measures of operational technology they observed an "absence of a significant association with respect to differentiation, and with a few exceptions, an overall lack of association with either span of control or personnel components".⁽⁷⁰⁾ At first glance, this result might cast doubt on Woodward's finding since Blau et al have used Woodward's scale of technology, albeit their own version, and examined it in relation to most of the structural variables which Woodward argued are influenced by technology. Also these results might lead to confusion when we recall that Zwerman only six years before Blau et al's study, conducted a similar study and confirmed most of Woodward's findings.⁽⁷¹⁾ In fact with replications such as these two studies it might be considered strange to have such contradictory findings. There might be no difference apart from the fact that they were conducted in different areas of the USA, i.e. New Jersey and Minnesota. However, a careful examination of the two studies reveals that the difference is deeper and is due to the methodology which was followed by each study in examining the relationships. This can be clarified as follows. Blau et al's

finding relates to an examination of the relationships on the level of the whole sample, i.e. 110 manufacturing firms. When they, however, classified the firms into three categories: unit and small-batch; large-batch, assembly, and mass production; and process production; and examined the same structural variables in relation to these three categories, they found apparent associations. Moreover, these associations were independent of the size of the organisation. Although not all of these relationships were statistically significant, as Woodward and Zwerman argued, the consistency of the pattern is impressive,⁽⁷²⁾ which in turn supports Woodward's findings. What this does mean is that the relationship between technology and structure, as reported by Woodward, should be examined in relation to the classification of production technologies, not in absolute terms. This might explain why Zwerman confirmed Woodward's findings and why Blau et al did not initially, but did so when they examined the relationship on the level of the three types of production technologies. If this interpretation is plausible, then Blau et al's study provides us with grounds to argue that Hickson et al did not find an association between technology and structural variables because they examined the relationship on the level of the sample as a whole. We might not be unreasonable to state that they might have found the same relationships which were reported by Woodward, confirmed by Zwerman, and supported by Blau et al, if they had classified their sample into the three categories, i.e. unit and small batch; large batch and mass production; and process production, and related their structural variables to these three production technologies instead of to their defective measure of technology which they called workflow integration.

Nevertheless, this is not the whole story with regard to the studies which found no relationship between technology and organisational structure. This story will be completed, at least in the present study, with Mohr's study, which, from the researcher's point of view, did not find the relationship for different reasons from in the case of Hickson et al, and Blau et al. Mohr was one of the writers who accepted the theme based on the prior work, (e.g. Woodward, Perrow, Harvey, etc.), which suggests the influence of technology on structure. In the meantime he was convinced that "the status of evidence bearing on the technological imperative has not advanced significantly".⁽⁷³⁾ Consequently he conducted his study in order to define whether and in what directions research on organisational technology should continue.⁽⁷⁴⁾ So far so good. However the problem with such research as Mohr's study comes when he, as well as other researchers, expected to find a relationship between technology, whatever the conception of this technology, and structure, whatever the way of operationalising this structure. Mohr investigated the relationship between technology and structure in 144 work groups from 13 local health departments. These work groups "included groups of custodians, laboratory glass washers, dog catchers, clerks, sanitary inspectors, public health nurses, dentists, physicians, and many others."⁽⁷⁵⁾ Although he argued that his study "afforded an excellent opportunity to replicate Woodward's findings that social structure was very substantially determined by organisational technology",⁽⁷⁶⁾ however, this was not the case as will be seen later. First of all, it is apparent that Woodward's classification of production technologies is not applicable to these groups. Consequently, her perception of technology in terms of the

extent to which the work process is controllable and its results are predictable, is not applicable either. In Mohr's study, "technology was conceptualised in terms of the manageability of tasks and materials - essentially the predictability dimension considered at the individual job level - and further conceptualised in terms of uniformity, complexity, and analysability".⁽⁷⁷⁾ This is the first deviation from Woodward's study. In fact, Mohr's conceptualisation of technology might be closer, but not identical, to Perrow's conception. Mohr's deviation from Woodward's study will become clear when we understand that he perceived organisational structure in a different way from Woodward. For Mohr, organisational structure is operationalised in terms of participativeness "though participativeness is not the only salient aspect of social structure in organisation".⁽⁷⁸⁾ However, participativeness was the only aspect he considered in his study. On the one hand, this is not the way Woodward proceeded in defining organisational structure, e.g. number of levels of management hierarchy, span of control, etc. No doubt Mohr was aware of her approach since he referred to it as a "structure as measured by personal ratios and resource disposition".⁽⁷⁹⁾ On the other hand, many organisational students might not regard participativeness as a structural aspect in the first place.⁽⁸⁰⁾ The only justification, however, for this perception of organisational structure is that the reported research was "a part of a larger study designed to investigate the determination of the style of supervision in organisation, along the dimension running from autocratic to democratic or participative".⁽⁸¹⁾

He hypothesised that under rationality norms:

manageable	<u>requires</u> →	no participativeness	<u>results</u> →	Mechanistic
technology			in	structure
unmanageable	<u>requires</u> →	participativeness	<u>results</u> →	Organic
technology			in	structure

Despite the above methodological deviations, Mohr's study showed a relationship between technology and structure, which is "statistically significant, however it is too small to signal the existence of an important relationship between technology and social structure in organisations".⁽⁸²⁾

As can be noticed, there is a discrepancy between his results and Woodward's results regarding the relationship between technology and organisational structure. The reason for this discrepancy as he claimed, is that groups of organisations in Woodward's study. i.e. unit, mass and process production organisations, vary in important subdimensions of technology other than manageability.⁽⁸³⁾

That is to say, technology is a multidimensional concept not a unidimensional one in terms of manageability. To support this viewpoint he added two dimensions to manageability to comprise an organisational technology. These are 1) task interdependence, and 2) noise level. Given the fact that task interdependence might play a role in participativeness, one might wonder about the role the noise level is supposed to play regarding participativeness. It might be illogical to argue that a high level of noise might prevent participativeness when there is a need for it; also, that a low level of noise might encourage participativeness when there is no need for it; moreover, that the level of noise in both these cases can be a determinant of the organisational structure. What enhances our viewpoint that the above two additional

dimensions are not appropriate aspects of technology is that the correlations among the above three measures of technology, (i.e. manageability, interdependencies, and level of noise), were low. Statistically speaking, the low correlations indicate that "either his measures had doubtful construct validity or that his measures were unreliable".⁽⁸⁴⁾ Since Mohr was not able to demonstrate the logic, the validity or the reliability, of his measures of technology, he provided insufficient reason to doubt the relationship between technology and structure.⁽⁸⁵⁾ In summary, Mohr's study was not originally designed to investigate the relationship between organisational technology and structure. Therefore, the variables which were chosen were relevant to the original purpose of the study, but were not relevant for investigating organisational technology. One should not expect from a study such as Mohr's, to find a relationship between technology and structure just by rereating the original variables, i.e. reshuffling the deck, so to speak, or by renaming some variables as technology and others as structure.

In fact, a nonorganisational student, that is to say an accounting researcher, might be confused regarding the relationship between technology and organisational structure, as there are studies which assure this relationship and there are studies, though very few, which claim that there is no relationship. A final word for the purpose of the present study is needed to clarify this situation.

6.6 A FINAL WORD

The situation can better be described using Comstock and Scott's words as follows, "some of the confusion in research findings stem from the somewhat **misplaced creativity of researchers** who seem reluc-

tant to replicate definitions or measures. Thus, current measures of technology rest on different conceptions..... Even when similar variables have been used, such as formalisation or centralisation they are seldom operationalised to **maximise comparability**."⁽⁸⁶⁾

Gerwin has made the same point and he added that "differences between studies in the nature of the organisations sampled may also account for conflicting results".⁽⁸⁷⁾ Fry has also given this issue his

attention.⁽⁸⁸⁾ First he has reviewed the fifty empirical studies in the area of technology-structure relationship from Woodward's study through 1980. He found that four specific conceptions of technology have been used by empirical research:⁽⁸⁹⁾

1. Technical complexity, e.g. Woodward
2. Operations technology, e.g. Hickson et al
3. Routine-nonroutine, e.g. Perrow
4. Manageability of task and materials, e.g. Mohr

The major structural dimensions examined in relation to technology through the empirical research were as follows:⁽⁹⁰⁾

- a. Vertical and horizontal differentiation of structure.
- b. Formalisation
- c. Centralisation

Finally, Fry found that the relationship between technology and structure was examined across three different organisational levels:

- A. The whole organisation
- B. The workgroup or subunit
- C. The individual

The above three issues, i.e. conceptions of technology, structural dimensions, and level of analysis, resulted in 140 different technology-structure relationships as reported by the empirical

research. This variety of relationships might raise a question regarding their significance. Using a particular statistical technique he found that the least significant relationships were those, 1) where technology was conceptualised in terms of operations technology, i.e. Hickson et al's conception, 2) where the relationship between technology and structure was examined at the individual level, e.g. Mohr. The 55 remaining relationships comprise, "a population of technology-structure relationships that are consistent and independent of technology, and structure conception and the level of analysis."⁽⁹¹⁾ Thus the study showed that there is empirical support for the technology- structure relationship provided that:

1. The level of analysis is the subunit and/or the organisation as a whole.
2. The conception and measure(s) of technology are not the Aston group's conception, i.e. operation technology, and measure, i.e. workflow integration.⁽⁹²⁾

The remaining results of Fry's survey and statistical test for technology-structure relationship, (also of interest for the present research), have shown the following:

1. The consistent curvilinear results use the technical complexity conception, i.e. Woodward. Moreover, Fry's viewpoint based on the significance of the findings is that, "it may be fruitful to continue Woodward's approach in future research",⁽⁹³⁾ and in particular to find out the main differences in structure among technology types.

2. The relationship is empirically supported regardless of the fact that the operationalisation of technology and structure was

objective and/or perceptual.

3. Using the routine-nonroutine technology conception, i.e. Perrow, has produced remarkably consistent findings. Given the fact that Perrow's conception of technology was perceptual "it is surprising to find consistent findings for routine-nonroutine dimension".⁽⁹⁴⁾

On the accounting side, organisational technology has been considered in very few studies. We will follow the above approach and start with the studies which examined technology conceptually and then empirically. Waterhouse and Tiessen, in developing their contingency framework for management accounting research, argued that, "whether explicitly recognised or not, the efficient design of the management accounting system must recognise the effects of organisation variables".⁽⁹⁵⁾ They cited technology as one of these variables. They perceived technology in terms of "the routineness or nonroutineness of the conversion process for the organisation's raw materials",⁽⁹⁶⁾ which is a reflection of Perrow's conception of technology. They argued that the advantage of Perrow's conception is that it can be related directly to subunits within an organisation, i.e. responsibility centres. One of the implications of technology, as they perceived it was in relation to the creation of budgetary slack. With routine technology there can be specified procedures which can be predetermined: how inputs are to be acquired; the throughput of inputs; and how output is to be disposed. These clear specified procedures will allow the organisational goal to be divided into sub-goals and to be assigned to subunits with minimum conflict. As they argued, planning on the grounds of these specified procedures will be efficient because once specified, procedures predetermine

activities and sub-goals for a relatively long-time period.⁽⁹⁷⁾ Based on this they expect that budgeting slack can be eliminated for two reasons. On the one hand, the existence of these specified procedures will decrease the reliance placed on planning through the budgeting process. On the other hand, the planning process through procedure specification will exhibit a minimum input from lower organisational members, i.e. it will be nonparticipatory, and therefore will reduce bargaining. The opposite situation is expected in the case of nonroutine technology. Here lower managers in the managerial echelon have access to information which is not available to the top management. Consequently, top management will find it difficult to specify procedures. As a result this will open the door to the following; 1) the need for determining the sub-goals in a participatory way; and 2) the bargaining over sub-goals. This, of course, makes the establishment of nonconflicting and operational sub-goals for subunits more difficult. Since there will be no specific procedures, budgetary goal(s) and sub-goal(s) will be broader and less clearly specified, and this will give the opportunity for the creation of budgetary slack. This is valid whether budgetary slack arises unintentionally during the budgetary process; is consciously built into budgets by managers to serve their personal goals and to establish "attainable" performance criteria; or is created as a result of pressure and the use of budgeted profit as a main criterion in evaluating managerial performance.⁽⁹⁸⁾

In a similar vein, Hopper and Berry have considered that technology as a contingent factor has an influence on choosing a strategy of control within an organisation.⁽⁹⁹⁾ From the three meanings associated with technology, (operations, i.e. Hickson et

al ; materials, i.e. Mohr; and knowledge, i.e. Perrow), they stuck with Perrow's conception. They justified this by stating that "operations technology has probably not proved to be as closely associated with structure as one believed; materials technology has been subjected to little empirical testing; and knowledge technology has perhaps yielded the most consistent results".⁽¹⁰⁰⁾ The same conception of technology, i.e. Perrow's conception, was applied by Ginzberg in his contingency view of accounting and information systems.⁽¹⁰¹⁾ Conceptually, he proposed a relationship between technology and the use of accounting and information systems either as procedural systems or decisional systems. The former systems "enhance control over the tasks by reducing the discretion of the person(s) performing the task also increase control by broadening the application of standard operating procedures. (The latter) improve decision making in the organisation through the institutionalisation of decision models."⁽¹⁰²⁾ If subunits employ nonroutine technologies, the great number of exceptions, coupled with the need of analytical procedures, will increase the difficulty of solving these exceptions through plans, standard procedures and managerial hierarchy. In this situation, accounting and information systems, in order to be useful and successful, should be in terms of decisional systems and provide additional processing capacity to face these exceptions. In summary, "the accounting and information system is likely to be used for both coordination and control in sub-units facing non-routine technologies, but only for control in sub-units facing routine technologies."⁽¹⁰³⁾

As far as the literature survey has revealed, technology has empirically been a subject for investigation by two accounting

studies. Burns and Waterhouses's study is one of the earliest studies, if not the first study, which examined the impact of technology on the management control system, namely budgetary control.⁽¹⁰⁴⁾ They operationalised technology in terms of the workflow integration of the Aston group's research, i.e. Hickson et al. They proposed a positive relationship between technology and the complexity of the budgetary control system, and the level of perceived control. This relationship was proposed through organisational structure as an intervening variable. The latter was perceived in terms of structuring of activities, and concentration of authority, and where concentration of authority consists of two parts; centralisation, and lack of authority. Control system complexity and the level of perceived control will determine the budget-related behaviour defined as "the activities, actions, and interactions of managers with each other and their tasks that relate either directly or indirectly to budget systems".⁽¹⁰⁵⁾ In this study they used the questionnaire which was developed by the Aston group to operationalise technology and structure. They examined the above relationship through a cross-sectional sample of 25 manufacturing and service organisations. As far as the relationship between technology and structure is concerned, Burns and Waterhouse's study revealed two results that are contradictory to the Aston group's findings. First, they found a positive and strong relationship between technology and the structuring of activities. Second, the statistical significance of the negative correlation between workflow integration and lack of autonomy was low. This means that with more workflow integration decisions tend to be centralised. The finding of the Aston group, however, indicates that "because of increasing control resulting

directly from the workflow itself in an integrated technology, decisions tend to become more routine and can be decentralised".⁽¹⁰⁶⁾ The impact of technology on the budgetary control system was found to be positive through the structuring of activities as was hypothesised, but on the level of perceived control only. That is, technology was found to have no impact on the complexity of the budgetary control system.

The second empirical study was carried out by Merchant, who examined the interlocking between technology and the use of budgetary control and its effects on organisational performance.⁽¹⁰⁷⁾ Merchant perceived technology in terms of its routineness, (i.e. Perrow's conception), however it was measured, using the following two measures:

1. The Aston group's workflow integration to measure the degree of automation of the production process.

2. A measure of the degree of product standardisation which was adapted from Thompson's typology of technology.

Merchant also distinguished between two types of production systems; 1) assembly and mass production, which for him represented routine and repetitive technology coupled with a high degree of product standardisation, and 2) custom technology which illustrates the case of nonroutine, nonrepetitive technology with a low degree of product standardisation. On the level of production departments he hypothesised that "departments with productive technologies that are relatively routine and repetitive tend to place greater emphasis on formal budgeting".⁽¹⁰⁸⁾ This emphasis was supposed to be displayed through two budgeting variables; 1) the importance which is placed on meeting budgets; and 2) the communication between a manager and his

superior on the one hand, and between him and subordinates on the other, with respect to issues of preparing the budget, deciding how to achieve it, and analysing variances. This communication will be more formal through standardised information flow rather than through interpersonal interactions.⁽¹⁰⁹⁾

The above hypothetical relationships were tested in nineteen organisations in the electronic industry. As he argued, in this industry the production technologies can range from routine, i.e. mass-produced items, to nonroutine, i.e. custom-made items.⁽¹¹⁰⁾ The hypothesis was partially supported.

First, there was no relationship between product standardisation and the two budgetary variables identified above. Second, there was a positive significant relationship between the degree of automation and the importance of meeting a budget and the formality of communication. However, the significance of this communication was found to be greater if the communication was with subordinates rather than with superiors.⁽¹¹¹⁾

For examining the fitness between technology and budget in relation to organisational performance, he classified the departments of the nineteen organisations into two subsamples, of high and low performing departments, based on a subjective criterion of performance, i.e. each manager was asked to rate his department on a scale ranging from well below average to well above average.⁽¹¹²⁾

Despite the fact that the measure of performance is very crude, the result was encouraging and showed that with the departments where the expected relationship between technology and budgeting variables existed, "the self-ratings of performance tended to be higher than in departments where they did not".⁽¹¹³⁾

So far, we have in this chapter examined the issue of

organisational technology through the organisational literature in the first place, and then in the accounting literature. If this section has achieved its purpose, then the following two points should have been evident:

First: that studying RAS in its organisational context cannot overlook technology as an influential variable.

Second: that Perrow's conception of technology, compared to others, is the one which has; 1) a theoretical basis, 2) a valid construct; 3) empirical support; and 4) a wide acceptance from organisational and accounting writers. In the light of the above it would appear to be justifiable and acceptable to use Perrow's conception in our perspective on RAS.

Technology is one of the three contextual variables we have to consider in our study of RAS. In the next chapter we will examine environment in more detail, as we have done with technology, in order to decide what account to take of it in our perspective on RAS.

FOOTNOTES

1. Perrow, Charles, "Complex Organisations: A Critical Essay", Scott, Foresman and Co., Illinois, USA (sec.ed.) 1979.
2. Dubin, Robert, "Working Union-Management Relations, The Sociology of Industrial Relations", Prentice Hall, Englewood Cliffs, N.J., 1959 as cited in Woodward, J. "Industrial Organisation: Theory and Practice", Oxford University Press, London, 1970.
3. Harvey, Edward, "Technology and Structure of Organisations", American Sociological Review, Vol.33, 1968, P.247.
4. Perrow, Charles, "A Framework for the Comparative Analysis of Organisations", American Sociological Review, Vol.32, 1967, P.194
5. Comstock, Donald E. and W. Richard Scott, "Technology and the Structure of Subunits: Distinguishing Individual and Workgroup Effects", Administrative Science Quarterly, Vol.22, 1977, P.180
6. Thompson, James D., "Organisations in Action", McGraw-Hill Book Co., N.Y., 1967.
7. Ibid., P.16.
8. Ibid., P.17.
9. Ibid., P.17.
10. Ibid., P.18.
11. Ibid., P.18.
12. Ibid., P.18.
13. Perrow, "A Framework for the Comparative Analysis of Organisations", op. cit.
14. Ibid., P.196.
15. Ibid., P.196.
16. Ibid.
17. Ibid., P.195.
18. Ibid., P.197.
19. Ibid., P.197.
20. Ibid., P.197.

21. Hunt, Raymond, G., "Technology and Organisation", Academy of Management Journal, Vol.13, 1970, P.246.
22. Perrow, Charles, "A Framework for the Comparative Analysis of Organisations", op. cit., P.207.
23. Ibid., pp203-204
24. Zwerman, William L., "New Perspectives on Organisation Theory", Greenwood Publishing Co., Connecticut, 1970.
25. Ibid. Essex sample consisted of 100 firms, (19% of all the firms in the area) vs. 55 firms in Minneapolis' sample (from approximately 2400 firm in the metropolitan area of Minneapolis and St. Paul). Also in Essex' sample the firms were more homogeneous with respect to both age and type of industry. In Essex' study the information was collected by a team of experienced researchers vs. student assistants in Minneapolis' study. Also data was gathered within a long period in Essex's study in comparison to Minneapolis' study where data was gathered within two months. Finally, there were differences in the statistical techniques used, that is median values for the various frequency distributions in Essex' study whereas Minneapolis' study relied primarily upon the presentation of the raw data in standardised form, percentages, with accompanying median values when these are appropriate.
26. Ibid. The relationship between ownership and management represents one aspect of the extension which Zwerman has proposed to Woodward's study and to be regarded as an independent variable in addition to technology and size of labour force.
27. Ibid. This relationship was found between technology and the following; span of control of chief executive; the ratio of managers and supervisor to nonsupervisory personnel; number of levels of management hierarchy. However, he found no relationship technology and span of control of first-line supervisors.
28. Ibid., P.143
29. Harvey, op cit.
30. Ibid., P.249
31. Ibid., P.254
32. Ibid., P.254 In addition to these findings, Harvey, similar to Woodward and Zwerman, found no relationship between size and organisational structure, or between technology and size.
33. Khandwalla, P.N., "Mass Output Orientation of Operation Technology and Organisational Structure", Administrative Science Quarterly, Vol. 19, 1974.

34. Ibid.
35. Ibid. In addition to that Khandwalla's study has shown that:
 1. There is no relationship between size and technology which supports the findings of Woodward and Harvey and contradicts that of Hickson et al.
 2. Controlling size did not significantly alter the relationships between technology and dimensions of organisational structure contrary to the general conclusions of Hickson et al.
36. Keller, R.T., "Dimensions of Management Systems and Performance in Continuous-Process Organisations", in D.Katz, R.L.Kahn, and J.S. Adams (eds), "Study of Organisations", Jossey-Bass Publishers, San Francisco, 1980.
37. Ibid., P.122
38. Lynch, Beverly P., "An Empirical Assessment of Perrow's Technology Construct", Administrative Science Quarterly, Vol.19, 1974.
39. Ibid.
40. Ibid.
41. Overton, Peggy, Rodney Schneck and C.B. Hazlett, "An Empirical Study of the Technology of Nursing Subunits", Administrative Science Quarterly, Vol. 22, 1977.
42. Ibid. The following kinds of nursing subunits were included in the study; pediatric, obstetrical; postpartum; rehabilitation; intensive care; general and specialised; auxiliary; acute psychiatric; and general surgical.
43. Leatt, P. and R. Schneck, "Technology, Size, Environment and Structure in Nursing Subunits", Organisation Studies, Vol. 3, No. 2, 1982.
44. Ibid. This study can also be used to indicate the relative importance of technology over size. Though they found a relationship between size and structure, however, this was only with respect to two of the three structural dimensions; that is role specificity and decentralisation.
45. Hickson, D.J., D.S. Pugh and D.C. Pheysey, "Operations Technology and Organisation Structure: An Empirical Reappraisal", Administrative Science Quarterly, Vol.14, 1969. This is another study of a series which are known as Aston Group Research and we have referred to them in chapter 5.
46. Ibid.
47. Ibid., P.380. Emphasis as in the original.

48. Ibid., P.380
49. Ibid.
50. Ibid., P.384
51. This multiplicity of automation was the reason why Woodward did not include it into the technical variables which were identified in her study. She explained this as follows, "automation though a convenient term, is difficult to define because it has several different meanings in popular usage.... (and) three different streams of technical progress (can be) implied by the term: the expansion of mechanisation by transfer devices; techniques of automatic control over manufacturing processes; and processing of technical and business information by electronic digital computers", Woodward, J., op. cit., P.12.
52. Hickson et al, op. cit.
53. Mohr, L.B., "Organisational Technology and Organisational Structure", Administrative Science Quarterly, Vol.16, 1972
54. Hickson et al, op. cit., P.388. Emphasis as in the original.
55. Ibid., P.389
56. Woodward, op. cit.
57. Hickson et al, op. cit., pp389-390
58. Ibid., P.390
59. Ibid., P.391. Emphasis added. In fact there were major differences between their sample and Woodward's sample. First their sample "left three categories (of Woodward's categories) vacant and had a high proportion of organisations in the batch production categories in the middle of the continuum due to the prominence of engineering industry in the region. (Second), there were also variations in the sample size 31 to 80", P.391. If we took these differences in mind, then we might appreciate that the difference between their scale of production continuity and Woodward's classification of production technology is major rather than slight.
60. Ibid.
61. Ibid., P.394
62. Ibid., P.395. Emphasis as in the original.
63. Child, John, "Organisation Structure and Strategies of Control: A Replication of Aston Study", Administrative Science Quarterly, Vol. 17, 1972.

64. Child, John and Roger Mansfield, "Technology, Size and Organisational Structure", *Sociology*, Vol.6, 1972.
65. Badran, M. and B. Hinings, "Strategies of Administrative Control and Contextual Constraints in a Less-Developed Country: The Case of Egyptian Public Enterprise", *Organisation Studies*, Vol.2, No.1, 1981.
66. Ayoubi, A.M., "Technology, Size and Organisation Structure in the Industry of a Developing Country: Jordan," Ph.D. Dissertation, Indiana University, 1975.
67. Blau, P.M., C.M. Fable, W. McKinley and P.K. Tracy, "Technology and Organisation in Manufacturing", in D. Katz, R.L. Kahn and J.S. Adams (eds.). op. cit.
68. Ibid.
69. Ibid.
70. Ibid., P.18. In this respect they found that size exerts a considerable influence on the structural variables and therefore they confirmed Hickson et al's finding in a sense that "the structure of factories like that of other organisations depends greatly on their size", P.20.
71. See Section 6-4.
72. Blau et al, op. cit.
73. Mohr, op. cit., P.447.
74. Ibid., P.444.
75. Ibid., P.448.
76. Ibid., P.448.
77. Ibid., P.448.
78. Ibid., P.448.
79. Ibid., P.448.
80. For example, Khandwalla has distinguished between people-oriented attempts and structural attempts for reducing uncertainty. Within the former he regarded participativeness as one of these attempts within the latter he considered vertical integration, matrix organisation, divisionalisation, etc. See Khandwalla, P.N., "Environment and its Impact on the Organisation", *International Studies of Management and Organisation*, Fall, 1972.
81. Mohr, op. cit., P.448

82. Ibid., P.449.
83. Ibid.
84. Lynch, op. cit., P.340
85. Ibid.
86. Comstock and Scott, op. cit., pp177-178. Emphasis added.
87. Gerwin, Donald, "Relationships Between Structure and Technology at the Organisational and Job Levels", Journal of Management Studies, Vol.16, February, 1979.
88. Fry, Louis W., "Technology-Structure Research: The Critical Issues", Academy of Management Journal, Vol.25, No.3, 1982.
89. Ibid.
90. Ibid.
91. Ibid., P.542.
92. Ibid. The same result was reported by Gerwin who found that the correlations between technology and structure were low only when Aston Group's conception of technology was applied on the organisational level. Gerwin, op. cit.
93. Fry, op. cit., P.547.
94. Ibid., P.548. Gerwin has also noticed that the studies which applied Perrow's conception of technology and have had similar sample characteristics, e.g. U.S. health related institutions, have produced similar results regarding the relationship between technology and structure, and which, in turn, enhances the reliability on Perrow's conception. See Gerwin, op. cit.
95. Waterhouse, J.H. and P. Tiessen, "A Contingency Framework for Management Accounting System Research", in Robert H. Chenhall, Graeme L. Harrison and David J.H. Watson, "The Organisational Context of Management Accounting", Pitman Publishing Inc., Massachusetts, 1981.
96. Ibid., P.102
97. Ibid., P.108
98. Ibid.
99. Hopper, Trevor M. and Anthony J. Berry, "Organisational Design and Management Control", in Tony Lowe and John L.J. Machin (eds.) "New Perspectives in Management Control", Macmillan Press Ltd., London, 1983.
100. Ibid., P.104

101. Ginzberg, Michael, J., "An Organisational Contingencies View of Accounting and Information Systems Implementation", Accounting, Organisations, and Society, Vol.5, No.4, 1980.
102. Ibid., P.372.
103. Ibid., P.376.
104. Burns, William J. Jr., and John H. Waterhouse, "Budgetary Control and Organisation Structure", in Robert H. Chenhall, Graeme L. Harrison and David J. H. Watson (eds.), op. cit.
105. Ibid., P.118
106. Pugh, D.S., D.J. Hickson, C.R. Hingins and C. Turner, "The Context of Organisation Structure", Administrative Science Quarterly, Vol.14, 1969, P.103
107. Merchant, Kenneth A., "Influences on Departmental Budgeting: An Empirical Examination of Contingency Model," Accounting, Organisations and Society, Vol.9, No.3/4, 1984.
108. Ibid., P.294.
109. Ibid., P.297.
110. Ibid.
111. Ibid.
112. Ibid.
113. Ibid., P.305

CHAPTER 7 ENVIRONMENT: MORE INSIGHTS

7.1 GENERAL

7.2 ENVIRONMENT: A REVISIT

7.3 ENVIRONMENTAL UNCERTAINTY

7.4 KINDS OF ENVIRONMENTS

7.5 FORMS OF RELATIONSHIPS

7.6 ENVIRONMENTAL STUDIES: A REVIEW

7.1 GENERAL

Considering the influence of environment on an organisation or subunit shifts the framework of analysis from the closed system viewpoint to the open system viewpoint. Environment, as with technology, has been overlooked by the classicists. Also, as with technology, its importance has been recognised by modern organisational theorists. Some of the organisational students give environment considerable weight compared to other contingent variables. For example, Mintzberg pointed out the relative importance of environment by stating that, "the environmental variables can have a profound effect on structure, often overriding those of age, size, and technical system".⁽¹⁾ Perrow, though one of the proponents of the technological imperative, has said that, "task, or technology prove to be important variables, but not the overriding importance we first claimed for them. The new wave-gathering force appears to be the environment".⁽²⁾ However, as we have no empirical evidence to support the above viewpoints, and as far as the chosen contingent variables of this study are concerned, it might be safe if these variables, (i.e. technology, environment, and interdependencies), are given an equal weight.

Burns and Stalker were the first organisational theorists to point out the influence of environment on organisational and management structures. Their study was followed by another pioneer study by Lawrence and Lorsch. Both studies were presented in the previous chapter. Following these two studies, organisational theorists have been interested in: prescribing the characteristics of environment; examining the relation between an organisation/subunit and its environment; identifying types or kinds of environment; etc.

These issues will be discussed in this chapter, and in doing so we will be interested in the environment from an organisational point of view. In other words, our approach in examining environment can be described using Mintzberg's words as follows, "we are not interested in the environment as an independent entity, but in its specific impact on the organisation. In other words, it is not the environment per se that counts but the organisation's ability to cope with it - to predict it - comprehend it, deal with its diversity, and respond quickly to it."⁽³⁾

7.2 ENVIRONMENT: A REVISIT

Most writers have defined environment in terms of physical dimensions.⁽⁴⁾ However, writers vary with regard to whether environment is what is external to an organisation, or what is external as well as internal to it. In the next paragraphs, we will present some of these definitions. One point, however, needs to be clarified before we start this review. Environment, in its generic sense, might cover everything on this earth, i.e. physical as well as nonphysical components. However, for the purpose of studying organisations, this generic sense will be narrowed to reflect, "the general cultural context of a specified geographical area and contains those forces recognised to have important influences on organisational characteristics and output", ⁽⁵⁾ e.g. economic, educational, legal-political, and social-cultural components. From all these environmental components, however, we are interested in that part of the environment which is relevant to goal setting and goal attainment for some focal organisation.⁽⁶⁾ This part can be called substantial environment, immediate environment, task

environment, or in general, an organisation's environment. The latter term will be used in this study.

Ewusi-Mensah has conceptualised environment as "consisting of all factors external to the organisation, a change in which may produce a change in the state of the organisation".⁽⁷⁾ Thus one condition for a factor to be within an organisation's environment is that there should be a relationship between this environmental factor and an organisation. Also, taking an external perspective but a more specific one, Pennings defined environment as "the organisation's source of inputs and sink of outputs, that is, the set of persons, groups, and organisations with which the focal organisation has exchange relations".⁽⁸⁾ Rice, on the other hand, has extended the conception of environment to include the external as well as internal physical factors of an organisation. For him, organisations can be described by their internal and external environments and the transactions across the boundaries between what is inside and what is outside.⁽⁹⁾ Duncan, however, has criticised the above and similar definitions and argued that the shortcomings of prior research on an organisation's environment was due to "the failure clearly to conceptualise organisation environment or the elements comprising it".⁽¹⁰⁾ In an attempt to cover this gap, he defines an organisation's environment "as the totality of physical and social factors that are taken directly into consideration in the decision-making behaviour of individuals in the organisation".⁽¹¹⁾ This totality of physical and social factors is classified into internal organisational environment and external organisational environment as follows:⁽¹²⁾

Internal Environment

1. Organisational personnel component
2. Organisational functional and staff unit component
3. Organisational level component

External Environment

4. Customer component
5. Supplier component
6. Competitor component
7. Socio-political component
8. Technological component

Three points can be made regarding this list. First, though Duncan has included the technological component within the external environment, the prevailing viewpoint is that it should not be included. That is to say that technology and environment are independent variables. Second, the above list can be seen as an inclusive list of environmental factors; therefore, no organisation or subunit is expected to identify all the components in its particular internal and/or external environment.⁽¹³⁾ Third, the relative importance of the above components will vary between organisations as well as between organisational subunits. For example, the customer/client component might have more influence in a manufacturing organisation than in a governmental agency. Also the internal environment might take much attention from the production manager in comparison with the external environment, and vice versa with respect to the marketing manager. Taking the above three points into consideration, Duncan's definition and list will be used throughout this study to reflect our viewpoint regarding an organisation's environment.

