

CONTRIBUTION OF FACILITIES TO BUSINESS OBJECTIVES;

**An Inquiry Into the Appraisal of the
Performance of the Physical Environment**

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**submitted for the degree of
Doctor of Philosophy
in Architecture and Building Science**

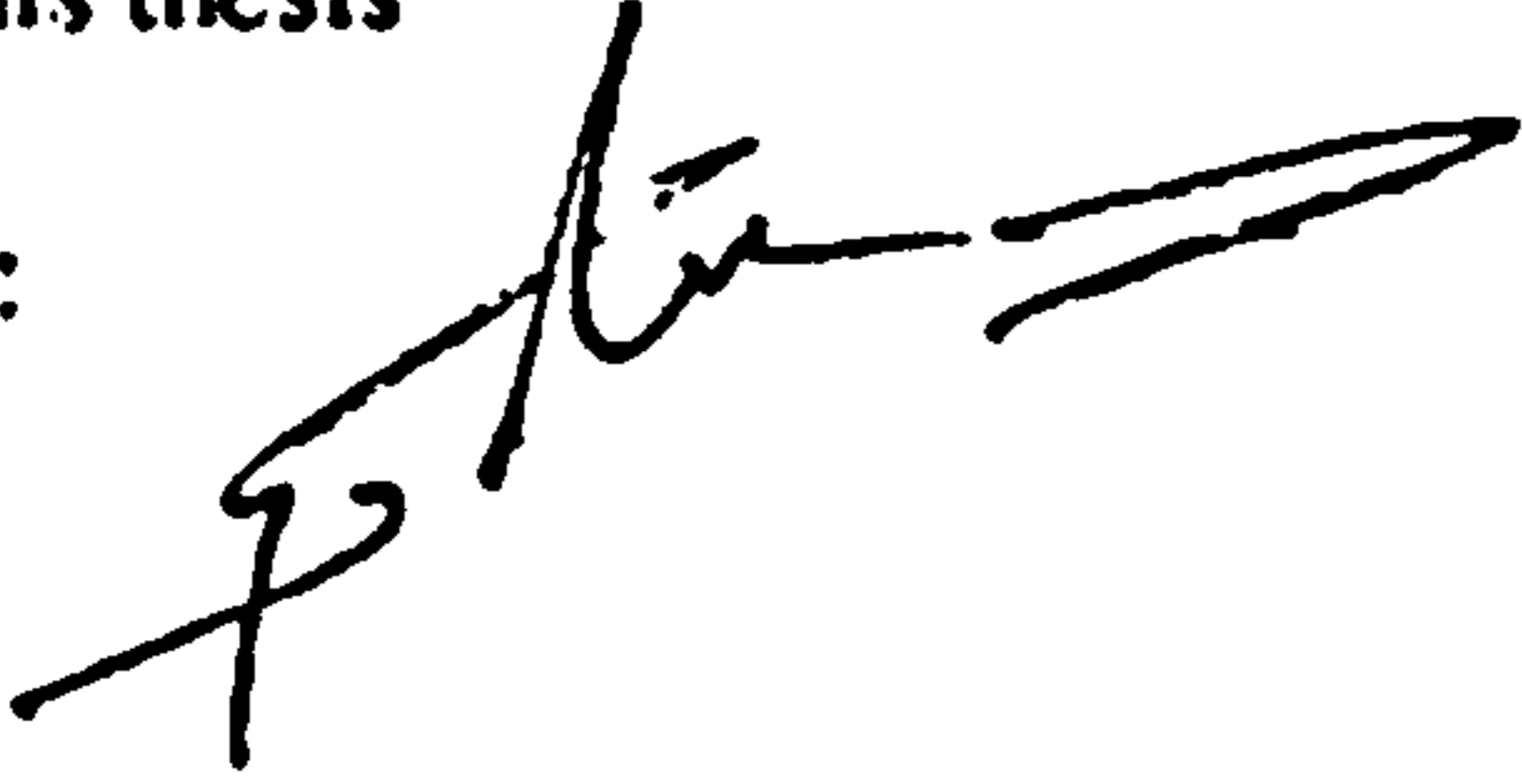
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CENTRE FOR FACILITIES MANAGEMENT
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TITLE OF RESEARCH:

**Contribution of Facilities to Business Objectives: an inquiry into
the appraisal of the performance of the physical environment**

Author: *Gregory Anthony Cambitsis*

ABSTRACT

Today, competitive and effective enterprises are the organisations which successfully respond to the challenges derived from the business and socio-economical environment. Due to the increasing importance of employees' attitudes towards the working environment, the significance of supporting systems to improve business efficiency takes new dimensions. The importance of corporate premises to productivity and other organisational issues has been acknowledged [Becker, 1990; Duffy, 1992a]. At the same time, increasing effort has been devoted to methods for the appraisal of the performance of premises. However, most existing methods are concerned with technical issues, and the performance of facilities is measured against a number of generalised and fragmented performance criteria, previously established according to the interests of the researcher or the financier.

This study challenges the reliability of existing assessment methods to predict and evaluate the overall performance of facilities by providing evidence about the contribution of premises to the communication of corporate identity, a domain hardly acknowledged by current assessment methods. Corporate communication is regarded by organisations as one of the emerging issues for consideration and management, since it may affect the images, attitudes and behaviour of the internal and external public. This work should be seen as an empirical study which provides new knowledge about the interaction between organisations and people, and the way in which buildings convey meaning, examples of the contribution that facilities can make in achieving business objectives.

The case study demonstrates the potential of the physical environment to influence business dimensions, not traditionally associated with the existence of premises, thus

not the subject of conventional methods. Furthermore, the importance of the findings relies on evidence that the answers concerning the impact of buildings to qualitative business dimensions can be found in other disciplines of science such as in environmental and cognitive psychology.

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To the late

Elias George Cambitsis

Then came, it seems, that wise and cunning man,
The first inventor of the fear of gods...
He framed a tale, a most alluring doctrine,
Concealing truth by veils of lying lore.
He told of the abode of awful gods,
Up in revolving vaults, whence thunder roars
And lightning' s fearful flashes blind the eye...
He thus encircled men by bonds of fear;
Surrounding them by gods in fair abodes,
He charmed them by his spells, and daunted them
And lawlessness turned into law and order.

Critias

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CHAPTER I

The Prolegomena

1.1 Introduction

The work is concerned with the contribution of corporate premises to overall business objectives and the importance of the physical environment to the organisation. The author's understanding of Assessment Building Performance (ABP) is that it refers to an examination into the efficiency of facilities through an exhaustive inquiry into the individual corporation's specific requirements. The research supports the hypothesis that the process of estimating the performance of facilities may effectively promote a comprehensive perception of potential uses of facilities by suggesting issues that might otherwise have been underestimated or neglected by the corporation.

The objective of ABP cannot be achieved without constant effort to improve our knowledge of understanding the behaviour of facilities and their interaction with the business and socio-economical environments. Yet, it is perceived that the above objectives can be accomplished only by the integration of ongoing knowledge in the fields of management and marketing; construction and engineering; human and behavioural sciences.

This approach is elaborated from a conceptual background from which further research into the assessment of the performance of facilities can emerge. The investigation of the physical environment's capacity to reveal information about the

occupant, an issue of corporate communication, is the selected vehicle for the justification of the importance of this approach, able to unveil underestimated functions of facilities.

The theoretical foundations of the study stand on an attempt to understand the intricate and elusive interdependence of the physical environment, human relations and job design and management, within the context of the demands for a continuous business environment. Other researchers have already pinpointed the lack of an appropriate methodology and theoretical background of existing models and procedures for the evaluation of environmental design and behavioural performance of buildings in use [Becker, 1990; Preiser, Rabinowitz and White, 1987]. The demarcation of disciplines into narrow fields of attention according to the paradigm of applied sciences has deprived social science of a comprehensive perception of the reality and human nature [Carmagnola, 1992].

From performed analysis, the foundations for the design of ABP models will emerge empowering a more comprehensive perception of the performance of facilities. Capitalising on the findings of the literature review, new approaches will emerge setting the guidelines for the design of more effectual ABP models, focusing on the individual corporation and specific operational conditions rather than the facility.

This work can be observed as an invitation to discuss the possible influence of changes occurring in the external environment to long term behaviour and performance of facilities. Furthermore, the direct and indirect ways in which facilities are able to contribute to business objectives through the influence of the performance of a number of business parameters e.g. employee moral, customers loyalty, stockholders assurance and the perception of the facility and working environment under the perspective of the new business environment are investigated.

The objectives of this research are to examine the impact of corporate indicators and the influence of the operational environment - embodying its business, market and physical dimensions - on the performance of facilities over time. Furthermore, the work explores attributes of facilities possibly neglected by existing ABP models, yet potentially significant of the overall behaviour of facilities as tools for business advantage.

1.2 On a New Perception of Facilities

Over the past two decades a strong criticism concerning the quality of the commercial building which dominates the centre of most modern cities has been passed on. Disapproving opinions concerning the popular contemporary office building have been widely expressed by scholars. According to Dowson [1992] '(the office building) is the symbol of today's vandalism that commemorates the unacceptable face of architecture lending its name to commercial exploitation'.

Under the influence of the modern movement in architecture, facilities used to be appreciated more as the combination of walls, space, cables and equipment, as mere shells for activities independent of the external world [Mikellides, 1974]. It is evident that the pressure of the estate market for the maximisation of assets' value and the narrow and misleading interpretation of *functionalism* in the workplace, allowed job planners, working environment designers and architects to separate the objective functions from the subjective ones and to abandon the tradition of balance between mechanical amenities and requirements, biological needs, social commitments and personal values [Mumford, 1975]. The consequences on the physical environment were rather dramatic, and as Jones comments,

Perhaps the worst effect was a kind of conspiracy of silence about aesthetic and qualitative issues: being unmeasurable, they were, for a while, considered to be not proper subjects for debate. The predominant belief in science as the answer to all problems pushed art into a subordinate position, and made it a luxury in relation to science's necessity. Such 'materialism' also meant that there was an over-emphasis on construction techniques and repetitive processes, which dominated the ordering of buildings to the exclusion of all else.

[Jones 1992, p. 30]

It appears that the main question that commercial buildings were called to answer at the end of the previous century, '*the development and construction of a building able to accommodate sufficiently a number of specific activities*', was biased towards the demands of the corporation under the structuralistic school of thought. However, this did not take into account the complexity of today's business environment. Impersonal style, neglect of the human factor and bland anonymity at the name of flexibility, manageability and work floor productivity; all characteristics of the

overwhelming majority of current industrial buildings which have been maintained from the factories of the previous century, are now considered as the main obstacles for the creation of new cultures and the implementation of competitive policies [Wallis, 1995].

The overemphasis of the concentration by developers and corporations on the utilitarian dimension has emanated in the production of facilities overlooking the significance of environment-user interaction and the effects on human behaviour [Lang, 1987]. The managerial perception of facilities as a mere overhead, a necessary resource strictly for productivity purposes, deprives corporations of a valuable tool of strategic significance [Varcoe, 1992a]. In addition, the potential importance of facilities as a medium of corporational culture and values in highly competitive environments, although recognised, is not yet considered thoroughly investigated [Cassels, 1991].

Today's leading enterprises expect that along with the fulfilment of requirements for functionality, adaptability, maximisation of space and the utilisation of resources, the modern working environment should be able to gratify wider organisational demands, assisting in developing a positive corporate identity and culture [Duffy, 1990b; Wingrave, 1990]. In addition, it has to satisfy the physiological; psychological and sociological needs of ultimate users, and be able to address other *stakeholders'* expectations¹ [Davey, 1990].

There are a number of events that compel us towards the pursuit of a greater understanding of human-working environment interaction, since the application of obtained knowledge in the domains of design, management and assessment of facilities appears significant for the satisfaction of the occupier's requirements which are:

- the change of the corporation's role in society, the elevation of its importance as a stabilising or destabilising component of society,

¹ Stakeholders according to Sancar [1985] are the various groups of people having an interest in or affected by the construction and operation of facilities and the built environment. Simon [1977] categorises stakeholders into four groups: users (employees, customers, visitors), non users (residents, street public, people engaged in commerce, support users such as fire fighters, postmen, janitors, etc.), developers (financiers, architects, engineers, builders), and planners (decision makers, planning authorities). Facilities impact upon those groups could be of economical, environmental, political, social or technological nature.

the new perception of organisations as communication networks, the new marketing and management approaches e.g. think global act local;

- the outbreak of the post industrial society and the emergence of new values and priorities, the globalisation of the market place, the impact of IT to any form of productive or social activity, the emergence of ecological issues; and
- the creation of a new kind of work and workplace, society's new expectations from corporations as servers rather than providers

The incorporation of IT in the work process, the management of facilities and building services not only fostered new approaches to industrial buildings design (Intelligent Buildings) and the diffusion of the workplace (sharing workplace, tele-work), but also changed the definition of the working environment. More and more corporations, particularly on the fields of services and electronics, have the tendency to regard themselves as *communication networks* and facilities as the essential instruments providing the technological and spatial infrastructure [Evans, 1992b; Young, 1992]. The new definitions and priorities in the workplace have brought new issues for examination under ABP, since it is recognised that management and human behaviour are of primary importance for the corporation.

1.3 On ABP Exercises

In recent years, increasing attention has been given to understanding and measuring different attributes of the performance of facilities in relation to corporate objectives. However, it is the very definition of what comprises corporate objectives and the extent of the fields of facilities that are identified as significant to these objectives designating the competence and legitimacy of such efforts [CIB, 1982].

Yet, it is not difficult to identify the prominence of the modernistic and technological traditions lying behind the design and production of existing ABP applications. It is a tradition accepted because of its technological achievements, emphasising *uniformity; functionality; simplicity; reliability*, compartmentalised disciplines and separating *qualitative* from *quantitative* attributes placing the latter at the centre of knowledge.

Today, the profound changes observed in the political, demographic, cultural and technological theatre have reformed the economical scenery [Naisbitt and Aburdene, 1990]. The emergence of the global market, the revolution in communications and the turbulent business environment at the onset of the post industrial era have introduced radical changes in the definition of familiar concepts. *Organisation, office work, corporate culture, working environment*, are all concepts whose interpretation was formerly taken for granted. Yet, they are now being continuously redefined, reinterpreted and re-evaluated in accordance with the latest theories that recognise the correlation and interdependence of phenomena such as organisational structures, production methods, and social phenomena [Morgan, 1986].

This research supports that nowadays a substantial amount of knowledge has been collected in the fields of the performance of building behaviour, management studies and human behaviour in relation to living conditions. However, this knowledge appears to be fragmented and employed for the fulfilment of detached objectives of every particular science. Today there is a demand from developers and facilities managers to incorporate this knowledge from the perspective of the corporation. There is a pressure to form a discipline able to provide the proper procedures for the holistic examination of the consequences of corporate premises and the physical environment to business objectives.

1.4 On Corporate Communication and Facilities

The paradigm of the present work could be seen as a pilot study in an attempt to develop more holistic methods for the appraisal of buildings. Moreover, this work is an attempt to extract information about the contribution of buildings to business objectives through the use of instruments found in other disciplines.

The case study is primarily concerned with the social dimension of facilities and more specifically with their potential role as mediums of identities, cultures and values for both corporations and users. Today, at the age of the information revolution under the constant bombardment of advertisements through the media; the unconstrained mobilisation and amalgamation of cultures; symbols and ideas, the effectiveness of premises as corporational mediums is in question.

This case study should be perceived as an attempt to investigate this particular area of user-environment interaction. The ability and capacity of observers to perceive

and interpret information derived from facilities and the physical environment by reference to corporate indicators such as corporate structure; culture and values is questionable. In addition, the study should be welcomed as an exercise that will aid the further development of ABP theoretical background through the investigation of managerial practice and its interdependence with the physical environment. Furthermore, the domains of corporate communication and corporate identity in reference to facilities are examined.

Corporate identity seems to be the visible part of the combination of a number of indicators that characterise enterprises and is perceived as a unique and distinctive feature of individual corporations. It is expressed through a variety of means such as products and services, assets, dominant culture, public relations, management behaviour and marketing [Bernstein, 1984; Olins, 1984].

The case study builds upon the assumption that the public is able to recognise, to a degree, organisational characteristics through the design of occupied facilities and working environments. Furthermore, it is suggested that the combination of facilities and marketing procedures based on characteristics of the physical environment can alter the initial perception about the characteristics of the occupier.

To sum up, the main interests of the attempted investigation can be described in the following research hypothesis:

Facilities and the appearance of the working environment reveal a variety of organisational characteristics of the occupier, which can be perceived and meaningfully interpreted by observers.

The research is initiated by the completion of structured questionnaires from volunteers. Four office buildings were selected as visual stimuli for the study, while a questionnaire concerning various corporate dimensions of occupiers was distributed to observers. From the multitude of organisational dimensions that were revealed by the literature review of the organisational and management theory, the clarity of a number of corporate indicators suggesting the structure, culture and behaviour of the occupier was examined.

Yet, although the case study examines a number of corporate characteristics in relation to the perception of the observers, the author recognises that this work is unable to provide a conclusive and cohesive explanation for the symbolic interpretation of the physical environment. This involves a much heavier task,

namely, observing a variety of public groups, organisational characteristics, different industrial buildings, physical components and the ambient conditions of the built' environment. However, the output of the case study can be used as a starting point for further research into the examination of the potentials of managing meaning and symbolism through the physical environment, and the use of premises as powerful tools of corporate communication, inside and outside the organisation.

The outcome of the investigation and analysis of the ongoing knowledge in the domains of business and human environment, which are described in the next chapters, intend to contribute to the better understanding of the role of corporate premises in a socio-economical context. It is expected that this review in combination with the performed case study, can eventually nurture more efficient procedures for the study of buildings and the design of more reliable ABP models.

1.5 Organisation of the Thesis

The present work unfolds in three main sections: Theoretical Background (Chapters 2-4), Focus of Concentration (Chapters 5-7), and Discussion and Interpretation (Chapters 8, 9).

In the first part of the work contemporary organisational theories, human behaviour and interaction with the physical setting, theories on the symbolic meaning of the working environment and corporate communication in reference to facilities are examined. Apart from some useful insight into the nature of the behaviour of facilities, the analytical review reveals the potential contribution of the physical environment to business objectives through the influence on the performance of organisational dimensions such as productivity and communication.

In the second part, a critical assessment of the theoretical foundation of existing ABP methodologies and models is presented, and the capacity of facilities to communicate specific characteristics of their occupants is questioned. The case study investigates the ability of observers to interpret the physical and spatial environment with respect to organisational indicators such as corporate structure, culture and values. Furthermore, the influence of the branding of facilities on the observers' attitude about the corporation is examined.

In the third part the findings of the case study are interpreted, and the consequences of the present research conclusions on the potential of facilities to contribute to corporate objectives is discussed. Furthermore, the improved perception of the importance of facilities triggers the re-examination of current ABP approaches and the redefinition of appropriate procedures. On the strata of the findings, the example of a new approach for the development of ABP exercises is outlined, suitable to fulfil the requirements of modern corporations and meet the issues put forward by the post-industrial socio-economical environment.

Chapter I

This chapter introduced the pressures of the modern socio-economical environment, responsible for the redefinition of the concepts of organisation, working relationships and the importance of facilities. In addition, the potential influence of physical assets to corporate objectives is mentioned. The complexity of assessing the performance of facilities in correlation to management aims is unfolded and the capacity of current ABP methodologies to provide meaningful measurements for the corporation, focused on the actual business demands is questioned.

Chapter II

This chapter pays attention to the approaches of the current organisational theory seeking to explain the phenomenon of the modern organisation in a form valuable to the focus of the study. Furthermore, the analysis concentrates on the study of the organisation taking into account the managerial requirements for the corporate premises. From the discussion, the extraction of insight into the potential role of the physical environment on business effectiveness is attempted. More specifically, the identification of parameters from the external environment and corporate indicators, which have a possible influence on the long term performance of facilities and organisational functions, and activities whose efficiency relies a degree, on the design of facilities and the working environment is pursued.

Chapter III

The chapter is concerned with the interaction of human beings with the physical setting and the study of users perception, attitude and behaviour by reference to the built environment. In addition to the physiological one, the recognition of the psychological and social dimensions and requirements of human nature, initiates the

demand for facilities and working environments which pay attention to the satisfaction of, often underestimated, users' needs.

Moreover, the examination of the influence of the corporational property to users' attitudes and behaviour supports the special significance of the role of the physical environment for the success of business objectives. Under this perspective buildings enjoy greater merit within the organisation, in contrast to the traditional one, where facilities are considered as envelopes for the accommodation of strictly utilitarian purposes. The objective of the analysis is to display that the behavioural and attitudinal aspects of users are not irrelevant to the physical environment, thus the evaluation of facilities can not be performed without sufficient consideration of their interaction.

Chapter IV

The chapter deals with the semiological value of premises and the ability of facilities to function as objects where the identity of the occupier is reflected. The nature of corporate communication and the importance of corporate identity, meaning, culture and symbolism to corporate objectives are examined. Furthermore, the possible contribution, advantages and limitations of the physical environment to the establishment of a desirable corporate culture and the presentation of the corporate identity to the internal and external public are investigated. The findings of the chapter suggest that the role of premises as mediums of corporate communication is of some significance, therefore it should be properly investigated with ABP methods.

Chapter V

Having investigated the extent of the importance of facilities on corporate objectives, this chapter reviews the traditional methodology that dominates existing building appraisal approaches. Moreover, their theoretical foundation to encounter the important issues arising in modern business conditions is questioned. The review examines the ability of ABP methods to take into consideration the parameters of the external environment, the organisational characteristics and the specific demands of management.

Chapter VI

The second part of the thesis is devoted to the justification of ABP methods concentrated on the organisation. That is achieved through the examination of a corporate dimension outside the area of interest of traditional methods. The next two chapters are concerned with the provision of evidence concerning the ability of facilities to be seen as means of corporate communication, where apart from the existence of the occupier, information is provided about the structure, culture and values of the organisation.

It is recognised that not all corporations seek to communicate their corporate identity. However, the author supports that in business conditions, where management considers the presentation of corporational values as an important parameter for the success of business objectives, ABP methods should be able to provide the appropriate methodology and tools for the assessment of the contribution of facilities to the topic.