In the light of the above definitions and components of an environment, we might conclude that environment is not a recent phenomenon which did not exist in the classicist's days. Thus the question which might come to mind is, in what way or sense have the classicists overlooked the environment? Also in what way have the

modern organisation theorists recognised it? In other words what does emerge from today's organisational environment which was not faced by organisations in the past? The answer to these questions is environmental uncertainty.

7.3 ENVIRONMENTAL UNCERTAINTY

In the classical organisation theory, this issue has not been examined. On the one hand, as we argued in the third chapter, external environment was very stable and this allowed the classicists to remove it from their framework of analysis, and to adopt a closed system viewpoint. On the other hand, as we have shown, the classicists concentrated on the internal organisation, i.e. in terms of the shopfloor, management structure, and organisational structure. On the other hand, from Duncan's classification we can see that internal environment comprises components internal to an organisation. The environmental uncertainty will be produced from the interactions and interrelationships between these components. Following the classical organisation theory, (i.e. scientific management, classical theory of management, and bureaucracy), will lead to the one best way to organise or structure these interactions and interrelationships and this in turn should eliminate the internal environmental uncertainty. In fact, the twofold assumption identified above has been found to be inappropriate in almost all current practice.⁽¹⁴⁾ Given the invalidity of this assumption, contemporary organisational theorists have been interested in investigating the issue of environmental uncertainty in order to identify the causes behind this phenomenon. Lawrence and Lorsch, for example, have argued that environmental uncertainty is a product of

three reasons:⁽¹⁵⁾

1. The clarity of information.
2. Uncertainty of causal relationship.
3. The long time span of definitive feedback.

On the other hand, Duncan, after reviewing the concept of uncertainty in information and decision theories, has considered the following as components of environmental uncertainty:

"1. the lack of information regarding the environmental factors associated with a given decision making situation,

2. not knowing the outcomes of a specific decision in terms of how much the organisation would lose if the decision were incorrect, and

3. inability to assign probabilities with any degree of confidence with regard to how environmental factors are going to affect the success or failure of the decision unit in performing its function".⁽¹⁶⁾

Finally, Khandwalla has viewed environmental uncertainty as embracing several related phenomena:⁽¹⁷⁾

1. uncertainty about the future
2. uncertainty about the causes or consequences of events, and
3. uncertainty about what responses to make to events.

Despite the differences between the above writers in wording the three aspects of environmental uncertainty, it is not difficult to appreciate that there is some agreement between them. This can be noticed with respect to the first two causes of environmental uncertainty. Nevertheless, what would appear to differ are the third reason of Lawrence and Lorsch, and Duncan's third component.

However, the following discussion should show that they are not

entirely different. For most of the decisions taken in the today's organisations, there is a time lag between taking the decision(s) and receiving the result(s), in terms of definitive feedback. When the time lag is short then the changes in the environmental factors will be little. Given that the decision is well prepared, then the probability of the impact of the environmental factors on the success or failure of a decision can be assigned with much accuracy. This accuracy will be less when the time lag is longer. In such a case, the changes in the environmental factors can be substantial and this has a significant impact on the success or failure of the decision(s). Nevertheless, it might be better to use the phrase "time span" or "time lag" in conceptualising this third aspect of environmental uncertainty than to use the phrase "probability assignment".

Galbraith, in fact, recognised and directed attention to the association between uncertainty and information. That is, the greater the uncertainty of environment, the greater the amount of information needed. In that sense, "uncertainty is defined as the difference between the amount of information required to perform the task and the amount of information already possessed by the organisation." (18) Mathematically we can perceive the amount of information needed to perform as task as follows:

$$I = f(D, R, G)$$

where: I = the amount of information

D = the diversity of the outputs

R = the number of different input resources, and

G = the level of goal difficulty.

Following the above discussion, in this study the environmental

uncertainty will be regarded as a reflection of the following:

1. Not knowing the causes or consequences of future events; in other words the lack of clarity of information about future events.
2. Not knowing the outcomes of a specific decision in terms of how much the organisation would lose if the decision were incorrect.
3. The existence of a time lag between taking a decision and receiving a definitive feedback about its results.

Although the three causes are stated on the macro level, (i.e. the organisation), they are nevertheless applicable on the micro level, (i.e. the organisational subunit).

Given the fact that environment is a source of uncertainty, the degree of this uncertainty varies from one environmental state to another. That is to say, there is no one degree of environmental uncertainty, rather there are different degrees. The organisational writers have attempted to reflect this by forming a texture of environments, by classifying environments into static/dynamic, simple/complex, etc. These different types of environment will be the subject of the next section.

7.4 KINDS OF ENVIRONMENTS

7.4.1 TEXTURE OF ENVIRONMENTS

Emery and Trist have applied an evolutionary perspective and have argued that environment has evolved through four steps.⁽¹⁹⁾ Each of these represents a type of environment, and the four types are viewed as a texture of organisational environments. They perceived environment as consisting of elements, some of which are good and others are bad. In general, they argued that for organisational survival and goal achievement, an organisation will

move to the environmental area(s) where good elements exist and avoid the area(s) where there are bad elements.

The first type of environment they called a placid, randomised environment. This kind of environment can be viewed as the classical situation of pure competition, i.e. the classical market. In this environment there are many buyers as well as competitors. In this situation, as can be expected, an organisation will find enough buyers to absorb its products and nothing the organisation does will affect the market. Emery and Trist are arguing that within this environment, "goals and noxiants ('goods' and 'bads') are relatively unchanging in themselves and randomly distributed".⁽²⁰⁾ Two consequences can be stated in relation to this type of environment. First, "because the environment is placid, change occurs relatively slowly, and the element of uncertainty is reduced, (and second) because of the random nature of the environment, it does no good for the organisation to make strategic plans".⁽²¹⁾ Though we have stated that in general an organisation will seek area(s) where there are buyers, (i.e. good elements), and avoid the area(s) where there are competitors, (i.e. bad elements), the random nature of this environment prevents the achievement of this strategy. This is because the random distribution of good elements, for example, will make it difficult to know when and where two, three or, in fact, any number of good elements have been grouped together in order to make long-term plans to move towards an area where there are good elements, i.e. the buyers. Rather the organisation has to adapt to local conditions and make short-term decisions. Under these conditions an organisation can be quite small and survive as long as it can show adaptive behaviour in the face of local conditions. However, this

becomes progressively more difficult under the other types of environments.⁽²²⁾

Since there are distortions in the classical market mechanisms and imperfect competition "the goals and noxiants are not randomly distributed but hang together in certain ways";⁽²³⁾ however, they are still placid. Thus the environment was described as a placid, clustered environment. With this new environmental attitude, i.e. the clustered one, the organisation has to avoid the bad areas and seek the good ones. Moreover, in this environment, as Bobbit et al have argued, "not only does staying in the good areas help in goal achievement, but getting into bad areas can result in the organisation's not surviving."⁽²⁴⁾ The information regarding the clusters becomes available, as a result of the nonrandom distribution, and this assists the organisation to utilise long-range planning on how it will move through the environment to find good areas and avoid the bad areas. Based on this, Emery and Trist stated that "survival becomes critically linked with what an organisation knows of its environment."⁽²⁵⁾ In this environment the organisation's objective is not merely to adapt to local conditions, rather, its objective is that of "optimal location".⁽²⁶⁾ That is, the location which will not lead the organisation to miss key opportunities (clusters of good elements) nor lead it to stumble into disaster (clusters of bad elements).⁽²⁷⁾ On the other hand, and structurally speaking, organisations tend to grow in size, to become hierarchical, and take on centralised control and coordination.⁽²⁸⁾ As Terreberry argued, "this environment is characterised by two things:

- 1) the environment is itself not formally organised, (e.g. through

legislation and public regulation), and 2) transactions are largely initiated and controlled by the organisation."⁽²⁹⁾ From the above description she believed that this environment was the one which prevailed among the earliest formal organisations in the USA, i.e. in agriculture, mining, retail trade and construction.⁽³⁰⁾

The third type of environment evolved with the emergence of a number of similar organisations which could exert influence over their environment and other organisations. Emery and Trist named this environment as a distributed-reactive environment, and it can be represented by an oligopolistic market. In the previous environment, if there is more than one organisation of the same kind, then the existence of a number of similar organisations becomes the dominant characteristic of this environment. With this similarity then the part of the environment to which an organisation wishes to move or avoid is also the same part to which others seek to move or avoid. This in turn indicates that an organisation can improve its own chances only by hindering others. Moreover, every organisation knows that each of the other similar organisations will do this. With these characteristics of environment, long-range planning will be practiced, taking into consideration the following:⁽³¹⁾

1. Not only must the actions of the other similar organisations be considered, but their planned action must also be anticipated so that countermoves may be made.

2. An organisation has not only to make sequential choices, but must also choose actions that will draw off the other organisations.

3. An organisation's objective will not be conceived in terms of finding an optimal location, i.e. as in the placid, clustered environment, so much as in terms of acquiring capacity or power to

move more or less at will, i.e. to be able to make and meet competitive challenges.

As one would expect, uncertainty will be higher in this environment for two reasons. First, the time span of planning in this environment will be longer than in the previous, placid, clustered environment, and "as the time span of the plan increases, the level of uncertainty in the plan generally will also increase".⁽³²⁾ Second, uncertainty will also increase as a result of the interactive effects in this environment which did not exist in the previous one. With these differences in the environmental characteristics and, therefore, the level of uncertainty, organisational flexibility in terms of decentralisation will be required and this represents the structural modification.⁽³³⁾

The fourth and final type of environment is what they called turbulent environment. This is the environment which is encountered by most of today's organisations. It has no economic analogy as in the previous types. In the turbulent environment, according to Terreberry, "the accelerating rate and complexity of interactive effects exceeds the component systems' capacities for prediction and, hence, control of the compounding consequences of their actions."⁽³⁴⁾ The following trends are said to contribute to the emergence of this environment:

1. Organisations have become "so large that their actions are both persistent and strong enough to induce autochthonous processes in the environment".⁽³⁵⁾

2. There is government intervention in the economic market place, and the formation of public pressure groups.⁽³⁶⁾ The implication is that organisations become increasingly less

autonomous. (37)

3. There is an increasing reliance on research and development to achieve the capacity to meet competitive challenge. One aspect of this research and development is that new technology and products created by that technology are being introduced daily and this leads to a situation in which a change gradient is continuously present in the environmental field. (38)

In the turbulent environment uncertainty is the dominant characteristic. As Emery and Trist have put it, "the dynamic properties arise not simply from the interaction of the component organisations, but also from the field itself. The 'ground' is in motion". (39) When uncertainty becomes dominant then the consequences are as follows:

"1) there will be a shift in decision models from algorithmic towards heuristic problem-solving models; 2) optimising models give way to satisfying models; and 3) rational decision making is replaced by disjointed incrementalism". (40)

To summarise, Emery and Trist have proposed a texture of organisational environments which reflect an evolutionary perspective. From the above analysis, Emery and Trist's intention was to show that "not only does complexity, per se, increase as one moves from one level to another (i.e. from one type of environment to another), but more importantly, the potential effect of the environment on the organisation increases". (41) On the other hand, though it might not be extreme to argue that the environment of most of today's organisations has become turbulent, the most accepted viewpoint is that the real environment of organisations is often a mixture of the above four ideal types of environments, whose relative

weights will vary from one organisation's environment to another. (42)

7.4.2 Static/Dynamic Environments

Some writers refer to the different degrees of environmental uncertainty in terms of the static (stable)-dynamic (shifting) continuum of the environment. Dill was, presumably, the first organisational theorist who directed attention to the relationship between the degree of uncertainty and the changes in the environmental components of an organisation. (43) From his investigation of the environment of two Norwegian companies, he found that Alpha's environment had changed very little in a fifty year period. On the other hand, he found that Beta's environment had been subject to continuous change during the same period. These changes covered virtually all of the components of Beta's environment, e.g. Beta's products, production processes and equipment, consumers, etc. These continuous changes resulted in an environment which was different from the one which existed when Beta was founded fifty years earlier. Dill intentionally reported the changes in Alpha's and Beta's environmental components to demonstrate that these changes undoubtedly reflected more day-to-day fluctuations for Beta than for Alpha. As a result, this increased the degree of uncertainty which Beta was facing compared to Alpha. Considering Alpha's environment as static, Beta's environment would be dynamic.

— This environmental dimension has been subject to further elaboration. For example, Ewusi-Mensah broadly located Emery and Trist's four environments, identified above along this dimension as follows: (44)

Static	Dynamic
placid, randomised environment	Distributive, reactive, environment
placid, clustered environment	Turbulent environment

On the other hand, Duncan argued that the static/dynamic dimension is composed of two subdimensions:⁽⁴⁵⁾

1. the degree to which the factors identified by the decision maker in the environment are stable, and
2. the frequency with which the decision maker takes into consideration new and different factors in the decision making process.

The following are said to be the conditions of a static environment:⁽⁴⁶⁾

1. The organisation produces a single product, though it can be produced in a variety of styles, e.g. shoes, transformers, etc.
2. The product's demand is not only stable but there are steady increases, i.e. it is tied to population growth. This stability can be noticed, for example, from the reliance on historical data, i.e. the sales of the previous twelve months, for sales forecasting.
3. There is one single customer to whom the organisation sells its products.
4. The industry enjoys perfect competition due to ease of entry.
5. There is no competition in product price.
6. Organisations are regulated closely by legislation and governmental regulations.

It can be argued that the absence of one or more of these conditions will move the environment from the static state towards the dynamic state. Consequently, the degree of uncertainty will increase as we

move towards the dynamic end of this dimension.

7.4.3 Simple/Complex Environments

This is the second dimension which is also used in the organisational literature to indicate the level of environmental uncertainty. This dimension has also been proposed by Dill following his study of the two Norwegian companies.⁽⁴⁷⁾ With respect to this new environmental dimension, Dill was interested to find out whether the components which constitute an organisation's environment are few or numerous. Related to this is the question of whether these components are homogeneous or heterogeneous. Dill found that Alpha's environment consisted of few customers who purchased all the company's products twice a year and almost at the same time. The company was dealing with one union, and its market was the domestic market. This was in stark contrast to Beta's environment which consisted of a variety of quite different markets, three different unions, and suppliers from different parts of the world. Naturally, with these differences in the components, not only with respect to the number of components, i.e. one union vs. three unions, but also with respect to their homogeneity, we might expect Beta's environment to be characterised by a high degree of uncertainty compared to Alpha's environment. As Khandwalla has pointed out, the significance of this dimension is to illustrate the fact that each of the environmental component's segments, to some extent needs to be managed in a way different from the ways in which the other segments of the same component might be managed, e.g. children vs. women vs. men, also pre-teenagers vs. teenagers.⁽⁴⁸⁾ Mintzberg, on the other hand and following Galbraith, described the dimension in terms of the knowledge or information required to perform an objective, for

example, manufacturing folding boxes vs. sending a space ship.⁽⁴⁹⁾ In the former case, the manufacturer needs simple knowledge, whereas in the latter the space agency must utilize knowledge from the most advanced scientific disciplines to produce extremely complex output. As he puts it, "an environment is complex to the extent that it requires the organisation to have a great deal of sophisticated knowledge about products, customers, or whatever. It becomes simple, however, when that knowledge can be rationalised, that is broken down into easily comprehended components."⁽⁵⁰⁾

The above two dimensions have been combined by Thompson to form a matrix of environments as follows:

Simple/ Static (1)	Complex/ Static (2)
Simple/ Dynamic (3)	Complex/ Dynamic (4)

As the matrix implies, these different environments produce different degrees of uncertainty. However, Thompson has not specified these degrees. Rather, he was interested in explaining that these different degrees of uncertainty would be encountered by different organisational structures. This issue has been elaborated on by Duncan in his investigation into the managerial perception of environmental uncertainty. He suggests that organisational subunit managers operating in an environment similar to:⁽⁵¹⁾

1. Cell 1, will perceive low uncertainty.
2. Cell 2, will perceive moderately low uncertainty.

3. Cell 3, will perceive moderately high uncertainty.

4. Cell 4, will perceive high uncertainty.

If environmental uncertainty represents one side of the coin, then environmental predictability and/or controllability represent the other side. That is, where the environment is characterised by a high degree of uncertainty, then the ability of a manager to predict it and therefore to control it will be low. This notion can be explained in relation to costs and revenues as follows.

Static/simple Environment		Dynamic/Complex Environment			
Low Uncertainty		Moderate Uncertainty		High Uncertainty	
Predictable		Partially Predictable		Unpredictable	
Controllable costs and revenues		Controllable costs and revenues	Uncontrollable costs and revenues	Control-lable costs and revenues	Uncontroll-able costs and revenues

Ewusi-Menhas gives two reasons for decreasing the predictability of, and the controllability over, an environment:⁽⁵²⁾

1. that the underlying mechanisms in the environment may not be properly understood, and,

2. that certain critical parameters associated with these mechanisms may be known only approximately or partially.

Taking the arguments of Emery and Trist, and Terreberry regarding the tendency of an environment to be more and more turbulent, then the proportion of controllable costs and revenues will decrease more and more. However, it is difficult to accept that ultimately all costs

and revenues will be uncontrollable. On the other hand, applying the classicists' viewpoint, which assumes that an organisation's environment is characterised by its certainty and therefore all costs and revenues tend to be controllable, is also difficult to accept. The most reasonable viewpoint is that an organisation should behave in such a way as to move its environment from the unpredictable area toward the predictable area for the purpose of increasing the proportion of controllable costs and revenues. The continuous action reaction between organisation and its environment will result in a continuous shift of costs and revenues between the controllable and uncontrollable categories. This in turn implies that there is no universal classification of cost and revenue items, but different classifications for different organisations operating in different environments. The related issue to environmental uncertainty is the actions or courses of behaviour an organisation might take to deal with environmental uncertainty. This will be dealt with in the next section. We will complete the present section with the following two points:

1. Although the above two dimensions, i.e. static/dynamic and simple/complex, and the two typologies of environments described by Emery and Trist, and by Thompson, are the most accepted ones in the organisational literature, there are other environmental dimensions and typologies. For example, Staw and Swajkowski have argued that viewing an environment through a scarcity/munificence dimension of resources may be an important determinant of organisational actions in the environment.⁽⁵³⁾ They found that examining environment through this dimension provided a good explanation of organisational actions such as: price discrimination, franchise violation; price

fixing; illegal mergers and acquisitions, etc. On the other hand, Jurkovich has formed a typology of 64 environments using two dimensions: 1) general characteristics, i.e. the complexity of the environment, its routineness, and its degree of organising, and 2) environmental change, i.e. rate of change, and its stability.⁽⁵⁴⁾

2. Whether in terms of Emery and Trist's four environments or in terms of Thompson's typology, the fact that every organisation faces multiple environments becomes well established and accepted in the organisational literature. However, "it is a reasonable approximation to treat the environment as uniform along each of its dimensions, either because some of its more placid aspects do not really matter to the organisation, or alternatively, because one aspect is so dominant that it affects the entire organisation."⁽⁵⁵⁾

7.5 FORMS OF RELATIONSHIPS

Von Bertalanffy was the first systems theorist to realise the importance of a system being open or closed to the environment in distinguishing living from inanimate systems.⁽⁵⁶⁾ His study was the basis upon which organisational theorists started to view organisations as open systems, e.g. Katz and Khan.⁽⁵⁷⁾ However, most of the organisational theorists in the early days of applying the open system viewpoint, conceived the relationship between an organisation and its environment in terms of a one way relationship. That is, organisations should adapt to the environment in order to survive. In other words, there is one option for the organisation and that is to adapt to its environmental changes. Later, it became apparent that an organisation can change or influence its environment as well as adapt to it. The growing realisation and acceptance of

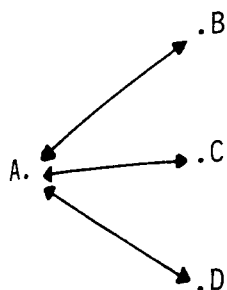
the dual relationship between an organisation and its environment can be seen from the work of modern organisational theorists.⁽⁵⁸⁾

However, it is common practice for a writer, when he examines this relationship, to concentrate on one of the two aspects of the relationship. That is, he might examine how an organisation can influence or change its environment, or how an organisation can adapt to its environment.

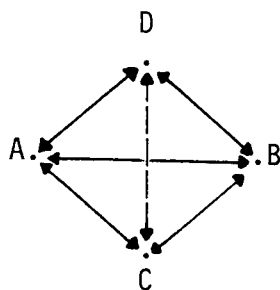
It has been argued that examining the relationship between an organisation and its environment could help in explaining the following:⁽⁵⁹⁾

1. The internal structure of the focal organisation.
2. Its degree of autonomy in decision making.
3. Its degree of effectiveness or "goal attainment".
4. Its identity, i.e. its public image and self-image.
5. The flow of information from the focal organisation to its environment and vice versa.
6. the flow of personnel from the focal organisation to the environment and vice versa.
7. the forces impelling the focal organisation to cooperate or compete with elements of its environment, to coordinate its activities to merge with other organisations, or to dissolve itself.

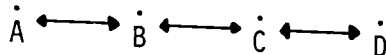
Graphically, Evan has depicted three forms of the relationship between an organisation and its environment.⁽⁶⁰⁾ These forms are illustrated below:



Wheel



All-Channel Network



Chain

We might argue that the degree of autonomy which an organisation can, relatively, enjoy within its environment will vary between the three forms of the relationship between an organisation and its environment. In order to illustrate this point, let us take organisation (A) as our focal organisation in this analysis. As can be seen in the wheel form of relationship, organisation (A) can enjoy a high degree of autonomy for two reasons. First, organisation (A) can find more than one organisation to deal with i.e. organisations (B), (C) and (D). Second, none of the transactions between (A) and (B), (A) and (C), and (A) and (D) is dependent on any kind of relationship between (B) and (C) and (D). In the all-channel network there are relationships between organisations (B), (C) and (D). Thus organisation (A) should not only take into consideration the relationship between it and each of the other organisations but also should consider the relationship between these organisations. This new contingency will decrease the degree of autonomy of organisation (A) compared to the wheel form. The least degree of autonomy is in the chain form. In this form the choices open to organisation (A) to deal with other organisations have been reduced from three to one. On the other hand, though there are relationships between organisation (B), (C) and (D), organisation (A) has no access to these relationships. That is to say it will be subject to these

relationships but has no influence on them.

As we have pointed out an organisation, in order to avoid the effects of environmental uncertainty on its survival and goal attainment, can behave in either or both of the ways identified above. That is, it can influence the environment and/or adapt itself to its environment. Duncan has investigated the first option and argued ~~that~~ an organisation can have an influence over its environment if it can, "(1) affect the demands made on it; (2) affect the expectations of performance made on it; (3) deal with alternatives to; and (4) have some control over the factors and components taken into consideration in the decision making process".⁽⁶¹⁾ Based on this, we can state that all organisations endeavour to control their environment by achieving one or more of the above four aspects of organisational influence. Otherwise, what does an organisation expect from its promotion programme unless it is to create a demand for its products? Also, what is the purpose of the product or activity diversification of an organisation unless it is to secure a demand for its products in order to survive? In addition to that, there is no reason for an organisation to spend a lot of money on its research and development department and programme(s) unless the aim is to affect the expectation of performance made on its products whether by improving the existing ones or innovating new products. Moreover, what objective can an organisation seek by increasing its suppliers, except to achieve control over them rather than to be controlled by them? These courses of organisational behaviour are examples of how an organisation can influence its environment.

If we take Wheeler et al's viewpoint and regard the above

courses as strategic changes which will require not only considerable time and resources in order to be implemented, but also may be constrained by political, legal and administrative factors, then the need for an organisation, particularly in the short term, to adapt itself to the environment can be realised. This kind of adaptation, as Wheeler et al argued, can be achieved through structural changes. A case in point is Lawrence and Lorsch's study which we presented in the previous chapter and which showed that different degrees of environmental uncertainty should be faced by different states of structural differentiation and consequently, different states and techniques of integration. In addition to structural changes, Hinings and others⁽⁶²⁾, and Ferris,⁽⁶³⁾ have argued that an organisation can cope with environmental uncertainty through three types of procedural actions. They called these: 1) coping by prevention; 2) coping by information ; and 3) coping by absorption. Naturally, applying any of these depends on the extent to which environmental contingencies are predictable. Coping by prevention is useful when environmental contingencies are highly predictable, and the other two procedural actions are useful when the contingencies are largely unpredictable. Therefore, coping by prevention refers to policies or procedures that reduce the likelihood that an environmental contingency will occur. An example of this kind of coping is the hiring of additional workers when production schedules are overloaded in order to prevent late delivery of orders. Also we might regard preventive maintenance, whereby machines are repaired on a scheduled basis, as another example of coping by prevention. Coping by information, as one might expect, refers to policies and procedures involving the dissemination of information to facilitate

coping; for example, providing the salesmen with product specifications and catalogues which can assist them in convincing the clients about the advantages of the organisation's products in comparison to competitors' products. Finally, coping by absorption refers to those activities undertaken by the organisation to offset the effects of environmental contingencies by internalising them, e.g. using a short term discount policy to offset the low demand for seasonal products.

Thus an organisation can cope with environmental uncertainty by introducing strategic changes and/or structural and procedural policies. The researcher's point of view is that an organisation's objective in the long run should be to control its environment for the sake of its goal attainment. Therefore, the introduction of strategic changes or policies becomes inevitable. However, no organisation can affect all of its environment's components and/or can influence them all the time. In such cases the organisation should follow the other approach and adapt to the environment.

An organisation's environment, as is the case with organisational technology, has been the subject of empirical studies. In the next section we will review some of the organisational as well as accounting studies which looked at the organisation's environment.

7.6 THE ENVIRONMENTAL STUDIES: A REVIEW

Gabarro has applied Lawrence and Lorsch's framework in a study of the school systems.⁽⁶⁴⁾ We might recall that Lawrence and Lorsch's study showed that an organisation, in order to be effective, should achieve the state of structural differentiation and integration which matches the demands of its environment. Gabarro's

study in fact provides ample support for Lawrence and Lorsch's findings. First, similar to the manufacturing organisations in Lawrence and Lorsch's study, effective schools achieved a high degree of integration among their subgoals in order to cope with their environment. At the same time it was important to maintain differentiation between these subgroups. Also he reported that the more effective schools were found to have attained higher states of both differentiation and integration. Gabarro's study is one of a number that have replicated Lawrence and Lorsch's study. These replications in general have confirmed the findings of Lawrence and Lorsch and there is little to be gained by discussing more of these replications. It is probably more useful to review some of the studies which have not confirmed Lawrence and Lorsch's findings.

In a direct assessment of Lawrence and Lorsch's work, Tosi et al examined their environmental uncertainty subscale.⁽⁶⁵⁾ Precisely, the study proposed to examine the differences among subenvironments, i.e. market, socio-technical, and scientific environments, and whether the latter was correlated with the manager's perception of his subenvironment's uncertainty or not. The study was conducted within 22 companies in 12 industries. The participants were 102 top and middle managers. First, in order to reflect the different degrees of uncertainty of the three subenvironments, they invented a measure which they called a volatility measure. They justified this invention by arguing that "the nature of uncertainty may be subject to several interpretations. A reasonable interpretation would be the degree of accuracy with which one can predict the future. Where there is less variance, there is more certainty. In terms of sales or income those firms or industries that have more stable patterns

would be in more certain environments. This measure dealing with the range of fluctuations of revenues or expenditures, is generally called volatility."⁽⁶⁶⁾ They formed three measures to reflect this volatility; 1) technological volatility to reflect research and development expenditure and investment in new assets; 2) income volatility; and 3) sales volatility. They applied these three measures for the 22 companies included in the study. Then they used Lawrence and Lorsch's questionnaire to reflect the manager's perceptions regarding the uncertainty of their subenvironments. The result showed no correlation between volatility measures and environmental uncertainty as perceived by the managers. Based on this they cast doubt on Lawrence and Lorsch's subscale as they stated that, "the conclusion here, therefore, is that the environmental subscale is not methodologically adequate.... the subscale reliabilities are too low to be treated as measures of different subenvironments, for example, marketing, production, and research."⁽⁶⁷⁾ However, we believe that their conclusion regarding the inadequacy of the environmental subscale of Lawrence and Lorsch is questionable on the following grounds:

1. They did not examine their scales of volatility and Lawrence and Lorsch's subscale in relation to, for example, the states of differentiation and integration of the companies in the industries, in order to determine which of these environmental measures was more sensitive to environmental uncertainty. Rather they related these two sets of scales to each other.

2. Their three scales of volatility which they formed to measure environmental uncertainty failed to produce consistent results on the level of the companies in the same industry. That is

there were major variations in the level of each subscale, (e.g. technological volatility), between the companies in the same industry. Given the fact that the companies in each industry, to a great extent, face similar circumstances, then the variations which their scales produced are an indication of the inadequacy of their scales. When they related their scales to Lawrence and Lorsch's environmental subscales there was no correlation. Based on the above we might argue that the failure to produce correlations might be due to the inefficiency of Lawrence and Lorsch's subscale, or equally it might be due to the inefficiency of their scales. However, point 3 below suggests that this failure is most likely to be due to the inefficiency of their scales.

3. When they calculated the interitem correlations of Lawrence and Lorsch's environmental subscales, the results showed the following:

a) All the correlations between the items of each subscale were positive, and half of these correlations were statistically significant, and b) 22 correlations out of 30 correlations between the items of the three subscales of Lawrence and Lorsch were positive and of these 7 correlations were statistically significant. These correlations were produced on the level of the samples as a whole. But, if these correlations had been calculated on the level of the industry's companies, then the significant positive correlations might have been more.

As was the case when we reviewed technological studies, and in particular Mohr's study, some researchers expected to find a positive relationship if they called a variable an environment, and called the other variable organisational structure, regardless of whether their

perceptions of these variables corresponded to their meanings in the pioneer study or not. This is in addition to the fact that some of these studies were not actually designed to examine the relationship between environment, organisation and effectiveness as proposed by Lawrence and Lorsch.⁽⁶⁸⁾ For example, Pennings examined the relationship between environment and five structural dimensions. His result showed no support for the contingency relationship between environment and structure. In fact we think that contingency theory, in general, and Lawrence and Lorsch's work in particular could be questioned if Penning's study had found a positive relationship, taking into consideration the following:

1. Some of his structural variables were neither considered nor investigated by the pioneer contingency theorists, e.g. Burns and Stalker, Lawrence and Lorsch, etc. Moreover one might wonder whether his variables could be regarded as structural variables in the first place. To clarify the issue the following were regarded as structural variables to be examined in relation to environment: a) the amount of informal communication, b) participativeness, and c) frequency of meetings.⁽⁶⁹⁾

2. The data were not collected to investigate the above relationship, rather "the data were collected initially for different purposes; therefore they put some constraints on the indicators that could be extracted from them".⁽⁷⁰⁾

3. Finally and most important, there was an external interference in the research process which could account for these contradictory results. As the author mentioned "the selection of the sample in this way (i.e. the way he described) **was largely imposed by the sponsor of the research project**".⁽⁷¹⁾ Though one might not be

able to pinpoint the effect(s) of this interference on the results, it would appear that his results were not free of bias.

The above studies represent only one of the environmental issues which have been subject to investigation. The other issue which is relevant to our study concerns the dimensions of environmental uncertainty and the managerial perception of environmental uncertainty. Duncan examined this issue through two environmental dimensions presented above, that is simple/complex, and static/dynamic dimensions.⁽⁷²⁾ Using Thompson's typology of environment, he hypothesised that managerial perception of uncertainty will vary from one environment to another.⁽⁷³⁾ To test this hypothesis he formed three scales to measure the three components of environmental uncertainty that he identified.⁽⁷⁴⁾ He chose 22 decision units within three manufacturing and three development organisations. He defined a decision unit or group in a similar way to what is known as a responsibility centre in a responsibility accounting system.⁽⁷⁵⁾ Thus, in order to simplify the matter for us as accountants, we will use the term responsibility centre instead of decision group. Each member of a responsibility centre was asked to give his responses to the three components which comprise environmental uncertainty as he perceived and experienced it within his organisational subunit. Then the average responses obtained from the responsibility centre's members on the scale of each component were used as the score of the given component experienced by the responsibility centre as a whole. Finally the scores of the three components of uncertainty were added to form a total uncertainty score for each centre. The results showed that 70% of the responsibility centres of manufacturing organisations

perceived their environment as a simple/static environment with low uncertainty. On the other hand 88% of responsibility centres in research and development organisations perceived their environment mainly as a dynamic environment. That is, they perceived it to be simple/dynamic or complex/dynamic with a moderate to high level of uncertainty.⁽⁷⁶⁾ As far as the dimensions are concerned, as contributors to environmental uncertainty perception, the study showed that the static/dynamic dimension is a more important contributor than the simple/complex dimension. This was based on the results which showed that, "the difference in perceived uncertainty between a static and dynamic environment is always significant regardless of whether the environment is simple or complex..... It appears that the complexity of the (responsibility centre's) environment does not have much impact on uncertainty until those factors considered in decision making begin to change, that is become dynamic".⁽⁷⁷⁾

This examination of environmental uncertainty perception has been replicated by other organisational students including Mericle, and Leblebici and Salancik. These replications have produced similar results despite the differences in the research methods and/or the type of organisations. For example, Mericle, using a laboratory simulation, was interested in reexamining the perception of dynamism and complexity as well as the perceived environmental uncertainty in relation to decision making, and in relation to allocations to activities which are directed to the acquisitions of the organisation's inputs, and to the disposal of its outputs, e.g. purchasing, information search, selling, industrial relations, etc.⁽⁷⁸⁾ First she found that dynamism is clearly perceived when it

is indicated by different magnitudes and rates of change of environmental components. There was a significant difference between the level of perceived dynamism reported by subjects in the situations that were intended to represent a dynamic state, and the level of perceived environment by subjects in the situations that were intended to represent a static state. This difference existed regardless of whether the environment was simple or complex. Both these findings provide a clear support for Duncan's findings. On the other hand, environmental complexity was better perceived when it was reflected by a large and multifaceted environment. What is interesting is that she found that the level of change in the environment, i.e. dynamism, had a great impact on perception of complexity, and this in turn confirms Duncan's finding. To connect the above findings we might say that the dynamism of an environment can be perceived independently of the environmental complexity. However, the opposite is not true. That is, environmental complexity is better perceived in relation to its dynamism dimension. Finally, the subjects reported high perceived uncertainty under decision making situations where events were changing quickly as opposed to where there was little or no change, whereas the level of perceived uncertainty was virtually the same between complex and simple situations. In a similar vein Leblebici and Salanick replicated Duncan's study in banks. They found that bank officers' perception of environmental uncertainty was better when they referred to it in terms of dynamism than in terms of complexity.⁽⁷⁹⁾ The above results should in fact increase our confidence and enhance the reliability of using Duncan's approach in other studies.