This chapter describes the adopted methodology for the accomplishment of the case study, aiming at examining the ability of facilities to present a variety of corporational characteristics to laymen. Four modern office buildings are observed, at the beginning, as stand alone means of the corporate communication and later as elements of a broader corporate identity programme. The respondents ability to identify the integral characteristics of the occupiers of the buildings has been tested and the ability of the observers to perceive hard and soft issues such as structure, hierarchy, purpose, culture and objectives has been investigated.

Chapter VII

This is the second part of the case study, dealing with the statistical analysis and the reliability and validity of the findings. The analysis is presented in a thematic structure by reference to the focus of interest of the work and the independent variables.

Chapter VIII

The chapter is occupied with the interpretation of the findings from the case study and the consequences in the design of ABP models. Moreover, the significance of evidence on the study of the performance of facilities and the areas of research is investigated. Building on the findings from the literature review and the conclusions

of the case study, the appreciation of facilities as managed resources integrated in the long term corporate strategy is examined. Furthermore, the importance of the results of the study and the knowledge found in other disciplines or areas of knowledge, able to enrich our understanding of the importance of facilities for the organisation and improve the competence of ABP methods is discussed.

At the end, a radical approach for the assessment of the performance of facilities under the organisational perspective, taking into consideration the new priorities of the individual corporation and the emerging issues derived from the conditions of the external environment, is proposed. Under the new approach the location of organisational, managerial and behavioural parameters in one ABP procedure that could measure the long term performance of facilities is attempted. This approach should be perceived as one of the new directions upon which future ABP models can be built.

Chapter IX

The last chapter highlights the main issues which have emerged in the previous chapters and reviews the conclusions of the study. It discusses the significance of this work for senior executives, explains the consequences of the findings on the fields of architecture, facilities management, assessment of facilities performance and corporate communication, and provides recommendations for further research into the above mentioned areas.

SECTION ONE

THEORETICAL BACKGROUND

Facilities within the Invisible Organisation

2.1 Introduction

Current methodologies for the evaluation of performance of premises and working environment have given little attention to the business and social requirements of the operational environment, the corporate and socio-economical context within which facilities operate. Preferences to inadequate methodologies, and to a certain extent the limited focus of objectives of the relevant research studies often result in an underestimation of the importance of the operational context. However, the absence of a proper investigation and understanding of the significance of the operational environment to the performance of facilities and potential influence to users and business objectives, raises questions concerning the relevance and significance of the attributes of buildings which are traditionally examined and measured, eroding the reliability of current ABP methods.

In the organisational context, *facilities are the consequence in the physical environment of management's attempts to address specific business demands within a broader socio-economical context.* Thus, any relevant ABP exercise should be concerned with the investigation of the external environment and corporate characteristics, addressing the broader issues that concern the corporation over time. The task undertaken in this work is to challenge the traditional approach of the assessment of facilities as isolated objects of study, and to propose an alternative orientation that introduces a number of attributes of the physical environment able to influence the business operation in the evaluation. For a more thorough appreciation

of the overall performance of facilities in the organisational context, a critical review of the current organisational theory, building evaluation, human perception and interaction with the physical setting are considered essential.

The chapter seeks to accomplish two main objectives. Firstly, an assessment of the potential role of facilities to business effectiveness through a review of current organisational theories concerned with the external environment and the nature of the organisation. It is perceived that a more comprehensive perception of the potential significance of facilities to different corporate dimensions and behaviours will be grasped through the examination of different organisational aspects important to the performance of organisations. The second objective is the review of studies concerned with the interdependence of organisational parameters with facilities attributes. This will display the advancement of knowledge in the domain of organisation-physical environment interplay and exhibit the current methodological approaches to the problem.

2.2 Organisations and the External Environment

Negandhi [1974] perceived the operational environment as consisting of three layers: a. the *organisational environment* embodying size; technology; organisational climate; the human and capital resources of the organisation, b. the *task environment* consisting of distributors; suppliers; employees; consumers; stockholders; the government; the community, and c. the *societal environment* recognising the economical; political; social; cultural and legal conditions. The examination of the performance of facilities cannot be accomplished without the recognition and investigation of the *external factors*. These are the parameters outside the corporation which constitute the long term conditions under which corporations and facilities operate. Schollhammer [1969] argues that traditional management literature has emphasised the *internal environment* of enterprises and underestimates the external environment where corporations function.

The external or societal environment has been defined in a variety of ways. Skinner [1964], along with Negandhi, recognised the importance of the framework consisting of four intermeshing systems which influence the position of corporations, the

technological, cultural, political and economical systems¹, which comprise a large number of heterogeneous factors. Indicators such as economics, politics and demographics have an indirect impact upon the performance of facilities in the sense that they comprise the societal context which constitutes the priorities of the long term strategic plan and determine the objectives and limitations of facilities. Yet, despite the parameters of the societal environment relevant to organisations, the performance of facilities has to be estimated by reference to the conditions of the property market and construction industry. The parameters associated with the property market, the advancement of the construction industry and public awareness about the environmental, social and economical impact of physical settings have direct implications on decision-making concerning the specifications of facilities, adopted design and management approaches.

A number of researchers emphasise the view of the corporation as an *indeterminate* structure interdependent with its operational environment, being under continuous scrutiny through economical, informational, technological and social uncertainties [Thompson, 1967; Lawrence and Lorsch, 1967]. They recognise the logic of systems framework in viewing the corporation as a reactive and adaptive social unit, highly determined and dependent on the idiosyncrasy of the operational environment [Beres and Portwood, 1981]. On organisational theory; other writers argue that corporations attempt to shape their environment, suggesting that the position of the corporation in the environment is a more or less political decision, while the environment-corporation interaction is an indication of the power strangle of various interests between corporational members [Hall, 1987]. According to Silverman the external environment is '*a source of meaning through which [organisational] members define their actions and make sense of others actions*' [1987, pp. 120]. The

¹ The systems that Skinner recognises embody a number of parameters. The *technological system* (product, process, equipment, quality, investment, controls of production, inventory, procurement, maintenance and productivity standards); *cultural system* (values, beliefs, assumptions, relationships, motivating factors, status symbols, customs, social institutions, social mobility, education, classes, castes and literacy); *political system* (stability of government, government controls, the jurisdictional system, integrity of civil servants, government attitudes towards business and labour, legislative procedures and the executive branch of the government) and *economic system* (relative cost of labour and materials, equipment, availability of credit, taxes, inflation, growth, cyclical activity, foreign exchange, competition, tariffs, distribution system and mass media for communications) [Skinner, C. W. (1964). Management of international production. In *Harvard Business Review*, September-October 1964, pp. 125-136].

significance of this approach, the *action theory*, is the provision of a context where corporational behaviour can be understood to embody not only strictly utilitarian concepts but also the social dimension, indicating the possible significance of meaning and self-identity.

The recognition of the significance of external parameters such as cultural characteristics and the industry's ability to support advanced facilities management approaches may be difficult and occasionally dubious to define. However, the examination of current trends is very important, since the tolerance of different socio-cultural systems of design approaches in the workplace and working conditions may vary significantly.

There are various examples where the external parameters have forced the early obsolescence of facilities or the restriction of specifications. The introduction of information technology in the workplace was the main reason for the abandonment, in the seventies, of a large part of the office building that was unable to cope with the higher specifications in the ambient conditions [Joudah, 1989]. Yet, apart from technological advance which is recognised as the main factor responsible for the obsolescence of facilities, cultural differences though often underestimated, seem important as long as they impose restrictions on design approaches. While in most western countries the provision of air conditioning systems for heating and ventilation of facilities is considered as a common standard, in Switzerland they have been forbidden as unhealthy. Real estate market differences in the UK and the Continent have emanated from different priorities in the design of facilities [Duffy, Laing, and Crisp; 1993]. Duffy [1992a] argues that while in UK the main concern lies in the insurance of investment and marketability of buildings, in the Continent the main preoccupation seems to be the satisfaction of the client.

It appears that the external environment has a direct influence on the requirements of facilities and the definition of adequate levels for the performance of buildings. The same design proposals are not acceptable in all socio-economic environments; therefore any ABP exercise should take into consideration the idiosyncrasy of the business and the real estate market conditions. However, it is recognised that during the operational life of facilities, the external environment changes in highly unpredictable ways. Therefore, no matter how exhaustive the examination of the future environment's conditions is, there is no guarantee that today's designed facilities will have an acceptable performance in the future world.

2.3 Thinking Facilities while Studying Organisations

In the past, architects and designers of the working environment have commented on the importance of congruence between management style and facilities. Moleski and Lang [1982] argue about the importance of offices in reflecting the hierarchy of authority, formal communication and other elements of the organisational structure. Separately, Dowling [1973] and Katz and Kahn [1978], referring to the case of Volvo, support that the redesign of the organisation, work groups and supervisory relations had required the design of a new factory in Kalmar, which would be able to enhance the new organisational structure and work culture.

In the organisational theory there is little concern with and reference to the role of facilities and the working environment in the structure and functioning of enterprises. Sundstrom and Sundstrom [1986] argue that organisations strive for *congruence* between certain characteristics of facilities and organisational properties. However, the degree and range of the desired congruence of organisational elements and the elements of facilities involved in such interaction has not been investigated properly. This may be due to the limited range of organisational theories concerned with the physical working environment, restricted mainly to the field of traditional management theories (Table 2.1). Sundstrom and Sundstrom [1986] support that according to the main interests of the particular organisational theory, the role and importance of the working environment in the organisation is perceived differently.

Burrell and Morgan [1979] argue that the field of the organisational theory possesses a plurality of competing *paradigms* at the disposal of the organisation analyst, offering a wide range of explanations of the activities, relations and conditions under which organisations operate. Morgan [1990] supports that only through the multidimensional investigation of different paradigms for organisational analysis can a sufficient understanding of the phenomenon of organisation be grasped. In this text Burrell and Morgan's suggestion of the examination of the social theory, organisational research and analysis in terms of four paradigms, the *functionalist*, *interpretive*, *radical humanist* and *radical structuralist* [Burrell and Morgan, 1979] is adopted.

Theory of Organisations	Role of the Physical Environment
<i>Classical Theories</i>	
• Weber: Formal organisations	Symbols of offices
• Taylor: Scientific Management	Efficiency (economy of motion) Supervision (visual accessibility)
<i>Humanistic Theories</i>	
• Maslow: Hierarchy of needs	Satisfier of individual's basic needs
• Herzberg: Satisfiers vs. dissatisfiers	Potential source of job dissatisfaction (Nine explicitly stated)
• Likert: Linking pin model	Proximity and accessibility associated with patterns of interpersonal interaction
• Homans: Groups	
<i>Systems Theory</i>	
• Trist: Sociotechnical system	Part of the technological side of an organisation (key is the fit with social organisation)

Table 2.1 *The role of the physical environment in the theories of organisation according to Sundstrom and Sundstrom [1986, pp. 337]. The depicted theories could be seen as the traditional areas of architectural enquiry in the pursuit of organisational efficiency through facilities.*

The study recognises that through the diversity of the paradigms it is possible to indicate the variety of ways in which the phenomenon of organisation can be approached and interpreted, revealing a number of different characteristics and attributes which may be important for the researcher. Yet, the identification of different paradigms should not be seen as a typological exercise for the classification of different organisational theories.

In the following pages of this section the four research paradigms and the contribution of the main organisational theories to our understanding of organisations will be presented. The interpretation of the insights gained by organisational theories for the interplay and influence between organisations and facilities is attempted through a critical review.

2.3.1 The functionalist paradigm

This category encompasses most of the modern models of organisational analysis. The functionalist organisation theories treat the organisation as a continuing process, a component of the broader societal system that serves the interests of its members. From the foundations of the paradigm the modern management theory emerges. Its popularity among organisational analysts is explained on the grounds of its

objectives, 'the progress and development of the formal organisation and the wider society' [Morgan, 1990].

Having been heavily influenced by the natural sciences, organisational theories of the paradigm strive to discern empirical knowledge from practice in order to initiate generalisable ideologies to manage and control organisations. Furthermore, they offer tools to the members of the organisation and especially to managers, for the achievement and assessment of their current practice, providing the opportunity for affirmation or negation of their methods in use.

Theories under the functionalist paradigm perceive the organisation as a problematic phenomenon where the pursuit of organisational endurance seems synonymous to the pursuit of operational efficiency and organisational effectiveness. The objective of the theories is the creation of an organisational reality in a way that makes controlled performance possible and seeks ways to overcome problems disrupting the achieved order. This is attempted through the generation of problem solving ideas and practices able to support organisational adaptability. The ultimate objective of the functionalist theories is the limitation of uncertainty through the

... development of a cohesive system of thought, where everything has a place within a web of ordered relationships that are intelligible, predictable and controlled. Its quest is for a bedrock of knowledge and an armoury of technique which human beings can manage and regulate their world in relatively clear-cut, systematic ways.

[Morgan, 1990, pp. 18]

The above objective has its foundation in the theoretical axiom that the proficiency of the context of our existence can be partly achieved, enabling the control of our destiny².

² The functionalist paradigm has been heavily influenced by the *empiricist* tradition which has set a high value on science as a means of generating knowledge, and where solutions for philosophical problems appear as essential applications of the general principles found in nature. Empiricism has established *cause*, and the pursued knowledge is claimed to be objective and universally applicable. The *radical empiricist* stresses knowledge by observation, attempting to equate experience with sense-experience, so that its philosophical enquiry is turned outward on the world. Even man himself is to be known by empirical observation rather than from subjective experience [Holmes, Roger (1990). *Person, Role and*

Formal bureaucracy, scientific management theory and the linking pin model represent the mechanistic approaches to the organisation. Weber's [1947] *formal bureaucracy* theory is preoccupied with the organisational *hierarchy* of authority and roles, and brings into attention the need for support of formal structures and duties of organisational members³. The hierarchy and significance of individuals and teams within the organisation are the primary areas where facilities and the physical environment is expected to provide some support. The importance of performed activities and the status of members have been expressed and reinforced over the years through the application of distinct final materials, spatial layouts and the allowance for personal control of the ambient conditions.

By emphasising *efficiency* on purely functionalistic terms, Taylor's *scientific management* theory adopted the idea of specialisation to its logical extreme [Taylor, 1911]. Taylor's theory was focused on the *design of tasks* and the *motivation* factor through external parameters [McGregor, 1960]. Even though today the original applied methods for the fulfilment of the above factors are considered obsolescent, the former through specialisation and the latter through strict supervision, the theory is appreciated because of its contribution to the awareness of work floor productivity and utilisation of organisational resources. The efficiency of organisations is claimed to be achieved through the rationalised use of resources including facilities and their attributes such as space; equipment and systems, and through the efficient use of *time* and *motion*.

Likert's [1961] *linking pin* model emphasised the formal and informal *relationships* among workers. The model perceived the organisation as a pyramid of overlapping groups of relationships among employees and recognised the importance of work-teams. The theory is of some significance for this study since it underlines the need for the nourishment and enhancement of interpersonal interaction inside the organisation⁴.

Organisation: some constructivist notes. In Hassard, John and Pym, Denis (eds.), *The theory and philosophy of organisations*. London, Routledge].

³ Perceiving organisations as formal structures of specified interconnected roles, Weber's theory emphasised the necessity for serial line of authority, uniform practices and rewards based on performance [Katz, D. and Kahn, R., L. (1978). *The Social Psychology of Organisations*. New York, Wiley].

⁴ Homans maintained that patterns of interpersonal interaction are associated with physical proximity among workers, while employees' attitude towards each other is partly depended upon the frequency of interaction

The metaphor of the organisation as an *organism* was expressed through the theories of systems and socio-technical systems. The *systems* approach perceived the organisation as a system composed of groups of people, with each group forming a subsystem [Miller, 1978]. As a system, the organisation is a set of *interrelated elements* e.g. people; equipment; and techniques, components that transform various input (raw materials, knowledge) into desired output (finished products, services). Through the described process, the organisation becomes a series of transformations from input to output having as a goal to make as few errors as possible [Katz and Kahn, 1978].

The *socio-technical systems* developed by the Tavistock Institute, insisted on the importance of internal agreement of the organisational parts and the compatibility between technology, people and the social structure of the organisation [Trist and Bamforth, 1982]. The role of the physical environment on the systems approach is seen as part of the technological constituent of the organisation, aiming to enhance the relationships among workers and their tasks, and to facilitate the necessary transformations [Trist, 1982].

The functionalist paradigm has provided this study with a variety of indicators with the help of which corporations could be partly described and compared. Organisational classification can be attempted according to the business *environment*, in the sense of stability, homogeneity, competition, market conditions [Dill, 1958; Lawrence and Lorsch, 1967; Pfeffer and Salancik, 1978], the industrial *sector*, distinguishing between public, private, voluntary, service, manufacturing, retail [Bearshaw and Palfreman, 1990; Scott, 1981], the adopted *strategy* which could be reacting, defending, analysing and prospecting [Miles and Snow, 1978], the organisational *structure* which could be bureaucratic, organic, matrix, divisionalised [Hall, 1982; Mintzberg, 1979; Pascale and Athos; 1986], the use of *technology* in terms of the technological evolution, integration and mass or unit production [Pascale, 1991; McKelvey and Aldrich, 1983; Woodward, 1965], the *employee commitment*, identifying coercive, utilitarian and normative organisations [Etzioni, 1961], and the *key beneficiary* among identified stakeholders such as employees, owners and managers, clients, and the public [Blau and Scott, 1962].

among people. The influence of these theories to the design of the workplace later created the concepts of bürolandschaft and open plan offices [Sundstrom, Eric and Sundstrom, Mary Graehl (1986). *Work places: The psychology of the physical environment in office and factories*, Cambridge University Press].

2.3.2 The interpretive paradigm

The interpretive paradigm theories view the order of the social world as the phenomenological outcome of our perception of the world and its symbolic relationships, a process continuously negotiated, affirmed and changing. According to the theories of the paradigm, human beings are the creators and believers of myths, ideologies and symbols, through which they seek to provide answers to metaphysical questions and give meaning to their lives and actions.

The theories of the paradigm see the organisational reality as a subjective essential personal fiction that every human being creates to provide a meaningful interpretation of organisational matters and the activities of individuals [Weick, 1979]. The phenomenon of organisation is perceived as a realm of activities supported by a network of rules, relations and myths. What is real in organisations is the product of human agency and his/her perception of the world⁵.

The above perception deconstructs the notion of tangible organisational reality, so well fostered by the functionalistic paradigm, creating new implications for the interpretation of organisations and the perception and practice of management. The organisation is no more a constant structure in a pre-defined environment, but rather a soft social fiction, where, instead of organisational barriers, management has to explore new opportunities for innovation. The important parameters for the endurance of the organisation are the systems of meanings and shared values that permit the emergence of organisational activity.

Under the *population-ecology* perspective, even the context where the organisation operates is directly related, affected and partly shaped by the organisation. The present and future of the environment are often direct consequences of the past actions and decisions of management. In this sense, the business environment is often perceived as turbulent, hostile and unpredictable, being to some extent the

5 The interpretive paradigm has been very much influenced by the philosophical movement of phenomenology and to a lesser extent of existentialism. According to phenomenology the world is the correlation of individual's meaningful experience, more a bracketed world than a real world. All beliefs in truths of any kind are suspended and we are driven by the objectivities derived by personal experience [Bateson, 1979].

consequence of the existence of organisations [Hannan and Freeman, 1977]. Extending this perspective to the use of facilities, the profitable use of premises cannot be assured. Yet, the decisions of the management concerning the promotion and use of facilities dictate the performance of facilities to a degree.

According to the theory of organisational ecology, organisations can be observed as *organisms*, constituents of a complex ecosystem providing the ingredient of *evolution*, the result of interaction *with* the environment. What is important is the survival of the stability within the environment not only the survival of the fittest [Boulding, 1981]. The significance of the *organism* metaphor is that it directs management's attention not only towards pre-defined short term goals, but also towards the fulfilment of conditions that will secure long term existence. Accordingly, the importance of facilities able to respond satisfactorily, over time, to assigned organisational needs and changes of the external environment without creating obstacles to sensitive internal or external issues is stretched.

The metaphor of organisations as information systems or *brains*, built on the current theories of modern cybernetics, focuses on the organisational demand for learning and *learning to learn* [Michael, 1973]. According to Morgan, de-fragmented structures and conditions that allow employees to have a *holographic* perception of their organisation and their role within them is the most important factor in enhancing the learning process [Morgan and Ramirez, 1984]. In terms of this perspective, the facility should be designed as a supporter of the learning process, providing the adequate physical environment and amenities.

To sum up, the interpretive paradigm indicates the dimensions firstly of organisational *change* as a consequence of symbiosis with the environment [Astley, 1984], secondly of *social responsibility*, since organisational actions affect the stability and conditions of the environment [Cannon, 1992; Smith, 1993], and lastly of ability to *learn* and self-organisation [Argyris, 1982].

2.3.3 The radical humanistic paradigm

The theories of the paradigm support that human beings often see the contemporary world as a concrete reality where no influence or power whatsoever can be claimed. Furthermore, it is argued that this perception of the structure of the world is responsible for the barriers of the social environment that cause alienation and

withdrawal. Radical humanist theories reject the idea of an objective reality, and on the contrary, support that reality is an extension of people, a thesis which redefines the power of people to manipulate the immediate environment and take full responsibility for their actions⁶.

Furthermore, they question the pre-existing social forms and exercise of power, and their effects on the freedom of the individual to choose, interpret and find meaning. Van Maanen [1981] argues that the choice of a system of meanings engaged by human beings can highlight the ethical dimension, since different approaches to existence result in different priorities, commitments, actions and consequences. The radical humanistic paradigm is an approach that puts human beings in the focus of inquiry, stressing that organisations should exist to serve people, express the humanness of society and exploit its potential, rather than using people as mere instruments and resources, an approach very much in fashion today.