As can be seen, the above studies were carried out to

investigate some environmental issues and were conducted by organisational theorists. Environment has also been examined by accounting researchers in relation to accounting phenomena. In the next part of this section we will review these studies. In doing so, we will follow the same approach which we have followed in the accounting studies which examined technology. We will first review the theoretical studies, then the empirical studies.

Waterhouse and Tiessen examined the impact of environment on management control systems through organisational structure as an intervening variable.⁽⁸⁰⁾ Following Duncan, they conceived environment as comprising internal and external components, except for technological component which they regarded as an independent variable. Also based on Duncan's findings, they accepted the static/dynamic dimension as an important contributor to environmental uncertainty in decision making. Thus environment was perceived to range from certain (static) to uncertain (dynamic). When environment is certain, specific procedures for performing organisational activities or tasks can be established, which, in turn, will push the organisation structure towards centralisation. However, this situation is difficult, if not impossible, when the environment is uncertain, as this requires unspecified procedures and leads to decentralised structure. Putting certain environment and routine technology on one side, and uncertain environment and nonroutine technology on the other side, then what has been stated regarding the impact of technology on budgetary slack, is, to a great extent, applicable to environment, and therefore there is no need for it to be restated here.⁽⁸¹⁾ Amigoni,⁽⁸²⁾ on the other hand, plotted the management control systems within a matrix which reflects two

dimensions; 1) degree of environmental turbulence, which ranges from low to high, and 2) degree of structural complexity reflected by, a) the number and degree of interdependences between organisational units, and b) the number and type of organisational units. The structural complexity can also range from a low to a high degree. What is relevant to the present study is his proposition that responsibility accounting is an adequate management control system where organisational circumstances reflect a low degree of turbulence and a high degree of structural complexity. In fact, we might go along with only half of Amigoni's argument. That is, as we have shown in this study, and in particular in the second chapter, conventional RAS is appropriate to a certain environment, i.e. the static environment, and this is reflected by Amigoni's low degree of turbulence. On the other hand, we might recall that one of the main problems of conventional RAS is that it assumes that organisational subunits are independent and that the relationship between them is in terms of pooled interdependence. Moreover, in the cases where there are interdependencies, which is inevitable in today's organisations, these can be handled using cost allocation or transfer pricing methods. In other words, conventional RAS assumes that there are no interdependencies between organisational units, or that interdependencies can be handled in one way or another to create an independence. There is no doubt that when either of these two conditions can be satisfied, then the result is an organisational structure which is characterised by a low degree of complexity rather than a high degree of complexity as Amigoni proposed.

Empirically, Khandwalla investigated the association between management control systems and environment, as reflected by the

competition.⁽⁸³⁾ Nine management control systems were chosen.⁽⁸⁴⁾ Competition was seen to be exercised through, 1) price competition; 2) marketing competition; and 3) product competition. By examining the relationship between competition and the use of management control systems amongst the presidents of 92 manufacturing firms, he found a significant statistical association between overall competition and use of management control systems. In particular he found a relationship between competition and the use of the following systems in order of their statistical significance:

1. Flexible budgeting
2. Statistical quality control of production
3. Standard costing
4. Internal auditing
5. Application of the internal rate of return or present value in evaluating investments.

As far as each type of competition is concerned, he found that product competition had the most impressive impact on the use of management control systems, then marketing competition, and finally price competition which had little or no impact on the use of management control systems. Merchant narrowed the area of investigation to a particular management control system, that is the budget.⁽⁸⁵⁾ The prior research, as he showed, claims that budgets can achieve the following two objectives, 1) adaptation, and 2) integration. However, he argued that these two objectives conflict, and it is virtually impossible to design and operate a budget system which can serve both of them optimally. Moreover, he thought that using a budget system for achieving either of the two objectives is contingent on market factors in terms of, 1) product life cycle, and 2) market share. Precisely, he proposed that organisations or

divisions with products early in the product life cycle will use a budget primarily as a planning tool, i.e. to achieve adaptation, rather than as a control and integration tool. Therefore, there will be less reliance on budget numbers as performance standards. With regard to market share as a contingency variable, he felt that a strong market position would be accompanied by more use of detailed and formalised budgetary procedures in order to retain this strong market position. This, in turn, meant that a budget will be more important for performance evaluation. The results, nevertheless, showed no support for the first hypothesis and weak support for the second one.

Environment as a contingent variable has also been looked at by two studies which were concerned with performance evaluation. First, Govindarajan investigated the impact of environmental uncertainty on the performance evaluation style.⁽⁸⁶⁾ Following the organisational theorists, e.g. Lawrench and Lorsch, Duncan, etc., environmental uncertainty was used to reflect the unpredictability in the actions of the components which comprise the external environment. Performance evaluation style was conceptualised as the degree of reliance superiors placed on formula approaches, as opposed to subjective (nonformula) approaches⁽⁸⁷⁾ in relation to the evaluation of a subordinate's performance and deciding the subordinate's rewards. Two hypotheses were formed to be empirically tested in this study. The first hypothesis stated that with low perceived environmental uncertainty, the superior will rely greatly on a formula-based evaluation and reward system; and on a non-formula-based approach when there is high perceived environmental uncertainty. The second and related hypothesis is that the above

relationship will be more pronounced for more effective organisations than for less effective ones. Examining these two hypotheses among 58 managers of profit centres, in eight multi-divisional firms which covered a diversity of industries, provided a degree of support for the hypotheses. Based on the results, Govindarajan indicated the usefulness of continuing the trend of using contingency theory for the design of management control systems in general, and for managerial performance evaluation in particular. Finally, Hays criticised conventional performance evaluation, as it is restricted to financially quantifiable data. He argued that modern organisation theory can provide a better approach to organisational assessment in general, and subunit evaluation in particular. Based on Thompson's work he distinguished between three types of variables which can explain the performance of an organisational subunit. These variables are classified into internal, interdependency, and environmental variables. He stated three propositions which specify the classes of variables that explain the performance of the three main functional departments of an organisation, i.e. production, research and development, and marketing departments. As far as the environment and its impact on performance evaluation is concerned, he proposed that environmental variables, (e.g. market share, dealer opinions, environmental stability, etc.), as well as interdependency variables, (e.g. reliability, cooperation, etc.), will provide equal contribution to the explanation of the performance of marketing departments. This as well as the other two hypotheses of the study, was tested with the functional managers of 109 firms. The result supported the hypotheses in general though it might appear that interdependence variables are less important than proposed.

Some readers of the above review might gain an impression that there is some inconsistency in the findings of the accounting studies and in particular between the three studies of Khandwalla, Merchant and Hays. This inconsistency might be apparent from Khandwalla who found a positive relationship between environment, in terms of competition, and the use of management control systems, e.g. budgetary system; however, Merchant did not find such a relationship. Also there could be inconsistency between Hays who found that environmental variables play a role in performance evaluation while Merchant did not. In fact with some explanation and analysis of the above three studies, this inconsistency disappears, especially after taking into consideration the fact that Khandwalla's study was conducted on the macro level, i.e. the organisational level, whereas Merchant's, and Hay's studies, were carried out on the micro level, i.e. the organisational subunit, division, department, etc. Starting with the macro level, i.e. the organisational level, we can say that as competition becomes greater due to the fact that the organisation's product is in its early stage of life cycle, or because the organisation does not have an established market share, then the organisational budgetary control system will be characterised by flexibility, i.e. Khandwalla's findings. Here budget is used mainly as a planning tool in order to enable the organisation as a whole to adapt to its environment, (e.g. Merchant's proposition), in terms of the competition in the market and through the three forms of competition identified by Khandwalla, i.e. price, product, and marketing competition. The opposite situation is true when competition is low. With low competition the budget will be less flexible as its purpose will be the achievement of integration and

control in the first place, i.e. Merchant's proposition. If all this is plausible, then we can proceed to examine the issue on the micro level, i.e. the organisational subunit. Although the organisation as a whole might face competition, the degree of competition will vary from one department to another. The greatest amount of competition will be in the department which operates as a linkage between the organisation and its environment, namely the marketing department. The least effect will be in the production department which operates within the boundaries of the organisation. This is because, by the nature of its function, it has no relationship with the environment, at least with respect to competition; or because the organisation intends to buffer it from market factors, i.e. stage of product life cycle and/or market share. In such cases, the marketing department will be evaluated in the light of environmental variables, e.g. competition, market share, product life cycle etc., whereas the production department will be evaluated in terms of internal variables, e.g. productivity, cost behaviour, manpower utilisation, etc., as Hays has argued. For the latter department, since it is protected from environmental influences, then the budget will always be used as a tool of integration and control; that is to say, to secure production in the quantity and quality which enables the organisation to compete, to stimulate demand for its product in the early stage of its life cycle, and to retain its market share. In such a case, the production budget can, or rather should, be used as a performance standard. On the other hand, with serious competition and where launching new products becomes common practice rather than the exception; when no product life has ever been completed; and where the market share is fluctuating, then the sales budget should

be used as a planning tool in order to assist in achieving adaptation to the environment. In such a case the estimates of the budget cannot reflect the reality and cannot be used as performance standards. It is not difficult, of course, to find that the opposite situation is true, i.e. when competition is low. Finally, in order to connect the two levels of analysis we might state that by depending on the type of sales budget, i.e. a planning tool or integration and control tool, we might be able to predict the type of organisational budget. This prediction, as one would expect, cannot be made using the production budget since it is always used as an integration and control tool.

With the above analysis we have come to the end of this section which has been devoted to the second contingent variable of the three variables that we argue ought to be considered in studying and structuring RAS. However, before we move to the third and final contingent variable, i.e. interdependencies or interdepartmental dependencies, we shall conclude this section by stressing the following points which will reflect our perspective on an organisation's environment for the purpose of this study:

- 1) On the organisational level, we perceive environment in a way similar to Duncan's definition. Thus, for us, environment will be the totality of physical and social factors which influence an organisation and therefore should be taken into consideration in decision making.

- 2) We will adopt Duncan's classification of environment as internal and external environments, however, with two exceptions. First, that technology will be excluded from the components of external environment, as we go along with the prevailing viewpoint

which regards technology as an independent variable. Second, though we accept his argument that "interdependence of organisational units in carrying out their objectives" is a variable which can be seen as a reflection of the internal environment, however, for us, interdependence will be regarded as an independent variable rather than as an environmental component.

3) We will follow Lawrence and Lorsch's viewpoint which perceives an organisation's environment as comprising three subenvironments, i.e. scientific, market, and techno-economic. Each of these subenvironments has its totality of physical and social factors which should be taken into consideration by the decision makers who encounter the above three subenvironments, i.e. research and development, marketing and production managers. The totality of physical and social factors of each subenvironment, by definition, will be a subset of the total components of the focal organisation's environment. Consequently this means the following:

a. that a particular environmental component, whether internal or external, might have an influence on two or more organisational subunits. This component might be faced by the organisational subunits jointly, (e.g. customer component), or separately, (e.g. governmental regulations and agencies). In the latter case each subunit will consider the component from the aspect(s) which affects its activity. For example, the production unit will consider the governmental safety regulations, whereas the research and development unit will consider the patent regulations.

b. the relative importance of environmental component(s) will vary from one organisational subunit to another. However, generally speaking, we might expect that internal environmental components will

have a greater impact on the production unit than external environmental components. The opposite situation can be expected with the marketing unit. The other functional units, e.g. the research and development unit, can be located somewhere between the previous two units.

4) Environmental uncertainty can be reflected by different environmental dimensions. However, through this section we have noticed that practising managers perceive environmental uncertainty better in terms of the static/dynamic dimension than in terms of the other dimensions. This might encourage us to apply this dimension as a reflection of environmental uncertainty. Thus environmental uncertainty increases as one leaves the static environment and moves towards the dynamic environment. The other dimensions will be used as supplementary dimensions to enhance the dynamism dimension whenever there is a need.

5) An organisation's environment is a source of uncertainty and to this extent it can jeopardise the organisational survival and goal attainment. We have pinpointed the three causes of environmental uncertainty. However, at the level of the organisational subunit the degree of environmental uncertainty varies from one subunit to another. We believe that the degree of environmental uncertainty of an organisational subunit can be determined in the light of:

a. whether the environmental components of an organisational subunit are internal or external. Generally speaking, the ability of an organisational subunit to put the environmental component(s) under its control is greater in the case of internal than external environmental components. Consequently, an organisational subunit will be subject to less uncertainty from the internal components than

from the external components.

b. whether the environmental component, i.e. internal or external, is static or dynamic. When the environmental component is static then the uncertainty it creates for an organisational subunit will be less than when the component is dynamic.

The third and last contingency variable that will be considered in this study is interdepartmental dependencies, which will be the subject of the next chapter.

FOOTNOTES

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31. Emery and Trist, op. cit. See also Bobbitt et al, op. cit.
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36. Bobbitt et al, op.cit..
37. Terreberry, op. cit..

38. Emery and Trist, op.cit., See also Bobbitt et al, op.cit.
39. Emery and Trist, op.cit., P.171.
40. Terreberry, op. cit., P.183.
41. Bobbitt et al, op. cit., P.428.
42. Terreberry, op. cit.
43. Dill, op. cit.
44. Ewusi-Mensah, op. cit.
45. Duncan, op. cit.
46. Robey, D., "Computers and Management Structure: Some Empirical Findings Reexamined", in D. Katz, R.L. Kahn and J.S. Adams (eds.) "The Study of Organisations", Jossey-Bass Publishers, San Francisco, 1980.
47. Dill, op. cit.
48. Khandwalla, op. cit.
49. Mintzberg, op. cit.
50. Ibid., P.268.
51. Duncan, op. cit.
52. Ewusi-Menhas, op. cit.
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56. Von Bertalanffy, Ludwig, "General System Theory", General Systems, Vol.1, 1956.
57. Katz, Daniel and Robert L. Kahn, "The Social Psychology of Organisations", John Wiley & Sons, Inc., (sec. ed.) 1978.
58. See for example Staw and Sz wajkowski, op.cit.; Donaldson, L. "Comments on 'Contingency and Choice in Organisation Theory'", Organisation Studies, Vol.3, No.1, 1982; Ewusi-Mensah, op. cit.
59. Evan, William M., "The Organisation-Set: Towards a Theory of Interorganisational Relations" in James D. Thompson (ed.) "Approaches to Organisational Design", University of Pittsburgh

press, USA, 1967.

60. Ibid.
61. Duncan, Robert B., "Multiple Decision Making Structures in Adapting to Environmental Uncertainty: The Impact on Organisational Effectiveness", Graduate School of Management, Northwestern University, Working paper #54-71, 1972, P.13.
62. Hinings, C.R., D.J. Hickson, J.M. Pennings and R.E. Schneck, "Structural Conditions of Interorganisational Power", Administrative Science Quarterly, Vol.19, 1974.
63. Ferris, op. cit.
64. Gabarro, John J., "Organisational Adaptation to Environmental Change", in Frank Baker (ed.) op. cit.
65. Tosi, Henry, Ramon Alday and Ronald Storey, "On the Measurement of the Environment: An Assessment of the Lawrence and Lorsch Environmental Uncertainty Subscale", Administrative Science Quarterly, Vol.18, 1973.
66. Ibid., P.28.
67. Ibid., P.35.
68. Pennings, op.cit., See also Osborn and Hunt, op. cit.
69. As we have indicated in footnote No.79 in the previous chapter, all these aspects can be included in the people-oriented attempts to reduce uncertainty rather than structural attempts.
70. Pennings, op. cit., P.397.
71. Ibid., P.397. Emphasis added.
72. Duncan, "Characteristics of Organisational Environment and Perceived Environmental Uncertainty", op. cit.
73. See Section 7.4.3
74. See Section 7.3
75. An organisational decision unit is defined as "a formally specified work group within the organisation under a superior charged with a formally defined set of responsibilities directed toward the attainment of the goals of the organisation". Ibid., P.313.
76. What is important is that none of the responsibility centres in manufacturing organisation has considered its environment as complex/dynamic environment. On the other hand none of the responsibility centres in research and development organisations has considered its environment as simple/static environment.

This difference might raise a question whether it is the nature of the environment or type of organisation that is most important in a responsibility centre experiencing uncertainty. Duncan has examined this issue and his results indicate that, "it is the nature of the organisation's environment rather than the kind of organisation that is most important in explaining the degree of uncertainty experienced in decision making", Ibid., P.322.

77. Ibid., P.325.
78. Mericle, M.F., "The External Environment: Effects of Change on Environmental Dynamism and Complexity", in D. Katz et al (eds.).
79. Leblebici, Huseyin and Gerald R. Salancik, "Effects of Environmental Uncertainty on Information and Decision Processes in Banks", Administrative Science Quarterly, Vol.26, 1981.
80. Waterhouse, J.H. and P. Tiessen, "A Contingency Framework for Management Accounting Systems Research", in Robert H. Chenhall, Graeme L. Harrison and David J.H. Watson (eds.), "The Organisational Context of Management Accounting", Pitman Publishing Inc., Massachusetts, 1981.
81. See Section 6.6
82. Amigoni, Franco, "Planning Management Control Systems", in Robert H. Chenhall et al (eds.), Ibid.
83. Khandwalla, op. cit.
84. These management control systems are as follows:
 1. Standard costing
 2. Incremental costing
 3. Flexible budgeting
 4. Internal auditing
 5. Operational auditing
 6. Internal rate of return or present value
 7. Statistical quality control
 8. Inventory control
 9. Evaluation of senior personnel
85. Merchant, Kenneth A., "Influences on Departmental Budgeting: An Empirical Examination of Contingency Model", Accounting, Organisations and Society, Vol.9, No3/4, 1984.
86. Govindarajan, V., "Appropriateness of Accounting Data in Performance Evaluation: An Empirical Examination of Environmental Uncertainty as an Intervening Variable", Accounting, Organisations and Society, Vol.9, No.2, 1984.
87. These two styles correspond to Hopwood's typology of evaluative styles, namely budget constrained style vs. nonaccounting style.

CHAPTER 8 INTERDEPENDENCIES: MORE INSIGHTS

8.1 GENERAL

8.2 INTERDEPENDENCIES: A REVISIT

8.3 FORMS OF INTERDEPENDENCIES

8.4 THOMPSON'S TYPOLOGY: ELABORATION AND SUPPORT

8.5 INTERDEPENDENCIES AND ACCOUNTING STUDIES

8.1 GENERAL

In general very little has been written about interdependencies in comparison with what has been written about technology and environment. Dependence in the organisational context can take two forms: interorganisational dependence which reflects the relationships between one organisation and others; and intraorganisational dependence which reflects the interactions within an organisation. We covered the first form when we examined the relationship between an organisation and its environment in the previous chapter. The second form can be categorised further into intradepartmental and interdepartmental dependencies. It is the interdepartmental dependencies, or interdependencies which concerns us in this chapter.

8.2 INTERDEPENDENCIES: A REVISIT

As in the case of the first two contingency variables, i.e. technology and environment, interdepartmental dependencies have been recognised by modern organisation theorists. Moreover, some of these theorists might regard the existence of interdependencies as a condition for the recognition of an organisation. For example, Miller has argued that unless there are interdependencies there is not an organisation but a collection of individuals.⁽¹⁾ In the classical organisation theory the assumption was that with a high degree of specialisation in an organisation, there will be fewer interdependencies. We have referred to this point in our analysis of the relationship between classical organisation theory and conventional RAS. With modern organisation theory, however, we find the opposite viewpoint being advocated. This viewpoint states that

"a unit of an organisation..... is a specialised portion of a division of labour. It is not a self-contained whole. Its meaning, purpose, and activities are defined by interdependence with other units".⁽²⁾ Clearly, specialisation increases interdependencies, and more specialisation means more interdependencies,⁽³⁾ contrary to the classicist's belief.

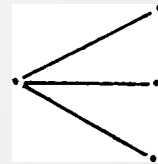
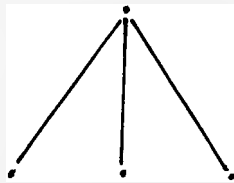
8.3 FORMS OF INTERDEPENDENCIES

In addition to Thompson's typology of interdependencies, Dubin has formed another typology of interdependencies which links the units inside an organisation. Three of these forms are original and three are derived from the former. These are as follows:⁽⁴⁾

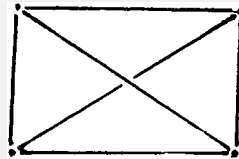
1. Serial interdependencies



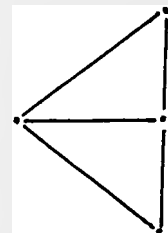
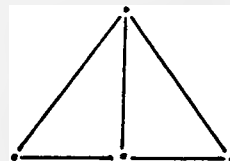
2. Radial interdependencies



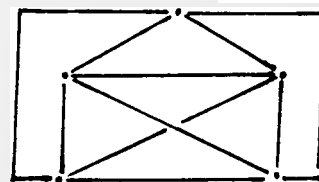
3. Circular interdependencies



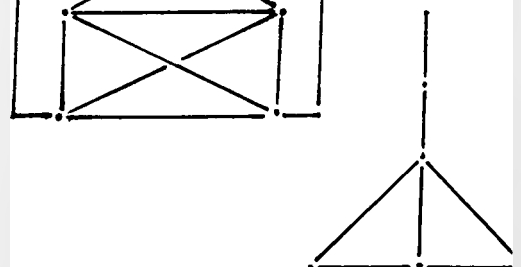
4. Radial and serial interdependencies



5. Radial and circular interdependencies

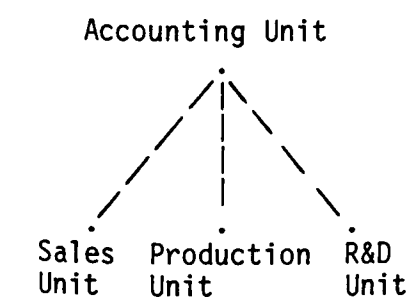


6. Serial-radial-serial interdependencies

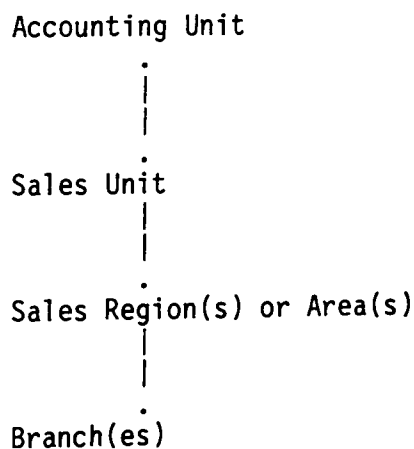


It is fairly obvious that Dubin's two forms of serial and circular interdependencies correspond to Thompson's two types of sequential and reciprocal interdependencies. Dubin has argued that the appropriate form of interdependence is dependent on the nature of the function which a unit performs in an organisation. In this respect he distinguished between four functions: direction; coordination; control; and innovation functions.⁽⁵⁾ The first function needs the interdependence to be immediate and unequivocal. This makes the circular interdependencies irrelevant because no single unit is dominant, an essential condition for performing the directing function. In turn, as he argued, the two forms which are appropriate are the serial and radial interdependencies. However, the vertical form of the serial interdependence (see the figure) is preferred where the whole group of units which is directed by the dominant unit represents a specialisation by purpose. The radial form of interdependence will be preferred when the whole group of units represents a specialisation by process.⁽⁶⁾ The following example might clarify the difference between the above two types of interdependencies as far as the direction function is concerned. When the time for preparing the organisational budget, i.e. master budget, is due, the accounting department as a directed unit will give its instructions to the different functional units to prepare the subsidiary budgets, i.e. sales budget, production budget, research and development budget, etc. Here the accounting unit directs different specialisations and this in turn means that the process of preparing the subsidiary budget will differ from one unit to another; e.g. quantity of raw materials required in the production budget vs. the quantity of finished products expected to be sold in

the sales budget, etc. The interdependence is radial in the sense that the accounting unit directs the preparation of the same thing, i.e. the subsidiary budget, but this has to be done in such a way as to reflect the differences in the processes, i.e. sales, production, research and development, etc. When it directs the preparation of the sales budget, for example, the interdependence will be serial in its vertical form and will embody the specialisation by purpose. Here although the accounting department has to deal with different sales units and subunits, it deals with one area of specialisation, i.e. sales activity. But the sales budget itself can be prepared in different ways to serve different purposes. For example, it can be prepared on the level of the main sales unit to reflect the expected cash inflows, or on the region or area level to direct the promotion programmes, or on the level of a branch for managerial performance evaluation purposes. As one would expect, the instructions will be similar, as they are all concerned with the sales quantities and prices, although they serve different purposes. The above differences are reflected in the figure below.



Different instructions
for the same thing
i.e subsidiary budget



The same instructions for
different purposes

With respect to the second function, i.e. coordination between units, Dubin has pointed out that the choice will be between radial and circular interdependencies.⁽⁷⁾ Given that the need for coordination emerges from the fact that none of the units involved has greater priority or dominance in the resulting web of interdependence, as is the case with the direction function, the type of interdependence that minimises the possibility of any single specialisation gaining dominance is preferred, that is, the circular interdependence. This proposition, in fact, comes very close to the finding of an empirical study regarding integration in effective organisations. Lawrence and Lorsch found that integration is effective 1) when the integrators have knowledge about the activities of the units needing to be integrated, 2) when their influence is based on professional expertise rather than hierarchical authority; and 3) when they do not bias their decision in favour of one or more units.⁽⁸⁾ All of these attributes can be inferred from the circular interdependence type of Dubin.

Dubin has pinpointed the radial interdependence as the appropriate type of interdependence for the control function for two reasons. First, since the control unit "tend(s) to have a maximum number of total organisation-linkages, because they are connected to every relevant unit exhibiting the behaviour to be controlled",⁽⁹⁾ then the serial interdependence form should be ruled out as it connects the control unit with only one successive unit. Second, contrary to the case of the coordinated unit but similar to the case of the directed unit, the control unit dominates all other units in the subject it controls. This means that the circular interdependence type is inappropriate, as it essentially gives equal

dominance to the units involved in the interdependencies.

Finally, he found that the serial interdependence type satisfies the two necessary functional conditions for performing the innovation function. The first condition is that innovators should be minimally committed to present organisation practice and this can be achieved by serial interdependence as there is only one link with some other unit of the organisation. "It is through this link that the innovating suggestions are passed on to the organisation, and through which organisation support flows back to the innovators."⁽¹⁰⁾ This minimum commitment to organisation practice will give the innovators the opportunity to "have maximum access to the larger environment from which new ideas may be drawn",⁽¹¹⁾ and satisfy the second functional condition for performing an innovation function.

Two issues related to the above types of interdependencies need to be mentioned. The first concerns the directionality of action in the interdependencies, and the second deals with the number of interdependencies. As far as radial interdependencies are concerned, the directionality of action might take one of the following two ways. According to the first, the radial focus unit, i.e. control unit, initiates action to which organisational units connected to it respond. In the second way, the direction of initiation is exactly reversed. This can be illustrated by a service unit where the organisational units initiate the request for service to the service unit, i.e. the radial focus unit.⁽¹³⁾ This difference in directionality leads us to the first issue regarding the number of interdependencies. As can be seen, the number of linkages being used will vary when the focus unit is a control unit and when it is a service unit. In the former, the control unit activates all its

links with organisational units. In the latter, when the service unit is servicing it is doing so in response to the request(s) simultaneously activated by the units to which it is linked. Given the fact that the requests for service are simultaneously activated by a few of the units to which the service unit is linked, then, "the volume of simultaneous requests for service is always materially less than the number of existing links radiating from the service department."⁽¹⁴⁾ The total number of interdependencies of an organisational unit will vary from one unit to another depending on the function(s) to which it is subject. Among the organisational units, the operating unit, e.g. the production unit, will have the greatest number of interdependencies, as it is connected with other units which direct, coordinate, and control it.⁽¹⁵⁾ On the other hand, and basing our argument on his prescription of the innovation function, we might argue that the innovating unit, i.e. research and development, should have the minimum number of interdependencies.

Dubin's typology was formed and introduced in the organisational literature before Thompson's typology. However, the real recognition of the importance of interdepartmental dependencies as a contingency variable began with Thompson's work and this has become the source upon which organisational and accounting researchers rely whenever the interdependencies in the organisational context are considered. Applying the same approach which we have followed in choosing the most accepted and applied forms of the previous two contingency variables, i.e. technology and environment, we will choose Thompson's typology of interdependence in this study to represent the third and final contingency variable that has to be considered in this study of RAS. For the purpose of this study the next section will elaborate

Thompson's typology as well as providing some empirical support for it.

8.4 THOMPSON'S TYPOLOGY: ELABORATION AND SUPPORT

In order to make the distinction between the three types of interdependencies, i.e. pooled, sequential, and reciprocal clearer, let us give some examples. We might recall that in pooled type interdependencies, though the organisational units might share common resources, they are independent in the sense that each can act without regard to the action of the other. A good example of this type of interdependence is "the teachers in a school who share common facilities and budgets, but work alone with their pupils".⁽¹⁶⁾ Based on this example the pooled interdependencies can be reflected by the following aspects. First, English literature as a discipline or subject is independent of mathematics, but both are being taught in the same school, and the survival of the school is dependent on teaching both, as well as other independent subjects. Second, in the classroom as an organisational unit, each teacher acts independently of the other teachers in the other classrooms. However, all act to achieve a common objective, that is, the survival of the school.

The first form of direct interaction(s) between the organisational units will be shown in the sequential interdependencies. In this form a successive unit cannot act unless the preceding unit acts properly. Also the success and the goal achievement of the preceding unit is dependent on the proper act of the successive unit. A case in point, of members working in series, is a relay race where the baton passes from runner to runner. Industrially, this type of interdependence is illustrated by "a mass

production factory, where raw materials enter at one end, are sequentially fabricated and machined, then fed into an assembly line at various points, and finally emerge at the other end as finished products".⁽¹⁷⁾

The complex type of interdependence is what Thompson called reciprocal interdependence. The complexity of this type does not come from the fact that the preceding unit feeds the successive one, i.e. sequential interdependence, but from the fact that units feed their work back and forth among themselves. In effect each receives inputs from and provides outputs to the others. To clarify the matter we can think of a hospital "in which the nurse "preps" the patient, the surgeon operates, and the nurse then takes care of the postoperative care".⁽¹⁸⁾ The same type of interdependence can be expected between the research and development unit, and the sales unit of a manufacturing organisation. The latter unit will provide the former with the information, i.e. through market research, about the customer's needs and expectations. The research and development unit will innovate or develop a product which will be launched through the sales department. Then the sales department will provide the research and development unit with the inputs, once more in terms of the customer's responses, in order to enable the latter unit to decide whether to innovate, or design a new product or to improve the existing one, and so on.