According to the theory which perceives organisations as *cultural phenomena*, the possible coexistence of several systems of meaning and subcultures within an organisation, presenting the identity of the various divisions and work groups should be recognised⁷ [Turner, 1990]. Thus, referring to culture does not necessarily mean harmony. *Visible* culture incorporates necessarily the act of negotiation between cultures of different positions in the organisation [Riley, 1983]. Moreover, under the

6 The radical humanistic paradigm has been heavily influenced by the philosophy of existentialism. For existentialism, all understanding, knowledge and truth occur only in the context of personal existence. Existence can be described as an absurd conflict between freedoms, each one trying to annihilate the other in order to preserve its own sovereign autonomy. According to Heidegger [1958], human beings are free to create and recreate the meaning of themselves, their actions and the world in terms of the projected possibilities reaching into the future. The world itself is a system of personal projections, an intelligent interpretation of given raw materials [Heidegger, 1962]. Existentialism opposes the notion of functional man, that reduces man to a factor of empirical social reality, and deprives him of mystery, dignity, identity and humanity [Marcel, 1950]. Each man is what he makes of himself, a person that is expressed through the freedom to choose his activities [Sartre, 1956, Camus, 1948].

7 Manning provides an example from the United States which illustrates the differences in sets of values between police officers and police administrators, a result of the organisational structure's configuration. Though at the beginning there were no differences, they were initiated because of the kind of work, and, they were developed further later due to cultural differences [Manning, P. (1977). *Police Work*. Cambridge, Massachusetts, MIT Press].

existential tradition, corporational cultures influence and transform the environment through the process of enactment. The recognition of cultural differences within the organisation is very important since they may be a parameter of depth, plurality and a source of innovation, or a factor of internal dissatisfaction and composition that undermines corporate efficiency.

As a consequence, the focus of management is *politics*, the management of meaning and the communication of the shared fiction to the various public groups [Smircich and Calas, 1987; Pondy et al. 1983]. The style of management is responsible for the fostering or suppressing of internal differences. Under the new insights, beliefs, symbols and resources and their relationships become of prominent importance requiring continuous supervision and control. Yet, it can frequently be seen that the applied policy, no matter in what direction, finds an expression within the working environment, particularly through the configuration of the layout, the use of furniture and final materials and the management of the workplace.

The metaphor of organisations as *political systems* regards organisations as loose networks of people with divergent interests, aiming towards the accomplishment of their own goals [Morgan, 1986]. Organisational strategy is an interest-based activity, the result of a continuous process of negotiation, while organisational action is a political action. Furthermore, the myth of organisational rationality is explained on the grounds of the existence of different aspirations and goals of individuals and groups within the organisation [Perrow, 1979]. Under this perspective, facilities can be seen as the visible part of the organisational balance of power, individuals' aspirations and organisational objectives.

The metaphor of organisations as *psychic phenomena*, perceives organisations as constructed social realities, the consequence of conscious and subconscious behaviours and processes. People often perceive them through the attributes of existence, validity and power, and the ability to exercise control and constraint over their creators. According to this theory, the invisible dimension of organisations, other than the subconscious, is able to trap the capabilities of people involved in the organisational process, and factors incompatible with reason such as frustration, stress, anger and aggression, otherwise without official existence in the organisational theory, can be examined and explained as people's reaction to conditions imposed by the organisation or themselves. The theory reveals the importance of the psychological and sociological needs of people, since a social environment poor in opportunities for self expression and interaction may cause

fragmentation of units and restrict the communication of knowledge. Yet, it seems that the contribution of the physical environment with the appropriate management style is very significant to the satisfaction of these needs.

Another contribution of the psychic prison metaphor is the observed resistance of organisations to innovation and change. It is supported that there is lack of cognition, by the management and organisational members, of the conscious and subconscious purposes which culture and activities serve. Yet, according to Mason and Mitroff [1981], change affects invisible elements possibly essential to the organisational process, perceived only when outside the social structure.

The radical humanistic paradigm contributes to our understanding of organisations by the recognition of the dimension of *culture*, and the importance of management of meanings and values [Harris, 1979]; the organisational *rationalisation* and the distribution of power within the organisation [Pfeffer, 1981]; and the *psychic prison*, which reveals the barriers of understanding the unconscious purposes of roles and activities [Burrell and Morgan, 1979].

2.3.4 The radical structuralist paradigm

The theories of the paradigm are preoccupied with the *logics of action*, generative mechanisms within the organisation which are responsible for the observed phenomena. The recognition by the radical structuralist of the deeper structures that characterise the social systems upgrades the significance of the dialectical process even more and provides unique insights into the understanding of organisational nature [Benson, 1983]. Furthermore, it supports the theory that deeper structures and generative mechanisms that govern the behaviour and forms of organisations can be best revealed in periods of crisis when the surface equilibrium and stability are disrupted⁸.

⁸ The radical structuralist theories have their roots in *structuralism* and *dialectical materialism*. According to structuralism, man is what is made by structures beyond his conscious will or individual control, while according to dialectical materialism things observed in the empirical world are not fixed and stable but the outcome of real contradictions of unconscious structures. The basic structuralistic claim of uncovering hidden unconscious structures behind surface meanings has been questioned by *deconstructionalists* who reject the binary opposition between surface and depth, event and structure, inner and outer, conscious and unconscious as revived forms of metaphysical dualism. Instead of questioning for a science of signs, they

The radical structuralist paradigm also maintains that organisations are *empirical facets* of an underlying mode of organisation, where their significance, role, structure and purpose are all specified and well controlled. This perspective has direct application to the effects of parameters from the external environment and public policies and regulations to the form and existence of organisations.

An interesting concept of the radical structuralist perspective is the organisational *praxis*, where organisations are perceived as forms of action to transform themselves in response to the external environment. This transformation is experienced at the level of reorganisation, and its effects are visible in the structural and social elements of organisations [Heydebrand, 1983]. This perspective is of significant importance since it has constituted the foundations of the modern preoccupations of management of *restructuring*, *reengineering* and organisational *learning* [Hammer and Champy, 1993].

The radical structuralist paradigm is responsible for the *dialectical theory* of management and the recognition of the *negational* consequences of organisational actions and existence. The *flux* and *transformation* metaphor examines the organisation from the perspective of change. Instead of attempting to explain change as a reaction to external phenomena, the radical structuralist theories support the concept of the dialectical nature of the organisation where change is the result of internal tensions, created by the very existence of the organisation. The process of change is *self-generated* on the grounds of the origination of the argument about what a form or action is, what its consequences are, what it is not and what the consequences could be.

The theory of *autopiesis*, explains change as the process for the achievement of balance of existing internal tensions within organisations, suggesting that organisations create their identities and perceive the environment as a projection of themselves [Maturana and Varela, 1980]. The *network* theory introduces the concept of loops and mutual casualty rather than mechanical casualty, and change is shaped by processes of positive and negative feedback [Maruyama, 1982]. Finally, the theory of *dialectical process* sees change as an action that produces movement in the opposite direction [Benson, 1983]. The ability of facilities to respond to changes of business demands and resist early obsolescence is one of the main concerns of

celebrate *language* as a multiple play of meaning [Derrida, J. (1982). *Margins of Philosophy*. Hassocks, Sussex, Harvester].

modern design. However, it is questionable whether the concept of adaptation should be reduced to mere operational flexibility, the main preoccupation of modern design, or whether it should embrace changes in management practice, organisational culture, stakeholders' values, work process and use of IT.

The metaphor of the organisation as an instrument of *domination* is concerned with the distribution of power and the advancement of certain interests at the expense of others. The metaphor recognises that domination may be intrinsic and intentional rather than a consequence of actions, and provides a means for dealing with otherwise dismissed issues such as the exploitation of people and physical resources. Furthermore, it offers insights into the social consciousness of organisations and the consequences of decision making, it emphasises the issue of ethics, it brings the question *whose interest*, and provides the foundation for a further discussion about management of organisations servicing society [Burrell and Morgan, 1979]. Despite the fact that this metaphor is preoccupied with an important organisational aspect and that it is very much in the interest of sociologists, the author is not sure about how the gained knowledge can contribute to a better understanding of the organisation-facility interaction. Yet, the theory introduces the concept of social responsibility to decision making and corporational behaviour, areas where facilities can provide visible examples of the consciousness of the organisation regarding their responsibilities towards stakeholders and society.

The radical structuralist paradigm is significant since it has indicated the dimension of *change*, the study of nature and sources of organisational transformation [Burrell and Morgan, 1979], and the dimension of *domination*, offering a framework for a deeper understanding of societal domination [Weber, 1968].

The analysis of the organisational theories indicates that facilities and the working environment have direct ties with the characteristics of the organisations using them, and implies their relevant importance to the organisational performance. Yet, the study has failed to present direct empirical evidence proving that facilities contribute to corporate objectives in ways other than strictly functionalistic. However, that seems to be due to lack of relevant research focused on the subject, rather than proof of the opposite. Moreover, there are a variety of indicators which suggest the potential significance of facilities to long term business performance, urging for further investigation of the possible interaction.

In addition, the overall significance to corporate effectiveness seems problematic not only to measure but even to identify. The influence of facilities on business is designated dually, directly by causing implications to the work floor productivity and indirectly, through the influence of organisational indicators such as motivation, public relations and organisational ability to innovation and learning. A number of organisational theories emphasise the importance of internal congruence between organisational components. Since the physical environment has a particular and extended influence on organisational affairs, it appears that the optimisation of corporate resources can be achieved when the decision making for the design and management of facilities is considered rather as an extension of the development, restructure and management of the corporation, than the outcome or the casual consequence of them.

The review of the organisational theory has also suggested that one of the key elements to the success of the organisational objectives is the human behaviour of the stakeholders of the organisations. Since organisations are part of a wider economical and social system, the management has to understand the underlining structures which maintain the organisational existence and growth, and it has to be aware of the forces that master human attitudes, responses and behaviours. In the practice of management, soft issues and human relations acquire upgraded importance since the attraction and maintenance of customers, the successful implementation of specific managerial styles in the workplace and the creation of desired corporate images very much depend upon the cultural characteristics and values of internal and external publics.

Today it is expected that among the accommodation of the large range of business activities, facilities should satisfy the psychological and social needs of users. Facilities should be able to provide a supporting environment. While contributing to the elimination of the effects of change and uncertainty to the internal public, yet, it is able to hoist employees moral and commitment to the organisation, and communicate the corporate culture and values to the external public. However, it is recognised that the identification of actual requirements for the achievement of corporate efficiency demands immense effort, since many of them are subconscious or lie behind bolder requirements. ABP exercises should be a process which discern, to the fullest extent, the diverse requirements of various users from the physical environment and evaluate the competence of examined solutions by reference to the particular business objectives and conditions of social context.

2.4 Redefining the Role of Facilities

The foregoing review of the organisational theory has provided this study with valuable information concerning the nature of organisations and their relationship with the external environment. Furthermore, it appears that there are certain less visible organisational aspects and functions of considerable importance for the long term organisational existence within the operational environment. However, the significance of these dimensions varies since the external environment is not homogeneous or stable. The significance and role of facilities relies on the objectives of the specific corporation and the managerial perception of the concept of effectiveness within the socio-economical context.

Yet, Duffy and Tanis [1993] argue that though the organisation theory has developed rapidly in the last few years, the planning of the workplace has remained almost static over the years rather expressing the beliefs of the management at the beginning of the century⁹. Today, in the organisational and management theory terms such as *productivity*, *efficiency* and *effectiveness* are broadly used¹⁰. However, it appears that they constitute the inheritance of the tradition of scientific management in order to measure the industrial output based on the serial production of an uneducated workforce for a consumer with little choice between products and services. However, now they are subject to scrutinisation for continuous redefinition under the modern requirements of the contemporary socio-economic system.

⁹ Duffy and Tanis mention the contribution of a number of authors in the organisational theory such as Deming, Drucker, Hammer, Peters and Senge, whose writings at the age of constant change and post-industrial era focus on the mechanisms which will enable organisations to become more customer oriented and adaptable to the new business environment. Through terms such as *reengineering*, *time-based competition* and *the learning organisation*, a new intellectual revolution in the domain of management is expressed, yet to find an expression in the design process of the modern office [Duffy, Francis and Tanis, Jack (1993). A Vision of the New Workplace. In *Industrial Development Section*, March-April 1993, Vol. 162, No. 2, pp. 1-6].

¹⁰ *Efficiency* has been defined as 'a measure of the ratio of resources -time, cost, effort, pain- to a given output' [Wilson Sheena (1986). Conditions of office. In *Design Journal*, pp. 98-100], while employee *productivity*, is defined as 'the quantity, quality and timeliness of an individual's work performance' [Stokols, Daniel; Martin, Janaea; Scharf, Ted; Churchman, Arza; Quin, Beth; Wright, Steven; Seifert, Marianne; McMahan, Shari; Sundstrom, Eric (1988). Facilities, design, Employee productivity and Organisational effectiveness. In *IFMA Journal*, Winter 1988, pp. 16-19].

Once synonymous with efficiency and work floor productivity by scientific management, corporate effectiveness has been identified in various ways by different researchers [Steers, 1975]. Argyris [1964] defines effectiveness in terms of output increase with constant or decreased input over time or through the maintenance of output with decreasing input, Katz and Kahn define it as '*the maximisation of return to the organisation by all means*' [1978, pp. 255], while Stokols [Stokols et al, 1988] as the productivity of individuals and departments, including aggregate rates of absenteeism; recruitment and retention of personnel; frequency and quality of communication among co-workers; employee health and morale at work-group level. Meanwhile Schein [1972] describes effectiveness in terms of communication, flexibility, creativity and commitment within the organisation.

Sundstrom and Sundstrom provide an interesting description of the overall achievement of corporate effectiveness with the identification of four essential elements: the satisfaction and commitment among organisational members, the communication and co-ordination within and among working units, the adequate production volume and quality, and the maintenance of a mutually supportive relationship with the external environment [Sundstrom and Sundstrom 1986, pp. 338]. Surprisingly, discussing the contribution of facilities to corporate effectiveness, Sundstrom and Sundstrom concentrate on the first three elements, failing to recognise the significance of facilities for the integration of the organisation within the social system. Accordingly, it appears that facilities exert no influence whatsoever on organisational parameters relevant to the external environment such as public relations and corporate communication.

According to Moleski and Lang [1982], the configuration of facilities influences organisational effectiveness by affecting the flow of activities, inter-group processes and communication patterns. In the same tune, Duffy [1990a] supports that in a working environment where the ability to learn is considered indispensable and the responsibility has been decentralised, the operational objective of facilities should be the provision of a physical environment that enhances communication and supports the main units of production, the work teams. In a twenty-four hours working day with employees working in remote locations and flexible hours, networking means the maximisation of use of collected information in a minimum time [Duffy, 1988]. The spreading of information relies on management practices, the culture of the corporation, the provision of IT infrastructure and the working environment where physical interaction takes place.

Furthermore, it seems that a new era of employee-workplace relationship is under way. As IT is less demanding on location, at least in the services sector, a shift is apparent, where work location is unfixed, mobile, tending to move where people are [Jack, 1990]. Other practitioners and scholars argue about the redefinition of the working environment, suggesting that future facilities, and particularly office buildings, will be mainly meeting places, providing hospitality services, conferencing and recreation facilities, moving single task repetitive operations out of the present office environment¹¹ [Marmot, 1992; Sundstrom and Sundstrom, 1986]. It is argued that office buildings will be seen as the providers of the appropriate infrastructure to support the extended working week and the electronic networking of employees. At the same time they would be able to support the physical setting to accommodate corporate rituals expressing the corporate identity, culture and values of the members of the organisations. The emphasis will be placed on the interpersonal relationships between work teams and clients, while the work process will be supported by a more sophisticated cultural context [Leaman and Borden, 1993].

Duffy [1988, 1992a] argues that the management of change will be the most important concept for consideration by the modern management. He continues, by supporting that the role of facilities for the achievement of organisational adaptation to modern needs is vital, since spatial configuration, the infrastructure of servicing, and the symbolism and meaning of the physical environment can present obstacles to the implementation of new technology, new kinds of work patterns and organisational culture¹² [Duffy, 1988; Duffy and Tanis, 1993].

¹¹ Some authors predict the disappearance of office buildings in the future as a result of the opportunity provided by IT for work in home or other remote areas. Despite the fact that the functions performed in the conditional office is expected to change, yet, it is recognised that work has a social dimension that can not be overlooked. Gale and Christie [1987] argue that people find a stable structure in their scheduled and fixed work in the conditional office that help them predict, plan and control their life. Besides, it is expected that with the expansion of IT in the social activities such as home entertainment, tele-shopping and education, there should be an increased demand for alternative ways of human interaction and socialising, a stronger requirement for the re-establishment of human relations and people identification within a team.

¹² According to Laing, the most important pressures for change that modern organisations face (in rank order) are concerned with organisational structure/relationships, IT/telecommunications, productivity, human resources, time pressures, comfort/welfare, green/environmental [Leaman, Adrian and Borden, Ian (1993).

It is apparent that today, when the power has shifted towards the consumer, the clarification of what optimises the performance of the facility is rather a concept of personal interpretation, subject to the particular business and environmental conditions. Yet, within the unsteady, competitive and highly volatile business environment where corporations operate, the performance of facilities has to be measured against the contemporary business demands, not necessarily the same as future ones. Therefore, it seems that reliable ABP methods have to be able to provide a comprehensive set of the attributes of facilities, upon which the specific business and social realities could be reflected.

So far, the influence of the external environment to the performance of facilities, the different perspectives of the organisation theory, and the multidimensional role of facilities to corporate objectives have been examined. In the rest of the chapter a critical review of the existing theoretical and experimental efforts that identify the organisational dimensions and their interdependence with the characteristics of facilities and the working environment will be presented.

The Responsible Work-place: user expectations. In Duffy, Francis, C., Laing, Andrew and Crisp, Vic (eds.), *The Responsible Work-place: The redesign of work and offices*, DEGW London, Ltd., pp. 16-32].

2.5 Business Indicators and the Properties of Facilities

There are a number of sources in the social sciences which indicate the existence of a kind of interdependence between organisational indicators and the characteristics of facilities. However, the form and intensity of these associations have been subject to dispute between researchers [Sundstrom and Sundstrom, 1986].

Within the architectural profession it is widely accepted that facilities and the working environment reflect the structural and cultural characteristics of organisations [Duffy, 1974a]. In environmental psychology a number of studies suggest that human beings design and modify their environment according to their needs, and that building environments incorporate characteristics consistent with the activities of the occupants [Sundstrom and Sundstrom, 1986]. The above theories are of particular importance to this study since they imply a dynamic changing process in the nature of the physical environment in order to comply with the current structures and activities of the organisation.

Accepting the assumption that facilities are part of an organisational system, according to systems theory, to achieve a balance within the system, the various components should be inclined towards *mutual accommodation*, implying the gradual congruence of facilities, activities and structures [Berrien, 1983]. The theory of sociotechnical systems supports that only when the social psychological and technological elements are in harmony can an organisation reach maximum efficiency [Trist et al., 1963]. Thus, the systems perspective suggests the dimension of constant modification and correction of the attributes of facilities, in order to avoid discrepancies inside the system and to maintain the equilibrium. If this hypothesis is valid, then the existence of various correlations between business indicators or systems of business indicators should be expected with the attributes of facilities of systems of the attributes of facilities.

In social research a number of studies attempts to identify corporate indicators and to examine their interdependence with facilities. Duffy [1974a], put forward the hypothesis that two corporate indicators, *bureaucracy* and *interaction*, are associated with two attributes of facilities, *differentiation* and *subdivision*¹³.

13 In Duffy's study, the term *bureaucracy* embodies among others the degree of the centralisation of decision making, the importance of the hierarchy of authority, the specification of roles, the importance of

Furthermore, he suggested the positive correlation of organisational bureaucracy with workplace differentiation, and the need for organisational units to interact with the demand for unified and unsubdivided space. However, empirical studies from the same author and other researchers have failed to confirm the hypotheses [Duffy, 1974b; Hage and Aiken, 1967; Grajewski, and Hillier, 1994]. The cause according to Sundstrom and Sundstrom [1986] seems to be the use of over-inclusive dimensions of the organisational structure and the physical environment, and the form of relationships between organisations and the workplace, apparently more complicated than previously anticipated.

Pascale [1991] has proposed a method of organisational analysis, known as the *Seven S Framework*, which defines seven areas of interest from the management's perspective: strategy, structure, systems, style, shared values, skills and staff, (skills being the product of the other six categories). While the framework examines the organisation using indicators from different paradigms, Pascale supports that only when the seven elements of management are in congruence, exceptional performance is possible. After empirical observation and the study of management methods in relation to a number of corporations, Pascale finally revealed contentions and tendencies of polarities in management practice (Table 2.2).

Yet, for effective management both extremes should be used, or as Pascale comments

Organisations need both. The answer lies in a 'dynamic synthesis' - not a compromise or mathematical halfway house of strategic and opportunistic tendencies, but a paradoxical embrace that contains both poles.

[Pascale, 1991, pp. 53]

standardisation. *Interaction* refers to the frequency and importance of communication between individuals and work groups. *Differentiation* refers to the degree of variety of workplaces, furniture and different patterns of space utilisation, while *subdivision* implies the degree of walls, screens and partitions found in the workplace [Duffy, Francis, C. (1974c). *Office Interiors and Organisations: A comparative Study of the relation between Organisational Structure and the use of Interior Space in sixteen Office Organisations*. Doctoral Dissertation, Architecture, Princeton University].

Contending Opposites		
Strategy:	Planned	• Opportunistic
Structure:	Elitist	• Pluralist
Systems:	Mandatory	• Discretionary
Style:	Managerial	• Transformational
Staff:	Collegiality	• Individuality
Shared Values:	Hard Minds	• Soft Hearts
Skills:	Maximise	• Meta-mize

Table 2.2 Contending opposites of strategy formulation defined according to Pascale's Seven S framework. It is perceived that within the act of management over time, both extremes coexist in some form [Pascale 1991, pp. 53].

Burrell and Morgan [1979] have proposed a model based on the contingency theory which assesses the congruence between organisational dimensions. This attempt was originally made to evaluate existing internal balances between organisational dimensions and their suitability to the environmental conditions (Figure 2.1). The main contribution of this model was the recognition of internal differences between departments and subdivisions within the organisation.

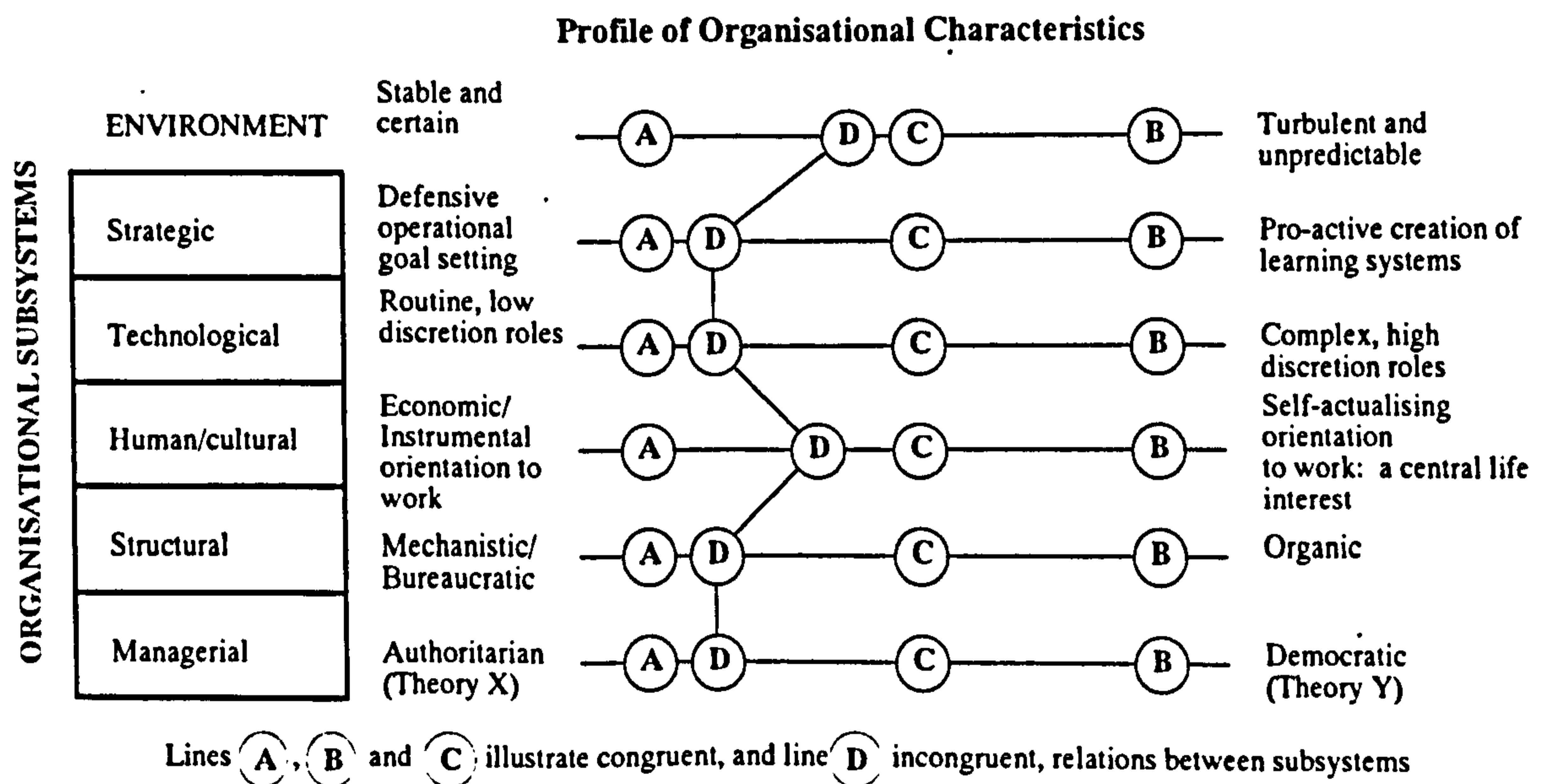


Figure 2.1 According to Burrell and Morgan [1979, pp. 177], the external environment is the primary parameter in defining organisational characteristics.

James and Jones [1976] have also suggested the existence of seven organisational dimensions, properties which, as they argue, can accurately be defined and organisations could be measured on a single continuum. These dimensions are, the size of the organisation, the total number of people and net assets; the centralisation

of decision-making, authority, and control in highest-ranking positions; the *configuration* of roles and work-units, subdivisions and subgroups (including the number of levels in hierarchy, the span of control, tall vs. flat shape of the organisation); the *formalisation* of roles (levels of specification, emphasis of status on formal channels and written communication); the *specialisation* (or the number of different jobs or specialities); the *standardisation* (or procedure and specialisation of task); and the *interdependence* among components of the organisation or among the tasks.

Based on James and Jones' dimensions, Michelson [1977] suggested the existence of parallels between organisational indicators and attributes of the work places. He proposed the hypothesis that organisational indicators are reflected in one or more properties of facilities and working environments, and that the latest ones are inclined towards congruence within the organisational structure (Table 2.3).

However, there are doubts concerning the definition of a number of organisational indicators and their linear association to properties of the physical environment. According to Michelson, the size of an organisation should be reflected in the number of people and the size of buildings, implying that the larger the organisation, the larger the requirements for floor space for people and equipment. However, that is not always true. There is evidence that a variety of factors can reverse the suggested correlation. At the above case of organisational size, the applied technological infrastructure, the method of production and the kind of employment are factors which influence the amount of space required.

The previous efforts investigate the interdependence of the attributes of facilities with the *formal characteristics* of organisations, derived mainly by the functionalistic paradigm. The literature review of the research for corporate indicators extracted by other paradigms which identify their importance to the performance of facilities is quite limited. This research has come across a few studies engaging aspects of corporate identity.

Table 2.3 Organisational Structure and the Physical Environment

Dimensions of organisational structure	Properties of the physical environment
<i>Size</i> : the total number of people and net assets	<i>Space</i> : the amount of floor-space in buildings
<i>Technology</i> : the extent to which processes in the organisation incorporate technology	<i>Automation</i> : the proportion of space devoted to machinery and equipment
<i>Configuration</i> : including numbers and sizes of work-units and the number of levels in hierarchy	<i>Delineation of work-units</i> : through location, enclosure and physical boundaries <i>Differentiation by rank</i> : of groups of individuals, using status markers
<i>Interdependence</i> : among work units and tasks, including work-flow	<i>Proximity of work-units</i> : adjacent to the work flow
<i>Specialisation</i> : the number of different jobs and tasks included in the organisation	<i>Differentiation by job or task</i> : of work areas for work units and individuals <i>Enclosure of task areas or work-spaces</i> : for specific tasks or jobs
<i>Centralisation</i> : of decision-making, authority, and control to the highest-ranking members of the organisation	<i>Uniformity of workplaces</i> : within ranks and jobs <i>Visual accessibility of work-space</i> : within subdivisions for supervision
<i>Formalisation of roles</i> : including role-specification, emphasis on status, and emphasis on formal channels	<i>Differentiation by rank</i> : of individual workspaces <i>Uniformity of workspaces within ranks</i>
<i>Standardisation</i> : of procedures and specification of tasks	<i>Rigidity of layout</i> : within buildings and work-units

Table 2.3 *Although the correlation presented by Michelson [1977] between the physical environment and a variety of formal characteristics of the organisation provides an all around concern for the concept, yet this association is characterised by simplicity of causes, linearity and fragmentation.*

According to Porter, Lawler and Hackman *climate* is 'the typical or characteristic day-to-day properties of a particular work environment - its nature as perceived and felt by those who work in it or are familiar with it' [1975, pp. 456]. Yet, Schneider [1975] denies climate as an organisational indicator, perceiving it as property of individual perceptions¹⁴. *Image* has also been defined as the collective perceptions

¹⁴ The elements that influence the perception of climate have been defined by Campbell, Dunnette, Lawler and Weick as *individual autonomy* (or freedom and responsibility in decision making); *degree of structure imposed on the position* (including the closeness of supervision and the specification of the details of jobs); *reward orientation* (including general satisfaction and orientation towards profit, promotion and achievement); *consideration, warmth and support*; and *co-operative interpersonal relations among peers* (including conflict, tolerance for conflict and co-operation among peers) [1975, pp. 306].

of an organisation held by the external public. Even though the above researchers argue that climate and image are organisational indicators potentially supported by the physical environment, no empirical studies have been revealed in support. Furthermore, although a number of exercises can be traced in literature for the improvement of these two factors through changes in the physical environment, the results have not been tested [Sundstrom and Sundstrom, 1986].

2.6 Conclusions

The review of current organisational theories has revealed the complexity of the organisational nature and its interaction with the external environment. The study of different paradigms has supplied this work with a number of organisational indicators and different approaches of describing organisations, through which corporations could be analysed and compared. Yet, the author was prevented from providing this work with another definition of the organisation. The complexity of the phenomenon, its significance to the different aspects of the social system and the variety of perceptions from different domains of knowledge have persuaded the researcher that a possible definition of the organisation may strip the phenomenon from valuable dimensions. Furthermore, up and coming theories always reveal new dimensions, thus any definition is condemned to become obsolescent sooner or later. Instead, the author has been inclined to exploit the flexibility offered by the combination of the examined theories, which are able to exhibit different aspects of a investigated phenomenon. Though it appears that none of the available theories is able to offer a satisfactory definition of the organisation, yet, the combination of the existing paradigms is capable of presenting an in-depth perception of the phenomenon.

Despite the fact that the study and experimentation, in order to improve the operational efficiency of facilities, is well recorded, the contribution of facilities to other organisational parameters performance is still, to a great degree, a matter of speculation. Human beings are the main constituents of organisations, thus their perception of the environment and their behaviour are the most important parameters for the achievement of business objectives. In the following chapter the interaction between facilities and users, and the effects of the physical environment on human performance will be examined.

CHAPTER
III

Building Performance and the Human Factor

3.1 Introduction

All architecture proposes an effect upon the human mind, not merely a service to the human frame... Architecture concerns itself only with those characters of an edifice which are above and beyond its common use.

[John Ruskin]

The primary cause for the appearance of the modern movement in architecture was the inadequacy of the previously established doctrine to respond satisfactorily to users' requirements at the beginning of this century [Andrew, 1985; Brolin, 1976]. According to the *fit theory*, architecture has to identify users needs and translate them into the production of newly-built environments [Lynn, 1980]. However, the physical environment besides meeting functional requirements, also expresses the spatial forms of users expectations and the current socio-cultural system and values [Mikellides, 1974; Groat, 1982; Jencks, 1977]. Furthermore, it has been suggested that human beings are sensitive and can respond to perceptual signs embedded within an environment, signals regarding the function of a referent space, the identity of occupants, the symbolism of the location [McHarg, 1962]. Any physical environment might be perceived as formal or informal, high or low status, protected or exposed, and so on [Kasmar, 1970].

In recent years, increasing attention has been devoted to understanding and measuring the contribution of physical assets and particularly of the office building to corporate objectives (ORBIT I & II, The Intelligent Building in Europe). Even though human perception and the response to the physical environment are central to the inquiry of architecture and environmental planning, there is little scientific evidence concerning the manner in which the appearance and spatial organisation of corporate assets and working environments influence human behaviour and attitudes towards the corporation and work.

There is a large number of studies concerned with the perceptual aspect of man's surroundings. Neutra [1954, 1956] has indicated that the building environment is shaped not only as an instrument which caters for functional requirements, but also as a reflector of contemporary values and social life. While today corporations talk about *human values; customer orientation; business effectiveness*, contemporary designers and critics describe the output of the design process with expressions such as *transparency; light; authenticity*.

References regarding the perceptual aspect of man's surroundings come from different sources. Redl and Wineman have emphasised how sensitive otherwise defensive children are to the *atmosphere* suggested by the physical environment, space distribution, furniture arrangement, and even the management of housekeeping [Redl and Wineman, 1952]. Yet, the diversity of styles and forms used in modern architecture has added to the confusion of symbolism and function. As Amendola [1983] argues, the thematic appearance of patterns and forms of the built environment elicit the user's consensus on what they are and for what they stand.

Do users perceive corporate premises, the working environment and implemented corporate cultures and policies in homogeneous and similar ways? Do designers manage to create environments able to provoke predictable interpretations and behavioural patterns? Do architects and the public share the same language describing the man-made environment and defining the priorities to be met?

Michelson [1968] argues that the modern physical environment fails in its most important objective, the satisfaction of the ultimate user's requirements. He supports that designers are unable to understand the complexity of users needs due to lack of time, education or interest. Studies on the design of ABP models, could not be conducted without a comprehensive understanding of the interdependence of users with their physical setting. Building on the assumption that human behaviour shapes

the physical environment and that the physical setting defines human needs to some extent [Lang, 1987; Neutra, 1956], the chapter begins with an attempt to describe in brief the parameters which have contributed to the development of the modern workplace.

Later, the chapter will be devoted to the examination of the significance of human beings in achieving business objectives. The importance for the organisation of the satisfaction of the physiological, sociological and social needs of the users of buildings, and the concepts of perception, interaction and behaviour of human beings with the environment will be examined. The chapter will conclude with the description of the main parameters which are responsible for the misfit between organisational requirements and users demands on the design of modern facilities.

3.2 Facilities as an Expression of Social, Economic & Technological Realities

Industry, overwhelming us like a flood which rolls on toward its destined ends, has furnished us with new tools adapted to this new epoch, animated by the new spirit. Economic law unavoidably governs our acts and thoughts.

[Le Corbusier]

The development of the workplace could be explained as the result of specific socio-economical circumstances, based on the assumption that the organisation of the man made environment is the reflection of certain realities indicating the physical conditions and dominant beliefs of the particular societies [Neutra, 1954; 1956]. Due to the propensity found in the physical environment to impose social and political schemata, architectural archetypes which promote new behavioural patterns and users' interrelation are accepted by society only when the appropriate economical, technological and social parameters are fully accomplished¹ (Table 3.1). Similarly, Sundstrom and Sundstrom [1986] suggest that the evolution of the workplace, the changes in industrial facilities and the emergence of office buildings were the response to a greater demand to accommodate the organisational

1 According to Neutra [1956], the relationship of the man-made environment with the social and cultural context is highly interactive and dynamic. Thus change of any of the parameters involved in the social context, modifies the form of the current balance within the system. If the whole system cannot tolerate the new balance, then there is a tendency for the restoration of the previous one.

requirements for improved productivity and efficiency within the current socio-economic conditions.

Date	Technological developments	Economical developments	Social development	Office buildings & working conditions
1860s	iron frame construction,		end of the Civil War in North America, first large corporations, office work	first office buildings, gentlemen club
1870s	elevators	economical growth		appearance of skyscrapers, very poor working conditions
1880s	structural steel	demand for maximum use of space	first legislation for office buildings	
1890s	telephone, typewriter, mechanical calculator		rapid expansion of office work	
1900s			labour union movement	
1910s		economical growth	scarcity of labour, women in work	buildings with winds
1920s			human relations movement	
1930s	electric lighting, central ventilation		Industrial democracy in Europe, connection of working conditions with productivity	improvement of working conditions
1940s	acoustical ceiling, electrical heating			
1950s			state regulations for Health & Safety in the workplace	recreational facilities
1960s	computer		movements to protect the environment	landscape office
1970s	Video Display Unit			windowless offices, systems furniture
1980s	desk-top computer, satellite communication	movement of industry to developed countries		combi office, architectural ornamentation, IB
1990s	portable computer, mobile phone, ISBN, fibber optics		tele-work	shared workstation, virtual workplace

Table 3.1 *The development in social, technological and economical context and the growth of the office.*

Accordingly, the emergence of the office building in the late 1800s is perceived as a consequence of the higher demand of large corporations for more administrative work and the accommodation of clerical operators. The necessity for proximity in urban business districts inevitably increased the value of the real estate in the inner cities and eventually resulted in the maximisation of space use by a upwards

expansion. Later, the invention of the elevator and steel frame structure made the construction of the skyscraper possible, enabling even further exploitation of the site [Sundstrom & Sundstrom, 1986].

Yet, despite that, the concept of removing the physical barriers separating office workers was pursued by the human relations movement in 1920s, the open plan office was realised in the 1950s, after the introduction of air-conditioning, allowing the design of deep plan offices. The *bürolandschaft* in Germany emerged in a period of continuous improvement of the standards found in the office environment. Many leading corporations were adopting more flexible policies on the design and management of the office, providing individual employees with greater authority upon the design and local arrangement of their workplace [Ellis & Duffy, 1980]. In addition, management was appealing for decreased construction and maintenance cost, higher levels of flexibility, departmental integration, facilitation of employee communication and better image through the design of open or *landscape* offices².

The improvement of the physical conditions in the office in the last decades was to a large extent, due to organisation analysts and writers on management like Drucker [1981]; Hassard [Hassard and Pym, 1990]; Burrell and Morgan [1979]. While Drucker recognises that the existence of the corporation is directly linked to the fulfilment of specific needs of society, he argues that economic performance should be the rationale and purpose of every business enterprise³. Yet, it is widely accepted that today employees are the only true resource that business enterprises have, and

² Today, the economical advantages of the open plan office in comparison to cellular offices are questioned, since the maintenance cost is often higher than the one initially anticipated. Furthermore, studies indicate that the levels of integration or segregation and the achievement of networking patterns do not depend on the type of the plan but rather on the *syntagm* of the space, the relation between each functional space and all other spaces within and outside the facility [Grajewski, Tadeusz and Hillier, Bill (1994). Do open plan office layouts necessarily promote interaction? In *Premises & Facilities Management*, January 1994, pp. 26-28].

³ Drucker does not overlook other important tasks and services of the organisation to society such as education; health care; and the advancement of knowledge. However, he maintains that their support depends on the surplus of economic resources [Drucker, Peter. F. (1981). *Management*. Pan Books].

therefore *worker achieving* is one of the most important tasks of management [Drucker, 1981]. Furthermore, as Drucker argues⁴

Making the worker achieving implies consideration of the human being as an organism having peculiar physiological and psychological properties, abilities, and limitations.

[Drucker 1981, pp. 39]

Yet, major works recognising the influence of the physical environment on the productivity of employees can be traced back to the 1930s. Studies about workers' satisfaction, had anticipated the physical environment as a *hygiene factor*, able only to create obstacles to the proper work process⁵. These studies revealed the significance of the physical environment upon productivity, and its minor impact upon motivation [Wilson, 1986]. Moreover, the discovery of the capacity of the physical environment and management practices to influence the satisfaction of employees' psychological needs was even more important.

Mayo's study at the Hawthorn Electrical Works in Chicago observed the well known *Hawthorn effect*, indicating for the first time the importance of *meaning* and *symbolism* in the workplace, evidence of the working relationships taking place in the work floor⁶ [Mayo, 1933].

⁴ Drucker introduces the term *worker achieving* to describe one of the measures of corporation's performance that assesses one of the task of management: workers production [Drucker, Peter, F. (1981). *Management*. Pan Books].

⁵ In 1960s Herzberg made the distinction between what was later termed *hygiene factors*, parameters able to cause employees' dissatisfaction, and the *motivators*, able to raise positively the feeling of commitment [Herzberg, Frederick; Mausner, B. and Snyderman, B. (1959). *The Motivation to Work*. New York, John Wiley].

⁶ There are some interesting claims by BOSTI that the Hawthorn effect was refuted. In a study published in 1984 it was supported that if the Hawthorn effect was valid, an overall increase in productivity resulting from office changes should have been observed, being observed as a signal of the management's concern and attention to employees. Since no such increase was observed, it is concluded that the Hawthorn effect is invalid [Brill, M; Margulis, S. and Konar, E. (1984). *Using Office Design to increase Productivity, Volume I*. BOSTI, New York, Workplace Design and Productivity Inc.].

The appearance of the Intelligent Building (IB) during the last decade celebrates a new culture in the workplace. The integration of business, communication and building technology, was promising minimisation of cost, almost unlimited flexibility and individual control of the micro-environment. Yet, in advanced economical societies, the concentration of management is focused on quality rather than quantity of the product [Laing, 1993]. The workforce of the Post-Fordist enterprise is composed mainly by consultants, with a small core of full time or part time employees that are highly educated and highly paid, specialists in their subject. In a working culture where facilities used to be treated as *overhead cost*⁷ by the management and where the focus was on efficiency, maximisation of space, ergonomics, flexibility, marketability and minimisation of the running cost, the dimensions of creativity, stimulation, communication and innovation have to be added [Varcoe, 1992b]. Due to the limited success of technologically driven solutions in addressing the social needs of organisations, today even the concept of the Intelligent Building as a universal solution is questionable and alternative proposals focused on the human factor are considered.

The nature of corporate premises is governed by society's ongoing attitudes of what the essential functions should be, what is their desired behaviour and the allowances of available technology. Being an integral part of the production process, current facilities consist an important parameter for the success of corporate objectives. Facilities have to support various business aspects and behaviours, yet, their main contribution is identified in support of the most valuable asset of corporations: the employees [Varcoe, 1992a].

Due to recent developments and current trends, business managers face new questions. How the working environment responds to the continuous change occurring in the work process, the structure of the corporation and on the value system of the users? How meaning and symbolism are perceived through facilities by the various *users*? How corporate premises can be seen as resources of business advantage from organisations concerned with emerging social issues such as

⁷ Varcoe argues that this short-sighted attitude towards facilities derives from the very nature of real property that itself does not generate gains for the corporation, and its inflexibility, is apparent through constraints in production efficiency especially in times of rapid change of the organisational structure, production methods and implementation of new technology [Varcoe, Barry (1992b). *The Property Influence*. In *Facilities*, Vol. 10, No. 12, pp. 18-23].

environmentalism and corporate integration to local society? How the philosophy and culture of corporations is communicated from buildings to employees, suppliers, contractors and customers? The work continues, examining the role of employees within the organisation, and the human interaction with the physical environment.

3.3 The Physical Environment and Human Performance

The last two decades a tremendous shift in the workplace has been observed. The introduction of the VDT in the office, the demand for greater power upon the environment which employees enjoy and the focus on workteam performance, have created new concerns for the personnel management [Christie and Gale, 1987; Brill, Margulis and Konar, 1984]. Furthermore, the endeavours for the design of cost-effective facilities providing maximisation of flexibility, marketability and manageability, though not in direct conflict with the habitability of the buildings, embodies the danger that environmental quality and human well being may be overlooked. Corporations seek now facilities which permit the employee's environmental control over the workplace, a parameter that enhances the performance of employees and overall organisational efficiency [Leaman, and Borden, 1993].