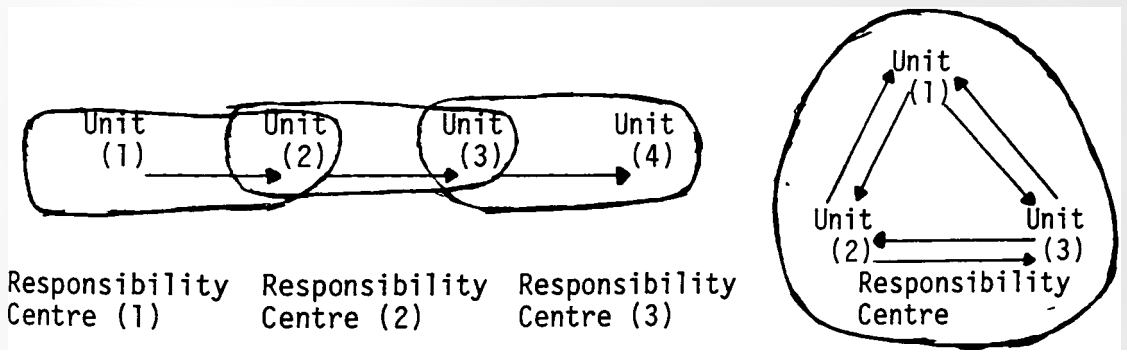
Given that pooled interdependencies can easily be recognised and identified, as there will be no direct interactions between the organisational units, the problem is deciding when interdependencies should be regarded as sequential or reciprocal. Generally, we can state four conditions which should be satisfied for interdependencies

to be sequential. First, the technologies of the sequential units should have more in common with one another than with units outside. Second, the output of the sequential units as a whole should be clearly measurable. Though the output of each individual unit might or might not be measurable, e.g. the driving wheels, however its value will be more if it is measured within the output of the sequential units as a whole, e.g. the motor car, than if it is measured individually. Third, the units should be reasonably equal in their status, that is to say, none of them can be regarded as a subunit of the other. Fourth, the sequence of operations should be unbroken; that is, material should not pass from unit (1) to unit (2) and then undergo a further process outside the organisation before going to operation (3). Naturally, when one or more of these conditions is missing then the sequential interdependencies will be reduced to the simpler type of interdependencies, i.e. pooled interdependencies according to Thompson's typology. On the other hand, although the main condition of reciprocal interdependence is that each unit receives inputs from and provides outputs to the others, we can state three more conditions. First, that these units are technologically differentiated. If they are similar, then the interdependence would have been pooled, (e.g. two assembly lines of motor cars), or sequential, (e.g. the units which comprise an assembly line). Therefore, reciprocal interdependence is more likely to occur between research and development units, and sales units, in the way we described it above, than to occur between two sales units, or two research and development units. Second, unlike the sequential interdependencies where the contribution of each successive unit can be identified, it might be difficult to define the contribution of

the individual units involved in the reciprocal interdependencies. For example, has the success of the new product in the market been due to the quality of the information which the sales unit collected regarding the needs and expectations of the customers, and fed to the research and development unit, or due to the ability of the latter to develop and design a good product? Also, is the recovery of a patient due to the success of the medical operation or due to the nursing care before and after the operation? Third, as in the sequential interdependence, we expect that the units should be reasonably equal in their status, i.e. none of them can be regarded as a subunit of the other.

The final point we might make in this elaboration of Thompson's typology is to do with the nature of responsibility, (i.e. individual or group), for each of the above three types of interdependencies, and the kind of responsibility centre that should be established within RAS. Starting with pooled interdependence, we might argue that individual responsibility should underlie this type of interdependence. This is based on the fact that there is no interaction between the units. Thus to impose group responsibility on units with pooled interdependencies will lead to problems and dysfunctions. The same situation may be faced in the other two types of interdependencies, (i.e. sequential and reciprocal), if individual responsibility is imposed when it should be group responsibility. Recognising this group responsibility is the only way to reflect the existence of overlapping relationships among the units which are sequentially or reciprocally interdependent. Ignoring this group responsibility, however, will make the situation worse as "dependence always tends to give rise to conscious or nonconscious hostility and

resentment".⁽¹⁹⁾ That is, as Miller argued, instead of encouraging the manager of the interdependent unit to feel not only that he is responsible for the task of his unit but that he shares in the responsibility for the total task of the interdependence unit by establishing group responsibility,⁽²⁰⁾ we increase the hostility and resentment by establishing individual responsibility. Given that group responsibility is the form which should underlie sequential and reciprocal interdependencies, then the issue is how large the group should be within each type of interdependence. In the sequential interdependence we expect the group to consist of two units, i.e. one unit and its successor and so on. In the reciprocal interdependence, the group should include all the units, i.e. two and over, as can be seen below.



These group responsibilities can be established on a permanent as well as a temporary basis, depending on whether the interdependencies are permanent or temporary.

Thompson's typology, as we have pointed out, is conceptual; however, it can be argued that this typology has practical validity. Two studies have illustrated this. First, Lorsch and Lawrence reviewed their original data⁽²¹⁾ in the light of Thompson's typology of interdependence, and found that there was a difference in the type of interdependence between the plastics, food, and container

industries. In this respect they made the following three points:

"1. The three environments in our study required that organisations deal, to some extent, with all three types of interdependence. Nevertheless, this typology has proved useful, because, as Thompson suggests, in each of the environments we have found that one or two types of interdependence had priority, depending on the major competitive issue (i.e. the dominant issue).

2. In the plastic and food industries (where the dominant issue was innovation), a reciprocal interdependence was required between sales-research and production research..... In the container industry where the dominant issue was scheduling, the interdependence was of pooled and sequential types. It was sequential in that sales specified requirements for production, but it was pooled in that allocation decisions had to be made with regard to scarce production capacity.

3. The other types were also present..... The reason, however, for pointing to the dominant type of interdependence required is that this appears to have had an important impact on the internal structure of organisation in each environment."(22)

No doubt this study provides ample support for Thompson's typology. Though the original study of Lawrence and Lorsch was not directed towards an examination of Thompson's typology, nevertheless, reconsidering the data in the light of Thompson's typology has not provided support for the typology only, but also assisted in explaining the structural differences, i.e. in terms of states of differentiation and integration, between the companies of the three industries.

Allen also applied Thompson's typology of interdependence to

examine the corporate-divisional relationship in diversified firms.⁽²³⁾ He found that pooled interdependence is the pattern of interdivisional relationships of diversified firms. Therefore, little direct interdivisional coordination is required. Between the corporate headquarters and divisions he noticed that interdependence takes the sequential form. The corporate headquarters provides the division with the inputs in terms of the funds allocated to the division and the evaluation of its economic performance. It is through this relationship that the corporate headquarters tends to exercise its control rather than through direct participation in formulating the divisions' product market strategies. Finally, he found that reciprocal interdependence prevails among functional departments within the product divisions of the diversified firms.

The above section represents interdependencies discussed in the organisational literature. It will be useful if we complete this section by reviewing the interdependencies discussed in the accounting literature in order to ascertain whether accounting researchers have recognised them, and how they have accounted for them.

8.5 INTERDEPENDENCIES AND ACCOUNTING STUDIES

Very few accounting studies have examined interdepartmental dependence as we have referred to it at the beginning of this section.⁽²⁴⁾ Vancil in his examination of the appropriate management control system for different organisation structures stated that, "the matrix form of organisation may be appropriate when much interaction between the functions is necessary or desirable."⁽²⁵⁾ He

expects that interdependencies in the matrix structure will, generally, be between marketing and manufacturing functions. Since the managers of these two functions are involved in activities which have major effects on profits, then the issue is how can the managers of the two functions be held jointly responsible? In order to answer this he suggested two approaches. One approach "is to hold each man responsible for a portion of the profits of the company, using transfer pricing to permit a calculation of that profit".⁽²⁶⁾ First, we might reasonably describe the interactions in the matrix organisation, using Thompson's typology, as reciprocal interdependencies. If this is true, then we need to know whether the portion of profits which each manager will be asked to achieve, let alone the basis upon which this portion will be determined, will reflect what he should achieve individually or in association with the other manager. If we assume that each manager should achieve his portion of profits individually, then we will be in a difficult situation, as is the case with conventional RAS, since we overlook the impact of each manager on the other in achieving or not achieving this portion of profits. If we take the other way and expect that this portion of profit should be achieved through association between the two managers as a group of managers, then there will be no need to define a separate portion of profits for each of them. Second, Vancil in this approach uses the transfer pricing method. In fact this will make the situation more difficult since there is no universal technique for establishing transfer prices, (as we argued in chapter 2), that can be used and that can gain the acceptance of the managers involved in reciprocal interdependencies. With respect to the second approach, Vancil's intention "is to use the matrix form

of organisation as an acknowledgment of the interdependence, and to hold each functional manager responsible for the entire profit of the business..... the manufacturing manager (for example) would be responsible for profit, defined as sales revenues less all manufacturing costs and all direct marketing expenses".⁽²⁷⁾ He pointed out that this approach requires "double counting" of each profit dollar and "the intent of double counting the profit is to make clear to all managers involved that they must work together in order to achieve their own individual objective. A profitable action which requires cooperation does not reflect to the credit of only one party, nor does it require a fictitious division of the profit between them".⁽²⁸⁾ In fact the second approach is much better than the first one as it avoids the problems which we have mentioned. However, the usefulness of this approach can only be recognised after its application in practice, taking into consideration two things which might decrease the likelihood of the application of this approach in practice. First of these is that Vancil himself states that the approach may seem confusing;⁽²⁹⁾ and second, the high costs which could be incurred for implementing the double counting method which Vancil suggests.

Macintosh and Daft, on the other hand, support our viewpoint by pointing out that interdependence among departments is an area of potential new insight into the design of control systems, e.g. RAS, within organisations.⁽³⁰⁾ Also they perceived interdependencies, as we have perceived them in terms of Thompson's typology, i.e. pooled, sequential and reciprocal interdependencies. They were interested in examining the relationships between the use of three management control systems and the types of interdependence among departments.

These three control systems are: standard operating procedures; operating budget; and statistical reports. They hypothesised that:⁽³¹⁾

- 1) pooled interdependence will be positively correlated with the use of standard operating procedures (SOPs) and negatively correlated with the use of an operating budget and statistical reports.
- 2) sequential interdependence will be positively correlated with the use of an operating budget and statistical reports and negatively correlated with SOPs.
- 3) reciprocal interdependence will be negatively correlated with the use of SOPs, an operating budget, and statistical reports.

They tested these three hypotheses among the functional managers of 90 major departments of a cross-sectional sample of organisations.

The sample included twenty organisations and embodied industrial, commercial, service and public organisations.⁽³²⁾ The results showed strong support for hypothesis (1), and modest support for hypotheses (2) and (3). With respect to hypothesis (2), the results showed a positive relationship between some of the variables of both operating budget and statistical reports, and sequential interdependence.⁽³³⁾

However, what is more important is that they found consistency in these results. Among these consistent results was the positive and significant relationship between the influence of upper management in target setting, with respect to both operating budget and statistical reports on the one hand, and the sequential interdependence on the other.⁽³⁴⁾

In other words, when the interdependencies are sequential, the influence of upper management in target setting increases regardless of whether the control system is an operating

budget or statistical reports. This positive and significant correlation was not found with the other two types of interdependence. Also, and only with regard to sequential interdependence, there was a positive and significant correlation, with the emphasis of top management on meeting targets as a variable in both operating budget and statistical reports.⁽³⁵⁾ This behaviour of the top management is expected within this type of interdependence. As we pointed out, in sequential interdependencies, the output(s) of a unit will be the input(s) of the successive unit. The most reasonable way for the management to secure the work flow between the departments is to exercise its influence in the target setting; that is to say, to ensure that none of the departments underestimates its target, since that would lead to idle capacity in the successive department(s). Also it should ensure that none of the departments overestimates its target since that could lead to a bottleneck and consequently redundant investment in an excessive stock between the sequentially interdependent departments. As one might expect, upper management's interest cannot be satisfied just by ensuring consistency between the targets of the departments involved in sequential interdependencies but will extend to provide an assurance that these targets have been met. This is because the nonachievement of the targets has the effect of both overestimating and underestimating the targets, as discussed above.

The results showed that managerial involvement in target setting, and the emphasis on meeting targets, were not significant in pooled interdependencies. However, both variables have significant negative correlations with reciprocal interdependencies.⁽³⁶⁾ With regard to the former type of interdependence, this finding is similar

to what was reported by Allen, who found that in diversified firms, where the interdivisional dependencies are pooled, the top management, i.e. the corporate headquarters, does not directly participate in formulating the divisions' product market strategies.⁽³⁷⁾ This is probably due in large measure to the fact that the inefficiency of one department or division will not have a direct impact on the performance of other units as is the case with sequential interdependence. This, in turn, might release the management from the pressure to ensure consistency between departments' targets through a direct approach, (i.e. exercising influence in a target setting), to an indirect approach, (i.e. exercising influence through resource allocation and the evaluation of the divisional economic performance). The reason why top management does not exercise influence in a target setting when interdependence is reciprocal will be understood when we present the result of hypothesis (3).

When interdepartmental dependencies are reciprocal, the correlations with the SOPs and the operating budget were negative, which generally supported hypothesis (3). But contrary to this hypothesis they found positive correlations between reciprocal interdependence and statistical reports.⁽³⁸⁾ Among the three types of interdependencies it is apparent that reciprocal interdependence reflects the most uncertain situation the managers might face. In this situation the manager cannot behave individually, nor is his behaviour influenced only by the behaviour of the preceding manager, rather his behaviour is influenced by the input and output exchanges between him and the other manager(s). This continuous exchange implies that the situation itself is also changing continuously.

Consequently, the involved managers will have information about the situation which might not be available to the top management. With this incomplete information top management cannot exercise much influence on target setting. The influence in fact will shift to the department managers, who have complete information about the situation. However, given that the situation is highly uncertain, then the likelihood of achieving a predetermined financial target will be very low, and consequently the usefulness of the operating budget for measuring and monitoring departmental and managerial performance will be less. Moreover, we might expect dysfunctional behaviour if the operating budget is used as a measuring and monitoring tool, or if there is an emphasis on meeting a budget, as indicated by the significant negative correlations between these two budgetary variables and reciprocal interdependencies.⁽³⁹⁾ When interdependence is reciprocal, there will be more reliance on statistical information to determine departmental targets. To explain this let us give an example. If the relationships between production, sales and research and development departments are reciprocal, then identifying their target in financial terms will be meaningless or nonsensical. First, relationships like these will happen for special circumstances, e.g. launching a new product. The nonexistence of experience with regard to this particular new product will restrict management's ability to determine a financial target. Second, it is even more difficult when we have to think about the form this financial target should take; that is whether it should be defined in terms of production costs, sales revenues, profit, etc. As can be seen, each figure will be contingent on the other, and since we cannot define any of them with reasonable accuracy, we

cannot therefore define the other figures. For these reasons, it could be better if the target is defined in nonfinancial terms; for example, in terms of the number of new customer contracts that can be obtained. This could be the sort of target which could reflect the situation of reciprocal interdependence and therefore the managers can exercise influence in this target setting, more so than in a financial target setting. That is, they are more able to exercise influence in target setting in statistical reports than in operating budgets. Nevertheless, the uncertainty of reciprocal interdependence also reduces the importance of the nonfinancial targets of the statistical reports for measuring and monitoring performance. These targets are used for planning and coordination in the first place.

The implication of the above analysis is that traditional management accounting tools and control systems, e.g. conventional RAS, are adequate for pooled and sequential interdependencies but are inadequate for reciprocal interdependence. It is the last type of interdependence which appears to pose the greatest challenge to management accounting researchers and practitioners.

We have come to the end of the part of the study which examines RAS in the organisational context from a theoretical point of view. We have shown that conventional RAS and its performance evaluation is not appropriate to today's organisations, (chapter 2), as it is tied to, and dominated by, classical organisation theory (chapter 3). The relationship between them has been established in chapter 4. Our view is that conventional RAS and classical organisation theory do not take into consideration the changes which have occurred internally and externally to the organisations. These changes have been highlighted by contemporary studies under the umbrella of modern

organisation theory and its four contingency variables. Our perspective is that studying and designing RAS should take into account three of these variables and we have justified this (chapter 5). Technology, environment, and interdependencies have been given more attention in order to define how they will be perceived for the purpose of studying and designing RAS (chapters 6, 7 and 8).

However, as far as RAS is concerned, this is only one side of the coin. The other side concerns RAS in practice. In chapter 1 we have stated that we would examine RAS in practice in the second part of the study, particularly chapters 9 and 10. In chapter 9 we discuss the research methodology of the empirical study.

FOOTNOTES

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10. Ibid., P.247.
11. Ibid., P.247.
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14. Ibid., P.249.
15. Ibid..
16. Mintzberg, Henry, "The Structuring of Organisations", Prentice-Hall Inc., Englewood Cliffs, N.J., 1979, P.22.
17. Ibid., P.22.
18. Ibid., P.22.
19. Miller, op. cit., P.289.
20. Ibid.
21. The data they collected through their first study. See Lawrence and Lorsch, op. cit.
22. Lorsch, Jay W. and Paul R. Lawrence (eds.), "Studies in Organisation Design", Richard D. Irwin, Inc., Illinois, 1970,

p.11, 41, and 42.

23. Allen III, Stephen A., "Corporate-Divisional Relationships in Highly Diversified Firms", in Jay W. Lorsch and Paul R. Lawrence (eds.) op. cit.
24. Chenhall and Morris have examined the impact of interdependence among other contextual variables, on the perceived usefulness of management accounting systems. Although they used Thompson's typology however, they regarded it in such a way as to reflect what we have called intradepartmental dependency in terms of "the extent of exchanges between different sections within the subunit.... (or) the change of output that takes place between segments within a subunit". (pp17 and 18.) Based on this the study is out of the scope of the present study as far as the interdependencies are concerned and therefore will not be reviewed here. See, Chenhall, Robert H. and Deigan Morris, "The Impact of Structure, Environment, and Interdependence of the Perceived Usefulness of Management Accounting Systems", Accounting Review, Vol. 61. January 1986.
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CHAPTER 9 THE EMPIRICAL STUDY: RESEARCH METHODOLOGY

9.1 GENERAL

9.2 THE OBJECTIVES

9.3 RESEARCH METHOD

9.4 THE FIRST DRAFT OF THE QUESTIONNAIRE

9.5 THE PILOT STUDY

9.6 THE SAMPLE: NATURE AND SIZE

9.7 SENDING THE QUESTIONNAIRE

9.1 GENERAL

In chapter 1 we highlighted the gap between accounting theory and practice. This gap in fact has been recognised by both accounting researchers and practising accountants. However, instead of working towards closing the gap, both sides have tended to criticise each other. Practising accountants criticise accounting researchers' view of management accounting as being irrelevant, while accounting researchers criticise accountants in practice for failing to adapt to new techniques.⁽¹⁾ The researcher's view is that this gap opened up when; 1) accounting researchers started to conduct accounting studies on the individual level instead of the organisational level⁽²⁾, and 2) accounting problems began to be discussed in the abstract without consideration being given to them in their natural state.⁽³⁾ In the previous chapter we examined RAS in theory. It is now time to examine RAS in practice. This and the following chapter of this study will be devoted to the collection and analysis of information regarding RAS in practice.

The literature survey which the researcher conducted revealed very few empirical studies dealing with RAS in practice. Mauriel and Anthony,⁽⁴⁾ and Reece and Cool⁽⁵⁾ examined the extent to which investment centres were prevalent in the USA and how the investment centre's performance was measured in practice. About twenty years after Mauriel and Anthony's study, Coates et al⁽⁶⁾ conducted a preliminary survey to investigate this issue in the UK but among a very small sample of organisations in comparison with the samples of the American studies. Awadallah examined the approaches to variance analysis in practice, but only with regard to costs and within one type of responsibility centre, namely, the cost centre.⁽⁷⁾

Concerning the use of accounting measures or information in the evaluation of managerial performance, the accounting literature provides us with the two leading studies of Hopwood and Otley. Hopwood's study in general indicated that there was very limited use of accounting measures or information in managerial performance evaluation. Moreover, the study showed that an exclusive use of accounting measures, i.e. budget constrained style, is usually accompanied by dysfunctional effects.⁽⁸⁾ Otley on the other hand has attempted to extend the validity of Hopwood's findings about the use of accounting measures in managerial evaluation, by examining them in different types of responsibility centres, i.e. profit setting centres instead of cost setting centres.⁽⁹⁾ Contrary to Hopwood's finding, Otley showed that in general, managers' feelings and attitudes do not appear to be strongly related to their superiors' style of evaluation and that the reliance on accounting measures does not lead to dysfunctional behaviour as reported by Hopwood.⁽¹⁰⁾

This discrepancy in the findings led some accounting researchers, e.g Brownell, and Govindarajan to conduct their studies as attempts to reconcile the findings of Hopwood and Otley. Brownwell on the one hand has argued that a better understanding of the relationship between evaluation styles, as proposed by Hopwood, and performance, can be achieved by moderating budgetary participation as a variable between evaluation style and performance.⁽¹¹⁾ Govindarajan, on the other hand, has attempted to make a reconciliation between Hopwood and Otley findings, by introducing environmental uncertainty as an important variable which affects the choice of performance evaluation style.⁽¹²⁾

Based on the above review of the empirical studies of RAS in

practice, we might state the following three points:

1. Each of the above studies has concentrated, mostly, on only one aspect of RAS. There is in fact a shortage of comprehensive surveys of actual practices of RAS. There are many questions which have not been answered by prior research, according to our literature survey, and which require a comprehensive study covering as many issues as possible relating to RAS in practice.

2. The above studies, except for Govindarajan's study, have not examined RAS in its organisational context. For example, Hopwood has conducted his study in cost centre settings, and Otley's study was carried out in profit centre settings. However, what contextual variables had led the former settings to be structured in terms of cost centres and the latter to be constructed in terms of profit centres is not known. Also, is there a relationship between the type of responsibility centre and industry, and between both of these and performance evaluation criteria, etc? In general, as Chenhall and Morris have indicated, there is a shortage of empirical work in the area of contingency theory and management control systems, e.g. RAS.⁽¹³⁾

3. The studies which examined the use of accounting data in performance evaluation concentrated on the users of the accounting data, or the persons who were subject to the accounting data for the purpose of managerial performance evaluation. Thus the issues have not been considered in relation to the preparers of the accounting data, i.e. the accountants.

Taking these three points into consideration, then, we can describe this empirical study as an exploratory study which attempts to investigate RAS in its organisational context in practice. The

following section will discuss the objectives of this empirical study.

However, one point needs to be mentioned here to eliminate any contradiction that might emerge between the theoretical and empirical discussion on the contingency variables, particularly size. In chapter 5, we mentioned the reasons for excluding size from the contingency variables which are, theoretically, believed to have an effect on RAS. Nevertheless, size was included in the present empirical study along with the other contingency variables. The reason for this is that the study is the first to investigate empirically the impact of contingency variables on RAS and we were interested in ascertaining: first, whether contingency variables, generally speaking, do have an impact on RAS in practice, and second, specifically which ones have this impact. Given the existing gap between theory and practice, as we indicated at the beginning of this chapter, it seemed better to examine as many of the potentially influential contingency variables as possible rather than only selected variable(s).

9.2 THE OBJECTIVES

As we indicated, our intention in this empirical part of the study is to collect information with respect to RAS in practice. In particular, we shall direct the empirical study to achieve the following objectives:

1. To ascertain whether RAS in practice is widely applied or not.
2. To investigate accountants' views with regard to some contextual variables. In fact, in the organisational literature,

variables such as technology, environment, size, etc. are very familiar and have general acceptance as influential variables on organisation structure. These contextual variables and their impact on organisation structure have been transmitted to the accounting literature and were examined in relation to accounting systems, e.g. Waterhouse and Tiessen, Gordon and Miller, Emmanuel and Otley, etc. However, given the fact that organisational studies were conducted by nonaccounting researchers, e.g. Woodward, Lawrence and Lorsch, Burns and Stalker, Pugh et al., etc., and that the information which led to the recognition of these variables and their impact on organisational structure was collected from nonaccounting managers or participants, then the need to know how the accountants perceive these variables can be appreciated. Some knowledge of this is necessary before we can ask the accountants about the relationships between these variables and RAS.⁽¹⁴⁾

3. To gain a knowledge of the types of responsibility centres which are used in practice. Also, one of the main interests with regard to RAS in practice is to know on what basis responsibility centres are established. In other words what variables play a role in choosing and designing the responsibility centres in practice?

4. To identify how "authority" and "controllability" are determined and applied in practice. There is almost no need to state that these two issues represent two main pillars upon which the RAS structure is built.

5. To find out the way accountants perceive performance evaluation within RAS. For example, the accounting literature indicates that accounting reports are not widely used in managerial performance evaluation. Thus it will be interesting to know whether

accountants realise this or not.

6. To highlight the sort of communication between management accountants and other functional managers in the organisation. Our interest here is to know whether management accountants in practice consider that communication with other managers is important or not? If so, what methods of communication are used? How frequent is this communication, etc.? This area of investigation, in fact, represents one of the most neglected areas in researching management control systems.

7. To know whether management accountants are satisfied with their RAS's or not. Given the gap between theory and practice, and the fact that accounting practice, as it is argued by academics, is behind accounting theory, then it is worth investigating to what extent management accountants are satisfied with their RASs.

9.3 RESEARCH METHOD

The next decision a researcher has to take in an empirical study context concerns the research method. In general, there are two approaches to data collection: structured interviews, and mailed questionnaires. In this research we have selected the questionnaire method. This can be justified as follows. In the case of using structured interviews, since the researcher will be the only field worker, the number of organisations must be limited for the interviews to be conducted effectively and efficiently. This might explain why the number of organisations included in Coates et al study and similar ones was small in comparison with other studies. Such a small number of organisations, however, provides an

insufficient basis to achieve some of the objectives of this study, regarding, for example, the prevalence of RAS in practice, the types of responsibility centres which are used in practice, etc. This constraint led to the researcher's decision to use the mailed questionnaire. In a similar study Jones has justified using this method of data collection by stating that, "this approach would have the advantage of covering a large number of companies, but with certain penalties." (15)

These disadvantages are well explained in the Social Science research books; but what concerns us here is whether or not the present study suffers from these disadvantages. Oppenheim has mentioned six disadvantages of using questionnaires. First, eliminating the interviewer means that the questionnaire has to be much simpler and no additional explanation can be given. Second, a mail questionnaire cannot hope to cover people of low intelligence or of very limited educational background. Third, it lacks the personal introduction of the research by the interviewer, though a good covering letter can be helpful. Fourth, mail questionnaires are usually perused before being answered, so that respondents often skip questions or come back to them later, all of which may bias the responses. Fifth, people often pass on mail questionnaires to others for completion. Sixth, by far the greatest disadvantage of mail questionnaires is the fact that they often produce very poor response rates. (16) The following discussion suggests that the biggest drawback of using the questionnaire in this study will relate to disadvantage number six. Since we intend asking management accountants about accounting phenomena which we think they are familiar with, i.e. RAS, then making the questionnaire simple should

be advantageous to the study, i.e. it should lead to a high response rate. Given the fact that accountants are generally well educated then the second disadvantage is irrelevant to this study, i.e. it should lead to a high response rate. Given the fact that accountants are generally well-educated then the second disadvantage is irrelevant to this study. A covering letter will be sent with the questionnaire to eliminate, or at least reduce, the impact of the third disadvantage (see appendices A and B). The fourth disadvantage might have a very limited effect on the present study, as questions are generally independent of each other and following a specific order in answering the questionnaire is not essential. The present study is naturally open to the fifth disadvantage; however, it is likely that the distortion in the sample will be very limited. As Oppenheim in his discussion of this disadvantage explains, the distortion in the sample will be generated as a result of the respondents "who receive a questionnaire about lawn mowers, and they do not own one, they will pass it on to someone who does."⁽¹⁷⁾ In this study the likelihood that one company in the sample will pass the questionnaire to another company is very limited. However, what is likely to happen is that the chief accountant may pass it on to another accountant for completion. It is unlikely that the questionnaire will be passed to and answered by somebody outside the accounting department and/or accounting personnel, e.g. marketing department and/or personnel, since the questionnaire investigates an accounting phenomena and needs an accounting background. Our case, in fact, is not similar to the case discussed by Oppenheim as a source of distortion, because whether the questionnaire is completed by the chief accountant or any accounting personnel, they are in the

end all accountants whom we want to question. Finally, in this study, as will be discussed later, some steps, e.g. shortening the questionnaire, providing stamped, self-addressed envelopes, will be taken to reduce the impact of the sixth and final disadvantage of using the questionnaire.

The questions in the questionnaire are mainly formed as multiple-choice, closed questions. All the questions are long questions. Sudman and Bradburn argued that longer questions are better because, 1) they provide memory cues and act as a form of aided recall, and 2) they take more time to read and therefore give more time for the respondent to think.⁽¹⁸⁾

Some of these questions were formed to reflect issues that have been investigated and discussed by other studies, and have been included here for one or both of the following reasons:

1. the issue needs to be investigated once more since the prior studies produced contradictory results, e.g. about the purpose of responsibility accounting reports, and/or

2. the issue needs to be elaborated by examining it in the light of other variables, e.g. what variables are behind the establishment of responsibility centre(s), etc.

Other questions were constructed for the purpose of this study. The issues which are reflected by such questions, as far as the researcher knows, have not been investigated by the prior studies, e.g. the management accountant's perception of technology, environment, etc; ways and methods of communication between the management accountant and other functional managers, etc.

9.4 THE FIRST DRAFT OF THE QUESTIONNAIRE

In an exploratory study such as this, a researcher might be motivated to inquire about as many issues as possible within the subject under investigation. This in turn might make the questionnaire too long and therefore discourage the participant(s) from completing it. To avoid this a researcher has to make a number of trade-offs between issues, to decide which should be included in the questionnaire and which should be excluded. In this study, the trade-offs between the issues of RAS in practice resulted in thirty questions.

The original questionnaire consisted of four sections; later it was split into two questionnaires, each section serving one or two of the objectives mentioned above. Section one investigates the accountant's viewpoint or perception regarding four contextual variables; namely, technology, environment, size and interdependencies. The accountant was given different definitions (or conceptualisations) and/or dimensions (or measures) for each variable and was asked to choose the one which comes closest to his perception. Since this study is probably the first one to investigate this issue with accountants, it was thought that providing the accountant with alternatives to choose from would be better than providing him with only one choice. In this latter case the risk that the accountant's perception or viewpoint does not match the definition provided will be greater than in the case of providing him with more than one alternative. However, in order to reduce the possibilities of nonresponse, at the end of each subsection devoted to investigating each contextual variable, there is a space for use where the respondent does not find his viewpoint or perception

covered within the alternatives given to him. The accountant's perceptions with regard to these contextual variables are also used in section two of the questionnaire.

Section two was designed to achieve objectives 2 and 3. The accountant is given four types of responsibility centres and asked to tick the types which are used by this organisation. This enables us to rank the types of responsibility centres according to their prevalence in practice. In addition, this section identifies the variables which play a role in choosing and designing responsibility centres in practice. The accountant is provided with a list of all possible variables, collected from the accounting as well as the organisational literature, which might have an influence on RAS' structure. Four of them have been mentioned in section one. The other variables do not raise problems with regard to their meanings or concepts. We also want to know how the chosen variables influence RAS and therefore a space is given for the respondent's comment. The issue of authority and controllability within RAS is covered in this section through seven questions. These questions are designed to reflect issues raised in the accounting literature. The point here is to find out the extent to which there is a convergence or divergence between the accounting literature and practice, with respect to authority and controllability within RAS.

Performance evaluation, through RAS in practice and as accountants conceive it, is the subject of the third section. This section enquires about the objectives of RAS' reports; the extent to which performance evaluation relies on these reports, and finally, the contents of the reports. First the accountant is asked to indicate the relative importance of performance evaluation as an

objective, in relation to the other objectives which might be achieved from preparing responsibility accounting reports. Moreover, it is interesting to determine the extent to which these reports are used in evaluating the performance of the responsibility centres and their managers. Our concern here is with the priority given to these accounting reports. This provides us with an indication of the accountant's faith in the efficiency and sufficiency of these reports for performance evaluation. Performance evaluation can be achieved using financial/quantitative criteria and/or nonfinancial/qualitative criteria. The accountant is therefore provided with two lists, each of which reflects one of these two kinds of criteria. Also he is asked to state what criteria are embodied in the responsibility accounting reports he prepares and what criteria he would like to see embodied. The issue of performance evaluation criteria is reflected in the last three questions of this section.

The final section is concerned with the accountant's approach to carrying out his job, and in particular, the relationship between him and other departmental or responsibility centre managers. Thus, this section will show the importance of communication between him and other managers, the frequency of this communication, the methods used by accountants to deal with these managers, etc. The final question in this section of the questionnaire investigates the accountant's satisfaction with RAS in his organisation.

9.5 THE PILOT STUDY

The first draft of the questionnaire was tested in two successive stages. In the first stage, the questionnaire was tested among the members of staff of the Department of Accounting and

Finance, University of Strathclyde. Five copies were distributed. Based on this, some modifications were introduced into the questionnaire. There were some concerns regarding the length of the questionnaire. The modified questionnaire was taken to the second stage of the pilot study and was distributed among practising accountants who were taking the MBA course at the Strathclyde Business School (1986-1987). Their main reservation was with regard to the first section of the questionnaire which examines the accountant's perception regarding the four contextual variables as well as the questions which connect the issues of RAS and these variables. They cast doubt on the sufficiency of the practising accountant's background to deal with such issues. One of the participants expressed this by stating that, "I have become familiar with issues, i.e. technology, environment, etc., as a result of the course I am currently doing. I doubt that many practising accountants will be familiar with these issues." The practising accountants also directed the researcher's attention to the point that the questionnaire could be too long. At the same time, a copy of the modified questionnaire was sent to the Chartered Institute of Management Accountants (CIMA) asking for their views before sending out the questionnaires. As with the practising accountants they expressed their worries regarding the issues of the first section and the issues which combined RAS and the contextual variables.

In the light of the pilot study, there were three options to choose from:

1. To omit all the questions which investigate the accountant's perception regarding the contextual variables as well as the questions which connect RAS's issues and these variables, or

2. To keep the above questions and to shorten the questionnaire by omitting some other issues included in it but not linked with the contextual variables, e.g. issues and questions regarding the communication between the accountant and functional managers, or

3. To compromise between the above two alternatives.

Careful thought resulted in a rejection of alternatives one and two. Option one isolates RAS in practice from its organisational context, and, in turn, conflicts with our aim in this study, that is, to examine RAS in its organisational context. The second option, though it shortens the questionnaire, means that we lost the opportunity to examine some issues which have not been examined before. This left only option three for the researcher to follow. The compromise has been achieved by, first, reducing the number of questions and, second, splitting the original questionnaire into two independent parts of questionnaires. From examining the original questionnaire it was found that sections 1 and 2 could be included in one questionnaire, (hereafter Q.1), as they are interrelated. These two sections reflect the contextual variables, and the RAS issues which we proposed to investigate. (See Section 7-4.) Also, it was found that sections 3 and 4 of the original questionnaire could be included in another, separate questionnaire, (hereafter Q.2.). Sections 3 and 4, though they are not interrelated, nevertheless deal with issues within the accounting function which the accountant should be familiar with. (See Section 7-4.)