Focusing on the individual employee and the workteam, industrial psychologists have concentrated much of their analysis on two dimensions, *satisfaction* and *performance*. It is supported that the physical working environment is able to influence both through psychological processes. Research has associated job satisfaction with low rates of absenteeism and turnover [Davis, 1977]. Job satisfaction is considered as the outcome of the employees' evaluation of their job as a whole or of the general quality of life at work [Mumford, 1972; Landy and Trumbo, 1876; Locke, 1983].

Job satisfaction is affected by a variety of parameters such as payment, working relationships, personal priorities, and the physical conditions, while the physical environment represents a less important parameter (Figure 3.1) [Sundstrom and Sundstrom, 1986]. According to Maslow's theory, people pay attention to the physical environment when it fails to meet their basic needs [Wahba and Bridwell, 1975]. Herzberg [1966] also considers the physical working environment as *dissatisfier*, a parameter which if inadequate is capable of creating dissatisfaction, while if satisfactory leads to indifference to the physical environment.

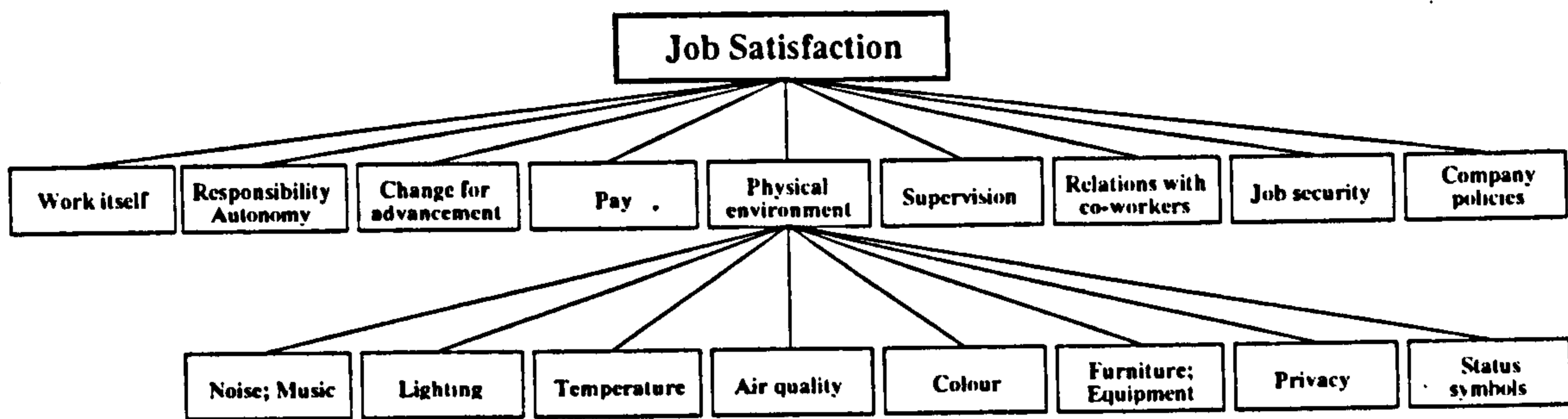


Figure 3.1 The physical environment and its attributes as parameters of job satisfaction [adapted by Sundstrom and Sundstrom 1986, p. 80].

Job performance is the effectiveness with which employees accomplish, individually and as teams, their assigned tasks by reference to criteria such as quantity, quality and efficiency. Research findings indicate that performance may be influenced by the physical environment through *arousal, stress, distraction, overload and fatigue*⁸. However, the way these psychological processes affect human performance is not straightforward. The positive or negative effects occurred in the above psychological processes depend on the kind of activity performed by individuals. Furthermore, their influence is cumulative, thus the combination of the levels of the above parameters may affect performance while individually they are harmless [Sundstrom and Sundstrom, 1986]. Yet, while the impact of the psychological processes is considered to have short-term effects on performance, the environment itself may become a low priority input over time, depending on the *adaptation* levels of the individual [Lang, 1987].

Professionals believe today that motivation and creativity can be achieved only by integrating the physical environment, job design and management of organisational

⁸ Arousal refers to a person's general state of alertness or excitation, both physiological and psychological [Scott, 1966], while the level of arousal for maximum performance of an activity depends on the activity's complexity [Yerkes and Dodson, 1908]. Stress has been defined as a form of physiological and psychological mobilisation in response to perceived adversity, demand, challenge or threat [Baum, Singer and Baum, 1981; McGrath, 1976]. Berkum [1964] suggests that mild levels of stress improve the performance of single tasks and degrade the performance of complex tasks. Overload refers to excessive sensory or information stimulation that exceed a person's capacities [Sundstrom and Sundstrom, 1986]. Distraction has been defined as a diversion of attention from the activity and as an impediment to performance [Morgan, 1916]. Fatigue is defined as the consequence of muscular exertion [Woodson, 1981].

culture [Wilson, 1985]. Peters and Waterman [1982] support that what matters in a successful corporation is a well understood corporate value system, a highly motivated workforce and a continuous commitment to learning and innovation. Alongside the consideration of the objectives to be accomplished from the construction of the well known factory of Volvo in Kalmar, a process to restructure the work tasks took place and a new culture was introduced in the organisation. The factory was designed to reflect the new culture in the workplace supporting the notion of interdependence between the high quality of the production and the high self-esteem and satisfaction of employees. The managerial brief quotes

In Kalmar we must produce a factory which, without sacrificing efficiency and economic results, provides the possibility for the employees to work in groups, to communicate freely, to carry out job rotation, to vary their rate of work, to feel identification with the products, to be aware of quality responsibility and be in a position to influence their working environment.

[Frampton 1974, p. 150]

Davey [1990] and MacCormac [Cruickshank, 1987] go further by arguing that modern corporations have to enhance the local culture and make concessions for the benefit of the employees and the community. According to MacCormac [Cruickshank, 1987], large corporations have to achieve a symbiosis between the local and wider economy. He continues by suggesting that the physical environment has a role to play in this aim by generating the conditions where local and international transactions can interact, and where work, dwelling and leisure could be integrated in a new form of living.

Duffy [1988] argues that today's main consideration of employers and employees is to *achieve* optimum efficiency, an objective which under modern conditions can be realised only in an environment which stimulates intellectual activity, able to gather people together, and gets the most out of teams and individuals. In post-industrial economies work floor efficiency and low operational cost appear not to be enough for corporations that seek organisational efficiency in the working environment. The management has to satisfy the demands of employees for meaningful and humane working environments able to express their individuality, and to reward the employees' achievements through respect and status [Leaman and Borden, 1993]. The chapter continues with a review of the needs of users from their physical environment.

3.4 The Physical Environment and Human Needs

The analysis of the role of the physical environment in human life can be performed under different perspectives. Perceived as physical constructions, facilities can be *climate modifiers*, designed to provide the appropriate conditions for specific activities. When they are approached as physical settings where activities are performed by occupants and machines, they are *behaviour modifiers*, while when they are perceived as objects of meaning and symbolism, they are *cultural modifiers* [Hillier and Hanson, 1984; Croome, 1986].

Architects and interior designers often emphasise the formal, spatial and visual aspects of their design proposals. On the other hand, developers concentrate on the issues of risk, safety, marketability and economy. To embody low risk of early obsolescent and be broadly accepted, the physical environment has to comply with the requirements of all stakeholders. However, there is growing criticism by designers and managers concerning the inadequacy of modern architecture to satisfy human requirements. John Portman supports that

The fundamental failure of modern architecture was that in the shift from an agrarian society to an industrialised society, from handicrafts to the machine, from single production to mass production, in trying to produce in abundance for all people, the people themselves got left out.

[John Portman, 1984]

Yet, underlining the important role of developers and their responsibility for the provision of a humanised physical environment, Mikellides quotes

the failure of modern architecture in recent years is only partly the fault of architects. The main burden of blame for inhuman architecture must rest upon clients who have failed to educate themselves for the great responsibility they undertake.

[Mikellides, 1980, p. 43]

Modern management is concerned with the levels of motivation and encouragement of behaviour beneficial to corporate objectives within the workplace. Yet, the guiding force behind behaviour is the satisfaction of human needs [Barker, 1968; Ehrlich, 1969]. Even though psychologists argue that the needs to be satisfied are

given priority over the strongest, the physiologically based, rather than the weakest, the psychological based⁹, the degree which each need has to be fulfilled varies, relying on individual cultures and values, personality and temporal conditions. Galitz [1984] argues that today's workers are concerned with the physical and psychological effects of the office environment. That is observed as part of an ethical shift in the workplace, where employees are looking for materialistic and psychological returns, and they are concerned with the quality of their work life and the humanisation of the working environment.

Failure of facilities to comply with the occupants' requirements embodies the risk of damaging corporate pursuits. This can occur through direct impact with a healthy workforce, where the symptoms may include the increase of the levels of absenteeism and accidents and the decrease of staff turnover in the workplace, or through indirect influence that can result in low moral and motivation, and weakness to attract and keep high quality employees in the organisation [Landy and Trumbo, 1976; Moleski, 1974]. Yet, while corporations seek to take advantage of the abilities of their main resource their employees, social scientists argue that the maximisation of the employees' performance will be achieved when designers pay more attention to the lives and behavioural patterns of the ultimate users, addressing their physiological, psychological and social needs [Porter, Lawler, and Hackman, 1975].

The importance of addressing the users' physiological needs is visible through the vast amount of national and international legislation and policies on health and safety issues. However, the existing standards of physical comfort in the working environment are based on social pressure, moral and humanitarian reasons. Yet, apart from the legal obligations, organisations today are strongly interested in the issue due to the implications to the organisational performance. Evidence suggest

⁹ The identification of human needs has been the subject of study by various authors such as Fromm [1950], Erikson [1950], Whiting and Child [1953], providing a number of models. Yet, two models of special importance due to their heavy usage by environmental design and theory were the ones suggested by Leighton and Maslow. Leighton's [1959] scale of *essential striving sentiments* identifies the needs of physical security, sexual satisfaction, expression of hostility, expression of love, security of love, receiving of recognition, expression of spontaneity, orientation on terms of being with others, securing and maintenance of membership in a definite group and belonging to a moral order. Maslow's [1954] well known model of *hierarchy of human needs* identifies, in order of importance, the physiological needs, safety needs, belonging and love needs, esteem needs, actualisation needs, and cognitive and aesthetic needs.

that crucial parameters for the occupants' ill health and lower performance at work are discomfort and distress, caused by ergonomically inappropriately designed physical environments and poor ambient conditions [Grandjean, 1973; Ruck, 1989].

Yet, the compliance with regulation standards doesn't seem enough to provide a discomfort-free working environment. Research into the subject suggests the existence of misunderstanding of the nature of the physiological needs of the users. Traditionally, facilities are designed to provide stable and uniform conditions on a twenty-four hour basis per day and for all seasons. Although this is often a precondition for places where special equipment are installed and operations sensitive to changes of ambient conditions are performed, that is in contrast to actual human needs [Ruck, 1989].

Human life is governed by the *biological clock*, a mechanism responsible for the performance of internal organs. The human body functions differently throughout the working day, therefore, its sensitivity and tolerances to ambient conditions vary¹⁰. To make things even more complicated, bodily comfort is affected by the performed activity and psychological parameters such as mood, motivation and stress [Croome, 1986]. The previous parameters in addition to psycho-somatic characteristics of the individual, are considered as the main reasons for the occupants' low satisfaction with the environment, observed in facilities of uniform centralised control upon ambient conditions [Becker, 1981, Grandjean, 1973].

Furthermore, on the ergonomics of the workplace, important consideration should be given to the misguided belief among a number of professionals that an electronic workplace is more demanding than the conventional one. A number of guidelines concerned with the design of the modern workstation are no more than specifications for workstations treating employees of different *status* rather than of different *activities* (Table 3.2).

¹⁰ Recognising the biological needs of users, in some facilities, the air conditioning systems are arranged to imitate the daily circle through variations of the temperature and light during the day. However, a more environmentally sound and less expensive approach would be the design of green buildings, since they can be designed to follow the changes of the daily circle with virtually no extra cost [Croome, 1986].

Conventional Workstation	Automated Workstation
Minimal standard equipment	Larger work area required
Standard tasks accommodated such as writing, referencing, conferencing, telephoning, filing, typing & transcribing	More work surface needed
Reduced acoustical privacy	Acoustical and visual privacy
Minimal adjustment requirements	Adequate primary work surface
Task lighting optional	Task lighting may require adjustable light at equipment location
Stationary work surfaces	Adjustable work surfaces
Transcriber optional depending on dictation system used	More filing facilities
Document holder by typewriter optional depending on word processing system and/or personal preference	More equipment and accessories such as retractable keyboard sleeves and disk driver hangers
	Ease of leg movement
	Footrest often required

Table 3.2 *Conventional and Automated Workstation Design Factors [Tweedy, 1986, p. 73]. From the review of the guidelines appears the favour treatment of employees using IT compared to the conventional ones, without consideration of the performed activities of the individuals.*

The arrival of the *portable computer, mobile workstation* and *hot-desk*, have generated new demands on spatial arrangements and interactive systems between users. The design of workstations along general guidelines instead of the actual requirements of users embodies the risk of increased fitting cost, unsuitable workstations and loss of opportunities offered by the particular characteristics of the organisational structure and working culture [Christie and Gale, 1987; Kleeman, 1992].

The tolerance levels of people to poor working conditions are subject to personality and culture to a great degree. Kantowitz and Sorkin [1983] suggest that people of higher socio-economical status are less willing to accept unfit conditions between activities and the physical environment. When people seek for objectives of a higher end, the satisfaction of physiological needs should not be seen as a necessary precondition for the completion of a behaviour, at least for some time, since people may sacrifice comfort for other gains. People's aspirations and motives are key parameters for the acceptance of poor physical environments.

A very important, yet often underestimated, function of the physical environment is the satisfaction of social needs of users to some degree. According to Peponis

[1985], the generation of social relationships in the workplace is over and above the ones required, programmed and implied by the management. Yet, by furnishing the employees' integration to the working environment, they constitute essential elements for the existence of the organisation.

Due to their importance for the occupants' satisfaction, the exercise of privacy¹¹ and control¹² by individuals over their working conditions appear to be very significant parameters among the affordances of the physical setting [BOSTI, 1981; Ferguson, 1983]. It is suggested that the personalisation and control of the environment has positive outcomes on motivation and self esteem, while the absence of control increases alienation, stress, and ill health [Glass and Singer, 1972; Miller, 1950, 1978].

Interaction is recognised as an essential part of the work process. Argyle [1989] argues that the processes of command, advice and learning are performed through interaction, contributing to the senses of belonging and comradeship among employees. It is suggested that high levels of interaction sustain human relationships, promote individual growth, decrease alienation, aid the learning process of the employees, and contribute to the communication of information, corporate cultures and values¹³ [Argyle, 1989].

11 Sundstrom and Sundstrom argue that '*the concept of privacy may be defined in terms of retreat from people, management of information, or regulation of interaction. Privacy in work environments involves all three definitions but generally refers to the limitation of interaction or communication*' [Sundstrom and Sundstrom 1986, pp. 313].

12 According to Ganster, '*Control can be broadly defined as the ability to exert some influence over one's environment, presumably so that the environment becomes more rewarding or less threatening*' [1988, p. 88]. In the working environment control involves the personal freedom to manipulate and regulate the physical and ambient conditions.

13 The physical environment is able to support various types of personal and groups interaction. Finrow [1970] argues that in the working environment interaction can be observed for the accomplishment of common tasks and exchange of information, accidental interaction, and casual meetings. All of these types of interaction can be enhanced by the spatial configuration of the working environment. The *functional distance* between units, the *functional centrality* of commonly used facilities [Finrow, 1970], and the spatial qualities of intermediate spaces such as corridors and collection points [Moleski, 1974] are considered the main predictors for the adopted interaction patterns by users.

A number of facilities, mainly offices buildings, have been built the last two decades, taking into consideration the analogy between patterns of living and possible architectural configurations, especially the ones found in the old town¹⁴. Hertzberger's project for Centraal Beheer in the 1970s, introduced the concept of balcony, semi-private and individualistic workplaces in the open plan office layout. SAS in Stockholm claims the rediscovery of casualty and plurality of experiences found in the old street, while the NMB in Amsterdam among others, was designed to present the elements of spontaneity, individuality and reference places.

However, it is recognised that the opportunities provided by the spatial configuration of facilities could be exploited in a constructive manner for the corporation only where there is proper and continuous support by the social and administrative systems of organisations¹⁵. The desired degree of individual, interdepartmental and employee-customer's interaction varies according to the socio-cultural conditions and managerial style. Since the provision of affordances for interaction in the physical environment can add considerably to the initial and operational cost of facilities, the specific requirements of the management and the demands of the users have to be examined explicitly by ABP methods.

Privacy, personalisation of space and territorial demarcation indicate behaviours which can be controlled, to some extent, by the configuration of space, the use of structural components and finishing materials [Sommer, 1969; Lyman and Scott, 1967]. Yet, the desired, by the corporation type and degree of these behaviours is subject to the organisational culture and social context. ABP models should be able

¹⁴ According to Cook, the quality of the *ancient* or early man-made environment can be discovered in the coexistence of the old street and the reference points of homes, the garden wall and the interplay between private, semi-private and public space, the existence of centres and focal points. The plurality of elements and places safeguards a functionalism much broader than modern ergonomics, embodying the satisfaction of the psychological and social requirement of users [Cook, Peter (1969). *Architecture: action and plan*. Studio Vista].

¹⁵ It is observed that the degree of interaction found in the workplace is in positive correlation with the territorial control and privacy [Holohan and Saegert, 1973; Chermayeff and Alexander, 1963]. The lack of territorial control and active support of management is suggested to be the main reasons for the failure to increase the levels of interaction of various open plan offices and working environments [Ellis and Duffy, 1980; Grajewski and Hillier, 1994].

to address the capacity of facilities to provide environments in congruence with organisational philosophy and the users' patterns of behaviour.

Some interesting findings by Gatchel [1980] indicate that even one's belief that he/she is able to exercise control over his/her environment, mitigates stress and strain when he/she is exposed to unexpected situations. Reverting the findings, the explanation to users of the behaviours and opportunities offered by the environment is of equal importance with the quality of actual conditions. Hence, the training to perceive, use and modify the workplace to the users' needs is a new significant dimension for the maximisation of the performance of facilities. That also means that even when the findings of ABP applications indicate the compliance of the working environment with the needs of users, the lack of understanding of the attributes of the environment and the principles of design is enough to originate dissatisfaction and affect business objectives.

3.5 On Aesthetics and Taste

It appears that in the decision making of product design, marketing and predicting the consumer's choice, the concepts of style¹⁶ and aesthetics are major issues to be examined. According to Duffy, Laing and Crisp [1993], the most important issues to be considered on what concerns decisions on the characteristics and specification of facilities by organisations; are: location, servicing, open/enclosed offices, security/access, settings/furniture, procurement, forms of environmental control, floor size, site and depth of space. However, while most executives consider the visual aspects of facilities and physical environments as of trivial importance in

¹⁶ Referring to the application of style in architecture, Jencks said that '*style is a social contract between people, who agreed that certain elements of architecture should mean certain things, and like language it also comprise a set of rules for the use of those elements in certain ways*' [Jencks and Baird' 1969, p. 51]. Furthermore, Jencks and Baird support that style is a kind of language, the mean of communication where architects find and select the essential elements with which they try to communicate, therefore '*style doesn't determine itself the meaning of physical environment*' [Jencks and Baird' 1969, p. 51]. However, the author of this study accepts the position that symbolism is not a quality found only in the theme. Even the choice of the language, used to communicate the theme with, has meaning, since the process of selection is not arbitrary but subject to judgement and rejection.

comparison to technical and organisational issues, the public is quite sensitive to the aesthetic and symbolic quality of the physical environment.

Appleyard and Fishman [1977] argue that characteristics such as scale, colour, shape, finishing materials and style convey information to the public about the organisation and the city, implying the balance of power, the culture and values of the ones that dominate them. Within the post-industrial society where there is intensive market competition, small merits of profit and customers that select between identities instead of products, the salability of commodities is heavily dictated by their aesthetic attractiveness. Apart from a few prominent headquarters buildings, aesthetics are hardly an issue on what concerns investment on premises [Sage, 1977].

However, the aesthetic aspects of facilities are important for corporations, since it seems that the preferences of taste are not universal and the provision of pleasant facilities and working environments is a parameter which contributes to the positive corporate image and high levels of motivation and esteem¹⁷. According to Kaplan [1979], the patterns of aesthetic values are the key parameters to preference judgements. Referring to the natural environment, Ulrich urges that *'there is absolutely nothing in this substantial body of findings to suggest that aesthetic preferences for natural environments are random or idiosyncratic'* [1983, p.187] suggesting that if there are any disagreements in taste, they must be due to differences in cultural background and education. Yet, Oostendorp and Berlyne argue that *'individual differences in taste for architectural styles may not be as large as, especially, art theorists want us to believe'* [1978, p. 146].

The importance of the aesthetic quality found in the physical setting has been well recorded in the past through empirical studies by various researchers [Harrison and Sarre, 1975; Russell and Ward, 1981; Lowenthal and Riel, 1972]. Behavioural studies have indicated the importance of the visual quality of the physical

¹⁷ Joshua Reynolds was warning his students that 'It is certain that the lowest style will be the most popular as it falls within the compass of ignorance itself and the vulgar will always be pleased with what is natural in the confined and misunderstood sense of the world' [Wark 1959, p. 89]. If that is true, a series of questions arises for designers and corporations: How can they produce facilities neither too simplistic nor too intellectual? What would be the consequence of educating employees on the perception of art? How important is it for users to know that the corporation addresses broader issues yet irrelevant to core business such as taste and aesthetics?

environment on the well-being of human beings [Maslow and Mintz, 1956; Samuelson and Lindauer, 1976; Ulrich, 1984]. The results of a research by Berlyne [1971] indicate that the visual environment influences behaviours such as attention, looking time and choice, while Ulrich [1984] found that shoppers often follow alternative routes with higher aesthetic quality.