By splitting the questionnaire, we, in fact, follow other researchers who took the same decision in similar studies. First, we can mention Penning's study as an identical case where the data was

collected through two independent questionnaires.⁽¹⁹⁾ Pennings justified this by stating that "since the amount of information desired from questionnaires was too great to be obtained from one questionnaire, two are used."⁽²⁰⁾ In this study the two parts of questionnaires were distributed among two subsamples of the same category of subjects, i.e. the brokers of 40 branch offices of brokerage organisations. From the accounting studies we can cite the studies of Hays and Khandwalla among others.⁽²¹⁾ In all these studies as well as ours, the need for collecting a great amount of information is the justification for splitting the information required between the two parts of questionnaires.

This split has shortened the length of the questionnaires. However, from the pilot study described above, we would have expected that Q.2 would be easier to answer than Q.1. If this assumption were true then the response rate of Q.2 would be higher than the response rate of Q.1. Another decision was whether to distribute both parts of questionnaires among the whole sample or whether each should be distributed among a subsample of organisations. This question will be discussed after illustrating the procedures which were followed in choosing the sample.

9.6 THE SAMPLE: NATURE AND SIZE

There is no need to argue that RAS can be applied by all kinds of organisations, e.g. profit and nonprofit, private and public, manufacturing and service, etc. However, for reasons of personal preference and experience, the researcher chose the sample of organisations for this study from manufacturing organisations in the UK.

Miller et al have investigated the samples of most of the organisational studies, to find a solution to the debate among the organisational theorists regarding three issues:

1. The homogeneity or heterogeneity of the sample.
2. The size of the sample.
3. The sampling method or technique.

They suggested that the sample of organisations should be heterogeneous, large and probabilistic.⁽²²⁾ Following Miller et al, with some adjustments for the purpose of this study, we can suggest that the attributes of our sample be as follows:

1. Heterogeneous to an extent. It reflects two production systems, namely mass production and process production. For each type of production system we chose two industries. The four chosen industries in this study are as follows:

- | | | |
|-----------------------------------|---|--------------------|
| A. Pharmaceutical Industry | } | Process Production |
| B. Food Industry | | |
| C. Radio and Electronics Industry | } | Mass Production |
| D. Motor Vehicle Industry | | |

Choosing the sample on the industry level has been advocated by a number of organisational theorists; among them are Hirsch and Perrow.⁽²³⁾ This approach was followed by Merchant when he investigated the differences in approaches to budgeting in the electronics industry.⁽²⁴⁾ Also, for the purpose of highlighting the differences among the UK companies in regard to financial planning and control, and in particular company forecasting practices, Jones drew his sample from the organisations of four industrial groups,

namely, mechanical engineering, clothing, building and construction, and food, drink and tobacco.⁽²⁵⁾ The benefit of this approach to choosing the sample is that it enhances the possibility of doing comparative research. That is, by controlling the effect(s) of some variables in the sample organisations of an industry, the impact of the variable(s) under investigation can be better measured.

In this study it was considered that this limited heterogeneity of the sample would allow the researcher to make a number of useful comparisons regarding RAS in practice, 1) between the companies selected in each industry; 2) between the industries within each production system; and 3) between the production systems. For example, does technology have a similar impact on RAS in companies of the same industry, and in companies of the two industries within the same production system, (e.g. mass production) or not? If so, does this technological impact of RAS vary between the two production systems or not? Also, based on Woodward's findings, is classical organisation theory applicable in mass production organisations more so than in process production organisations? Assuming that we have two definitions of authority, i.e. a classical one and a modern one, do accountants in mass production companies perceive authority in a different way from their counterparts in the process production companies? Could there be differences between the industries regarding the performance evaluation criteria which are used or applied as a result of the differences between the industries' environments? Is the communication, i.e. importance, method and frequency, between an accountant and other functional managers dependent on the type of industry? Of course, useful as well as manageable comparisons such as these cannot be made with either a

completely homogeneous sample or an entirely heterogeneous sample.

2. Medium size sample. In accounting studies, the size of the sample ranges from 1697 organisations⁽²⁶⁾ to two organisations.⁽²⁷⁾ However, studying RAS in its organisational context and applying a contingency theory framework, by necessity requires a large number of cases to give the study some validity.⁽²⁸⁾ In this study the actual size of the sample was 181 companies distributed as follows:

A. Pharmaceutical companies	65
B. Food companies	33
C. Motor Vehicle companies	42
D. Radio and Electronics companies	41

This sample resulted from the application of the following criteria:

(1) The chosen company should employ 100 or more employees. This is consistent with our assumption that only large companies would apply RAS.⁽²⁹⁾ This assumption can be supported by the findings of Duck's survey, of the use of management accounting techniques in manufacturing industries. He found that among small firms there was a wide-spread lack of appreciation of the advantages of management accounting techniques.⁽³⁰⁾ However, the issue is, how large should an organisation be in order to be included in the sample? Although there is no universal criterion for distinguishing between small and large organisations, it can be said that there is some agreement among prior studies that an organisation is regarded as small if it employs less than 100 employees.⁽³¹⁾

(2) The main product or activity of an organisation is within the range of products or activities specified above. Using the "Standard Industrial Classification" (SIC)⁽³²⁾ and "Key British Enterprises: Britain's Top 20000 Companies"⁽³³⁾ (KBE), the following

explains how the companies were chosen for the purpose of this study. In SIC, pharmaceutical products are given Code 25700. Among the companies which are listed in KBE as pharmaceutical manufacturers, we chose companies which regard pharmaceutical products as their only, or main products. In the latter case, the company might produce secondary products, e.g. chemicals (SIC 25600), detergents (25810), cosmetics (25820), etc. However, if pharmaceutical products were the secondary products, then the company was excluded from the sample. From the companies listed in Appendix C, Arthur H. Cox & Co. Ltd. was chosen as it produces only pharmaceutical products (section 1-340). Also Jeyes Ltd. (section 1-708) was chosen since its main products are the pharmaceuticals, though it also produces chemicals (25600). But consider, for example, Croda Polymers International Ltd., listed within the section of companies producing pharmaceuticals in KBE. Its trade is as follows: manufacturers and distributors of painters' sundries, paints and powder coatings and resins. Its SIC is mentioned in the following order: 25520. 25510. 25700, 25670 (section 1.348). The same can be stated with respect of Givandan & Co. Ltd., which trades as: manufacturers of aromatic chemicals, perfumery, specialists and international specialists in creative perfumery and flavours, and its SIC are: 25820, 25700. These two companies as well as others, were not chosen as they did not satisfy the second criteria, though some of them employ over 100 employees.

In the food industry we chose the companies which operate in the following activities:

- a. production of frozen meat products (SIC 41222)
- b. processing of fruit and vegetables (SIC 41470)
- c. freezing fruit and vegetables (SIC 41471)

d. fish freezing (SIC 41501)

Although the number of companies listed in KBE under these four food manufacturing activities is 82, the sample was only 33, due to the fact that many of the listed companies employ less than 100 employees. This small number of employees characterises the food industry in comparison to the other three industries chosen in this study. However, it was decided to stick with the first criterion, i.e. choosing the companies which employ 100 or more, for the purpose of consistency in choosing the whole sample. Also it was noticed that big companies are engaged in more than one activity. For example, Waldens Wiltshire Foods Ltd., which employs 700 workers, produces meat (41222) and fish (41501). This company will be listed twice in KBE, once under SIC 41222 and also under SIC 41501. Eliminating duplications such as these also reduced the total number of companies mentioned above to the number which is reflected by the sample.

The motor vehicle companies which represent the first of the two mass production industries embodied in the sample, are listed in SIC under the general heading of "Motor Vehicle and their Engines" (35100). This general heading includes the following subheadings:

- a. Manufacturers of passenger cars (35101)
- b. Manufacturers of commercial vehicles (35102)
- c. Manufacturers of motor vehicle engines (35103).

However, there were difficulties here too. First, what has been stated with regard to the above two industries was valid in the motor industry. For example, Laird (Anglesey) Ltd., has the following SIC: 22100, 22000, 32042, 35102 as its trade is: general engineers and metal fabricators, manufacturers of wide range of military equipment,

including bridging equipment and the rotopress refuse collection vehicle (section 1.750). In fact, applying the above two criteria resulted in a sample which reflected the real motor vehicle manufacturers in the UK, e.g. Peugeot-Talbot Motor Co., Jaguar, etc. (see appedix C.)

Finally radio and electronics industry is reflected by SIC 34430, i.e. manufacture of radio and electronic capital goods. Although most of the companies in this industry are mainly engaged in producing this type of product, many employ less than 100 employees. Excluding the latter companies led to a sample of 41 companies.

(3) Using probability theory. Miller et al stated that any sample of organisations should be probabilistic. This is, of course, in order to eliminate, or at least reduce, the bias in choosing a sample from a population of organisations. In our sample, we included all the companies of the four industries which satisfied the above two criteria. In other words, the sample has embodied all the population. Therefore, there was no reason to apply any of the sampling methods.

The sample includes subsidiary as well as independent companies. No distinction was made between these two forms of organisations. The only condition for including any of them is that the organisation has to satisfy the two criteria specified above. Parent companies were excluded from the sample on the following grounds. Given the trend among parent companies to diversify their activities for reasons well known in finance and financial management, then it is likely that the parent company will engage in activities other than those undertaken by their subsidiaries included in the present sample. If this is the case, then it becomes difficult to determine

the holding company's main activity for inclusion in the sample. For example, the Laird Group plc has the trade: holding company for group involved in specialist engineering and transport systems, sealing systems, service industries. This trade is reflected by the following SIC: 83960, 36202, 25300, 35210, 48123, 22100, 22000, 77002, 77001, 66111, 48122, (section 1.751). No doubt the determination of the main activity of the parent company within this diversity of activities is arbitrary. Moreover, as Scapens et al have argued, it is logical with this diversity of activities that the corporate head office acts as a holding company to buy and sell operating companies rather than to engage in a particular productive activity.⁽³⁴⁾ In this situation it is possible that the holding company will be interested in establishing RAS s in its operating companies more than in establishing systems in the corporate head office. This is in addition to the fact that not all the parent companies of the companies operating in the UK and included in the present sample are British. Therefore it would be wrong to include the parent companies which are located in the UK and overlook the parent companies which exist outside the UK. However, none of the organisations in the sample was a branch. The majority of the organisations included in the sample performed the three main organisational functions, i.e. production, marketing, and research and development. The organisations in the sample are widely distributed along the scales of capital, sales and number of employees, as can be seen in tables 1-3.

Table (1)
Distribution of the Organisations according to the capital

Scale	Foods	Pharma- ceuticals	Motor Vehicle	R&E	Totals
50000 and less	12	12	10	12	46
50001 - 100000	4	5	7	3	19
100001 - 150000	5	1	1	2	9
150001 - 200000	2	2	2	2	8
200001 - 300000	2	6	-	7	15
300001 - 500000	-	5	4	3	12
500001 - 1000000	2	16	5	4	27
1000001 - 2000000	1	4	2	1	8
Over	5	14	11	5	35
Unspecified	-	-	-	2	2
Totals	33	65	42	41	181

Table (2)
Distribution of the organisations according to the Sales turnover

Scale	Foods	Pharma- ceuticals	Motor Vehicle	R&E	Totals
less than 1000000	-	-	-	-	-
1000000 - 5000000	5	13	8	11	37
5000001 - 10000000	4	12	7	11	34
10000001 - 20000000	7	10	11	5	33
20000001 - 50000000	6	17	2	5	30
50000001 - 100000000	2	7	4	3	16
Over	7	5	10	3	25
Unspecified	2	1	-	3	6
Totals	33	65	42	41	181

Table (3)
distribution of the organisations according to the number of employees

Scale	Foods	Pharma- ceuticals	Motor Vehicle	R&E	Totals
100 - 500	18	40	25	28	111
501 - 1000	3	8	9	4	24
1001 - 1500	2	5	3	-	10
1501 - 2000	3	5	-	1	9
2001 - 2500	1	-	-	1	2
Over	5	4	5	4	18
Unspecified	1	3	-	3	7
Totals	33	65	42	41	181

9.7 DISTRIBUTING THE QUESTIONNAIRES

As we have pointed out, after splitting the questionnaire into two parts, i.e. Q.1 and Q.2, a question was raised regarding whether both parts should be distributed among the whole sample of organisations, i.e. among the 181 companies, or should each part be distributed among a subsample? In fact the first alternative was rejected since each respondent, in the end, would receive a long questionnaire, whether in one copy or in two copies. In turn this might discourage the respondent from completing both parts, or, at least, one of them. There were also the problems regarding which part should be sent first and why, and when the second part should be sent, i.e. after a week, two weeks, etc? The researcher believed that the second alternative was better as it avoided the above problems. Also its effectiveness could be increased as follows. First, at the end of each part we could inform the respondent that he had completed one part of the questionnaire and that the second part could be sent to him if he were interested. This might motivate the

respondent to be more cooperative than in the case of imposing the second part on him as in the first alternative. Second, since each part would, initially, be distributed among half of the sample, and since we were keen to know the viewpoint of as many practising accountants as possible, then we could indicate within the preface notes that a group of accountants could collectively participate in answering it.

Based on what has been stated so far, the whole sample of organisations, i.e. 181 companies, was split into two subsamples. Table 4 shows these two subsamples and the type of questionnaire which was sent to each. Each copy of the questionnaire was attached to a stamped addressed envelope. Some of the respondents asked for the second part of the questionnaire, but not as many as we would have desired. Finally, after three weeks from the date of sending out the questionnaires, the reminders were sent to the organisations. Some other responses were received after these reminders were sent. Table 4 summarises the final situation regarding the questionnaire. As can be seen, from 181 companies approached, 40 responded. Of these, 28 companies completed only one part of the questionnaire, i.e. either Q1 or Q2. The rest of the companies, i.e. 12 companies, completed both parts of the questionnaire. This resulted in a total of 52 copies of the questionnaire being distributed (26 copies of Q1 and Q2). The respondents who completed both parts of the questionnaire were not classified as a separate group; rather their responses were included as part of the response to each questionnaire. Thus we have two groups of responses, i.e. responses to Q1 and responses to Q2. We believe that this categorisation will not cause any difficulty in the analysis since the responses were

collected from the same class of subjects, i.e. accountants, and concerned the same phenomenon, i.e. RAS s in practice. Although we encouraged the completion of the questionnaire on a group basis, only two copies were completed on this basis (a three person group). This problem of receiving individual responses was also confronted by Scapens et al. (35)

The above 52 copies were answered by 40 participants, categorised as follows: 19 financial managers/controllers, 14 chief accountants, 1 treasurer, and 6 management accountants.

Table (4)
The Final Situation regarding the questionnaires

Description	Foods		Pharma- ceutica		Motor Vehicle		R&E		Totals	
	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2
Sent out	16	17	32	33	21	21	21	20	90	91
Positive response received	4 25%	4 24%	12 38%	7 21%	3 14%	4 19%	2 10%	4 20%	21 23%	19 21%
Negative responses	1		3		4		2		10	
No responses	24		42		31		32		129	
Positive responses	4	4	12	7	3	4	2	4	21	19
No. of respondents who received Q.2 and asked for Q1.			3		2				5	
No. of respondents who received Q.1 and asked for Q.2		1		4		1		1		7
	4 25%	5 28%	15 43%	11 30%	5 22%	5 23%	2 10%	5 25%	26 27%	26 27%

So far, this chapter has described all the procedures which were followed in designing and sending the questionnaire as a method of data collection used in this study. The following chapter provides an analysis of the collected data.

FOOTNOTES

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CHAPTER 10 THE EMPIRICAL STUDY: ANALYSIS AND RESULTS

10.1 GENERAL

10.2 Q.1; SECTION 1: THE STRUCTURAL VARIABLES

10.3 Q.1; SECTION 2: RESPONSIBILITY ACCOUNTING SYSTEM:
CENTRES, AUTHORITY AND CONTROL

10.4 Q.2; SECTION 2: RESPONSIBILITY ACCOUNTING REPORTS;
PURPOSES AND CONTENTS

10.5 Q.2; SECTION 3: ACCOUNTING FUNCTIONS; COMMUNICATION
AND METHODS

10.6 Q.1 and Q.2: SATISFACTION WITH RESPONSIBILITY
ACCOUNTING SYSTEMS IN PRACTICE

10.1 GENERAL

In this chapter we will present and analyse the results of the questionnaires which were received. In the previous chapter we indicated that a consequence of using the questionnaire method is the possibility of a low response. This in fact is the case with the present study as each of the two parts of the questionnaire, ie. Q.1 and Q.2, achieved a 27% response rate. The achievement of the same response rate for both questionnaires might allow us to question the point made by some people who participated in the pilot study. That is, as far as practising accountants are concerned, Q.1 would be more difficult to complete than Q.2. We attempted to increase the response rate by attaching to the questionnaire a stamped self-addressed envelope, and by sending reminders to the organisations asking for their co-operation. However, two points can be mentioned regarding the response rate achieved in this study.

First, there is no specific percent which should be achieved before starting the analysis. In fact what can be regarded as a reasonable response rate is a matter of judgement which depends on the circumstances of each survey. Therefore, 74% of the effective sample of the Family Expenditure Survey of the Ministry of Labour had been described as a low response rate,⁽¹⁾ whereas 56% of the effective samples of physicians involved in the case for hospital merger was regarded as a reasonable response rate.⁽²⁾ Nevertheless in comparison with the other studies which used the questionnaire method, the response rate achieved in this study is reasonable.

Awadalla in his investigation of variance analysis in practice achieved a 22% response rate from a cross-sectional sample of organisations.⁽³⁾ The response rate achieved in our study was also

greater than that achieved by Hays, whose 23% was considered reasonable for data analysis and findings.⁽⁴⁾ In a similar exploratory study conducted by Jones, 1697 organisations were included in the sample; however only 550 questionnaires were returned, i.e. 32% response rate.⁽⁵⁾ Scapens et al chose a sample of 744 companies to examine the accounting methods used to control divisional capital investment. The replies were 331, of them 300 questionnaires were usable. Only 221 responses were received from divisionalised companies. Consequently and in the light of the purpose of their study, the real response rate is 29%.⁽⁶⁾ Tomkins has achieved a lower response rate from that achieved by Scapens et al or that achieved in the present study. In Tomkins' study of the financial planning in divisionalised companies a sample of 200 companies (groups) was chosen, but "the response was disappointing in terms of the number of companies prepared to give information. However, 65 were kind enough to co-operate with the study, etc."⁽⁷⁾ However, given that only 51 of the responding companies were divisionalised, then the response rate will drop to 25.5%.

Second, as can be seen from table 4 in chapter 9, there are differences between the response rates of the four industries included in this study. The highest and lowest response rates were achieved in the pharmaceutical and the radio and electronics industries respectively. Nevertheless, the present study is not odd or unique in this respect. As Oppenheim has pointed out, "the important point about (the) poor response rate is not the reduced size of the sample, which could easily be overcome by sending out more questionnaires, but the possibility of bias. This is because almost invariably the returns are not representative of the original

sample drawn.... non response varies from one survey to another. We cannot overcome this problem entirely."⁽⁸⁾ However, as far as this research is concerned, since there is no apparent reason for the difference between the response rates, we find it difficult to speculate as to why the difference occurs.

It would appear that reasons for not responding rates are common among the studies. In the present study, similar to other studies, the major reasons for not responding are as follows:

1. "Completing questionnaires is time consuming. We cannot afford the time or manpower for such ends. We are all under extreme pressure."
2. "The organisation is participating in another research project, and we have insufficient time to become involved with a second project."
3. "The company does not fall into any of the categories stated in the questionnaire. (This reason was stated by a company manufacturing the most expensive care products in the U.K.)"
4. "The company is a conglomerate and diversified and I am unable to answer the questions in any meaningful way so as to represent the views or circumstances of the company as a group."
5. "The questionnaire is difficult and academic."
6. The company is no longer trading, or the principal business was changed.

The sample was chosen on the industry level in order to make some useful and desirable comparisons. Unfortunately, the low response rates with respect to the food, motor vehicle, and radio and electronic industries might make the result of the comparison insignificant. Therefore in this chapter we present the results on the level of the sample as a whole unless there is a need to

highlight differences between industries regarding some specific issues. The next five sections consider the results of the two parts of questionnaire, i.e. Q.1 and Q.2. All the returned questionnaires were found to be usable. However, as with other studies, there are some questions which have not been answered by some respondents. Nevertheless, these cases are few and are scattered through the questionnaire replies.

10.2 Q1: SECTION 1: THE STRUCTURAL VARIABLES

10.2.1 Technology

In order to examine the accountant's perception of technology, we presented respondents with four different definitions from which to choose. The four definitions accounted for 19%, 15%, 52% and 7% respectively. Despite the fact that none of the definitions acquired a vast majority of the responses, nevertheless, 52% of the practising accountants tended to perceive technology as "the substitution of mechanical equipment for human labour". There is virtually no difference between accountants' perception of technology on the production system level and/or the industry level. In other words, the accountants' perception of technology is independent of the production system and/or the industry.

10.2.2 Environment: Perception

As with technology, the accountant was given three definitions of environment and asked to select one of them. These three definitions were adapted from the organisational literature and reflect different perspectives. As can be seen, the definitions become more precise and specific as one goes further down the list of definitions. The result showed that defining environment in terms of

"the totality of internal and external factors that are taken directly into consideration in decision making in the organisation" scored 77% of the responses. One respondent interestingly stated, "Buildings have environments. I have never heard the word applied to organisations".

10.2.3 Environment: Types

Using two environmental dimensions, i.e. simple/complex and static/dynamic, four different environments were presented to the accountant for him to define the characteristics of his organisation's environment. The result shows that 20 out of 25 respondents (80%) considered their organisations' environment as complex/dynamic. Without denying the fact that the business environment has changed radically in recent years, it is nevertheless surprising that most respondents believed that their organisations operated in a complex/dynamic environment. Although little research has been undertaken on the issue of the environments of the four industries, we have reason to believe that they are not quite as similar as the respondents perceived them to be. In the pharmaceutical industry's environment we find patent regulations, a high degree of predictability in the behaviour of governmental control agencies, and a high degree of control over the distribution and wholesale prices of the products,⁽⁹⁾ all of which suggest that the pharmaceutical industry's environment is a complex/static or simple/dynamic environment rather than a complex/dynamic one. However, for the accountant of a radio and electronics organisation to choose the latter environment is not so strange since the industry does not enjoy any of the privileges which are enjoyed by the pharmaceutical industry. Also, according to Lawrence and Lorsch's

study, the main issue in the food industry is innovation, and this gives the industry's environment its dynamic dimension.⁽¹⁰⁾ However, the external as well as the internal environmental components of the industry are few in comparison with other industries, e.g. the motor vehicle industry; and this in turn, makes it a simple environment. Probably none of the four industries' environments chosen for this study can be described as certain, in the way that Lawrence and Lorsch showed with respect to the container industry's environment. Only two accountants in the pharmaceutical and motor vehicle industries perceived their organisations' environments as simple/static environments.

10.2.4 Environment: Causes of Uncertainty

As we pointed out, three reasons for environmental uncertainty have been identified by nonaccounting researchers and these were aired among nonaccounting managers. These three reasons are as follows: 1) not knowing the causes or consequences of future events; 2) not knowing the outcomes of a specific decision; and 3) the existence of a time lag between taking a decision and receiving a definitive feedback about its results. In this study we were interested in knowing whether accountants perceive environmental uncertainty in the same way as nonaccountants. If so would they give these three causes of environmental uncertainty the same order of importance given to them by nonaccounting managers? In order to calculate the relative importance of these causes in creating environmental uncertainty according to the accountant's perception, the responses were assigned weightings of 3, 2 and 1 according to

their rankings. Although the three causes have been recognised by accountants as contributors to environmental uncertainty, there is nevertheless some slight difference with regard to their relative importance. As with nonaccounting managers, practising accountants gave cause number 1, as mentioned in question 1.2.3, the highest relative importance. Causes two and three, however, were perceived by accountants to have almost a similar importance in creating the environmental uncertainty.

10.2.5 Size

Generally speaking, the most frequent measures of size in accounting studies are sales turnover and number of employees, despite the fact that other measures of size can be found not only in the accounting literature but in the organisational literature as well. Question 1.3 in Q.1 was included for two reasons. First to ascertain whether the measures of size used by practising accountants are similar to those used in the accounting studies; and, related to this, to determine whether there are differences between the measures of size used on the organisational level and on the subunit level as well as between the subunits. We would expect that the measure of size which is used for production subunits is different from the one which is used for research and development subunits. Second, as we have pointed out in the previous chapter, some knowledge about this issue is needed before we can investigate the relationship between organisational or subunit size and RAS, i.e. questions 2.3 and 2.11 in Q.1. Table (10-1) shows the result of this inquiry.

Table (10-1)
Measures of organisational and subunit size
according to their relative importance

Measures	Organisation	Subunit		
		Production	Marketing	R&D
A. No. of employees	2	2	2	1
B. Net assets employed	3	4	4	3
C. Sales turnover or volume	1	6	1	4
D. No. of operating units	5	5	6	4
E. Capacity	5	1	3	5
F. Annual capital investment	4	3	5	2

The table ranks the measures according to their importance. The result is produced from counting the numbers of responses which were given to each measure when it was ranked as the first, second or third important measure. From the table it seems that sales turnover and number of employees have the same degree of importance as measures of size in practice as they were predicted to have in the accounting literature. As far as the measures of size are concerned, the result indicates a state of convergence between the accounting literature and practice. Nevertheless, one might be surprised at the low importance given to item (F), i.e. annual capital investment. In fact, in today's business organisations with the stress they lay on innovation and product improvement, we would expect the capital budget to have greater importance than sales turnover on the organisational level since the latter in most cases is dependent on what can be introduced from new and/or improved products.

10.2.6 Departmental Interdependencies

The typology of interdependencies reflected in question 1.4 is taken, with minor modifications, from Thompson's typology. As we

have shown, Thompson's typology is mainly conceptual. However, it has been found empirically to be valid in practice.⁽¹¹⁾ We would expect to find clear clusters of organisations around at least two types of interdependencies, as a result of the work of Woodward and Lawrence and Lorsch.⁽¹²⁾ The first is the sequential type of interdependence which is common in mass production organisations, (in our case, the motor vehicle and radio and electronics industries). The second is the reciprocal type of interdependence, common in process production organisations, (in our case, the pharmaceutical and food industries).

In the food and pharmaceutical industries the main issue is innovation. The incomplete knowledge that each department, (i.e. production, marketing, and research and development), has about the other departments' contingencies makes the reciprocal exchange of information vital in order that each department can perform its function. This is not the case with respect to mass production industries. In addition to the fact that the relationships between the different production departments are sequential, through the assembly production line, the relationships between, at least, marketing and production departments on the one hand, and design and production departments on the other hand are sequential as well. However, this does not mean that reciprocal interdependencies do not exist in mass production organisation, or that sequential interdependencies do not exist in process production organisations, rather it is only a matter of prevalence. That is, we expect sequential interdependencies to prevail in mass production organisations and reciprocal interdependencies to prevail in process production organisations. Table (10-2) shows the distribution of the

sample organisations according to the type of interdependencies and industry.

Table (10-2)
The Sample Organisations according to the Interdependencies

Types of interdependencies	Food	Pharama- ceutical	Motor Vehicle	Radio & Electronics	Total
Pooled	-	4	-	-	4
Sequential	1	4	2	-	7
Reciprocal	3	7	3	2	15
	4	15	5	2	26

From table 10-2 our reasoning on interdepartmental dependencies within the sample organisations is partially supported with respect to the first two industries which reflect the process production industries, as 10 out of 19 respondents described the interdependencies in their organisations as reciprocal. Clearly the reasoning is not supported with respect to the mass production industries, i.e. the last two industries. Generally speaking it appears that reciprocal interdependencies prevail in today's organisations regardless of whether the functional departments are concerned with new products (i.e. food and pharmaceutical industries), or established or standardised products (i.e. the motor vehicle and radio and electronics industries).

10.3 Q.1: SECTION 2: RAS; CENTRES, AUTHORITY AND CONTROLLABILITY

10.3.1: Types of Responsibility Centres

In this part we will present the results of questions 2.1 and 2.2. of Q.1 which investigate the types of responsibility centres

which are used and how long they have been in use in practice. Only one food company from all of the companies in the sample did not employ any type of responsibility centre. As far as the production department is concerned, it is apparent that in practice it takes the form of a cost centre. In 22 out of 25 companies that answered this question the production department is treated as a cost centre. However, 3 companies treated their production departments as profit centres and 6 treated them as investment centres. The implications of this last finding are as follows. First, transfer pricing is not widely used among British companies. Applying the transfer pricing approach, whatever method is followed in determining the prices, (i.e. margin or full cost, market-based or negotiation methods), requires the establishment of profit centres. This requirement is not apparently satisfied among British companies. Contrary to the findings of Coates et al, investment centres are apparently not widely used in practice. Coates et al from their survey of 14 companies claimed that investment centres prevail in the U.K.⁽¹³⁾ The results of the present study, however, produce the opposite finding. Our results are confirmed by the finding that return on investment (ROI) and residual income, which are the main performance evaluation criteria of investment centres, have no wide application in practice, (see question 2.3 of Q.2). This is despite the fact that investment centres are the most prevalent types of centres in US companies.^{(14),(15)}

It was the researcher's intention to word the definitions of responsibility centres in the questionnaire as clearly as possible to avoid ambiguities which were faced in other studies.⁽¹⁶⁾ The result with respect to the marketing centre, however, could be confusing at

the first glance. In the accounting literature, the marketing centre is always viewed in terms of a revenue centre. The result shows that 14 out of 24 companies (58%) which answered this question consider a marketing centre as a cost centre, whereas 11 and 12 out of 24 companies (46% and 50%) consider it as a revenue and a profit centre, respectively. The confusion with respect to marketing centres arises because they were regarded as cost centres as well as revenue and profit centres. Nevertheless, the following two points might clarify the above confusion. First, it is possible that some respondents have considered them as cost centres because each marketing centre incurs some costs in order to perform its functions; i.e. salaries, commissions, travelling expenses, advertising and promotion costs, etc. This might explain the reason why some respondents (12 out of 25 respondents) regard marketing costs as one of the performance evaluation criteria of the marketing centre. But, the marketing centre's main purpose is to sell the organisation's product(s) and to bring in revenues for the organisation. Consequently, it is not only a cost centre but a revenue centre as well. Second, within an organisation, as far as our sample of organisations is concerned, the only responsibility centre which can incur costs and acquire revenues is the marketing centre. These revenues should be enough not only to recover the product costs, i.e. production costs, marketing costs, etc., but to achieve some profit for the organisation as well. In other words the marketing centre is the gate or door through which organisational profit is achieved, and, therefore, can be considered as a profit centre. What has been stated above represents, one possible explanation of the sample's understanding of the nature of the marketing centre.

This confusion, fortunately, does not exist with respect to R&D. The result shows a clear trend to using cost centre as a form of R&D responsibility centre. 24 organisations in the sample have R&D functions. Of these, 21 (88%) use an R&D cost centre. Only one respondent in a radio and electronics company indicated that their R&D centre was regarded as a profit centre. The indications are that the R&D unit is not generally regarded as a profit centre, despite the recent trend in the accounting literature to treat them as such.⁽¹⁷⁾ Also, it seems from the results of our survey that R&D investment centres are not prevalent in practice. Only four organisations (17%) apply this type of responsibility centre. Moreover, we found that this form of R&D responsibility centre is not used in the two mass production industries, namely, the motor vehicle and radio and electronic industries covered in our sample. This could support the viewpoint that to treat R&D as an investment centre and to apply ROI would restrain innovations.⁽¹⁸⁾

Reece and Cool's study shows that 38% of the organisations in their sample had used profit and investment centres for over 25 years.⁽¹⁹⁾ This confirmed Mauriel and Anthony's findings which reported that in the USA investment centres grew rapidly during the late 1950's and early 1960s.⁽²⁰⁾ According to the present study the oldest types of responsibility centres operating in the UK are cost and revenue centres. Both have been used for over 25 years. Profit and investment centres on the other hand, have been in practice for less than 25 years. This means that they were introduced during the late 1960s and the early 1970s, and, ten years after the American introduction. However, it seems that both types of centres are less popular in the UK than in the USA.

10.3.2 Contingency Variables and Responsibility Centres

Two questions, namely questions 2.3 and 2.4, have been constructed in this study to investigate what contingency variable(s) influence the design of responsibility centres in practice. Eight contingency variables were listed and the respondent was asked to rank them according to their relative influence. The result of the question has been computed in two ways. The first way counted the number of responses which were given to each contingency variable as the top variable. The second way counted the number of responses which were given to each variable when it was considered among the top three variables.