Although a number of correlations on the pleasant perception of the environment has been observed in experimental research, the universality of beauty has not been proved¹⁸ [Lang, 1987]. Santayana [1896] is responsible for the distinction between *sensory*, *formal* and *symbolic* aesthetics. According to Lang,

Given an environment that well affords a standing pattern of behaviour, it is aesthetically pleasing if it provides pleasurable sensory experiences, if it has a pleasurable perceptual structure, and if it has pleasurable symbolic associations.

[Lang, 1987, pp. 186]

Sensory experiences derive from the sensations, the self-arousal of the sensory systems, obtained from the environment. Formal experiences are perceived by the syntactic and geometrical qualities of the visual part of the environment. Symbolic experiences derive from the associate meaning and symbolism of the patterns found in the environment. Even though the structural qualities of the environment such as shapes, proportions, rhythms, the degree of complexity and order have some aesthetic appeal to users, their significance to pleasurableness on formal aesthetics is not clear. Besides, although there is a lot of emphasis on formal aesthetics by designers, most people appreciate the environment mainly in terms of its symbols

¹⁸ Empirical aesthetics, through scientific and quasi-scientific techniques and correlational analysis have attempted to explain the aesthetic experience. According to the *information-theory* approaches, the pleasurableness of the environment is greater when the multiplicity of meaning is greater too, provided that there is always a sense of structural order [Moles, 1966; Arnheim, 1971]. The *semantic* approaches associate pleasurableness with the meaning of elements of the environment, suggesting that the meaning is a learned association between the object and an idea [Lyons, 1968; Norbeg-Schulz, 1965]. The *semiotic* approaches are concerned with the cultural systems of meaning of the physical environment, since the same elements may have different meaning in different situations [Morris, 1938]. Finally the *psychological* approaches focusing on the structure of the environment and individual's personality, support that pleasurableness can be obtained when moderate levels of arousal have been achieved [Berlyne, 1974; Helson, 1964].

and affordances for activities. Symbolic aesthetics is concerned with the pleasure generated by the recognition and associations people make with specific configurations and characteristics of the built environment¹⁹. Symbolism is a very important parameter for the assessment of the aesthetic value of a concept, since it can introduce bias on the aesthetic appreciation of an object, reinforcing or undermining the aesthetic perception [Mikellides, 1980].

Pleasure by the symbolic aspects of the physical environment is generated when people are able to associate themselves with specific configurations and characteristics of the built environment. This identification with the symbolic aspects of the environment provides a sense of belonging and contributes to the fulfilment of people's need of identity [Rapoport, 1982]. However, according to Maslow hierarchy of human motivation, the importance and appreciation of the symbolic meaning of the physical environment should vary by reference to individual's anxieties and primary concerns. Thus the symbolic aesthetic of the environment should have greater appeal upon people whose primary needs are self-actualisation, and cognitive and aesthetic fulfilment.

The study has recognised that a dimension of the performance of facilities is on accounts of their *aesthetic quality* and the generation of human attitudes towards the physical environment and the corporation. However, studies on the perception of beauty and symbolism between architects and non architects have pointed out that the parameters of education and training are significant factors for the appreciation of symbolism [Berlyne, 1971]. Yet, the dimension of symbolism is central to the aesthetic appreciation of the physical environment. Possibly the introduction of mechanisms which aim to the improvement of the levels of communication between designers and ultimate users could reduce uncertainties and improve the appreciation of the environment among users.

¹⁹ Using the semiological metaphor, Jencks and Baird argue that designers communicate with users through the elements of *syntagm* and *system*. Syntagm in architecture is perceived as the ways that different architectural elements are arranged together in order to compose the architectural forms, while architectural systems are the libraries where architects can look and select the form through which specific elements can be realised [Jencks, C. and Baird, G. (1969). *Meaning in architecture*. Barrie and Rockliff].

3.6 Environmental Perception and Assessment

The understanding of the ways human beings perceive the environment is an important issue not only for the environmental designer but also for corporations, since the perception and interpretation of the environment is of some significance to parameters such as image, communication and motivation [Lasswell, 1979; Herzberg, Mausner and Snyderman 1959]. The existing theories of environmental perception provide some insight into the arising potential for better integration between employees, activities and settings. That can be realised through the suitable design of facilities and working environments.

According to Russell [1988], judgements of the environment consist of *affective* and *non affective* appraisal.

Affective appraisal is one aspect of how someone interprets an environment.

To find a place pleasant, interesting, stressful, or the like is to attribute to that place an *affective quality* - a capacity to alter mood. In other words, to say of an environment that it is pleasant is to say that it can produce pleasure.

[Russell, 1988, pp. 121]

Non affective appraisals are objective attributes of the environment such as colour, age and other physical characteristics which do not resemble emotions. Affective appraisals are expressed with words such as interesting, comfortable, dreary and restful, indicating the existence of affective qualities which may influence the individuals' behaviour and attitudes about the owners and occupants of the setting. According to Parducci [1968], the affective appraisal of a setting is relevant to specific conditions, peripheral and previously encountered places, the individual's experience, space and time, while Sonnenfeld [1969] argues that human judgement is affected by the quality of everyday environment.

Furthermore, Russell [1988] has suggested a two dimensional spatial representation of the affective quality of the environment using the dimensions of pleasantness and excitement (Figure 3.2). Affective qualities are important to environmental appraisal since they have been found to be significant parameters for the meaningful interpretation and comparison of environments [Ward and Russell, 1981].

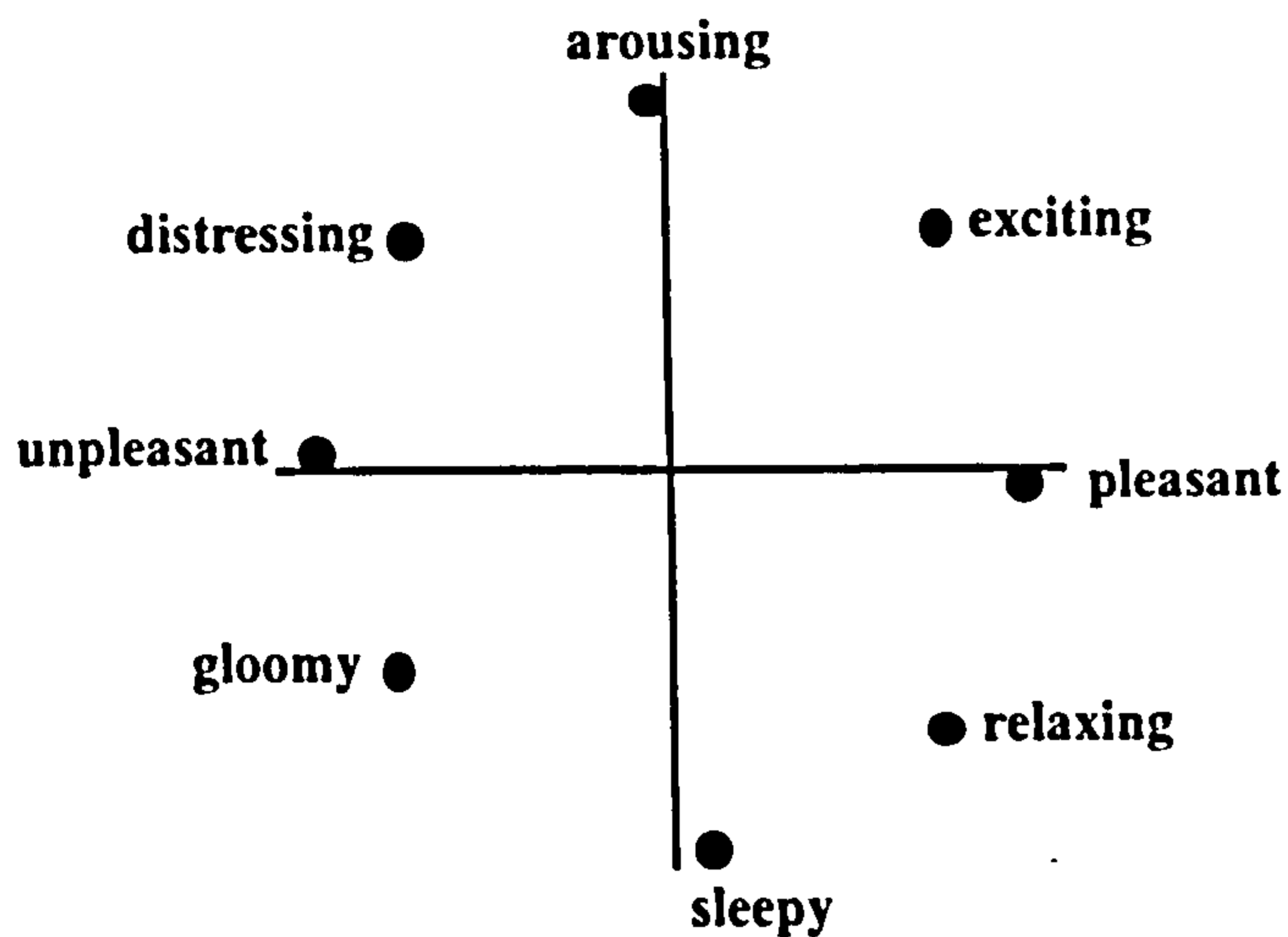


Figure 3.2 Russell proposes eight main representative descriptions translated here on regions of space, every setting will fall within one of the affective spaces [Russell 1988. p. 125].

Concentrating on the reception of sensory experience, the Gestalt theory proposes that all perceptions are organised into figures. Furthermore, patterns and forms appear to have certain 'dynamic' qualities such as movement, weight, intention and feelings, explained by a suggested isomorphism between perceptual experience and human neurological processes²⁰ [Arnheim, 1968, 1977; Levi, 1974]. If the Gestalt theory has some ground and the important constituents of perception are the properties found on the perceived objects, then the design of facilities, their configuration, and the selection of used materials are very important for corporations, since they are the attributes which affect the perception of users and their cognition of their physical and social structure of the environment.

For the *transactional* theory, perception is a dynamic process between the observer and his/her environment, mutually affected by each other. As a result, perception is something highly subjective, where every individual creates his/her own world in which he/she tries to find happiness and satisfaction [Ittelson, 1954]. The information perceived from the environment is transmitted by symbolic properties which initiate meaning, ambient qualities which evoke emotional responses and

20 Being the dominant theory during the course of this century, the Gestalt theory has very much influenced the modern movements in architecture and modern arts, especially the ones of cubism and abstract movements, attracted by the called *laws* of perception which are proximity, similarity, closure, good continuance, closedness, area and symmetry. However, the Gestalt theory has been seriously challenged by transactionalist and ecological theories, especially due to lack of evidence of the concept of isomorphism [Gregory, Richard, L. (1966). *Eye and Brain, The Psychology of Seeing*, New York, McGraw-Hill].

motivational messages which stimulate needs²¹ [Lang, 1987]. Yet, it is recognised that human beings process the perceived information by reference to their past experience and present attitudes²². The importance of the transactional theory of perception for corporations lies on the importance assigned to human experience. The insight received by this approach imply that efforts to measure the aesthetic performance of facilities should take into consideration the human factor. The social characteristics and perceptual abilities of ultimate users are equally important with the design of facilities.

Proshansky [1978] argues that people construct a cognitive pattern of place-identity through the selective interpretation of environments. This is generated by sets of transactions between the person and the environment. Yet, while this is a personal and internalised action, a common scheme of place-identity interpretation is shared by people, to the extent that they have gone through similar transactions. Accordingly, any idiosyncrasies are explained not in personalities but in the uniqueness of person-environment transaction [Proshansky, 1978].

The *ecological* theory perceives sensory experience as a by-product of perception, and senses as perceptual systems [Gibson, 1966]. People learn to detect the value or meaning of things, yet they can perceive only what they know how to find. The process of searching is guided by anticipatory schemata, innate or learned cognitive structures [Neisser, 1977]. According to Koffka [1935], all objects have a *demand* or *invitational* quality which provokes particular interpretations, behaviours or

21 Koller has recognised eight perceptual qualities of the built environment which are able to influence emotional responses: pleasantness, complexity, unity, enclosedness, potency, social status, affection and originality [Mikellides, Byron (1980), *Architecture and People*, New York, Holt, Rinehart and Winston].

22 The change of the focus of interest attempted by the transactional theory in reference to the Gestalt theory, is more visible by the transactional theory's following assumptions: perception is multimodal, perception is an active process, perception cannot be explained by separating behaviour into the perceiver and the perceived, perception cannot be explained in terms of conditioned responses to stimuli, the observer-environment relationship is a dynamic one, the image of the environment that an observer has depends on past experiences as well as on present motives and attitudes, past experiences are projected onto the present situation in relationship to one's needs, and perception is governed by expectancies and predispositions [Lang, 1987; pp. 90]. The shift of interest towards the human factor, underpinned by the above assumptions, provides a new frame of reference for facilities management and human resources policies for the provision of the 'right working environment', communication, and perception of the organisation.

feelings. Gibson [1979] supports that all material or non material objects own properties which enable different species, social groups or individuals to use these objects in specific ways. These properties, which Gibson calls *affordances*, in material objects and settings are the physical attributes of their configuration that allow an observer to administrate a variety of utilitarian, meaningful or aesthetic appreciation to the object.

The concept of affordance is central to the design of man made design theory, since aspects of the physical environment imply or afford certain behaviours and interpretations, expanding or restricting the users' choices of activities and experience [Lang, 1980]. Although the implications of certain experiences from the physical environment vary between settings, the perception of affordances depends on the values and the ability of the user to perceive them. While the physical environment and its affordance do not change, characteristics of users such as social background, previous experiences, needs and attitudes are the main determinants for the interpretation of the physical setting and recognition of its affordances [Gibson, 1979].

The ecological theory and the concept of affordance contribute to the knowledge of the performance of facilities through the provision of insights into parameters influencing social behaviour and the interaction of human beings with the physical environment. Furthermore, it the importance of two issues is stressed, the capacity of facilities to connote behaviours and meanings, and the human ability to learn.

The increased mobilisation of populations during the last century and the workforce's consistency by people of various backgrounds and cultures have resulted in a highly heterogeneous perception and moderate unpredictability concerning the users' ability to perceive the environment in congruence with the objectives of the designer. Besides, it appears that the users have a partial perception of the affordances of settings and that not all perceived opportunities are desirable or active [Lang et al., 1974].

The review of coexisting theories of perception has revealed the importance of the physical environment, and the ability of people to interpret it meaningfully. Human perception, aesthetic preferences and behaviour appear to be influenced by the socio-cultural environment, the psychosomatic state of the individual and the affordances of the natural and built environment. Therefore, reliable ABP methods should adopt adequate procedures to identify the characteristics of the ultimate user.

The perception of the environment is considered as a participatory experience between people and the physical setting. The cultural and psycho-somatic differences between the individuals' command for a phenomenological approach to the perception of the environment where the focus of interest should not be how things are but how they are experienced [Berleant, 1988]. The environment then could be designed to encourage or inhibit participation, and emancipate or intimidate the occupants.

The appreciation of the affective quality of a physical setting depends on the cultural characteristics, prior human experience and predisposition of the users. In an environmental assessment, the appraisal of the affective quality of the facilities can be seen as the average or the consensual affective appraisal by the specific population that the environment will experience [Russell, 1988]. That implies that different groups of the public may appraise the setting in different ways, thus the accomplishment of the measurement of affective quality in ABP methods should be supplemented by a relevant study of the characteristics of the target population.

An interesting issue arising from the transactional and ecological approaches of perception is that the performance of facilities does not rely only on the characteristics of the users but also on their ability to learn. Since it is suggested that users can be taught new ways of perception, what to pay attention to and the meaning of otherwise dubious signs [Gibson and Walk; 1960], their capacity for interaction with the environment could be improved. Thus, the training of employees on how to properly use fixtures of their working environment, the communication of the values which premises represent to customers, the benefits to the local community from the existence of facilities, and the opportunities for improvement and the minimisation of risk through premises to financial analysts, could be considered as areas of facilities management's concern and subjects of corporate communication exercises, dependent on both, corporate strategy and the stakeholders' characteristics. Furthermore, the results of any ABP application accounting the human factor should be regarded as expressing the contemporary effectiveness of facilities to business objectives under the specific circumstances and taking into consideration the contemporary users' abilities rather than a definite and conclusive interpretation of the capacities of facilities.

3.7 The Physical Environment and Human Behaviour

The study of human behaviour is of central concern to the environmental design theory. The environmental perception and behavioural approach argue that behaviour is a function of the individuals' motivations, affected by the perception and meanings of the world and the constraints of the physical environment [Lang, 1987]. Corporations are interested in human behaviour and its causes since behavioural patterns encouraged by the social and physical environment may have beneficial or restraining effects on the individuals' and groups' performance.

It is supported that the physical environment can contribute to the satisfaction of human needs on various levels, through the provision of safety and security, symbolism and meaning, freedom of action and choice, inspiration and beauty [Lang, 1987]. Environmental psychologists argue that although social and interpersonal factors are important determinants of human activities, the perception of the physical environment influences behaviour [Wohlwill, 1970]. Mehrabian and Russell [1974] claim that the physical environment and its elements have *emotion eliciting qualities* and that emotions such as pleasure and dominance serve to determine a variety of *approach-avoidance behaviours* such as the physical approach, work performance, exploration and social interaction²³.

Wohlwill [1970] argues that the relationship between behaviour and the physical environment can be defined under three dimensions. Firstly, the physical context determines the range of possible actions and imposes restrictions on the kind of activities which can take place within it. For example, the kind of behaviour of an employee working in a storehouse differs from the engaged behaviour of another employee in an office area. Secondly, particular qualities of the environment or the perception of the overall quality of the physical environment are able to influence the behaviour and personality of the individual. Thus, the level of self-esteem and moral of employees in a well-maintained and clean building may be much higher than the ones of the employees working in a building with visible signs of negligence and

23 The emotions provoked by the physical environment are not dramatically expressed and easily identified. However, they are the consequence of a persistent everyday experience that according to Mikellides 'probably have far greater impact than we might thought or be willing to acknowledge' [1980, p. 86].

deception. Thirdly, the environment can serve as a motivating force. As Wohlwill suggests,

Individuals give evidence of more or less strongly defined attitudes, values, beliefs, and affective responses relating to their environment... They develop diverse forms of adjustment and adaptation to environmental conditions. They exhibit temporary and permanent responses of approach to and avoidance of or escape from given environmental situations...

[Wohlwill, 1970, pp. 304]

This dimension contains three aspects: affective and attitudinal responses to the environment, approach and avoidance of various environmental attributes and adaptation to environmental properties.

The *ethological* approach maintains that some behaviours do not characterise humans only, but they can be found in other animals too. In human beings, even though they can be affected by culture, they are innate [Hall, 1966]. On the other hand, the *behaviourist* theory perceives behaviour as the consequence of reinforced patterns which can be learned. There are well known exercises by architects seeking to influence human behaviour in the working environment, the most interesting concerning territorial behaviour. Both attempts, the *landscape offices* in the sixties and the *hot desk* in the nineties, aimed, partly, at the maximisation of floor-space use through the change of territorial behaviour. With regard to the issues of adaptation and the satisfaction of the users, these exercises had ambiguous consequences. Even though it is accepted that an improvement in space use had been achieved, it seems that the users' productivity and satisfaction also influenced, negatively or positively, by factors such as the participation in the decision making process, the communication of managerial aims and the freedom of environmental control.

Here, the danger of perceiving the environment as a *determinant* factor should be acknowledged. It is widely believed, especially by designers, that through the environment it is possible to manipulate social behaviour in a form of a stimulus-response model [Brolin, 1976; Lipman, 1974]. *Ecological psychologists* accept that the physical environment exerts a degree of coercion over the behaviour of

individuals and groups²⁴ [Wicker, 1979]. However, although the existence of a relationship between the environment and human behaviour has been accepted by a number of authors [Grajewski and Hillier, 1994], social variables rather than architectural factors seem to be the determinants of social patterns²⁵ [Mayer, 1967]. The environment affords specific behaviours, yet, their realisation depends on the users' predisposition to exercise them [Gibson, 1979].

Another interesting issue regarding the users' behaviour is the human ability to deal with the environment. *Environmental competence* depends on factors such as the individuals' physical and mental health, intellectual capacity and ego strength [Lawton, 1977]. Lawton argues that the greater the ability of an individual for environmental adaptation, the less the constraint by the social and physical environment. Therefore, the freedom of expression and activity depends on the individual's competence. Since the behaviour and fulfilment of the users' needs can be affected by the complexity of the environmental design, the concept of environmental competence of the users should be a matter of consideration during the initial stages of design.

The issue has already attracted the attention of a number of architects concerned with the dilemma whether the physical environment should be designed to comply with or challenge the users' competence. There is a variation of opinions concerning the degree of anthropometrical fitness between people and the physical environment. Even though most human beings seek high levels of physiological satisfaction, others believe that comfortability is a kind of decadent [Brebner, 1982].

Lloyd's headquarters in London could be seen as the implementation of environmentally 'complying' with the users' needs approach. It was designed to

²⁴ The deterministic approach expresses the wider belief that human values and behaviour are shaped through *nurture* within the geographical, social and cultural setting, rather than through *nature* [Franck, Karen (1984). Exorcising the Ghost of Physical Determinism. In *Environment and Behaviour*, Vol. 10, No. 4, pp. 411-430].

²⁵ Research findings by Grajewski and Hillier [1994] suggest that in occasions where two different organisations carry out different activities in the same office building, the usage of a pattern of interaction occurring in the same locations are similar to both situations. However, the generation of interaction could be considered useful or harmful for the corporation, depending on the social patterns, culture and managerial style within the specific corporation.

provide maximum physical comfort and the users' control over their workplace. Even though the building is fully air-conditioned, employees' workstations are equipped with facilities which provide special heating and ventilation systems and acoustical protection devices²⁶. The working environment is designed to minimise the needs for physical movement providing high levels of flexibility and adaptation to the users needs [Duffy, 1992a]. In contrast to this, the headquarters of NMB in Amsterdam is designed to challenge the users' competence. This approach is expressed by the absence of air-conditioning while the workplace arrangements and space planing are direct responsibilities of the users. Moreover, the challenge finds its climax by locating the lifts in 'hidden' corners and elevating the stairs to prominent features, providing further opportunities to the users for casual communication and socialising [Mackenzie, 1991; Du Roy, 1990]. The previous two approaches, both from the finance sector, had the same objective, to provide a qualitative environment where the users' needs could be fully complied. Yet, the applied solutions stand for two different perceptions of 'quality' reflecting the anxieties, culture and values of developers, designers and users.

Yet, whatever the followed approach, the danger from environments too challenging to the users' competence, resulting in stress and possible mental illness should be acknowledged [Klee et al., 1967], while too comfortable environments could lead to the atrophy of users' abilities [Lawton, 1977]. From the above it is evident that ABP models cannot be instruments which measure mere quantitative and isolated characteristics of premises. They should incorporate procedures able to distinguish between different cultures and values, while the performance of facilities should be examined within the broader socio-cultural context.

The examination of the human behaviour theories has indicated that the physical environment should not be seen as a deterministic factor of the users' activities, but rather as an accommodative one. From this point of view, ABP methods should be able to examine the range of activities permitted within the facilities and the risk to restrict useful behaviour for the users and the corporation [Parsons, 1966]. Instead of measuring the performance of certain activities, ABP methods should examine the

²⁶ Lloyd's approach to provide *micro-environmental control devices* to employees is based on studies indicating the importance to the users' satisfaction due to the exercised control over their ambient conditions, even if the combination of ambient parameters is considered to exceed the recommended by physiology levels [Croome, 1986; Leaman and Borden, 1993].

probability of behaviours to be performed, since their realisation depends on other parameters of the social and managerial level [Mayer, 1967].

3.8 Human Behaviour and Attitudes towards the Corporation

The examination and understanding of human behaviour is mainly the task of social psychologists. In their attempt to analyse and explain their domain of focus they have developed the idea of *concepts*. Concept is an abstraction '*a term or symbol that represents the similarities in otherwise diverse phenomena*' [Labovitz and Hagerdon, 1971, p. 1]. Concepts are the fundamental tools for building theories, engaged in explaining relationships and human behaviour. The most important concepts used by social psychologists are symbols, interaction, attitude, socialisation, role, self, reference group and the definition of the situation. Concepts are significant in the sense that they are integral to the theory and they form a distinctive set of analytical tools [Lauer and Handel, 1977].

The concept of *attitude* is widely shared among social psychologists. A common definition of attitude is as '*certain regularities of an individual's feelings, thoughts, and predisposition to act toward some aspects of his environment*' [Secord and Backman, 1964 pp. 97]. Attitude is formed through the perception of stimuli such as the quality of products, the employees' behaviour, advertisement, the company's record. Even though the analysis of an individual's attitudes towards a phenomenon such as a corporation, reveals the presence of the *affective* and *cognitive* attributes of attitudes, behaviour is not always easily observed. The positive attitude toward a corporation could embody respect for the corporation and its products or the belief that one of the corporation's aims is the promotion of the general interest and the quality of life. Moreover, such attitudes can be expressed through the propensity to buy corporate products or through a positive preoccupation towards the corporation in industrial disputes.

Mead [1934] argues that our attitude toward an object embodies a diversity of responses. Since any attitude object comprises a variety of meanings for us, it is unrealistic to expect a specific behaviour to be the result of an isolated attitude. Furthermore, studies suggest that an attitude to a specific action is not necessarily the same as an attitude towards an issue with which that action is related [Weinstein, 1972].

The creation and maintenance of positive attitudes is an important subject for the management since the individuals' attitudes imply certain predisposition to action matters considering the corporations²⁷. However, attitudes are complex phenomena and they function in interdependence rather than in isolation. Therefore, the individuals' behaviour towards a corporation is subject to the interrelationship of a number of attitudes towards the different aspects of the organisation such as services and products, the employees' behaviour, culture and policies, the physical property, and the history of the organisation. Furthermore, the relationship of attitudes may be conceived in terms of a network, where attitudes occupy a central or peripheral position in the system bringing the possibility for a larger or smaller number of interconnections.

Attitudes emanate to behaviour in specific situations where the interaction of attitudes and variables of the social context takes place. It is possible that a behavioural tendency towards the corporation may be peripheral or inhibited by situational factors such as social norms. For example, an employee who has a negative attitude towards the corporation, may comply with the situation but the behavioural tendency of the attitude may result to aggression towards the self, rather than the corporation or other colleagues. The self-direction of this aggressiveness, may later develop psychosomatic symptoms to the individual such as frustration and stress.

A number of studies have shown that attitudes affect perception [Newcomb et al., 1965]. Yet, Mead [1936] argued that attitudes determine perception in the sense of defining the nature of the perceptual object. Objects are defined in terms of their meanings, meanings are the individual's behaviour towards the object, and behaviour is the consequence of attitudes. Mead supports that '*I see the object as I may later respond to it... What I see will depend upon what I am going to do later*' [1936, pp. 131]. Hence, the positive attitude of an employee towards the corporation may influence his/her perception towards an open plan office layout as a mean of greater flexibility and social interaction between individuals and teams or as a symbol of prevailing equality in the workplace. On the other hand, a negative

²⁷ A number of studies on the subject show that attitudes are poor predictors of human behaviour, and that prejudicial attitudes on paper are not consistent with the way people behave in real situations [Deutscher, 1973; Ehrlich, 1969]. However, Lauer [1971] supports that the problem of discrepancy is due to inadequacies in research rather than lack of relationship between attitudes and behaviour.

attitude may influence the interpretation of the layout as an attempt to control the workforce or as a means of exercising corporate power upon the individual. Moreover, an insecure employee may perceive the working environment as an alien, hostile setting, where action and change are threats, while a motivated employee may perceive the same environment full of opportunities for the innovation and exploitation of his/her talents.

Brehm and Coher [1962] argue that human beings seek cognitive consistency of their attitudes towards themselves, the social environment and physical setting, implying that the observers' attitudes towards corporations and their properties are interdependent. In compliance to the balance theory [Heider, 1946], if there is a positive attitude towards the physical environment, then an inclination for positive attitude towards should be expected the owner. If on the other hand a person has a particular attitude towards a corporation, a predisposition should be expected towards all aspects concerning the corporation, including the properties.

It appears that physical properties influence public attitudes through aesthetics and symbolism. However, the degree of significance depends on the interest of individuals in the corporation, the industrial sector and the social context. Since the stakeholders' attitudes are a matter of concern for the management, the ABP methods should be able to examine and identify the possible inconsistencies between the organisation, the implemented cultures and premises.

3.9 Conclusions

The previous chapter recognised the role of the employees as a major resource of the modern enterprise and their importance to achieve business objectives. This chapter was occupied with the significance of the physical environment on maximising the employees' performance. Furthermore, it examined the competence of the physical setting to influence human perception, attitudes and behaviour.

The chapter reviewed the current theories on the employees' physical, psychological and social needs in association with the working conditions, and the association of the human performance with the satisfaction with the physical environment. In addition, it examined the importance of the qualitative characteristics of the environment, the development of attitudes towards the corporation and the ability of the environment to endorse or prohibit certain behaviours.

The next chapter concentrates on the symbolic role of facilities within the organisational context. Facilities are viewed as objects of corporate identification, and their ability to reflect the formal organisation is examined. Moreover, the performance of the physical environment as a means of corporate communication, the significance of its elements to present particular organisational indicators, and the importance of facilities on the implementation and support of corporate culture and values are investigated.

Facilities as a Means of Corporate Communication

4.1 Introduction

Today there is a growing awareness by the management of the commercial value of a good reputation and the importance to preserve a socially acceptable profile. Successful business enterprises recognise that they operate under continuous scrutiny by society and organisational performance on areas such as public relations, marketing and corporate communication is of equal importance to work floor productivity and innovation [Morgan, 1986].

Having rediscovered the value of corporate symbolism and corporate identity, enterprises create, support and publicise mythologies, anecdotes and chronicles which announce their individuality from the lot and declare their prevailing culture. As was seen in Chapter 3, symbolic qualities can be attributed to the physical environment. Among others, facilities can be seen to function as signs of specific social activities and behaviours, or as signifiers of the individuals and groups that occupy, work and own them. Appleyard and Fishman referring to the external appearance of buildings propose that

The more unique, large, and dominating a building is, the more clearly will it be distinguished from others, and the more it is therefore susceptible to symbolisation.

[Appleyard and Fishman, 1977, p. 95]

However, though human perception of the physical environment was perceived as predictable and solid in the domains of meaning and symbolism in former times, it is suggested that today's mobile populations and variform of social and cultural background that shape modern societies have debilitated the human ability to meaningfully interpret his/her surroundings [Neutra, 1954;].

The objective of this chapter is to investigate the association of the physical environment with the formal organisation, and to examine the significance of facilities as means of corporate communication. Even though a variety of corporate indicators have been investigated by the organisational theory and their correlation to the physical and spatial characteristics of premises has been attempted to be identified, still the issue of corporate communication and its impact upon business objectives remains largely unknown, being a matter of speculation and personal interpretation [Jackson, 1987]. What is even more peculiar, is the fact that neither the science of architecture nor that of management have devoted enough concern on an issue which through the ages would be recognised as one of architecture's primary functions and management's preoccupation [Appleyard and Fishman, 1977; Jackson, 1987; Lang, 1987].

The chapter will continue with a brief description of the topics surrounding the concept of corporate communication and the importance of corporate identity to modern enterprises. Later, the significance of the symbolic attributes of the physical environment at corporational level, the parameters which contribute to the symbolic perception of the environment, and the corporate branding through premises will be examined.

4.2 On the Definition of Issues

Corporate communication has been defined as '*the total communication activity generated by a company to achieve its planned objectives*' [Jackson, 1987]. Corporations use three forms of communication: *marketing, organisational* and *managerial*. It has been suggested that corporations achieve maximisation of

advantages when there is congruence among all forms of internal and external communication [Tagiuri, 1982; Olins, 1984]. This study examines facilities as part of the organisational communication, and under its spectrum the following issues are covered: corporate advertising, environmental communication, guidance, internal communication, investor relations, labour market communication, public affairs and public relations.

Terms such as corporate identity, corporate image, corporate branding and personality reflect the current difficulty in perceiving and defining precisely the relevant concepts within the domain of corporate communication. A review of the literature reveals little agreement as to which term appropriately describes this area of corporate communication, allowing academics and practitioners to use the terms interchangeably. According to Balmer [1993], the inability to identify and describe the concept of corporate identity properly remains a major issue.

Attempting to use a working definition, the study has accepted that *corporate identity* is the self portrayal of an organisation perceived by a multitude of signals through corporate and individual behaviour, communication and symbolism¹ [Van Rekom, Van Riel, and Wierenga, 1991]. *Corporate personality* is described as the outcome of corporate dimensions such as the company's structure, work process, operational environment, shared values, beliefs, acts and behaviour [Birkigt and Stadler 1988]. *Corporate image* is perceived as the overall impression that a group or an individual have about a corporation, it is a mosaic synthesised by numerous impressions formed as a direct or indirect result of a variety of fragments of corporate activity and individuals' behaviour, over time [Bernstein, 1984]. Furthermore, the number of corporate images of an enterprise should be proportional to the size of its stakeholders² (Figure 4.1).

¹ More information and comprehensive analysis concerning definitions and concerns of corporate identity can be found in the writings of Abratt [1989], Balmer and Wilkinson [1991], Bernstein [1984] Boylan [1989], Caust [1972], Gray and Smeltzer [1985], Ind [1990], Margulis [1984], Olins [1989, 1984].

² This study recognises the existence of various groups of people with specific interests about the corporation and their possible participation to more than one group at the time. The most important public groups that corporations deal with are customers, distributors, financial analysts, stockholders, special interest groups, the general public and employees [Gray, Edmund, R. and Smeltzer, Larry, R. (1985). SMR Forum: Corporate image, an internal part of strategy. In *Sloan Management Review*. Summer 1985, pp. 73-77].

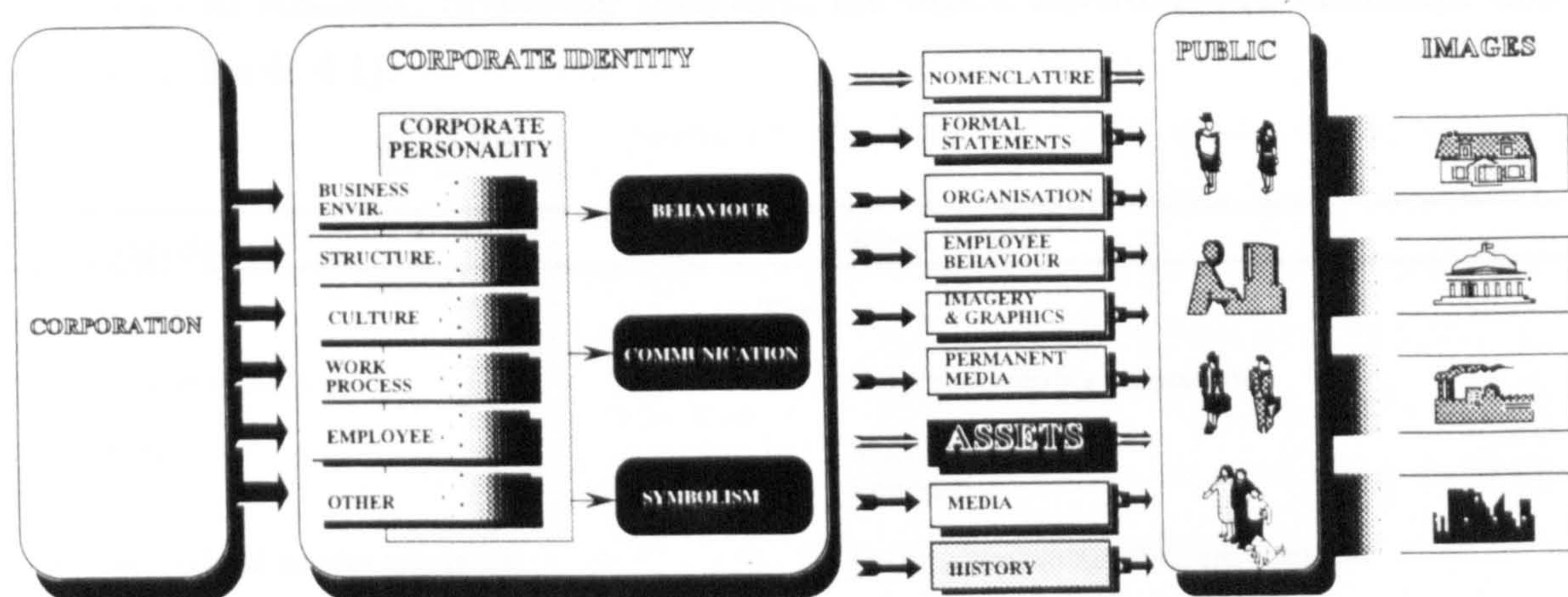


Figure 4.1 Corporate Identity and the creation of Corporate Images

Corporate identity is one of the organisational attributes, to which the literature of management has only recently devoted some attention. It is expressed through corporate products, assets, culture, behaviour and marketing to the internal and external public of the corporation. Yet, it is one of the most misunderstood and highly subjective indicators of the modern organisation. According to Balmer [1993] its suspected importance to corporate objectives is well mentioned on a number of works but few studies are underpinned by empirical research and much of the literature treats the subject superficially. Abratt remarks that

Despite the voluminous literature the concept remains unclear and ambiguous as no universally accepted definitions have emerged.

[Abratt, 1989]

All corporations have an identity. A corporation could enjoy a lucid, well established and distinctive corporate identity, a low profile identity where nobody knows what the corporation is all about other than it exists, or even a confused and chaotic identity consisting of a number of conflicting sub-identities [Tagiuri, 1982]. Yet, a strong corporate identity is perceived as a sort of business advantage, contributing to corporate objectives by raising motivation among organisational members and groups, attracting and retaining customers, and increasing the confidence amongst external groups [Olins, 1984].

Walker [1990], introduces the term of *design maturity*, attempting to describe the degree of effort devoted by organisations trying to communicate their corporate identity to the public. The more mature an organisation is in the involvement of

business with design, the more holistic an approach is adopted to the implementation of design to business, involving furniture, the office environment, landscape and premises (Table 4.1).

Design specialism	Nature of work
Top	
Corporate specialists	Corporate identity programme
Architects	Major buildings Landscape
Architectural and interior specialists	Factory/workshop/office environment
Interior design	Retail environment Shop fitting Furniture and accessories
Graphic and corporate specialists	Design manual/guidelines Visual identity Co-ordinated signs, stationery and print items Product brochures
Production engineering	Process improvements
Manufacturing specialists	Specialist advice e.g. materials, manufacturing
Engineering and industrial designers	Co-ordinated range of products New product development Product improvements Product appearance/styling
Graphic designers	Exhibitions Instructional literature Retail display Packaging and sales literature Letter heading and logo
Bottom	

Table 4.1 *The ladder of design maturity [Walker, 1990, p. 44].*

However, there is little solid empirical evidence demonstrating that facilities and the working environment indeed exert some form of influence on corporate identity of contemporary organisations. Reviews on the topic report that few studies have been conducted and that problems in experimental design, measurement and methodology are common. Furthermore, in literature referring to corporate identity, very little attention is given to the role property plays on corporate image and most authors [Margulis, 1977, Olins, 1989; Ind, 1990] seem to concentrate on the visual impact of assets, ignoring the properties of the environment which are perceived by the other human senses.

However, all evidence suggests that the congruence of corporate identity with the image presented through premises is an important factor of the performance of facilities by reference to corporate objectives. Cassels [1991] argues that operationally efficient facilities, succeeding in all current appraisal measures, may be the wrong properties for the particular corporation. In ABP applications the harmony and compatibility of management-culture-facility-working environment has to be examined, so that the means which will ensure the contribution of facilities to the presentation of a solid corporate image will be provided. Yet, the study should cover not only the internal consistency but also the importance of presenting a strong corporate image through the specific facility for the particular enterprise.

Some of the questions that the management and ABP designers are interested in are: How effective the symbolic function of corporate premises is today? What is the importance of the congruence between corporate identity and the physical environment? How facilities operate as means of corporate communication, and what is their contribution to public relationships?

4.3 **On the Meaning and Symbolic Presence of Facilities**

The physical environment is more than an indifferent background in accomplishing organisational functions. It is a crucial parameter for the performance of activities since physical dimensions are able to induce or prohibit crucial behaviours. Yet, decision making on what behaviours are to be supported has also a political dimension since it expresses social values [Heath, 1988].

As Ittelson [1978] argues, the physical environment has the potential of enhancing or contradicting value systems. Heath [1988] supports that the social significance of places and the formality of behaviour are the most obvious attributes of the social system manifested by the environmental characteristics of scale, quality of materials and construction details.

On the proposition of an empirical scheme for the analysis of the meaning of buildings, Markus [1982] supported that experience is derived from three sources: *form, function* and *space*. Under the term 'style', forms and images are the geometrical properties, the proportion; articulation; colour; ornamentation and surface treatment, able to create immediate and powerful images. Functional is the experience of activities within the building, the labelling and location of spaces;

furniture and equipment. The spatial experience is created by the human movement and refers to the number and location of entrances in the building; the sequence and linkage of spaces, the depth of spaces and the number of alternative routes to a space. According to Markus [1987], all these experiences are open to theoretical analysis which relates them to buildings' attributes.

The main body of methods and techniques which examine the meaning of forms has the same roots with art-historical disciplines, mainly visual ones, providing an enormous literature to the subject [Markus, 1987]. The function of buildings, as described by the objectives and formal requirements of the programme, expresses the underlying values and intentions of the providers, which according to Markus is never 'innocent' since it is a political action [Markus, 1986]. The analysis of the spatial structure examines the depth and shape of the relations or the interface between the functional labels as they unfold within the building [Hillier and Hanson, 1984; Steadman, 1983].

Yet, apart from the behaviour based theory of symbolism, well described in the previous chapter and above [Lang, 1987; Santayana, 1896], the semiological approach to the symbolism of products has to be also considered [Jencks and Baird, 1969]. Lynn [1980] suggests that symbols have the charisma of preoccupying people over an extended period of life, often becoming a guide by which people find meaning in their life³. Symbols represent important unconscious materials seeking

³ Frequently, the physical environment is considered as neutral, while space as a container of human activities where behaviour is independent of space. However, though it may be overlooked, the physical environment has some influence not only on the human behaviour but also on mentality, while at the same time our beliefs, values and perception of the world have significant influence on the way we construct our environment and determine our behaviour. A very vivid example comes from the North American Indian culture: *'You have noticed that everything an Indian does is in a circle, and that is because the power of the World always works in circles... In the old days when we were a strong and happy people, all our power came to us from the sacred hoop of the nation, and so long as the hoop was unbroken, the people flourished... Birds make their nests in circles, for theirs is the same religion as ours. The sun comes forth and goes down again in circle. The moon does the same, and both are round. Our teepees were round like the nests of birds, and these were always set in a circle, the nation's hoop, a nest of many nests, where the Great Spirit meant for us to hatch our children. But the white man has put us in these square boxes. Our power is gone and we are dying, for the power is not in us anymore'* [Black Elk speaks, In Lynn, 1980, p. 6]. For the Indian, the physical environment was the extension of himself. The man made environment was not only in congruence with his ideas and perception of life and the world, but was also a

expression and integration with consciousness. It is common belief that in the past architects had the knowledge and ability to design environments capable of providing specific symbolism and meanings to users [Neutra, 1954; 1956]. It is also widely accepted that before the appearance of scientific marketing and advertisement, laymen were able to recognise the importance and identity of institutions through their premises.

It is suggested that facilities communicate a variety of meanings simultaneously from the utilitarian level to the symbolic one⁴ [Gibson, 1950]. The symbolic meaning is not important only on account of its influence to the aesthetic judgement of the environment, but also as a means of communication of corporate culture and values. However, the fixed perception of meaning of a stimulus should not be taken for granted, since it is a process affected by the observers' cultural and social characteristics [Gibson, 1950]. However, as Jencks and Baird [1969] argue, the designers mistaken belief that human beings have the same ability to receive and interpret the physical environment has added to the ambiguity and confusion generated by the modern man made environment.