Table (10-3)
The contingency variables according to their
relative influence on responsibility centres

Contingency Variables	First Count		Second Count	
	No. of responses	Ranking	No. of responses	Ranking
Technology	-	-	3	6
Environment	3	3	7	4
Size	3	3	7	4
Organisational Chart	7	1	17	1
Interdepartmental dependencies	3	3	12	2
Personalities of the senior managers	-	-	5	5
Location	1	4	5	5
Tradition and custom	4	2	8	3

As can be seen, the organisational chart represents the main

influential variable on choosing and designing responsibility centres. In both ways of counting the relative influence, the organisational chart has the major influence. In the first part of this study we explained that in the conventional RAS, the main source of information for establishing responsibility centres is the organisational chart. Also we stated our point of view that the organisational chart provides only the initial information for designing RAS.⁽²¹⁾ However, the result of 2.3 contradicts our viewpoint and indicates that the organisational chart is, despite its apparent shortcomings, still the accountant's main source of information for designing RAS.

As far as the three contingency variables that we have argued should be taken into consideration in designing RAS are concerned, the result provides support for two of them, namely, interdependencies and environment. But the unexpected finding concerns the influence of technology. Notwithstanding that accountants have different perceptions of technology, there is an apparent agreement among them that technology represents the least influential variable in designing RAS in practice. This result was not expected given that we intentionally chose the sample in this way to highlight the differences between technologies and their impact on RAS.

In the first part of this study we argued that size has no role to play in determining the type of responsibility centre, and that the size of the centre, whatever measure is used, will not result in the production centre, for instance, being a profit centre rather than a cost centre. However, it seems that size does influence RASs more than we suggested it did in the first part. Table 10-3 shows

that it has a similar influence to environment. However, respondents did not explain how size affected RASs in practice.

Table (10-3) also illustrates the importance given to tradition and custom as an influential variable in designing RASs in practice. Practising accountants are commonly described as traditionalists by the nonaccounting managers, and the result of question 2.3 gives some justification for this description. Table (10-3) shows that tradition is ranked among the top three variables that have an influence on choosing and designing RAS in practice. Following tradition and custom is presumably due to the accountant's belief that it reflects best practice. This is apparent from the responses to question 2.4. Of the respondents who answered question 2.3, 17 explained how the selected variables affected the choice and design of responsibility centres. Ten respondents explained how the organisational chart and tradition and custom affect responsibility centres. Here are some of these comments:

- "Items ranked 1 (organisational chart) and 2 (tradition and custom) significantly affected the choice/design. Other factors had very little effect."
- "Centres are most often decided by the organisational chart."
- "The accounting system is similar to those I have installed and modified in other engineering companies."

Sometimes companies have their responsibility accounting systems imposed on them. The following comments support this:

- "Accounting definitions and organisational practice of the parent company in the USA."
- "Not at all (here the respondent refers to listed variables and that they do not affect RAS). We are a subsidiary company and have responsibility accounting systems imposed on us."

Only one respondent explained the impact of other variables, i.e. environment, on the choice and design of responsibility centres. He stated that:

- "The company found itself having to respond to its environment and altered its structure accordingly."

All the contingency variables included in question 2.3 and not mentioned in the above analysis, were regarded by the respondents to have a weak influence on RASs in practice. (See table 10-3.) This is, in fact, consistent with the perspective taken in the first part of this study.

In summary, we can conclude that in practice, the organisational chart, interdependencies and tradition and custom are the main influential variables influencing the choice and design of responsibility accounting centres.

10.3.3 Authority and its Sources

Authority and controllability are two pillars of RAS'. In questions 2.5 and 2.6 we were concerned with authority and its sources.

A. Definition

Question 2.5 provided the accountant with two definitions of authority. The first, i.e. definition (A), reflected authority as in the classical organisation theory where, "authority goes with the position and/or is delegated from above. A person who occupies a position or is delegated authority, is the proper person to obey without question". The second definition, i.e. definition (B), was conceptualised to reflect authority as in the modern organisation theory in the sense that "authority is the ability of certain persons, whether occupying formal organisation positions or not, to

influence the behaviour of others, and the commitment of organisation resource(s), based on the relevance of the information available to them, the soundness of their reasoning, etc. As a result people are naturally willing to accept this authority rather than have it imposed on them". Caplan, based on his study of behavioural assumptions of management accounting, indicated that there is a tendency on the part of accountants to move in the direction of a broader and more modern approach to management authority, as reflected in the study by definition (B).⁽²²⁾ However, from his study "it is not possible to ascertain without further research, whether the movement away from the traditional view, which may have already taken place is part of a continuing trend"⁽²³⁾ or not. In fact we have included the issue here to ascertain the following:

- 1 - Does the accountant's definition of authority depend on the type of production system?
- 2 - To what extent is the tendency of accountants to move away from the classical definition of authority continuing?

One third of the respondents perceived authority in a way similar to definition (A) and the rest perceived it in terms of definition (B). As far as question (1) is concerned it seems that the accountant's definition of authority is independent of the type of production system and industry. The responses from the four industries are distributed between the two definitions. Notwithstanding that Woodward argued that classical organisation theory is more appropriate to mass production technology (reflected in our sample by the motor vehicle and radio and electronics industries) than in process production technology,⁽²⁴⁾ (reflected in this study by food and pharmaceutical industries), only 29% of accountants in mass

production industries accepted definition (A) against 55% of accountants in process industries.

With respect to the second question, the results for the sample as a whole can confirm the continuance of the accountant's tendency to move away from the classical definition of authority. In Caplan's study 20% (4 out of 20) of the accountants perceived authority in a way which indicates some awareness of the modern organisation theory view of authority,⁽²⁵⁾ i.e. definition B, whereas in this study the percentage has grown to 66% of the respondents. On the other hand, there is some indication that the traditional perception of authority has become questionable even among respondents who still accept it. Two respondents commented on the definition and in particular on the last part which requires 'obedience without question'. The first respondent stated, "I do not accept this," whereas the second respondent said that "there is something wrong with an organisation that would expect this to happen." In fact, rejecting this part of the definition is a rejection of the grounds upon which authority in classical organisation theory stands and which are found in two of its sources, namely scientific management and bureaucracy.

B. The Sources

In classical organisation theory, authority is gained from position, in the first place. The opposite is the case in modern organisation theory. There, authority can be exercised through managerial and technical expertise, information access and control, personality, etc. Although, position and its role in exercising control is not denied in the modern organisational theory, less emphasis is placed on it than in the classical organisation theory. As far as RAS is concerned, our interest is to ascertain the basis

upon which a responsibility centre's manager gains his authority over cost/revenue items. Is it derived from his position as is the case with the classical theory of organisation, or through the sources of modern theory as identified above, or through a combination of the sources of both theories? Question 2.6 attempted to determine what the position is. This question embodied all the possible sources of authority over cost/revenue items. In forming this list, we relied on Kenny and Wilson's study, which examined the effects of various factors on authority among a sample of managers.⁽²⁶⁾ If we regard these managers as responsibility centre managers who exercise control through their authority over cost/revenue items, then it might be interesting to find out whether the source(s) of authority over a cost/revenue item, from the viewpoint of the managers who are subject to RAS will be similar to the accountants' point of view who operate RAS or not. It is hoped that investigating this issue will achieve two things: 1) to know whether there is a divergence or convergence between the two perspectives, and 2) to assist in transmitting each side's perspective to the other side. Table (10-4) shows the result of question 2.6, first by counting the numbers of responses which were given to each factor as the top factor, and second, by counting the number of responses when the factor was considered among the top three factors. Also the table shows the relative importance of these variables according to Kenny and Wilson's study.

Table (10-4)
Sources of authority

Sources or Factors	First Count		Second Count		Kenny and Wilson's Study Ranking
	No. of responses	Ranking	No. of responses	Ranking	
1 Technical expertise	1	4	14	2	3
2 Managerial expertise	10	1	18	1	1
3 Personality or personal traits	1	4	6	5	5
4 Position	9	2	14	2	6
5 Access to and control of information	4	3	12	3	2
6 Access to senior management and other influential people	-	-	7	4	4

According to the accountants, table (10-4) shows that the two main sources of authority over a cost/revenue item are perceived to be managerial expertise and position respectively. The importance of these two sources does not change between the two methods of counting. In fact, the above order of the factors seems to support the point which we mentioned above that the tendency of the accountants to move away from the classical perspective of authority is continuing. With respect to the other variables there is not much change in their relative importance between the two methods of counting except with technical expertise which is ranked as the second most important factor.

In comparison with Kenny and Wilson's ranking we notice a remarkable convergence between responsibility centre managers and accountants regarding the sources of authority over a cost/revenue item. The only exception is regarding position. From the

accountant's viewpoint, we might speculate that managerial expertise should be coupled with position in order for the former to be effective. This emphasis on the role of position as a source of authority does not correspond with the managers' perspective. According to the latter, when the issue is between managers of equal, or near equal, status, formal authority is roughly equal between them and loses its impact. This leaves the opportunity for the other factors to play the major role in influencing a cost/revenue item. That is, "those individuals who can elicit and monitor (information) not only from within (the organisation) but also from outside and can feed such information into decision-making processes, become influential as a result".⁽²⁷⁾ Finally, from table (10-4) it can be seen that personality or personal traits as a factor in authority has very little importance in both studies. We might recall that the same factor was considered to have little influence in choosing and designing responsibility centres, i.e. question 2.3. The results of the two questions contradict the emphasis that has been placed in the management and management accounting literature, on a manager's personality as an influential factor on management control systems.⁽²⁸⁾

10.3.4 Controllability within Responsibility Centres

The close association between authority and controllability within the conventional RAS can be revealed in many ways. Simply, they are two sides of the same coin. Twenty six accountants answered question 2.7 which attempted to investigate the association between authority and controllability in practice. Only one did not know whether this association existed in his organisation or not. Of the remainder, sixteen (62%) believed that the head of a responsibility

centre who has authority over a cost/revenue item is not the only person who can exercise control over this item. This is, of course, an obvious rejection of the assumption which underlies conventional RAS.

What criteria do accountants use in practice to determine the location of control over a cost/revenue item? To find out, we provided the accountants with three criteria, derived from the accounting literature. These are as follows; A) an item is controlled at the centre which incurs it; B) an item is controlled at the centre which influences its amount through utilising a service; and c) an item is controlled at the centre which is held to be responsible for it by the accountant. Two of them, i.e. criteria A and B of question 2.8, are relatively objective criteria. We can assume that when the situation is ambiguous and the accountant finds difficulty in determining the centre which could exercise control over a cost/revenue item, using the above two objective criteria, then he could use subjective criteria as indicated by item C of question 2.8. It was important to know whether these criteria were actually applied in practice or not, and which of them was more applicable. The result indicated that all three criteria are used in practice, but with a different degree of prevalence. Criterion (A) is the most prevalent one as 18 out of 25 respondents (72%) used it, then criterion (B) (5 out of 25, 20%) and finally criterion (C) (2 out of 25, 8%). The low frequency of criterion (C) may illustrate the objectivity of practising accountants in determining the controllability of a responsibility centre over a cost/revenue item. But the high frequency of using criterion (A) in comparison to criterion (B) might cast doubt on this objectivity. In other words,

based on our findings we might argue that in practice controllability over a cost/revenue item is, more or less, at the centre which incurs it. Such general applicability, though justified during the days of classicists, could be difficult to justify nowadays given the differences in the organisational context within which RAS operates. Apart from tradition and custom, we can find no reason to justify the application of the same criterion within different organisational contexts.

We can summarise the situation so far as follows. In practice, there is a realisation that a responsibility centre manager is not the only person who can exercise control over a cost/revenue item within his responsibility centre (question 2.7). However, controllability over a cost/revenue item, in general, is assumed to be achieved at the centre which incurs it (question 2.8). Based on this, one might expect that in practice a responsibility centre manager will be considered to have influence only on the costs/revenues which are actually incurred within his centre. However, it seems that this is not the case as 56% of the respondents to question 2.9 considered that all costs (i.e. direct costs, fixed costs, and allocated central costs) and revenues within a responsibility centre are subject to the influence of its manager.⁽²⁹⁾ Only 32% of the respondents considered that the responsibility centre manager can influence direct items and 12% of them considered that he can influence the variable items. It is not difficult, of course, to understand the impact of the production manager on the usage of the raw materials in his centre, or the impact of the manager of a sales branch on the revenue of his branch especially when he has considerable autonomy in determining prices.

Even when prices are determined centrally we might still consider that the branch manager will have an impact on the revenue through directing the efforts of his salesmen. However, it would be difficult in practice to believe that any manager has an impact on the operations of, for example, the central computer in the company's headquarters. In fact, the link between the impact of a responsibility centre manager and the costs of the central computer is very weak, if there is a link at all. Nevertheless, it seems that in practice the existence of such a weak link can be a justification for the inclusion of these costs, i.e. the central computer costs, and the similar costs within the items which are considered to be subject to the influence of a responsibility centre manager.

Zimmerman in his discussion on the costs and benefits of cost allocations in practice has argued that a responsibility centre manager could be responsible for common and central costs for achieving one of the two following objectives:⁽³⁰⁾

- a. reducing the over consumption of perquisites in the responsibility centre and in particular when other monitoring costs are high, for example, because the agent and principal are geographically dispersed.
- b. proxying the costs of degraded service, delay, and future expansion that arise when a common resource is shared by several decision makers.

Nevertheless, he stated that, "it is unlikely that cost allocations are "perfect" in the sense that they eliminate all the (manager's) overconsumption of perquisites or that allocated costs measure "exactly" all the costs arising from decentralisation. However, as long as the benefits from cost allocations (e.g. reduced

perquisite consumption or less delay costs) exceed the costs of cost allocations (e.g. the additional book-keeping costs and the costs of erroneous decisions), then we expect rational individuals to employ allocation techniques."⁽³¹⁾ Nevertheless, it is not clear, at least from Zimmerman's study, whether in practice cost allocation is applied on the basis of cost-benefit analysis as suggested by Zimmerman or whether it is, merely, applied as a matter of tradition and custom.

This is likely to cause some confusion among responsibility centre managers. In reality he cannot exercise control over all costs and revenues within his centre; however, he is assumed by accountants to exercise this control. What makes the situation worse, is that a responsibility centre manager in practice may be evaluated on the basis of all costs and revenues within his centre as indicated by the second part of question 2.9. It is not surprising, as a result of this, that managers complain and criticise the irrationality of responsibility accounting systems in practice.

This situation does not mean that the accountant believes that a responsibility centre manager can exercise complete control over the costs and revenues which he, i.e. the accountant, considers to be controllable items within a responsibility centre. In response to question 2.10, only 26% of the respondents believed that the responsibility centre manager can exercise full control over all the items within his centre. On the other hand, it is surprising that 14 accountants out of 24 (58%) respondents agreed that the responsibility centre manager can exercise complete control only over the majority of his costs and revenues. This is regardless of whether the responsibility centre is a production, marketing, or R&D

centre. As far as the last group of respondents is concerned, it is noticeable that there is an apparent contradiction between what the accountant believes and what he practices. He believes that a responsibility centre manager cannot exercise full control over all the costs and revenues within his centre; nevertheless the manager is evaluated on the basis of all the cost/revenue items.

Thus the accountant knows that a manager cannot exercise full control over all the cost/revenue items within his centre. But, does the practising accountant know what factors limit the control of a manager over a cost revenue item? Twenty two participants answered question 2.11. Of them 19 (86%) not only thought that the listed variables do affect the control held by a responsibility centre manager but also that their effects vary depending on whether the centre is a production, marketing or R&D one. Tables 10-5 summarises the importance which was given to the variables in relation to the three functional responsibility centres.

Table 10-5
Contingency variables and their effects on
the controllability of responsibility centre manager.

Contingency variables	Production		Marketing		R&D	
	Count	Rank	Count	Rank	Count	Rank
1. Technology	7	3	5	4	12	1
2. Environment	8	2	11	1	9	2
3. Size	6	4	6	3	4	4
4. Interdepartmental dependencies	16	1	8	2	8	3

Knowing that the marketing centre, which performs a boundary-spanning activity between the organisation and its external

environment, will be subject to the external environment, i.e. competitors, customers, regulatory agencies, etc., more than the other two functional centres, i.e. production and R&D, then we can appreciate why practising accountants consider environment as the top factor which affects the control of the marketing centre manager.

Also it is not difficult to explain why accountants in practice perceive interdependencies as the most influential variable on the control of a production centre manager. There is no doubt that the control that the production manager has over the costs of waste, for instance, is dependent on the purchasing centre, maintenance centre, personnel centre, etc. In the meantime he is relatively free from the influence of the external environment.

Finally, technology has the greatest impact on the control of a R&D centre manager. We might recall that accountants' perceptions of technology are diffused among the four definitions and none of these definitions has clear support from the respondents. Also we might recall that there is apparent agreement among accountants that technology has no impact on responsibility centres. However, for accountants to state that the greatest impact of technology is within the R&D centre rather than the other centres, might give us some grounds to argue that technology for accountants means innovation, invention, and/or development. None of the definitions supplied reflects this perception and therefore none of them received strong support from the accountants.

These differences were also found when we applied Kendall's W, as a nonparametric statistical test, which measures the coefficient of concordance. Kendall's W ranges between 0 and 1, with 0 signifying no agreement and 1 signifying complete agreement.

Appendix D shows that W is very low, that is, the effects of the contingency variables vary from one centre to another. This in fact confirms, statistically, our interpretation of the responses as reflected in table 10-5.

Using a subjective criterion for ordering these variables, i.e. the bigger the total score of ranking for the three centres the less the importance of the contingency variable, we can state that accountants consider environment as the main factor which can limit the control a manager has over a cost/revenue item. Interdependencies come second, then technology and finally size. The result clearly indicates that accountants are aware not only of the fact that no manager can exercise full control over his costs/revenues but also are aware of the factors which can lead to this limited control.

Apart from departmental interdependencies, these variables have been regarded by accountants as relatively uninfluential in choosing and designing responsibility centres, (question 2.3). However, they do believe that these variables have an impact on the control of a responsibility centre manager. It is possible to reconcile the two viewpoints disclosed in reply to questions 2.3 and 2.11. Whether the responsibility centre should be regarded as a cost, revenue, profit or investment centre depends on the organisational chart and tradition and custom in the first place. However, the control of each centre manager is determined in the light of the impact which the contingency variables have on the responsibility centre and these vary from one functional centre to another as indicated above.

This concludes our analysis of the results of Q.1. The response to the question asking about the respondent's level of satisfaction

with the RAS in his organisation will be discussed later along with the response to the same question in Q.2.

10.4 Q.2: SECTION 2: RESPONSIBILITY ACCOUNTING REPORTS:

PURPOSES AND CONTENTS.

In this and the next section of this chapter, we will discuss the results of Q.2. Only in one particular instance will we use the results obtained from Q1 to support the results of Q2. This seems permissible as we are dealing with the same type of respondent in each case (i.e. accountants).

10.4.1 Purposes of RAS Reports

In this respect we are interested in clarifying two issues: 1) What do practising accountants feel the purpose of RAS report to be. Is it performance evaluation (item A of question 2.1) or control (item B) or both? and 2) What other purpose(s) can be served by RAS reports? For example, are RAS reports used for the purpose of salary increases, rewards, penalties (item C) or for determining present and future training needs (item D)? The result shows that 56% of the respondents (14 out of 25) gave performance evaluation the first priority as opposed to 24% (6 respondents), who considered control to be the most important purpose of RAS. Two respondents gave the two purposes an equal priority. Thus it seems that practising accountants agree with the second group of accounting writers identified in chapter one, regarding the purposes of RAS. This result, which is confirmed by other findings,⁽³²⁾ can be generalised to state that in practice RAS reports are used primarily for the purpose of performance evaluation. In practice, however, it appears that there is a separation between managerial performance evaluation

and rewards, penalties, etc. This is despite the argument of some accounting writers for connecting or relating managerial performance evaluation to the organisational reward (penalty) system.⁽³³⁾ Two respondents out of 25 stated that RAS reports are used for managerial performance evaluation for the purpose of salary increases, rewards, penalties, etc. Finally, RAS reports appear to have very weak links with the determination of the present and future training needs, since only one respondent gave this purpose the highest priority.

10.4.2 The Degree of Reliance on RAS Reports for Performance Evaluation

Although there are some accounting studies which have examined the use of accounting reports for managerial performance evaluation, none of these studies was conducted among accountants. Our interest here is to determine to what extent practising accountants are aware of using accounting reports in performance evaluation. In forming Question 2.2 we have adapted Hopwood's notion, which distinguishes between the different evaluative styles in relation to the reliance on accounting data for performance evaluation, but with some modifications to take account of the fact that the respondents were accountants. Thus item (1) of question 2.2, which asks accountants whether accounting reports are mainly used for performance evaluation, matches Hopwood's first style of managers which he called budget constrained style. These managers concentrate on the achievement of a budget as reflected by accounting reports for the purpose of performance evaluation, and so on with respect to the other three items of the question. We are also interested in examining the issue at both the responsibility centre level and the centre manager's level. This is to determine whether

in practice accounting reports have a similar importance on the two levels for the purpose of performance evaluation. Table (10-6) shows the result of this question.

Table (10-6)
Summary to the responses of Question 2.2 regarding
the use of accounting reports in performance evaluation.

Description	Responsibility Centre	Responsibility Centre Manager
1. Accounting reports are mainly used.	16%	13%
2. Accounting reports are used and occasionally additional information is sought.	40%	33%
3. Accounting reports are used and additional information is always sought.	44%	50%
4. Nonaccounting information is always sought.	-	-
5. Don't know.	-	4%
Number of respondents	25	24

From table 10-6 we can state the following:

1. Accountants in practice are aware that accounting reports are used in performance evaluation whether with respect to the responsibility centre or its manager. As can be seen from table 10-6 only 4% of the respondents (1 out of 24), and only with respect to the responsibility centre manager, do not know whether accounting reports are used in performance evaluation or not.

2. None of the respondents believed that in practice accounting reports are not used in performance evaluation. In fact the present study is in line with Otley's study which reported the absence of a nonaccounting style of performance evaluation in practice. Both

studies. i.e. Otley's and ours, are supported by a recent survey of the different ways of performance evaluation in business, which deemphasised the importance of the nonaccounting style.⁽³⁴⁾ Thus except for Hopwood's study, prior research and this study clearly point to the importance of accounting reports on performance evaluation in practice.

3. Only 16% and 13% of the respondents stated that in practice, performance evaluation is, mainly, based on accounting reports with respect to the responsibility centre and its manager respectively. This result is consistent with Hopwood's finding which revealed that only 20% of his managers sample was classified as budget constrained style. On the other hand, although Otley's main contribution was that using budget constrained style would not necessarily result in the dysfunctional consequences reported by Hopwood, only 13% of his sample of managers were classified as style (A) of evaluation, which is equivalent to Hopwood's budget constrained style and to our item (1) in table 10-6. In connection with the above point we might conclude that, though accounting reports are not the only basis for performance evaluation in practice, they are not entirely overlooked.

4. The table shows that the majority of respondents believe that in practice, and for the purpose of performance evaluation accounting reports are used and additional information is occasionally (item 2) or always (item 3) sought.

However, ought we to expect a relationship between using accounting reports for the purpose of performance evaluation and the organisational context? In other words, as a result of the differences in the organisational context, we might find the responses of the accountants from one or more industries to be

concentrated around one item, for instance, item 2, and responses from other industries to be concentrated around the other item, i.e. item 3. To test this, the accountants' responses were classified according to the industry (table 10-7).

Table 10-7
A classification of the responses regarding using accounting reports in performance evaluation according to the industry.

Description	Food		Pharm.		Motor		R&E		Total	
	RC	MA	RC	MA	RC	MA	RC	MA	RC	MA
1. Accounting reports are mainly used.	2	2	1	-	-	-	1	1	4	3
2. Accounting reports are used and occasionally additional information is sought.	2	1	5	4	1	1	2	2	10	8
3. Accounting reports are used and additional information is always sought.	1	1	5	6	4	4	1	1	11	12
4. Nonaccounting information is always sought.	-	-	-	-	-	-	-	-	-	-
5. Don't know	-	-	-	-	-	-	-	1	-	1
	5	4	11	10	5	5	4	5	25	24

The results seem to indicate that the degree of reliance on accounting reports for the purpose of performance evaluation is not dependent on the organisational context. Rather it seems that the distribution of the majority of the responses between items (2) and (3) reflects a growing realisation on the part of practising accountants that accounting reports per se do not reflect reality

sufficiently to be solely used for performance evaluation. These reports should be used in addition to other information. Although the need for additional information could be occasional or continuous, nevertheless, and, according to the accountants, this information will not entirely replace accounting reports. Performance evaluation cannot, therefore, be entirely in terms of nonaccounting style, i.e. Hopwood's finding. This interpretation is consistent with Carruth et al who found that in practice 66% of the information which is used for performance evaluation is accounting information. (35)

10.4.3. Performance Evaluation Criteria

This issue has various aspects which could be studied empirically. However, in order to contain the length of the questionnaire, we chose only one aspect for detailed investigation. In the present study we were interested in the types of performance evaluation criteria used in practice and whether they are financial/nonfinancial and quantitative or qualitative. With regard to this aspect we were interested in knowing the following:

1. The most prevalent performance criteria in practice for the sample and for each industry.
2. Whether the criteria are similar among responsibility centres despite functional differences.
3. Whether the criteria are similar among responsibility centres' managers despite their functional differences.
4. Whether the criteria are similar for each centre and its own manager, and
5. Whether there is an association between performance evaluation criteria and the organisational context.

Therefore, questions 2.3 and 2.5 were included in Q.2. The first reflects the financial/quantitative criteria and the latter reflects the nonfinancial/qualitative criteria.

A. Financial/Quantitative Criteria

Question 2.3 embodies most, if not all, of the financial/quantitative performance evaluation criteria which are likely to be used in practice. Practising accountants were asked to determine which of them were used for evaluating each of the three functional centres as well as the functional managers, i.e. production centre and manager, marketing centre and manager, and R&D centre and manager, within their organisations. Their replies are considered below at the sample level and then at the industry level.

I. The Sample Level.

Table 10-8 shows the top seven criteria are frequently used with respect to the responsibility centres and their managers.

Table (10-8)
The performance evaluation criteria are frequently used in practice.

Criteria	Responsibility Centre						Responsibility Centre Manager					
	P		M		R&D		P		M		R&D	
	R	F	R	F	R	F	R	F	R	F	R	F
1. Profit (Absolute)											All	
2. Profit margin			4	16					4	13		
3. % profit growth			5	13					4	13		
4. Profit mix desired, etc.			7	11							less	
5. Costs: actual	1	23	6	12	1	15	1	20				
standard	2	20					2	18				
6. Sales: actual			1	23					1	21	than	
budgeted			1	22					2	16		
7. Sales growth rate, etc.			3	17					3	14		
8. Variances: total	7	14					7	10			ten	
component	3	19					3	18				
9. Return on investment												
10. Residual income											cou-	
11. Cost reduction	6	16			2	11	4	14			nts	
12. Stock losses	5	17					5	13				
13. Number of operating days	4	18					5	13				
14. Others												
Number of criteria	7		7		2		7		5		-	
% of total responses	74		66		39		66		55		-	

R = ranking

F = the frequency of responses.

Twenty five out of 26 respondents answered question 2.3. As will be seen in table 10-9, the number of respondents varies from one functional centre to another, and from one manager to another. In preparing table (10-8), it was decided to include all the criteria which scored ten or more responses. This decision was based on the researcher's value judgement. For each responsibility centre or manager, except for the R&D centre and manager, the criteria included in table (10-8) gained the majority of the responses.

Generally speaking we can see that the number of criteria used for evaluating the performance of responsibility centres is greater than that used for their managers. Also, the number of criteria varies among the centres and among managers. The largest number is for the production centre/manager, followed by marketing and, finally, R&D.

Examining the criteria used for evaluating responsibility centres shows that they are, in general, different from one centre to another. The only two criteria which are similar are 1) actual costs (no. 5) and 2) cost reduction (no. 11). However these two criteria have different degrees of importance from one centre to another. For the responsibility centre managers, the criteria used in practice for managerial performance evaluation are entirely different from one functional manager to another, at least with respect to production and marketing managers. Some readers, however, might consider this as a common sense finding. Nevertheless, the importance of this finding is that it provides empirical confirmation for this belief which has not previously been achieved.

In an examination of the similarities and differences between performance evaluation criteria of a responsibility centre and those of its manager we see that the criteria are identical with respect to production. Also five of the seven criteria listed in relation to the marketing centre are also used for its manager. What is important is not only that the same criterion is used for the centre and its manager but also that it is given the same degree of importance whether it is used for a manager's performance evaluation or the evaluation of his centre. Again Kendall's test of the coefficient of concordance was applied. Here also the findings as

can be seen in appendix D confirm our interpretation in both cases. This result, in addition to supporting the practising managers' complaint about using the same criteria for evaluating the performance of the manager and his centre, also illustrates a stark contradiction between the accounting literature and practice. For example, Warner, in relation to performance evaluation, has distinguished between two types of objectives:⁽³⁶⁾

1. the operational objective which is concerned with motivation at manager level.
2. the strategic objective which is concerned with decisions at the centre level about where to invest or divest.

In the light of the above distinction, we might find some difficulty in understanding how costs, whether actual or standard costs, can be used in evaluating the centre's performance. Also, it is difficult to understand how actual and budgeted sales rather than profit, whether in terms of absolute profit, profit margin, net profit, etc., can be used as a basis for decisions about retaining, closing or diverting a marketing centre. Finally it is difficult to believe that in practice, as the result indicates, cost variance, in particular individual cost variance, would affect the decision to apply a new production technique, more so than the cost reduction which could be achieved from the application of this technique.

Although the researcher is aware of the fact that there is no clear cut line between the performance evaluation criteria that can be used for a manager and those that can be used for his centre, it is nevertheless not unreasonable to expect that some of these criteria would be better used for managerial performance evaluation rather than for the centre and vice versa. Thus, although the

criteria might be similar, they should have different degrees of importance when being applied to managerial performance and the centre's performance. Nevertheless, it seems that practising accountants do not share this expectation as they gave the criteria similar degrees of importance regardless of the level of evaluation. In fact, little change is apparent nowadays compared to 15 years ago when Tomkins conducted his study. Tomkins also reported a lot of similarity between the measures used for evaluating the centre and its manager. In Tomkin's words, "these results seem to indicate, despite logical reasons for using different measures, that many groups do not distinguish between the part played by the division and the evaluation of the performance of the chief of that division. In fact, out of the 44 groups, no fewer than 28 reported exactly the same measures and exactly the same rankings for the two purposes." (37)

However, before we move to the second subsection which presents the result on the industry level, it is useful to make a few observations about table (10-8):

1. From the accounting literature one might gain the impression that the practising accountants view profit as an important criterion for performance evaluation. (38) This could be true on the level of the divisions. (39) However, on the level of functional responsibility centres, the present study indicates that profit is not an important criterion for performance evaluation at the level of the responsibility centre or its manager.

2. According to the result of question 2.1 of Q.1 profit centres do not prevail in the UK. The result of question 2.3 of Q2 seems to give some support to this as profit seems to be less

important in comparison to other criteria for assessing centres and/or managers, particularly with respect to production and R&D managers and centres.

3. From table (10-8) it is clear that variance analysis is used in practice for production centres and their managers only. However, individual variances are more important for performance evaluation than total variances. Also from table (10-8), and as far as the variance analysis is concerned, we might infer that in practice variance analysis is not used for revenue items. The table shows that actual and budgeted sales are the two most important criteria for assessing the marketing centre and its manager. However, the two forms of variance analysis are not widely applied in practice for either the marketing centre or its manager.

4. In the accounting literature the two criteria recommended for use in evaluating the performance of investment centres are return on investment (ROI) and residual income (RI). There is a large body of research regarding these two criteria. Recently, accounting writers, as a result of the dysfunctional effects of ROI, have advocated RI as a better performance evaluation criterion for investment centres.⁽⁴⁰⁾ Neither criteria, however, appears to be widely used in practice in the UK. On the one hand, the numbers using these criteria in our sample ranges from none to 8 out of 23. On the other hand 4 out of 5 respondents who answered question 2.4, regarding the criteria they would like to see embodied in responsibility accounting reports, mentioned ROI.⁽⁴¹⁾

5. The centre using the least number of performance evaluation criteria listed in table (10-8) is R&D. However, what is strange as far as the R&D centre manager is concerned, is that none of the

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criteria listed in question 2.3 achieved sufficient response to appear in table (10-8), the nearest two criteria being no. 5A and 11 which both achieved a score of 8. If our interpretation of the accountant's perception of technology is accepted, i.e. that the accountant perceives technology in terms of innovation, invention, and development,⁽⁴²⁾ then we can appreciate that none of the criteria in question 2.3 is relevant for evaluating the performance of the R&D centre manager. In other words, there is probably no causal relationship between the end result of the effort of the R&D centre's manager and any of these performance evaluation criteria.

II. The Industry Level

In this subsection we will examine the performance evaluation criteria of each function across the four industries chosen for this study. The purpose is to determine whether the criteria used for each function have the same degree of importance across industries. In doing so, we have to take into consideration the following three points:

1. 25 out of 26 companies that completed Q.2 answered question 2.3. Of these 5 were food companies, 10 pharmaceutical companies, 5 motor vehicle companies and 5 radio and electronics companies.

2. Of these 25 companies, the actual number which answered the question with regard to each function, i.e. centre and manager, varied, as can be seen from table (10-9).

Table (10-9)
Number of companies within each industry
which completed question 2.3 on the functional level.

Function(s)	Food		Pharm.		Motor		R&E		Total	
	RC	MA	RC	MA	RC	MA	RC	MA	RC	MA
Production Marketing R&D	5	5	10	10	5	5	4	3	24	23
	5	5	10	10	5	5	5	4	25	24
	4	4	10	9	3	3	4	3	21	19
Number of respondents	5	5	10	10	5	5	5	4	25	24

3. At the industry level the criterion is important if it achieves 75% or more from the total responses.⁽⁴³⁾

Table (10-10) shows the important performance evaluation criteria at the industry level.

Table (10-10)
Important performance evaluation
criteria at the industry level

Criteria	Food		Pharm.		Motor Vehicle		R&E	
	RC	MA	RC	MA	RC	MA	RC	MA
A. PRODUCTION	%	%	%	%	%	%	%	%
5. Costs: Actual	100	100	90	90	100	-	100	100
Standard	80	80	90	90	80	-	75	-
8. Variance: total	-	-	-	-	80	-	75	-
components	100	100	80	90	80	-	-	-
11. Cost reduction					80		75	
12. Stock losses	80						75	
13. No. of operating days			100	80				
B. MARKETING								
2. Profit margin	100	80	80					
3. % profit growth	80	80	-					
6. Sales: Actual	100	80	100	90	80	80	80	100
Budgeted	100	80	100	90	-	-	80	75
7. Sales growth	-	-	90	80	-	-	80	75
8. Variance: Total							80	
C. RESEARCH AND DEVELOPMENT								
5. Costs: Actual	75	-	80	-	100	-	75	-
8. Variance: Total							75	
11. Cost reduction					100			

With reference to the table the following comments could be made:

1. As far as the type of production technology is concerned the significance of cost reduction as a criterion is recognised only by mass production technology industries, i.e. motor vehicle and R&E. On the other hand Woodward argued that, "in process production technology, the main criterion which is used in evaluating the performance of the production manager is the number of days in the year they can keep their plants running".⁽⁴⁴⁾ Among the two process industries included in this study, the criterion is important only in

pharmaceutical study.

2. It was only in the motor vehicle industry where criteria nos. 2 and 3 had a nil response on both the level of the marketing centre or its manager. Also it is only in this industry that the budgeted sales criterion is not important. This criterion also achieved nil response at both levels.

3. In conjunction with table (10-8) we can see that actual costs which were a criterion at the marketing centre level lost their importance at the industry level. The opposite can be seen with respect to the total variance analysis criterion which became important at the level of the marketing centre in the radio and electronics industry. However, this latter finding might not contradict what we stated previously, which was that in practice variance analysis is essentially applicable to the costs rather than to revenues.

The above two subsections have shown the financial/quantitative criteria applied in practice for performance evaluation of the responsibility centre and its manager for the main three functions in an organisation, namely, production, marketing and R&D. Throughout the analysis we noticed a great similarity between the criteria used for the responsibility centre and those used for its manager. Apart from the R&D function, this would seem to justify the practising managers' complaint about accounting reports which not only apply the same criterion for the two different aspects of performance evaluation but also give the criterion the same degree of importance. The results also showed that the criteria generally, vary between the various functional responsibility centres and also between the managers of these centres. Nevertheless, financial/quantitative

criteria are only one kind of criteria used for performance evaluation. The other is the nonfinancial/qualitative criteria reflected by question 2.5 of Q.2. The next section presents the results of this question.

B. Nonfinancial/Qualitative Criteria

Practising accountants are criticised for their concentration on the financial criteria at the expense of other criteria and in particular nonfinancial and qualitative criteria.⁽⁴⁵⁾ Question 2.5 examined the extent to which accounting reports prepared for performance evaluation embody nonaccounting criteria. Twenty five companies completed question 2.5. Following the same procedures which we followed in preparing table (10-10) at the industry level, table (10-11) provides the result of question 2.5.

Table (10-11)
Nonfinancial/qualitative criteria on the
industry level.

Criteria	Food	Pharma- ceutical	Motor Vehicle	R&E
A. Productivity	% 80	%	% 100	% 80
B. Market Share		80		
C. Product Quality			80	
D. Employees absenteeism				80
E. Meeting delivery schedules				80

Table (10-11) illustrates the point that nonfinancial/qualitative criteria are not widely provided by accounting reports for the purpose of performance evaluation in practice and this could justify the nonaccounting managers' criticism.

Table (10-12) summarises the above analysis by showing the important financial/quantitative as well as nonfinancial/qualitative criteria at the industry and function levels for both responsibility centres and their managers.

Table (10-12)
Summary of the performance evaluation
criteria at the industry level.

Criteria	Food		Pharm.		Motor		R&E	
	RC	MA	RC	MA	RC	MA	RC	MA
1. FINANCIAL/QUANTITATIVE								
1.1 PRODUCTION								
5. Costs: Actual	x	x	x	x	x		x	x
Standard	x	x	x	x	x		x	
8. Variance: total					x		x	
components	x	x	x	x	x		x	
11. Cost reduction					x		x	
12. Stock losses	x						x	
13. No. of operating days			x	x				
1.2 MARKETING								
2. Profit margin	x	x	x					
3. % profit growth	x	x						
6. Sales: Actual	x	x	x	x				
Budgeted	x	x	x	x				
7. Sales growth			x	x				
1.3 R&D								
5. Costs: Actual	x		x		x		x	
8. Variance: Total							x	
11. Cost reduction					x			
2. NONFINANCIAL/QUALITATIVE								
A. Productivity		x			x		x	
B. Market Share			x					
C. Product quality					x			
D. Employees absenteeism							x	
E. Meeting delivery schedules							x	

One of our interests in examining performance evaluation criteria in practice is to determine whether there is an association between the criteria and the organisational context. As can be seen, most of the performance evaluation criteria on the level of the production department and manager are used in organisations in both the mass and process production technologies, but with two differences. The first concerns cost reduction and the second is the number of operating days. The former is applied only in mass production and the latter in process production. This might lead us to conclude that using performance evaluation criteria in practice is not, generally speaking, dependent on the type of production technology.

Despite our expectation, the practising accountants in the four industries indicated that their organisational environments and interdependencies were, to a great extent, similar. Given these similarities we might assume that there would be a similarity between the organisations in the four industries in their use of performance evaluation criteria. A reexamination of table (10-10) showed that the organisations in the four industries were remarkably similar in the use of some criteria, e.g. actual and standard costs, actual and budgeted sales, and variance analysis, etc., which we could call conventional criteria. Also, there was a degree of similarity with respect to other criteria among these organisations, e.g. profit margin, profit growth, sales growth, cost reduction, stock losses and productivity, which we could call the new criteria. The first category of criteria has been supplied by accounting reports for a long time and will presumably continue to supply them. Moreover, we can argue that this type of information is inherent to the accounting

function, that is, it is a necessary and unavoidable part of the accounting function. These criteria were used when there was a great deal of similarity between organisations, i.e. the classical organisation theory, and will continue to be used though there are now many differences between the organisations, i.e. modern organisation theory.

The new criteria, on the other hand, are used by the organisations; however, we could highlight some differences in their use of these criteria which in turn might lead us to reject the idea that the use of these new criteria in these organisations is due to the similarities in their environments and/or interdependencies. For example, the cost reduction criterion is applied in the motor vehicle and radio and electronics industries, whereas stock losses information is important only within the radio and electronics industries. Also, the profit margin is used in three of the industries. One of them regards the criterion as important for both the marketing centre and its manager, i.e. the food industry. Of the other two industries, one of them, i.e. the pharmaceutical industry, considers it important only for the responsibility centre whereas the other, i.e. radio and electronics, considers it important for the marketing centre manager. On the other hand, percentage profit growth has been identified as important by only two of the three industries. The use of the criteria within these two industries, however, is consistent with the use of the profit margin criterion, i.e. both are used for the same centre and/or manager. Nevertheless, this consistency is lacking when we come to the cost reduction criterion. As can be seen, the criterion is listed among the production centre's criteria for both the motor vehicle and the radio

and electronics industries. But it is listed only among the R&D centre's criteria for the former industry. Each of the other criteria are used in only one industry but could easily be used in the others, e.g. market share, product quality, employees absenteeism, and meeting delivery schedules.

It might be difficult to argue that the similarities among the four industries using performance evaluation criteria is due to similarities in their environments and interdependencies. Based on what has been stated with respect to the conventional and new criteria, we might argue that the criteria embodied in accounting reports for the performance evaluation of the responsibility centre and/or its manager are independent of the organisational context. But if we accept that the inclusion of the conventional criteria in the accounting reports is merely the continuation of providing the financial information which historically has been provided in these reports, then we can argue that embodying the second category of criteria in the reports is the result of the accountant's realisation of the need for other information, both quantitative and qualitative, to supplement the financial information necessary for performance evaluation for both the responsibility centre and its manager. This interpretation recalls the result of question 2.2 of Q.2 where the majority of the respondents showed that other information is, occasionally or always, sought in addition to accounting reports.

This brings us to the end of section one of Q.2, which investigated responsibility accounting reports and their purposes and contents, in practice. We can summarise the results of this section as follows:

1. Performance evaluation is the main purpose for preparing accounting reports in practice.
2. There will always be some reliance on accounting reports in evaluating performance.
3. Accounting reports will continue to embody the conventional criteria; however, there is already a tendency to reflect other nonaccounting criteria. This will grow with the growing realisation on the part of practising accountants of the need for supplementing the accounting reports with other information for the purpose of performance evaluation.
4. The results indicate that the degree of reliance on accounting reports, and the type of criteria applied in performance evaluation, are independent of organisational context.

10.5 Q.2: SECTION 3: ACCOUNTING FUNCTION:

COMMUNICATION AND METHODS

The communication and the methods of communication, between accountants and other managers within an organisation have received little attention from accounting researchers. Watson and Baumler advocated the idea that accountants should perform the role of integrators, as described by Lawrence and Lorsch, between the different functions and managers within the organisations.⁽⁴⁶⁾ Empirically, though among a relatively small sample of organisations and a small number of practising accountants, Hopper conducted an investigation into "the validity of some of the claims that accountants deliberately restrict their role to "bookkeeping" activities and limit their involvement in management owing to

bureaucratic and conservative attitudes".⁽⁴⁷⁾ The study, however, showed that only a few accountants described their role in a manner which confined it to bookkeeping and information provision. These two studies however, did not investigate the main issues of communication between the accountant and other managers. It would be interesting to ascertain to what extent accountants perceive communication with other managers to be important. How frequently do they communicate with other managers? What method(s) of communication do they use? How long do communications take between them and other managers? Is there a relationship between the importance of the communication, its frequency, the method(s) of communication, etc., and the organisational context? The above issues as well as others were included in section 3 of Q.2.

As far as the importance of communication between accountants and other managers is concerned, all of the 26 respondents to question 3.1 considered this to be important. Moreover, 77% of the respondents considered it to be very important, while 23% considered it to be 'important'. In terms of production technology, i.e. mass and process production technologies, only 10% of mass production respondents (one out of 10 respondents) considered communication to be important, against 31% in the process industries (5 out of 16 respondents).

With this degree of importance, we might reasonably expect that the frequency of communication would be high. This, in fact, is the case. Only one out of 26 respondents does sometimes communicate with other managers. It is apparent that despite the differences between practising accountants with regard to the degree of importance they give to communication, the frequency of communication is generally

high. If this result indicates anything, then it surely indicates that practising accountants not only realise the importance of their liaison role, using Hopper's terms, within their organisations, but also actually perform this role. Hopper argued that some practising accountants saw their role as 'bookkeepers' whilst others regarded it as 'service'.⁽⁴⁸⁾ Performing the bookkeeping role does not require such a high frequency of communication, as indicated by the accountants, as does the 'service' role. This high frequency of communication should enable accountants to participate with other managers in the decision making processes, e.g. buy or produce decisions, pricing decisions, and they should therefore be able to fulfil the expectation of both themselves and the managers they serve, contrary to Hopper's study.

In general, communication can be executed in one of the two following categories; written and verbal. In questions 3.3 written communication is represented by items A, B and E. Item E represents the most advanced method of communication where the accountant feeds the electronic accounting system with the information and data which is then transmitted to managers through their terminals. Verbal communication is illustrated by items C and D. It is surprising that none of the organisations included in the sample had such an advanced accounting system as reflected in item E, despite the fact that some of the organisations in the sample could be described as giant organisations whether in terms of capital and/or sales turnover. This left items A, B, C and D to represent the method of communication in practice. Table (10-13) illustrates the results of question 3.3.

Table (10-13)
Methods of communication according to
their importance in practice.

	Food	Pharm.	Motor	R&E	Total
Methods of communication	Top Meth. No. of resp.	Top Meth. No. of resp.	Top Meth. No. of resp.	Top Meth. No. of resp.	No. of resp.
A. Memos	-	-	-	1	1
B. Accounting Reports	1	3	-	-	4
C. Telephone	-	4	3	3	10
D. Face to face	4	4	1	1	10
No. of respondents	5	11	4	5	25

The result of question 3.3 speaks for itself and needs little comment. Only 20% of respondents considered written methods of communication to be important. Each of the two methods of verbal communication was chosen by 40% of the respondents. However, they are not equally effective in getting things done, i.e. question 3.4.

Twenty two out of 25 respondents completed question 3.4 which investigates the effectiveness of communication methods in getting things done. Of these, 17 respondents (77%) thought that the 'face to face' method is the most effective communicating method for getting things done. Although telephoning achieved a similar degree of importance to that of the 'face to face' method, its effectiveness seems to be less, as only 3 out of 22 respondents (14%) perceived it to be the most effective method.

Events which are subject to communication between the accountant and other manager(s) can, in general, be categorised as follows. The first category includes all events which occur in a responsibility

centre and which directly affect that centre, e.g. exceeding the budgeted costs of production labour, exceeding the standard limit or allowance for costs of waste, etc. The second category reflects events which occur in other centre(s) and which affect the performance of a specific centre. Information about this kind of event, of course, must be transmitted because of the sequential or reciprocal interdependencies between the centres. For example, a substitution of one raw material by another might necessitate some adjustments to the production workflow and this in turn may lead to some delays in meeting delivery schedules. Does the accountant inform the sales manager about this event or not? In other words, does he consider that informing the marketing manager is the responsibility of the purchasing manager and/or production manager or does he consider that this is his responsibility as well as theirs? Given the high degree of importance which the practising accountant gives to communication, and the high frequency of the communication which he undertakes with other managers, we might reasonably assume that the first kinds of events would be the subject of this communication. Achieving communication of the second kinds of events could be one aspect of the performance of the accountant's role as integrator. The result of question 3.5 reveals that this aspect of the integrating role is performed by accountants in practice, as none of the respondents ticked the 'never' response. However, the frequency of performing this role in practice can range between 'always' (42% of the responses), 'frequently' (35%) and 'sometimes' (23%). Within each industry the responses are distributed among the above three types of responses.

As can be expected, an accountant, in informing one

responsibility centre about the events which occur in other centres, can use the same methods of communication as he uses when informing the centre about events which occur within it. 61% of the respondents (17 out of 26) use verbal methods, i.e. 'telephone' and 'face to face', against 35% (9 respondents) who use written methods, i.e. memos and accounting reports. If the weights assigned to the communication methods are an indication of the importance which the practising accountant gives to the two kinds of events which should be transmitted to the responsibility centres, then we might argue that practising accountants give more consideration to events occurring inside a responsibility centre than to events occurring across centres. This can be recognised by comparing the results of questions 3.3 and 3.6. 80% of respondents used verbal methods when they communicate with other managers for their internal events whereas 65% of respondents used the same methods for informing these managers about the events which occur in other centres. Conversely, written methods were used by 20% of the respondents in the former case against 35% in the latter case.

As was the case with Q.1, the second questionnaire also ends with a question which asked the respondent about his state of satisfaction with the RAS in his organisation. In the next section we will illustrate the state of satisfaction of the accountants with RASs in practice.

10.6 Q.1 & Q.2: SATISFACTION WITH RESPONSIBILITY ACCOUNTING SYSTEMS

IN PRACTICE

The general state of dissatisfaction of nonaccounting managers with the accounting systems in practice can, clearly, be understood

from the accounting and management literature and does not need to be repeated here.⁽⁴⁹⁾ However, whether this managerial state of dissatisfaction is or is not accompanied by dissatisfaction on the part of practising accountants has not been considered by prior researchers.

Of the forty practising accountants who participated in completing either Q.1, or Q.2 or both, 39 expressed their state of satisfaction with their RASs. Of these 9 (23%) were entirely satisfied, 23 (59%) quite satisfied and finally 7 (18%) were dissatisfied. Of those who were quite satisfied or dissatisfied, ten explained the reason for the low satisfaction with their RASs. The first category of reasons can be combined under the title of "less appreciation and cooperation on the part of nonaccounting managers" as follows:

- "The system is ignored by both directors and managers."
- "Formal and regular reviews of results with all budget holders need to be introduced."
- "The appreciation of financial consideration is not always given enough importance by other key members of the company."

This low satisfaction can also emerge from the system itself as it is applied in practice, e.g.:

- "The system is 'outdated and inflexible'."
- "It is not fully computerised. Also it has not been explained to managers."
- "Computer systems need update."
- "The current system gives only global analysis and does not permit control easily at cost centre level expenditure. There is no mechanised profit centre reporting system for the major section of the business."
- "I would like to see electronic mail used in the top management of the company and introduced faster than at present."

From the above we can see that accountants also have their reservations about nonaccounting managers and their attitudes towards accounting systems. Thus, the users, i.e. the nonaccounting managers, were not satisfied with the way accounting systems in practice were operated by the accountants. Also, the operators, i.e. the practising accountants, were not satisfied with the way accounting systems were being used, i.e. by nonaccounting managers. However, and as far as the state of satisfaction of accountants in practice with their RASs is concerned, the study revealed a general tendency among the practising accountants to be satisfied with their RASs.

Having presented and analysed the results of the questionnaires, it is important to realise the limitations of the findings:

1. The present study is the first one to address itself to the study of RAS in an organisational context and to seek the views of accountants. Some of the results should therefore be regarded as preliminary and need to be confirmed by future research.
2. The response rate of this study was no worse than the response rates of some other studies, as we pointed out in section 10-1 of this chapter. Given that the study was an exploratory study we would have been happier with a higher response rate to make the results obtained in this chapter more reliable. Throughout the analysis, whenever there was a need, we showed that there was little difference between the companies regarding their answers to the questions, i.e. there was little difference between the answers due to differences in the organisational context of the four

industries. Based on this we might say that the differences between the response rates of the four industries did not have much impact on the results. However, since there is no apparent reason for these differences in the response rates, then the results have to be considered with caution.

3. In this study about 85% of the respondents occupy senior positions in the organisational hierarchy, i.e. chief accountants, financial managers, and controllers, whereas only 15% of the respondents occupy lower positions in the hierarchy. The variations in the responses due to the differences in the respondents' positions in the organisational level seem to have little impact on the result. Nevertheless, the present study did not investigate the potential differences in the responses which may have been due to the respondents belonging to different hierarchical positions in the organisations.
4. Another reason for treating the results cautiously is the fact that we used the questionnaire method for data collection. In order to make the questionnaire short and simple, some questions were formed to give wide meaning. A case in point is question 4.2 of Q1. With respect to this question we thought that examining whether or not the accountant perceives the existence of the interdependencies in his organisation should be given priority over the examination of the contents of these interdependencies. Therefore, the phrase "interdepartmental relationships" was used to embody all kinds of relationships, i.e. whether in

terms of information, services, materials, products, etc. It is, of course, possible that the respondents had in mind all these kinds of relationships when they answered the question, as anticipated by the researcher. Also, it is possible that they had in mind only one of the above kinds of relationship. Given that we investigated the accountant's perception of interdependencies and their impact on RAS in practice, then it would be useful for future research to investigate in more detail the effects of the contents of relationships, i.e. information, services, materials, etc. on RASs.

Also, although we related our questions to the functional responsibility centres, there is a possibility that some respondents had related their answers to the responsibility system on the organisational level rather than on the responsibility centre level. For example, it is possible that some accountants related the contingency variables to the organisation in total rather than to the functional subunit(s), i.e. question 2.3 of Q1. Or that some of them had the organisation as a whole in their minds, rather than the responsibility centre, when they answered question 2.7 of Q1 regarding the person(s) who can exercise control over an item within a responsibility centre. The same can be stated regarding question 2.8 of Q1 which investigates the location of controllability over a cost/revenue item.

Despite these limitations we would still suggest that the empirical work of this study has achieved its objectives and as an exploratory study it has provided useful information to draw a general picture about RASs in practice. Nevertheless further work

requires to be done, particularly in relation to those issues discussed in section 11.3, i.e. implications for future research.

In this part of the study we have investigated RAS in practice. In the first part of this study we examined RAS in theory. The final part of this study, i.e. chapter 11, combines both parts in a summary of, and conclusion to, the whole study.

FOOTNOTES

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43. The minimum number of responses for all industries was 4. In order to determine how important a criterion is, it is required that a majority of respondents would have indicated so. In this case of 4 respondents, it is clear that only 75% or 100% acceptance of the criterion would indicate that it is important since a 50% acceptance is indeterminate. The question then is deciding on the percentage at which acceptance of a criterion

will be determined in cases where the respondents exceed four. Since the importance of a criterion will be compared across industries the 75% acceptance rate will be used in all cases.

44. Woodward, op. cit., P.162.
45. In the accounting literature it is apparent that accounting writers advocate the need to develop new nonfinancial criteria for managerial performance evaluation as reliance on financial objectives is no longer appropriate for today's organisations. For example, see Kaplan, R.S., "Measuring Manufacturing Performance: A New Challenge for Managerial Accounting Research", Accounting Review, Vol.59, October, 1983, P.688.
46. Watson, D.J.H. and J.V. Baumler, "Transfer Pricing: A Behavioural Context", Accounting Review, Vol.50, July 1975.
47. Hopper, Trevor M., "Management Accounting Job and Structural Considerations", Management Accounting, London, January, 1981, P.24.
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49. We referred to the managerial attitude in chapter 1, and we quoted Pick as a reference when we stated that "...top management frequently dislikes (conventional) responsibility accounting and finds distasteful the (disciplinary) decisions called for by it."
Also see Pearson et al who found that "an impressive number of accountants in industry perceive something less than a pleasant attitude from operating personnel. (p.14)..... The evidence indicates that when accountants perceived that the (accounting) system was doing a good job of meeting the needs of operating personnel, they perceive relatively high levels of cordiality between operating and accounting personnel." (p.19.) Pearson, Della A., Robert E. Seiler and Ira R. Weiss, "Why Do Management Accountants Feel Disliked?", Management Accounting, N.Y., March 1982, pp. 14-19.

CHAPTER 11 SUMMARY AND CONCLUSIONS

11.1 SUMMARY

11.2 CONCLUSIONS

11.3 IMPLICATIONS FOR FUTURE RESEARCH

11.1 SUMMARY

The research reported in the previous chapters was conducted to examine the organisational context of RAS. In chapter one we argued that studying RAS in its organisational context is essential. Our argument was based on two points. The first is that RAS is a management control system and that management does not manage in a vacuum but in an organisation. Second, that organisations are dominant nowadays and pervade all aspects of our contemporary life. Thus, studying RAS in the absence of its organisational context is worthless. The study of RAS in the organisational context can be achieved through one of the following approaches; 1) a traditional approach; 2) a contingency approach; and 3) a proposed approach, which reflects our perspective and lies between the above two approaches. The first two approaches reflect two different ways of thinking about organisations, namely, the classical and modern organisation theories. Thus our objective in this study was to find an answer to the following, "In the light of the two organisation theories how should RAS be structured to achieve a better performance evaluation?" In this study, we were interested in examining RAS in theory and practice. Consequently, the study was divided into two parts. Part one was devoted to RAS in theory and part two reported the empirical work.

Chapter two described conventional RAS. In this chapter, we showed that there was general agreement in the accounting literature on how conventional RAS is defined, how RAS' structure is established, and how managerial performance evaluation is conducted within RAS. Conventional RAS has been subject to some criticisms as a result of the dysfunctions which emerge from applying it in today's

organisations. It is not unreasonable, however, to say that confidence in conventional RAS has been lost due to the problems identified in relation to its structural principles and performance evaluation features. Though many accounting writers have directed their criticisms at conventional RAS, very few have attempted to deal with the problem(s) of conventional RAS.

In this thesis we argued that conventional RAS is tied to, dominated and influenced by, the classical organisation theory, and we therefore felt that it was useful to examine the classical theory, before investigating the relationship between this theory and conventional RAS. Chapter three presented the three sources of classical organisation theory, namely, scientific management, the classical theory of management, and bureaucracy. Each of these sources was examined in detail. Through this examination we found that they were very similar, despite the fact that they had different areas of concern. Nevertheless, the chapter showed that the three sources believe that there is always one best way to structure, or to organise an organisation. All of them adopted a closed system viewpoint in studying organisations and were, mainly, concerned with what was happening internally to an organisation. Also these three pioneer classicists had a similar objective behind their work, that is, to improve efficiency. Finally, they believed that their work had universal applicability. The chapter offered two possible explanations for these similarities and provided sufficient evidence to show that these similarities were due to the circumstances, in terms of stable technology and environment, which prevailed during the days when the work of these classicists was written, rather than to information transmission.

Chapter four highlighted the influential relationship between conventional RAS and the classical organisation theory. To be precise, the chapter illustrated the influence of classical organisation theory on conventional RAS. In doing so, we first established the influence in general terms. We found some grounds to connect conventional RAS and each of the three sources of the classical organisation theory. In addition, we examined some specific aspects of the influence of the classical theory on conventional RAS, in terms of the following: 1) the assumption that the latter has general applicability; 2) the establishment of responsibility centres and classifying cost and revenue items, on the basis of the division of labour; 3) the idea of authority and responsibility and its impact on the principle of controllability in conventional RAS; and 4) the impact of the principles of the unity of command, the unity of direction, and scalar chain on the reporting system of conventional RAS. Conventional performance evaluation, on the other hand, is not free of the influence of the classical theory. Rather we found that each of the five features of this performance evaluation was influenced by this theory. In this chapter, we rejected the idea that conventional RAS had general applicability. Rather, our view was that conventional RAS is appropriate and effective if it is operated under certain circumstances. We specified these circumstances and supported our argument by presenting two cases of companies which operated under similar circumstances and which used conventional RAS, and this did not lead to the problems and dysfunctions which were identified in chapter two.

In chapter five we directed our attention to a new way of

thinking about studying organisations, which we called the modern organisation theory. Chapter five was the first of four chapters concerned with this theory and its contingency variables. We started chapter five with a presentation of the main features of this theory in comparison to the classical theory. We noticed that modern organisation theory was an interdisciplinary quasi-interdependent science. Also, contrary to classical theory, there was no unified thought within modern organisation theory. Finally, it shifted the conceptual level of organisation study by asking some interrelated questions which were not considered by the classical theory. However, our main interest with modern organisation theory was to demonstrate that in contrast with classical theory, there was no one best way to structure or to organise; rather there were different structures for organisations operating in different circumstances. These different structures emerged from the fact that organisations varied with regard to their technologies, environments, size and interdependencies. The impact of these four contingency variables on an organisation's structure has been revealed by five pioneer studies, i.e. Woodward, Burns and Stalker, Lawrence and Lorsch, Pugh et al, and Thompson. These studies were carried out in the 1960s and resulted in a new way of studying organisations, which was known as contingency theory. Since the 1960s, contingency theory has dominated organisational studies. On the accounting side, we found that contingency theory had not been rejected in total by any accounting writer. Rather, most of them accepted it unconditionally and others accepted it with reservations. These reservations, however, were not directed to its underlying premise and we believe that it could provide valuable guidance for studying and designing

RAS. Then we turned our attention to determining the contingency variables relevant to our purpose. In this respect we thought that technology, environment and interdependencies have a major role to play in comparison with size in structuring RAS.

In chapter six, we gave more consideration to the first contingency variable, namely technology. We classified the studies which examined technology into three categories: conceptual studies; empirical studies which confirmed the impact of technology on structure; and empirical studies which did not find such an impact. Among the first category, we presented Thompson's typology of technology and Perrow's dimension of routine-nonroutine technology. Within the second category, Zewerman, Harvey, Khandwalla and Keller followed Woodward's approach in examining the relationship between organisational structure and technology, and they produced results which confirmed her findings. On the other hand, Perrow's framework of technology was found to be empirically valid. This was seen in the empirical studies of Lynch, Overton et al, and Leatt and Schneck. When we examined the second empirical category of studies, we found that there were four problems which were inherent in Hickson et al's technological scale, which they invented and called workflow integration, and as a result, they did not find a relationship between technology and organisational structure. Blau et al, on the other hand, did not find this relationship at the level of the sample as a whole. However, when they classified the sample into three categories similar to Woodward's classification of technologies and examined the relationship, they found a consistent association between technology and their structural variables. Finally, Mohr found no relationship, because his study was not originally designed

to examine the relationship between technology and structure. We showed that his construct of technology was lacking in logic, in validity and in reliability. We ended the controversy regarding the existence or nonexistence of the relationship between technology and structure by referring to the survey studies which examined all the technological studies in the period 1958-1980. These survey studies detected that there is a relationship between technology and structure, provided that; 1) technology was not reflected in terms of Hickson et al's workflow integration; 2) the relationship was not examined at the individual level. Also the survey studies showed that the relationship existed when it was examined in terms of Woodward's technical complexity conception and/or Perrow's routine/nonroutine technology conception, regardless of whether the relationship was investigated at the subunit or the organisational level. Perrow's conception, in particular, produced remarkably consistent findings.

In chapter six we also examined the accounting studies, which investigated organisational technology. The impact of technology on the creation of budgetary slack was examined by Waterhouse and Tiessen. In their examination they applied Perrow's conception of technology. Hopper and Berry supported Perrow's conception and applied it in their examination of the control strategies within an organisation. The same conception was applied by Ginzberg in his study of accounting and information systems. Empirically, Perrow's conception was adopted by Merchant in his investigation of the interlocking between technology and using budgetary control on organisational performance. Finally Burns and Waterhouse introduced Hickson et al's workflow integration into the accounting literature

as a measure of technology, in their examination of the impact of technology on budgetary control. The study, however, revealed two contradictory results of that of the Aston group's findings. Basing our conclusions on what has been stated, we arrived at two conclusions; 1) that studying RAS in its organisational context cannot overlook technology as an influential variable, and 2) that Perrow's conception of technology, among other conceptions, is the one which has, a) a theoretical basis, b) a valid construct, c) empirical support, and d) a wide acceptance. Therefore, it appeared to be justifiable and acceptable to use Perrow's conception in our perspective on RAS.

Environment was given a lot of attention in chapter seven. One main difference between the classical and modern theories of organisations is that environment is overlooked in the former, but fully considered in the latter. Uncertainty is the main factor which makes us interested in studying an organisation's environment. Three reasons were identified as the cause of environmental uncertainty. Environmental uncertainty, however, varies from one environmental state to another. This was shown by Emery and Trist's classification of environments, i.e. 1) placid, randomised environment, 2) placid, clustered environment, 3) distributed, reactive environment, and 4) turbulent environment. Also degrees of environmental uncertainty were reflected in Dills' two dimensions of static/dynamic and simple/complex environments, as well as Thompsons's matrix of environments which combined the above two dimensions. Using this matrix, we argued that controllable and uncontrollable costs and revenues would vary from one environment to another. This implied that there was no universal classification of cost and revenue items,

but different classifications for different organisations operating in different environments.

There is a two-way relationship between an organisation and its environment. Accordingly an organisation can change or influence its environment as well as adapt to it. We presented Evan's three forms of relationship, i.e. wheel, all-channel networks, and chain, and we explained how the degree of autonomy which an organisation can enjoy within its environment varied between these three forms. Also, we presented Duncan's four conditions which must exist for an organisation to have influence over its environment. In this chapter, we argued that an organisation's objective in the long run should be to control its environment for the sake of goal attainment. Therefore, the strategic policies which change the environment do become inevitable. However, since no organisation can affect all the components of its environment, and/or can influence them all of the time, then the organisation has to adapt to its environment through structural changes.

The studies dealing with an organisation's environment were reviewed in chapter seven. Gabarro replicated Lawrence and Lorsch's approach in studying the school systems and confirmed their findings. On the other hand, Tosi et al cast doubt on Lawrence and Lorsch's scale of environmental uncertainty. In our investigation of Tosi et al's study, we questioned their scale of environmental uncertainty, as it produced inconsistent results. Finally, we reported that Pennings did not find a positive relationship between environment and structure, mainly because his study was not originally designed to examine this relationship. The managerial perception of environmental uncertainty was examined by Duncan, who found that the

static/dynamic environmental dimension was a more important contributor to the managerial perception than the simple/complex environmental dimension. This result was supported by Mercile, and Leblebic and Salanick, despite differences among the three studies regarding research methods, the subjects, etc.

We reported also that environment had also been examined by accounting researchers in relation to accounting phenomena. Thus Waterhouse and Tiessen examined the impact of environment on the creation of budgetary slack. Amigoni, on the other hand, plotted the management control systems within a matrix which reflected the degree of environmental turbulence and the degree of structural complexity. The association between the use of management control systems and environment as perceived in terms of competition was examined by Khandwalla. Merchant examined the relationship between environment and the use of a particular management control system, namely, budgetary control. The impact of environmental uncertainty on the style of performance evaluation was examined by Govindarajan. Finally, Hays found that environmental variables were a major consideration in the evaluation of the performance of marketing departments. We completed this chapter by illustrating how we perceived environment for the purpose of studying and designing RAS.

The third and final contingency variable we chose to examine in studying and designing a RAS in the organisational context was interdepartmental dependencies. Chapter eight presented the classical viewpoint, which states that with a high degree of specialisation in an organisation, there will be fewer interdependencies. The opposite viewpoint is taken in the modern organisation theory which view the existence of interdependencies as

a prerequisite for the recognition of a collection of individuals to be regarded as an organisation, and states that specialisation increases interdependencies and more specialisation means more interdependencies. Accepting this viewpoint, we proceeded to present Dubin's typology of interdependencies, which consisted of six forms. The appropriate form of interdependence was dependent on the nature of the function which a unit performs in an organisation, i.e. direction, coordination, control and innovation. Among the two typologies of interdependencies, i.e. Thompson's typology which we presented in chapter five and Dubin's typology, we adopted Thompson's typology in our perspective on studying and designing RAS. In chapter eight we provided some elaboration of this typology. We mentioned the conditions for interdependencies to be described as sequential and reciprocal. Also we discussed the nature of responsibility centres and whether they should be on an individual or group basis. We argued that individual responsibility centre(s) would be used with pooled interdependencies. On the other hand, group responsibility should underly sequential and reciprocal interdependencies. We then dealt with the issue of how large the group should be within each of the last two types of interdependencies. In the sequential interdependencies, we expected the group to consist of two units, that is, one unit and its successor. In the reciprocal interdependencies, the group should include all the units involved.

This conceptual typology of interdependencies was, empirically, supported by Lorsch and Lawrence, and Allen. The former examined the interdependencies within companies in three industries, i.e. the plastic, food and container industries, and the latter examined the

corporate-divisional relationship in diversified firms. When we directed our attention to the accounting studies, we found that Vancil presented two approaches to solve the problem of interdependencies. The first approach was considered to be ambiguous and might lead to dysfunctions as a result of its reliance on transfer pricing methods. The second approach, though relatively better than the first one, was thought to be confusing and costly. Macintosh and Daft, on the other hand, attempted to establish relationships between the three forms of interdependencies identified by Thompson and three control systems, namely, standard operating procedures, operating budget and statistical reports.

With chapter nine we started the empirical part of this study. From the review of the previous studies we noticed three things. First, there was a shortage of comprehensive surveys of the actual practice of RAS. Second, most of the prior studies had not examined RAS in its organisational context. Third, the studies concentrated on the users of the accounting data for the purpose of performance evaluation and did not consider the preparers of the accounting data. Consequently, we described our objectives as follows: 1) to ascertain whether RAS in practice was widely applied or not; 2) to investigate the accountant's view with regard to some contextual variables; 3) to gain a knowledge of the types of responsibility centres which were used in practice; 4) to identify how authority and controllability were determined and applied in practice; 5) to find out how accountants perceived performance evaluation within RAS; 6) to highlight the sort of communication between management accountants and other functional managers in the organisation; and 7) to ascertain whether management accountants were satisfied with their

RASs or not. We considered that the questionnaire method was the appropriate research method to use for data collection in this study.

The first draft of the questionnaire was used for a pilot study and this resulted in the reduction of the number of questions and splitting it into two parts of questionnaires, namely, Q.1 and Q.2. The organisation sample was chosen to include four industries: pharmaceutical; food; radio and electronics; and motor vehicle. The actual size of the sample was 181 companies and it was divided into two subsamples, each receiving one part of questionnaires. From the companies approached only 40 participated and these completed 26 copies of each of Q.1 and Q.2. The results of the study are summarised in the next section.

11.2 CONCLUSIONS

The practising accountants' perception of the four structural variables included in Q.1 can be summarised as follows:

1. Technology is perceived in terms of "the substitution of mechanical equipment for human labour".

2. Duncan's definition of environment which we adopted in this study and which conceptualises environment as "the totality of the internal and external factors that are taken directly into consideration in decision-making in the organisation", is the one which was accepted by the practising accountants. The majority of them described their organisations' environments as complex/dynamic. Finally, they, to a great extent, listed the causes of environmental uncertainty in order of their importance, in a similar way to the order of these causes in the literature.

3. Sales volume and number of employees were the two most

important measures of size in practice as well as in the literature.

4. This study also showed that the three types of interdependencies existed in practice. However, it seemed that reciprocal interdependencies is the type which prevails in today's organisations.

With regard to the types of responsibility centres, the study revealed the following:

1. Production and R&D departments were generally structured as cost centres, regardless of the industry.

2. There was some confusion regarding the nature of marketing centres in practice. Contrary to the other functional centres, the present study was not able to determine whether marketing centres in practice were regarded as cost, revenue or profit centres.

3. Though profit and investment centres do exist in practice, the responses indicated that they are not widely used in the UK. This finding was consistent with the result which showed that on the level of functional responsibility centres there appeared to be lack of application of return on investment and residual income as performance evaluation criteria in the UK.

As far as the organisational context is concerned, organisational charts, tradition and custom, and interdependencies were the top three contingency variables having an influence on RAS and its responsibility centres in practice. Environment also had an impact. Contrary to theory, the empirical study highlighted the importance of size and deemphasised the importance of technology. Nevertheless, the stress which practising accountants put on the impact of the organisational chart and tradition and custom might lead us to conclude that they were the two main contingency variables

considered in practice in designing RAS.

Given that authority can be perceived either in the classical form or the modern form, the study confirmed the continuity of the movement of practising accountants away from the traditional view towards the modern view. There was no evidence to suggest that accountants' perception of authority was dependent on the production technology as one might have thought from the prior research. According to the accountants, the two main sources of authority of the responsibility centre manager over his cost/revenue items were managerial expertise and position. This provided further empirical evidence that practising accountants have moved away from the classical or traditional view of authority.

Investigating the issue of control within responsibility centres in practice showed the following:

1. Despite the fact that practising accountants believed that there was an association between authority and control, nevertheless, a responsibility centre manager who had authority over a cost/revenue item was not believed to be the only person who could exercise control over this item.

2. Control of a cost/revenue item was mostly located with the centre which incurred it. The status which is given to this criterion in relation to other criteria can easily be seen as a reflection of tradition and custom.

3. Though profit and investment centres do exist in practice, the responses indicated that they are not widely used in the UK. This finding was consistent with the result which showed that on the level of functional responsibility centres there appeared to be a lack of application of return on investment and residual income as

performance evaluation criteria in the UK.

4. This study revealed an apparent contradiction between what the accountant believed and what he practised. He believed that a responsibility centre manager could exercise full control over the majority of costs and revenues within his centre; nevertheless, the manager was evaluated on the basis of all the cost/revenue items.

5. In the organisational context, environment, interdependencies, and technology were the most important contingency variables which limited the control of marketing, production and R&D managers over their costs and revenues respectively.

The issues investigated in Q.2 are summarised below:

1. In practice RAS reports are prepared for the purpose of performance evaluation as a first priority. This was the view taken by some accounting writers, as explained in chapter one. Control, however, was a secondary purpose.

2. The results of the present study carried out among practising accountants were consistent with those of the prior research with regard to the degree of reliance on RAS reports, for performance evaluation purposes. The study confirmed that in practice managerial performance evaluation was not entirely dependent on accounting reports nor on nonaccounting information. Rather, the study clearly showed that managerial performance evaluation was conducted on the basis of accounting reports, but supplementary information was occasionally or always sought. It seems that the degree of reliance on accounting reports for the purpose of managerial performance evaluation is not dependent on the organisational context.

3. Though the criteria used for performance evaluation were

not similar across responsibility centres, ie. production, marketing and R&D, or between their managers, it was found that they were similar, not only between each responsibility centre and its manager, but also they had the same degree of importance at both levels of performance evaluation. This result illustrates a stark contradiction between the accounting literature and practice.

4. Examining performance evaluation criteria at the industry level showed that the similarities between industries in the use of these criteria were not due to similarities in their production technologies, environments or interdependencies.

Section three in Q.2, which was designed to investigate methods of communication between practising accountants and other managers produced the following results:

1. The communication between accountants and other managers in practice was perceived to be very important. Nevertheless, the realisation of the importance of this communication appeared to be greater in mass production industries than in process production industries.

2. Despite the difference between the respondents from the two production technologies, regarding the importance of communication, the frequency of communication was generally high between the accountants and other managers in practice in both industries.

3. In practice, verbal methods of communication, i.e. telephone and/or face to face, were more widely used by accountants than written methods, i.e. memos and/or accounting reports. Among these methods of communication, the face to face method was the most effective one in getting things done.

4. Practising accountants do not communicate with other

managers only in connection with events which occur within the responsibility centres of these managers, but also with events which occur in other centres and affect the performance of their centres. In performing this role the accountant also relies on verbal methods of communication.

5. It is clear that practising accountants put more emphasis on communicating with managers on issues or events which occur within their centres than on events which occur in other centre(s) and which affect their performance.

Finally we noted that accountants were not entirely satisfied with their RAS. Two general reasons for this were identified. The first was "the less appreciation and cooperation on the part of nonaccounting managers", and the second reason was that RASs in practice tended to be outdated and less sophisticated systems.

In chapter 10 we described the limitations of this empirical study. These limitations related to the use of the questionnaire as a method of data collection, and the response rate. However, the empirical study has achieved its objectives at least as an exploratory study of RAS in its organisational context in practice. To conclude, we might say that the present study showed that tradition and custom governed many of the issues of RAS which we investigated in practice. The influence of tradition and custom on RAS tends to overshadow the impact of the organisational context. Although we found some differences between the organisations of the four industries included in the study, these differences were not due to differences in their organisational context. In other words, the present study provides some evidence of the lack of association between RAS in practice and the organisational context.

11.3 IMPLICATIONS FOR FUTURE RESEARCH

As with other pieces of research, the present study was not able to answer all the issues and questions regarding the organisational context of RAS in theory and practice. However we can argue that a good piece of research is the one which answers some issues and opens up new areas for future research. The following are some of the implications for future research which have emerged from the present study:

1. Size, according to our perspective, was not an important contingency variable affecting RAS. However, in practice it has been revealed to be important. Thus how size can theoretically and empirically affect RAS needs to be investigated.

2. What type of responsibility centre, i.e. cost, revenue, profit or investment centre, is used in practice for the marketing department? This issue was unresolved in the present study.

3. From the study we noticed a growing realisation on the part of practising accountants that no responsibility centre manager can exercise full control, i.e. 100% control, over a cost/revenue item within his responsibility centre. It follows that individual managers are no longer an adequate basis around which responsibility centres should be established as is usually implied by conventional RAS. The issue is whether in practice, responsibility centres are, in fact, individual-based or group-based.

4. The present study showed that practising accountants are aware of the contingency variables which limit the control of the responsibility centre manager over his cost/revenue items. Two issues need further research in this respect; first, the way in which

these variables affect the nature of the control exercised by the manager; and secondly, which cost/revenue items within the control of the manager are most affected by these variables.

5. The results pointed out the importance given in practice to using RAS reports for the purpose of managerial performance evaluation, rather than for control purposes. This results supports the point which has been made by some accounting writers, e.g. Otley, regarding the importance of management control systems for managerial performance evaluation in practice, and also directs the attention of accounting researchers to this area of research.

6. Among the performance evaluation criteria included in this study, only three were used for evaluating the performance of R&D centres. These three criteria, however, achieved only 39% of the total responses. On the other hand, none of the performance evaluation criteria were important for the purpose of the performance evaluation of R&D managers. Given that the criteria included in this study were taken from the accounting and organisational literature, then we can argue that the latter does not reflect what is happening in practice with respect to the performance evaluation criteria of the R&D centre and its manager.

7. As an exploratory study, the results indicated that the same performance evaluation criteria are used by organisations in different industries. However, this study showed that these criteria have different degrees of applicability within these industries. The study, nevertheless, did not provide an answer to the question of why some of these criteria were more important in some industries than in others.

8. In this research no attempt was made to investigate the

impact of the heirarchical level of the functional units on RAS, that is, whether there are any differences between RAS's in practice when the three main functional units are located within a division, an independent organisation or the corporate head office. This point is worth investigating.

Investigating the above eight points in addition to what has been investigated in this research, will together contribute to the achievement of a better performance evaluation as we defined it in terms of less hostility, tension, fear, mistrust, etc.

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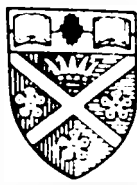
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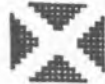


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A Division of the Scottish Business School

30 January 1987

Appendix A:Q.1

Dear Sir

I am currently carrying out research into Responsibility Accounting Systems in industry at the Department of Accounting and Finance in the University of Strathclyde. The main purpose of this research is to determine the similarities and differences among Responsibility Accounting Systems in four industries, and to ascertain the extent to which these similarities or differences can be attributed to differences in their technology, environment, size, etc.

I have developed a questionnaire designed to answer these questions and I am seeking your cooperation in completing it. I estimate that it should take only 20 minutes to answer the questions.

The study should provide us with a better understanding of the basis underlying responsibility accounting systems in practice and should help in the design and implementation of such systems.

I appreciate that businessmen do not normally have time to deal with this type of request; however, I should be very grateful if you could kindly spare time to complete the questionnaire and return it to me. A stamped addressed envelope is enclosed for this purpose.

Thank you for your cooperation.

Yours faithfully

A Abdallah

University of Strathclyde
Responsibility Accounting System Survey

A. Name of the company :
B. The industry :

C. The production system :
(Please tick)

Mass Production

Process Production

Continuous Production

D. The main product(s) : 1.
2.
3.
4.

E. Name and Official position of person completing this questionnaire .

F. Would you consider participating in a follow up interview ? ☒ Yes

☐ No

Name of the person who can be contacted if different from that stated above.

G. All answers and comments included in this questionnaire will be strictly confidential. However, would you please indicate if you agree for the name of your organisation to appear in a list of participants to this enquiry . ☒ Yes ☐ No

H. If you are interested in receiving a copy of the overall findings of this study, please tick the box opposite . ☐

General Notes

1. Most of the questions in this questionnaire can be answered by ticking (✓) the appropriate box against the answer(s) listed under the questions.
2. If any of your answers or comments require more space than has been provided for, please continue on the blank page opposite the relevant question and/or the spare page attached to the back of this questionnaire, referring in your answer to the code number of the relevant question(s).
3. This questionnaire, can be answered on an individual or group basis. That is, one person can answer it, or a group of persons can collectively participate in answering it. However, in the latter case, please :
 - a. Note that the answers or responses should reflect a consensus among the persons of the group or that they will reflect the viewpoint of the majority of the persons.
 - b. Indicate in the box provided the number of persons who participated in completing the questionnaire. ☐

Section One: Structural Variables

In the last two decades, some terms have emerged and have a wide use in today's business organisations. In this part of the questionnaire we are concerned with some of these terms and in particular the following :

1. Technology .
2. Environment.
3. Size.
4. Interdepartmental dependencies.

1.1. Technology

Please tick the box opposite the definition which most closely matches your perception of technology.

- A. The organisational process of transforming inputs into outputs. ☐
- B. The actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make some purposeful change in that object. This object may be a living being, human or otherwise, a symbol or an inanimate object ☐
- C. The substitution of mechanical equipment for human labour. ☐
- D. The type of production systems , in particular the following :
a. Unit and small batch production
b. Large batch production
c. Mass production
d. Process production
e. Continuous flow production ☐
- E. Other(please state)-----

1.2. Environment

1.2.1. Which of the following paragraphs reflects your perception of an organisation's environment?. (Please tick the appropriate box).

I. An organisation's environment is everything that is outside the organisation. ☐

II. An organisation's environment consists of all factors external to the organisation, i.e. persons, groups, and organisations, with which the organisation has dealings and relationships. A change in any of these external factors may produce a change in the state of the organisation. ☐

III. An organisation's environment is the totality of the following internal and external factors that are taken directly into consideration in decision-making in the organisation:

Internal Environment

- Organisational objectives and goals.
- Nature of the organisation's product(s).
- Interdepartmental dependences.

External Environment

- Customers.
- Suppliers.
- Competitors.
- Government regulatory control agencies.
- Public attitude towards the organisation.
- Trade unions

IV. Other (please state)-----

1.2.2. In general we can characterise an organisational environment through the following dimensions:

1. Simple/ Complex Dimension: this dimension reflects the number of environmental factors and their homogeneity. For example, a company may have one class of customers, e.g. men, or different classes, e.g. men, women, children. Also it may use standard materials or diversified materials, etc.
2. Static/ Dynamic Dimension: this dimension reflects the stability of the environmental factors. That is, whether they remain constant or are continually changing.

The following matrix is produced to reflect four different environments. In which cell do you place your organisation's environment? (Please tick the appropriate cell).

Simple/Static	Complex/Static
Simple/Dynamic	Complex/Dynamic

1.2.3. As organisational employees, we are concerned with our organisation's environment because of the uncertainty it might create for the organisation. Which of the following, do you believe causes environmental uncertainty?. (Please rank in order of significance, 1, 2, and 3).

- a. Not knowing the causes or consequences of future events. In other words, the lack of clarity of information about future events.
- b. Not knowing the outcomes of a specific decision in terms of how much the organisation would lose if the decision were incorrect.
- c. The existence of a time lag between taking a decision and receiving a definitive feedback about its results.

1.3. Size

Size, in general, can be measured in different ways. Here is a list of some of the measures which can be used. Please rank them in order of importance assuming you are going to use them to refer to :

1) The size of your organisation.

2) The size of a subunit within your organisation

(Please note : P = Production department

M = Marketing department

R&D = Research and development department)

	Organisation	Subunit		
		P	M	R&D
A. No. of employees	—	—	—	—
B. Net assets employed	—	—	—	—
C. Sales turnover or volume	—	—	—	—
D. No. of operating units	—	—	—	—
E. Capacity	—	—	—	—
F. Annual capital investment	—	—	—	—
G. Others (please specify)	—	—	—	—
-----	—	—	—	—
-----	—	—	—	—

1.4. Interdepartmental Dependencies

Here are three types of interdepartmental relationships. Please rank them in order of frequency of occurrence in your organisation between the marketing , production and research and development departments.

1. Type One : no direct interactions between the departments .
Actions in one organisational department can be taken without regard to actions in the others as long as the overall organisation remains viable.

2. Type Two : the output of one department is the input to the other department.

3. Type Three: each department exports its outputs to the others and imports inputs from the others. As can be seen, in this form each department involved is affected by, and affects each other.

☐
☐
☐

Section Two : Responsibility Accounting System : Centres ,

Authority and Controllability

(1) In some organisations this system might be known as a profitability accounting system or activity accounting system. These are just different names for an accounting system that recognises various responsibility centres throughout the organisation.

(2)The responsibility centre is a formally specified work group within the organisation under a manager charged with a formally defined set of responsibilities directed toward the attainment of the goals of the organisation.

(3)When the responsibilities of a centre are determined or reflected in terms of :

- a. costs only, we will call it a cost centre.
- b. revenues only, we will call it a revenue centre.
- c. both (a) and (b) as well as for some measure of profitability, a measure like net income, pretax income, etc., we will define it as a profit centre, and
- d. all the above, i.e. a, b, and c, in addition to some measure of profitability in relation to the centre's own investment base, i.e. return on investment and/ or residual income, we will refer to it as an investment centre.

2.1. In the light of the four types of responsibility centres identified above, what type(s) do you employ in the responsibility accounting system of your organisation? (Please tick the appropriate box(es) for the following: P= Production, M= Marketing, R&D= Research and Development).

	P	M	R&D
Cost centre	☐	☐	☐
Revenue centre	☐	☐	☐
Profit centre	☐	☐	☐
Investment centre	☐	☐	☐
None of the above	☐	☐	☐

2.2. Approximately how long has your organisation been employing the type(s) of centres referred to in the above question? (Please tick).

Years	Cost centre	Revenue centre	Profit centre	Investment centre
5 and less	☐	☐	☐	☐
6 - 10	☐	☐	☐	☐
11 - 25	☐	☐	☐	☐
over 25	☐	☐	☐	☐
Uncertain	☐	☐	☐	☐

2.3. What factor(s) do you think influenced the choice and design of responsibility centres in your organisation ? (Please rank the variables you choose in order of significance, i.e. 1, 2, ... 8).

Technology(as you perceived it in section 1)

Environment (as you perceived it in section 1)

Size (as you perceived it in section 1)

Organisational chart

Interdepartmental dependencies

Personalities of the senior managers

Location

Tradition and custom,i.e. what other organisations in the industry are doing

Others(please specify)-----

2.4. How do you think the variable(s) you have ranked above affected the choice and design of the responsibility centres in your organisation?.(Please state)

2.5. Here are two definitions other people have given to describe " authority ". Which of these definitions comes closest to how you yourself define or describe it?.(Please tick).

A.Authority goes with the position and /or is delegated from above.A person who occupies a position or is delegated authority is the proper person to obey without question.

B.Authority is the ability of certain persons, whether occupying formal organisation positions or not, to influence the behaviour of others, and the commitment of organisation resource(s), based on the relevance of the information available to them, the soundness of their reasoning etc. As a result people are naturally willing to accept this authority rather than have it imposed upon them.

C.Other(please state)-----

2.6.In your opinion, what is the main source(s) of authority of a responsibility centre manager over a cost/ revenue item? (Please rank in order of significance, 1, 2, ..., 6).

1.Technical expertise.

2.Managerial expertise.

3.Personality or personal traits.

4.Position.

5.Access to and control of information.

6.Access to senior management and other influential people.

7.Others (please state)-----

2.7. Where there is a person, e.g. head of responsibility centre who has authority over an item, is he, from the viewpoint of the responsibility accounting system of your organisation, the only person who can exercise control over this item? (Please tick).

Yes ☐

No ☐

Don't know ☐

2.8. In determining the controllability of cost or revenue items, do you consider that (please rank, 1-3, in order of applicability in your organisation):

- A. An item is controlled at the centre which incurs it. ☐
- B. An item is controlled at the centre which influences its amount through utilising a service. ☐
- C. An item is controlled at the centre which is held responsible for it by the accountant. ☐
- D. Others (please specify)-----

2.9. In your organisation which of the following costs and revenues are considered to be subject to the influence of a responsibility centre manager and also are used in evaluating his performance ? (please tick the appropriate box):

- A. Only direct cost/ revenue items within his responsibility centre. ☐
- B. Variable cost/ revenue items within his responsibility centre. ☐
- C. All costs, i. e. direct costs, variable costs, responsibility departmental fixed costs, and allocated central costs, and revenues within his responsibility centre. ☐
- D. Others (please specify).-----

2.10. In your organisation, the responsibility centre manager can exercise 100 % control over (please tick the appropriate box).

P M R&D

1. All the costs and revenues which are classified as controllable items within his responsibility centre. ☐ ☐ ☐
2. The majority of the costs/ revenues, etc. ☐ ☐ ☐

3. Some of the costs/ revenues, etc. ☐ ☐ ☐
4. Few of the costs/ revenues, etc. ☐ ☐ ☐
5. None of the costs/ revenues, etc. ☐ ☐ ☐

2.11 What factor(s) from the list below, do you think could limit the controllability of a manager over a cost/revenue item ? (Please tick the appropriate box(es)).

- | | P | M | R&D |
|-----------------------------------|--------------------------|--------------------------|--------------------------|
| a. Technology . | ☐ | ☐ | ☐ |
| b. Environment. | ☐ | ☐ | ☐ |
| c. Size. | ☐ | ☐ | ☐ |
| d. Interdepartmental dependencies | ☐ | ☐ | ☐ |
| e. None. | ☐ | ☐ | ☐ |
| f. Others (please state)----- | | | |

2.12 Are you satisfied with the design and operation of the responsibility accounting system in your organisation ?.(Please tick).

Entirely
satisfied

Quite
satisfied

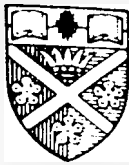
Dissatisfied

If not satisfied please state why.-----

For ease of completion I have split my questionnaire into two parts. You have completed one of these. Would you be prepared to complete the other? ☐ Yes ☐ No

Thank you for your cooperation

A. Abdallah
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A Division of the Scottish Business School

30 January 1987

Appendix B:Q.2

Dear Sir

I am currently carrying out research into Responsibility Accounting Systems in industry at the Department of Accounting and Finance in the University of Strathclyde. The main purpose of this research is to determine the similarities and differences among Responsibility Accounting Systems in four industries, and to ascertain the extent to which these similarities or differences can be attributed to differences in their technology, environment, size, etc.

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Thank you for your cooperation.

Yours faithfully

A Abdallah

University of Strathclyde
Responsibility Accounting System Survey

A. Name of the company :
B. The industry :

C. The production system :
(Please tick)

Mass
Production

Process
Production

Continuous
Production

D. The main product(s) : 1.
2.
3.
4.

E. Name and Official position of person completing this
questionnaire .

F. Would you consider participating in a follow up interview ? ☒ Yes

☐ No

Name of the person who can be contacted if different from that
stated above.

G. All answers and comments included in this questionnaire will
be strictly confidential. However, would you please indicate
if you agree for the name of your organisation to appear in
a list of participants to this enquiry . ☒ Yes ☐ No

H. If you are interested in receiving a copy of the overall
findings of this study, please tick the box opposite . ☐

General Notes

1. Most of the questions in this questionnaire can be answered by
ticking(✓) the appropriate box against the answer(s) listed
under the questions.
2. If any of your answers or comments require more space than has
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back of this questionnaire, referring in your answer to the
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3. This questionnaire, can be answered on an individual or group
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can collectively participate in answering it. However, in the
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 - a. Note that the answers or responses should reflect a
consensus among the persons of the group or that they
will reflect the viewpoint of the majority of the persons.
 - b. Indicate in the box provided the number of persons who
participated in completing the questionnaire. ☐

Section One : Responsibility Accounting System : Introduction

- (1) In some organisations this system might be known as a profitability accounting system or activity accounting system. These are just different names for an accounting system that recognises various responsibility centres throughout the organisation.
- (2) The responsibility centre is a formally specified work group within the organisation under a manager charged with a formally defined set of responsibilities directed toward the attainment of the goals of the organisation.
- (3) When the responsibilities of a centre are determined or reflected in terms of :
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 - revenues only, we will call it a revenue centre.
 - both (a) and (b) as well as for some measure of profitability, a measure like net income, pretax income, etc., we will define it as a profit centre, and
 - all the above, i.e. a, b, and c, in addition to some measure of profitability in relation to the centre's own investment base, i.e. return on investment and/ or residual income, we will refer to it as an investment centre.

Section Two : Responsibility Accounting Reports;

Purpose and Contents

2.1. For what purposes do you prepare responsibility accounting reports ?. (Please rank 1, 2, ..., 5, in order of importance, and put a cross in the boxes which are not applicable).

- A. To serve as a basis for modifying or changing behaviour within responsibility centre(s) towards more effective working habits, i.e. control aspect. ☐
- B. To provide an adequate feedback to each responsibility centre on its contribution to the achievement of the organisational goals, i.e. performance evaluation aspect. ☐
- C. To furnish information for managerial performance evaluation within the responsibility centres for the purpose of salary increases, rewards, penalties, etc. ☐
- D. To assist in determining the present and future training needs. ☐
- E. Others (please state)-----

2.2. To what extent are accounting reports used in evaluating responsibility centres and their managers?. (Please tick one).

	Respons- ibility Centre	Respons. Centre Manager
1. Accounting reports are mainly used.	—	—
2. Accounting reports are used and occasionally additional information is sought.	—	—
3. Accounting reports are used and additional information is always sought.	—	—
4. Nonaccounting information is always sought.	—	—
5. Don't know	—	—

2.3. Here is a list of financial/ quantitative criteria which might be used in preparing responsibility accounting reports. Which of these criteria do you use in your responsibility accounting reports for evaluating the performance of a responsibility centre ?. (Please tick)

(Please note : P = Production department

M = Marketing department

R&D = Research and development department)

Criteria	Responsibility Centre		
	P	M	R&D
1.Profit (absolute)	—	—	—
2.Profit margin	—	—	—
3.% profit growth	—	—	—
4.Profit mix desired among existing or potenial product lines.	—	—	—
5.Costs: actual	—	—	—
standard	—	—	—
6.Sales(volume and value): actual	—	—	—
budgeted	—	—	—
7.Sales growth rate, i.e. % growth in sales	—	—	—
8.Variances: total	—	—	—
according to its	—	—	—
components, i.e.material,labour,etc.	—	—	—
9.Return on investment (ROI)	—	—	—
10.Residual income	—	—	—
11.Cost reduction	—	—	—
12.Stock losses	—	—	—
13.Number of operating or running days	—	—	—
14.Others (please state)-----	—	—	—
-----	—	—	—
-----	—	—	—

Which of these criteria do you use for evaluating managerial performance ?(Please tick).

Criteria	Responsibility Centre Manager		
	P	M	R&D
1.Profit (absolute)	—	—	—
2.Profit margin	—	—	—
3.% profit growth	—	—	—
4.Profit mix desired among existing or potential product lines.	—	—	—
5.Costs: actual	—	—	—
standard	—	—	—
6.Sales(volume and value): actual	—	—	—
budgeted	—	—	—
7.Sales growth rate, i.e. % growth in sales	—	—	—
8.Variances: total	—	—	—
according to its	—	—	—
components, i.e.material,labour,etc.	—	—	—
9.Return on investment (ROI)	—	—	—
10.Residual income	—	—	—
11.Cost reduction	—	—	—
12.Stock losses	—	—	—
13.Number of operating or running days	—	—	—
14.Others (please state)-----	—	—	—
-----	—	—	—
-----	—	—	—

2.4. Which of the above criteria would you like to see embodied in the reports of your responsibility accounting system for the purpose of performance evaluation.(Please state)

2.5. Which of these criteria are used in preparing your reports for performance evaluation?.(Please tick).

A.Productivity.

☐

B.Market share.

☐

C.Product quality .

☐

D.Employees turnover or absenteeism.

☐

E.Meeting delivery schedule(s).

☐

F.Consumer satisfaction.

☐

G.Product improvement.

☐

H.Others (please state)-----

Section Three: Accounting Function; Communication and Methods

3.1. In your opinion, how important for your work is your contact or communication with other persons and groups within other departments, e.g. marketing, production, research and development, etc. (please tick)

Very important	☐
Important	☐
Quite important	☐
Not important	☐
Don't know	☐

3.2. How often do you contact or communicate with other persons and groups within other departments? (please tick).

Often	☐	Hardly ever	☐
Sometimes	☐	Don't know	☐

3.3. Which method of communication do you use most?.
(Please rank in order of frequency).

A. Memos.	☐
B. Accounting reports/ statements.	☐
C. Telephone.	☐
D. Face to face.	☐
E. Electronic mail	☐
F. Others (please state)-----	

3.4. Which of these methods of communication is the most effective in getting things done?. (Please state).

3.5. If anything goes wrong in a responsibility centre which might affect the performance of another responsibility centre(s), do you inform the latter centre(s) to take appropriate action(s) or not?(Please tick).

Always	☐	Sometimes	☐
Frequently	☐	Never	☐

3.6. If yes, how long does it take to inform the other responsibility centre(s)? (Please tick).

a. Immediately, for example through face to face meeting or telephone. ☐

b. Within a reasonable time, for example using a memo. ☐

c. A relatively long time, for example using periodic accounting reports. ☐

e. Others (please state).-----

3.7 Are you satisfied with the design and operation of the responsibility accounting system in your organisation ?
(Please tick)

Entirely
satisfied

Quite
satisfied

Dissatisfied

If not satisfied please state why.-----

For ease of completion I have split my questionnaire into two parts.
You have completed one of these. Would you be prepared to complete
the other? ☐ Yes ☐ No

Thank you for your cooperation

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Appendix C

Names of organisations agreed to appear in
a list of participants of this study

Names of Organisations	Industry
1. Waldens Wiltshire Foods Ltd.	Food
2. Dawnfresh Seafoods Ltd.	"
3. The Nestle Co. Ltd.	"
4. Marr Frozen Food Ltd.	"
5. Kraft Food Ltd.	"
6. Arthur H. Cox & Co. Ltd.	Pharmaceutical
7. Johnson and Johnson Ltd.	"
8. Organon Laboratories Ltd.	"
9. Jeyes Ltd.	"
10. Reckitt and Colman Products Ltd.	"
11. Pfizer Ltd.	"
12. Roche Products Ltd.	"
13. Sanofi UK. Ltd.	"
14. Upjohn Ltd.	"
15. Sterling-Winthrop Group Ltd.	"
16. Ciba-Geigy Chemicals Ltd.	"
17. Thomas Kerfoot & Co. Ltd.	"
18. Peugeot-Talbot Motor Co. Ltd.	Motor Vehicle
19. King Trailers Ltd.	"
20. Jaguar plc	"
21. Motor Panels (Coventry) Ltd.	"
22. Boalloy Ltd.	"
23. Quantel Ltd.	Radio and Electronics
24. Mather and Platt Alarms Ltd.	"
25. Osprey Electronics Ltd.	"

APPENDIX D

The following table summarises the result of using Kendall's W as a non-parametric statistical test to the findings of both tables 10-5 and 8.

Description	W	Chi-square	Degree of freedom	Significance
Table 5 The impact of the different contingency variables on the controllability of a manager over a cost/revenue item.	.4667	4.2000	3	.2407
Table 8 The similarities in using the performance evaluation criteria:				
a. between the different functional responsibility centres	.2813	12.6580	15	.6287
b. between the different functional managers	.1498	6.7404	15	.9645
c. between the production centre and its manager	.9937	29.8122	15	.0126
d. between the marketing centre and its manager	.9504	28.5133	15	.0186

W ranges between 0 and 1, with 0 signifying no agreement and 1 signifying complete agreement.

A small probability of the test of significance of chi-square indicates a high degree of concordance.