As Festinger [1967] supports, according to Heider's balance theory, people strive for a consensus of attitudes, therefore the symbolic appreciation of facilities and

bridge with nature, providing him with the symbolism essential for identifying himself and finding meaning in his actions. Despite the fact that the decline of the Indian nation was the consequence of the violent meeting of two completely different societies that triggered demographic and socio-political changes (e.g. the Europeans' movement to the West occupying the main resources, and the imposed white men's values and economic system), the Indian perceived that for the weakening of his people's strength, their allocation to a man made environment alien to their culture and opposite to their beliefs was responsible. It is apparent that in today's global society where communication between various groups and nations is much more frequent and easy, it is very difficult to trace equivalent or even milder reactions. However, the previous example is an indication of the importance of symbolism in human life, assigned by man to the physical setting, and the consequences to the occupants' moral and alienation when the identification with the environment is interrupted.

⁴ There are a number of approaches concerning the levels of meaning attributed to the environment. Gibson [1950] has classified six kinds of meaning that could derive from the same object or stimuli: the primitive concrete, use meanings, the meanings of instruments and machines, the value and emotional meaning of things, the level of signs and the level of symbols. Hershberger [1974] identifies the presentational meaning (the perception of shape and form), the referential meaning, the affective meaning, the evaluative meaning and the prescriptive meaning.

physical environments should be in congruence with the users' predisposition towards the referent context. That implies that apart from the highly subjective concepts of taste and beauty, the appreciation of facilities is also influenced by the users' attitudes towards the owners and the values attributed to them.

The potential influence of the physical environment to the presentation of a desirable corporate image will be examined together with the significance of facilities branding to the management's functions such as public relationships and the implementation and support of organisational culture.

4.3.1 The Physical Environment and Corporate Images

Corporate image appears to be the collective outcome of impressions deriving from different aspects and attributes of facilities, such as the location of the facility by reference to the local community and market centre, the size, shape and architectural style of the property, the configuration of the work place, decoration, furnishing, ambient conditions, final materials and equipment.

The location of facilities is usually considered as the most important parameter for a positive corporate image. The location of offices and shops in city centres, expensive areas or places associated with specific activities and trade are usually perceived by the public as signs of corporate strength and status within the industry [Sundstrom and Sundstrom, 1986; Appleyard and Fishman, 1977].

In the past, enterprises from different sectors such as banks, religious institutes, universities, parliaments had their own identical architectural style. Specific shapes, and patterns used to indicate values recognisable by the users and the local communities [Lang, 1987]. It is true however, that with the arrival of the modern movement and onwards, this tradition was broken and new hierarchies of priorities for symbolism emerged. Today, in coexistence with the traditional symbolism of the owners' power, rationality and security, there is the designers' attempt to present abstract concepts such as transparency, flux and transformation through a language of rather ambiguous interpretation in the envelope of buildings [Jencks, 1977; 1980].

The configuration of facilities provides information concerning the significance of permitted behaviours through spatial quality, amount of space and the location of activities in relation to each other. The environment carries symbolism concerning

the authority and structure of corporations, the freedom of expression, the status and respect that the employee and groups enjoy within the organisation [Jencks, 1980].

Through their colour, sonic, haptic and olfactory properties, finishing materials indicate the importance of the place and its occupants, provide associations with specific situations, and afford or inhibit particular kinds of behaviour [Lang, 1987]. Furthermore, the use, by the designers of materials other than these used in the local tradition, justified by practical considerations or on the pretext of artistic expression, reveals another quality of materials, to be identified with specific activities such as glazed tiles and mercury vapour lamps associated with laboratories and research institutions. However, this association is not always desirable, since materials may connote behaviours incompatible with the desirable one [Sundstrom and Sundstrom, 1986].

The ambient conditions of the environment, though often underestimated, are another means of communication. Illumination and acoustics are the properties which have attracted most of the designers interest [Lang, 1987]. The affordance for attraction of the users' attention to specific features of the building, places and objects, and the creation of particular feelings such as mystagogy and reverence, exercised in the past particularly by religious institutes, are well known applications of the properties of the ambient conditions.

It seems, however, that the strength of corporate identity communicated by properties is stronger when there is congruence and homogeneity between the different elements of the physical setting. However, in today's continuously changing working environment, where activities are *zoned* instead of *caged*, there is an enormous demand for flexible facilities. An obvious challenge to the designers is the production of non anonymous facilities and spaces, apparently an issue not yet satisfactorily resolved by contemporary architecture⁵. Under the current economic conditions where the dominating approach is the *exact-fit*, designers have to train

⁵ Twenty years ago, Cook supported that '*... the idea of place almost certainly means less than it did it in the safe world of social division and narrow culture*' [1969, p. 83], while Mies Van der Rohe commented that '*The individual is losing significance; his destiny is no longer what interests us. The decisive achievements in all fields are impersonal and their authors are for the most part unknown. They are part of the trend of our time toward anonymity.*' [Jencks 1971, p. 22]. Today however, on the verge of post-modern society together with the rediscovering of the local and the individual, there is a reassessment of the value of the ephemeral and a return to more traditional issues that secure consciousness and identification.

themselves on the human-environment interplay and discover new means of communication [Cook, 1969].

Furthermore, according to Kepes [1966], the components of the physical environment and facilities as entities have symbolic values, which derive from the connoted meanings that the users give to them. However, meanings are results of psychological associations, social conventions or of accidental incidents [Burchard and Brown, 1966]. Thus, depending on the socio-cultural context or the users' predisposition, the application of a specific solution or combination of elements could be given different interpretations by different users, groups, or societies.

The symbolism or otherwise reference to the physical environment is an active property of the socio-cultural context which changes over time. For example, the Acropolis of Athens, was a symbol of power and imperialism in antiquity, yet today, it is a symbol of democracy. Though the first applications of modern movement in housing estates reflected the belief for the rationalisation of physical resources and human behaviour, today they connote the brutality and alienation found in the modern city. Both of the above are classic examples of the changes in referent meanings. Jencks [1977] argues that if facilities intend to communicate, to survive the transformation of society and the change of values, they have to be over-coded by the engagement of a redundancy of popular signs and metaphors. However, from the implementation of semiotics to the physical environment, well-exercised over the ages and recently of particular consideration for post-modern movements, a debate has emerged on the educational and social role of architecture and the desired levels of elitism versus populism.

As was revealed in the previous chapter, the perception and interpretation of the physical environment depends to a great degree on experience. It appears that a continuous conscious and unconscious training takes place during human life which associates specific impressions of the physical environment with particular social nuances. Thus, the existence of heterogeneous spaces able to define significance and behavioural patterns is a fundamental function of architecture which should not be ignored in corporate premises. Lynn [1980] argues that in the name of the flexibility and marketability of facilities, the physical environment is deprived of the pluralism

of the interaction between heterogeneous spaces⁶. Furthermore, the mobilisation of human beings from different societies and fundamentally different backgrounds makes the existence of a variance of perceptions and interpretations of the same environment and the indicated behavioural patterns, at least for a transitional period of adaptation, inevitable [Lynn, 1980]. Furthermore, Duffy [1990b] argues that it is the complexity of modern demands, the current procurement system and the requirements of developers for economy of means which have triggered the exaggeration of technical issues, the underestimation of longevity, the isolation of the designers from the ultimate user and the underestimation of the meaning and symbolism of corporate premises.

The attitudes of internal and external customers are subject to close scrutiny by today's corporations. The management, through different means of corporate communication attempts to influence human predisposition to the benefit of the corporation. The physical environment is one of the means of corporate communication through which the corporate identity can be expressed. The location of the facilities, the architectural style, the buildings' layout, spatial arrangement, furniture choice and decoration are potential symbols which communicate cultures and values, status, inspirations and objectives [Rapoport, 1982].

However, it appears that symbolism is a highly speculative subject of the performance of facilities. Though further research in the subject has to be conducted, until we have a conclusive understanding of the significance of the different elements of the physical environment for the perception of symbolism, and are in a position to appreciate the symbolic aspect of the physical environment alongside the physical, environmental and behavioural dimensions, the indications suggest that symbolism and underlined meaning should be issues being addressed by ABP methods.

⁶ Eliade calls today's homogeneous space found in modern cities *profane space*, while spaces of great significance, initiated due to the religious needs of archaic societies are *sacred spaces*. In sacred spaces the world is considered alive, therefore the spatial experience is of elevated importance. Thus, there are rites and prescriptions of how such spaces should be built and approached. According to Eliade, the alienation of modern man from the experience of space of various significance has weakened human sensitivity and understanding of the appropriate behavioural patterns [Lynn, Glenn Robert (1980). *A psychology of building*].

4.3.2 Facilities Branding and Corporate Images

Meaning is not attributed only to the physical properties of the environment. Corporate identity and meaning are communicated through indirect characteristics of the socio-cultural context. The design and construction process are often expressed through facilities *branding*. According to Fisk [1991], the products of capitalist societies always exceed actual needs, therefore popular discrimination is relevant to the selection of products in use, the meaning associated by them and the conditions of everyday life. Williams [1976] argues that aestheticism became important in the nineteenth century as a weapon of the class struggle by distinguishing the cultured educated bourgeoisie from the rest, the working class.

The acceptance of the symbolic meanings of facilities and their perception as cultural banks and artworks to the eyes of the users is influenced by the promotional campaigns initiated by developers. The mass culture theory of the Frankfurt School has developed the term *distraction* to explain the influence of branding. For Horkheimer [1977] mechanical reproduction within a capitalist system transforms reception from the state of absorption to the one of inattentiveness, resulting in the atomisation of the work. For Adorno, this distraction is associated with commodification which characterises any product of consumption [Adorno, 1978]. Commodification aids a distracted user, attuned to only those aspects of facilities which campaigns have delegated as valuable⁷. Although campaigns are often seen as mere extraneous accomplishments to facilities, under Adorno's perspective they can be viewed as a process of mass culture, essential to the social appreciation and acceptance of products.

The symbolic attributes of facilities are often communicated to the users through indirect means and marketing procedures, since they do not always have observable

⁷ Adorno uses the Marxist concept of *commodity fetishism* to explain the production of aesthetic objects in mass culture. According to Marx, the commodity fetish is an attribute of products in the capitalistic system that adds to the value of objects through a social process that determines its significance within the marketplace. For Adorno objects have no inherent value. The exchange value of artistic objects is defined by their treatment as fetishes that becomes their usage value [Adorno, 1978]. Since facilities can be perceived to have a dual existence, on utilitarian and symbolic or aesthetic grounds, their exchange value should be considered as the outcome from the contribution of both values.

characteristics. The promotional text engaged in these campaigns is in written, verbal or video form, including stories about the design and construction of facilities, the participants, the objectives of the design, special features of the building, and the affordances of the physical environment. The text is often central to the users' experience, since it influences perception by *educating* observers how to view and consume the premise, about the necessity of the existence of facilities and about specific attributes and objectives. Their effectiveness however upon the users' attitudes appears to be subject to applied marketing aggressiveness by the management. Yet, there is lack of evidence from empirical studies to confirm the influence of facilities branding, due to the sort of relevant studies rather than to indications to the opposite.

Furthermore, the increase in the marketing value of premises should not be seen as the overall concern of branding. It is rather the multiple access to facilities, their service for the integration with the social environment and the recognition of an heterogeneous in interests and perception public. The promoting campaign aids the developer, owner and designer's attempt to communicate their desired culture and values, to eliminate the danger of misinterpretation of the design, to debilitate the users' resistance to accept the promoted physical environment and to contribute to the commercial long life of the premises.

During the process of designing the headquarters of the Banque Populaire at Cahors in France, Micholet and Lourd-Conti organised a public exhibition providing information on the corporate objectives and on issues concerning the implications of the new building to the community. Through the following debate, a brief was prepared which met the requirements of all stakeholders. It is accepted that on this occasion, apart from the elimination of risk from the adoption of an inappropriate proposal, the process which forms the guidelines for the design of the new building also achieved the transformation of the brief procedure to a major advertising campaign promoting the corporate image [Micholet and Lourd-Conti, 1983].

Developers also recognise that the marketing of facilities as unique entities instead of anonymous concrete investments can add to corporations' mythologies and prestige [Cassels, 1991]. The decision making of an imaginary and inspirational name by buildings or settings such as *Ark*, *Exchange House*, *Broadgate* and *Century Tower* often follow the same marketing procedures like new-landed commodities. Various old premises with a historical record or of some significant symbolism for the local population have been subjected to expensive renovation and refurbishment

by corporations attempting to capitalise on the historical connotations of the place. Furthermore, the engagement of a famous architect on the design process gives some kind of reputation and credibility to buildings [Jencks and Baird 1969]. For Mackenzie [1991] the important value of NMB headquarters is not due to aesthetics of the building but to the decision process and design, where the involvement of the ultimate users expresses the respect of the management towards human nature and democratisation in the workplace.

The physical environment, in addition to the operational one, has a symbolic value on account of what it stands for. Corporate property can be seen as a political statement of the principles which govern the relationship between enterprises and the social system. Facilities branding is a function often underestimated by the management which if applied properly could contribute to corporate branding, the introduction of new cultures, and the minimisation of resistance in changes. Yet, facilities branding seems to be an important issue for real estate developers too, particularly in cases of speculative buildings. The appropriate facility branding for specific customers is able to add to the facility's marketability, since it can be perceived as a value-adding characteristic, creating comparative advantage to the branded building. Furthermore, facilities branding is a significant managerial function on account of its possible contribution to the smooth implementation of corporate culture and policies to the internal public and the communication of the prevailing values to the external. That creates two additional responsibilities for ABP models, the study of the client's managerial style and the examination of the ability of facilities to be used as a means of corporate branding.

4.4 Facilities and the Formal Organisation

The art of a people is a reflex or direct expression of the life of that people...

At no time and in no instance has architecture been other than... an emanation of the inmost life of the people.

[Louis Sullivan, In Andrew 1985, p. 58]

Cooper's [1974] research on personal identity and housing supports the argument that the houses where people choose to live represent the image which people have of themselves or what they aspire to become. It is also suggested that the selection of premises and the physical characteristics of the working environment reflect the occupants' social organisation and their perceived image. Yet, the geographical

distribution of space is not determined only by the functional requirements, since clusters of behaviour settings are organised to correspond to the formal hierarchy and needs of status [Moleski, 1974]. It is supported that even though the physical environment where organisational members operate is largely specified by the spatial requirements, the aesthetic and symbolic needs of the occupants have to be also met.

Lasswell [1979] argues that the true image of corporations is presented through their premises. However, this statement should be treated with scepticism, since in the case of corporations, this image represents mainly the belief of the management and it is often distorted by the corporation's marketing objectives⁸. Doubts concerning the equal representation of organisational members and groups through facilities have been expressed by other researchers too [Steele, 1973]. As Sommer supports, the built environment often consists of *hard architecture*, responding to the needs of the management and the organisational members with greater opportunity to exercise power [Sommer, 1974]. This *upper* or *external intervention* is more often expressed through the specification of requirements, the general layout and the selection of final materials.

Yet, it could be accepted that through the spatial configuration of facilities, the formal organisation and organisational boundaries can be reflected to a great degree. The management's policy concerning the desired levels of interaction between units and divisions can be enforced by the space syntax and location of various behaviours by reference to the overall configuration of buildings [Peponis, 1985]. In addition, various examples have been recorded where organisations express their style of management and strategy through the spatial configuration of premises [Gouldner, 1954; Burns and Stalker, 1961; Gyllenhammar, 1977; Van Dommelen and Noordegraaf, 1986; Duffy, 1989].

⁸ In the CBS Building in New York, while the senior administrators had the opportunity to select the decoration and furniture of their office, a symbolism was imposed to lower rank employees with few opportunities of identity and self expression. According to Rapoport, this resulted in conflict between management and employees concerning the personalisation of workplace [Rapoport, Amos (1967). *The Personal Element in Housing: An Argument for Open-Ended Design*. In *Interbuilt-Arena*, No. 14, November, pp. 44-46.].

It is suggested that through the building forms, contemporary architects make an effort to symbolise the beliefs and ambitions of the new industrial society. However, in a society characterised by a high diversity in objectives and value systems among its members, designers are often accused of their inclination to represent only the aspirations of capitalists and their own. As Mikellides [1980] argues, the consequence of this is that contemporary buildings symbolise little of the values and anxieties of the larger part of society, triggering the separation of people from their physical environment, with the latter treated as alien.

Apart from the efficiency and maximisation of resources, monumental buildings of multinationals and wealthy corporations claim to express the power and social significance of their owners to society. Lloyds' headquarters in London, the Transamerica Pyramid in San Francisco and the BMW head office in Munich are examples of corporate means communicating the same message: *power*. Jencks quotes about skyscrapers

[They are] pointing skyward optimistically like rising corporate spirits and rising corporate profits to be located in the clouds, a symbol of triumph... The symbol of corporate power, the rising up of real estate, services, production, the variety of city functions integrated for a single end - a 'capital symbol.'

[Jencks, 1980, p. 15]

However, today it is considered that such brutal display of corporate power is not acceptable any more. In view of the twenty to thirty-year length of facilities operational life, in the post-industrial society corporate premises should be able to achieve a balance between the display of power and their respect towards the society they serve, providing evidence of the social role of enterprises within the social domain.

According to Hodgkinson [1993], in the advanced economies of the post-Fordist era, employees, consumers, investors and local authorities will be concerned with the overall reputation of corporations, together with the environmental performance, ethical investment and treatment of the public. Apart from broader ethical issues which the management faces today and expresses through corporate responsibility policies, the adoption of environmental friendly programs in the workplace by an

increased number of competitive modern corporations illustrates the recognition of the significance of facilities, to create and sustain a positive image⁹ [Gardner, 1993].

The presented status and importance of corporations has to be achieved through a system of references and values accessible to the public and judged as politically and ideologically congruent to the stakeholders' culture. If various users are able to interpret the corporate identity through facilities and the working environment, the adoption of inappropriate design solutions by corporations may fail to communicate the desirable symbolism and meanings to the public. Monumental scale, sophistication of design and expensive materials, the main elements of expression of power, are nowadays replaced by or combined with recreational amenities for employees and the local community, environmentally friendly features and other means of communication which designate corporate responsibility, the users' participation and shared values with the various stakeholders¹⁰.

In the western world, where people move from dependence to post-industrial reliance, large corporations are slimmed down by disengaging whole departments, where divisions restructure and regroup to form independent self-efficient new enterprises [Knevitt, 1985]. As was revealed in Chapter two, change is a continuous and inevitable reality of organisational life. Change can be characterised by progressive evolution or dramatic suddenness. Even though change is more often

⁹ Yet, it appears that apart from mainly headquarters buildings, the quality of the majority of facilities image is not in harmony with the officially presented corporate image. That seems to be due to its classification by the management as a low priority factor. Yet, the day-to-day work activity and contact with the customers taking place in the operational buildings, indicates that the importance of low budget facilities image may deserve further attention.

¹⁰ There is an increased number of corporations that apart from clients and employees recognise the importance of corporate responsibility towards other stakeholders and the society in general. This realisation is often translated to the physical environment through the design of environmentally sound facilities and the provision of amenities to the local community. Duffy presents the example of BA criteria for the assessment of the proposals for the new headquarters at Heathrow: environmental, value orientated and operational-technical. On the environmental criteria, the main issues were the contribution of the building to the local community infrastructure and the improvement of quality of life in the area, while of considerable importance was the design of a facility that expresses the corporate identity without offending the neighbours [Duffy, Francis, C. (1990b). *Masters of Change*. In *The Architectural Journal*, 13 June 1990, pp. 26-31].

observed on task activities, the size and structure of organisations, a continuous internal reassessment takes place simultaneously, concerning the desirable image to be presented inside and outside the organisation.

Often, changes in corporate structure and culture are followed by changes in the premises. Exercises which reform the corporate identity may or may not be accompanied by changes in the operational and structural levels of organisations. However, even if it is a highly cosmetic exercise with no impact on other corporate indicators, it will almost certainly evoke changes in the appearance of the physical environment [Lasswell, 1979].

The visual part of change of corporate image in the workplace is manifested through changes of logos, signs, refurbishment, change of space planning and layouts, even through change of the premises. Duffy [1990b] supports that the role of the physical environment is critical in the communication of changes in corporate culture and managerial styles. Facilities which reflect old regimes and obsolescent practices of management, may undermine the impact of internal changes and organisational evolution.

In the post-industrial socio-economical context enterprises have to present a strong corporate image, but be consistent with the ethical codes of the societies within which they operate and serve. If organisational indicators are reflected through the appearance of premises, it is crucial for enterprises to occupy facilities compatible with their nature and the operational context. Addressing the issue of image, ABP methods should be able to measure the presented image of the facility by reference to the required one by the specific situation, the users and the social conditions. Facilities image seems to be a rather qualitative property, instead of *how large*, the question seems to be *what kind*.

4.5 Conclusions

Facilities represent the most valuable physical asset most corporations. However, it is their importance in the domains of personnel productivity and business support, their potential influence on public relationships and the visualisation of the culture of employees and predominant corporate values which indicate that their full significance cannot be appreciated without a simultaneous examination of the consequence of its existence to other organisational dimensions. Exercises

concerning the appraisal of the performance of buildings and their importance to the enterprise, rather than treat them in isolation, should incorporate a holistic view, taking into consideration not only the distinctive organisational realities but also the economical and social environment within which they coexist.

The chapter was concerned with the role of facilities as a means of communication of the organisational culture, values and policies. It reviewed the ongoing theories and claims the appreciation of the physical environment as a semiological object, reflecting the intentions, power and values of the investors and users. Finally, it examined the impact of facilities on rather illusive issues, not very often associated with the physical environment, such as corporate communication, public relations and corporate branding.

Today it is expected that facilities are functional not only in operational and habitual terms, but also in environmental and symbolic. They have to be *symbolically accessible*, fostering the user to take possession of the functions and codes symbolically embedded in the environment, and to choose a behaviour efficient for his/her duties and in congruence with the individual's needs. Furthermore, the physical environment has to underline a *legitimate* culture, to present the social structure of the corporation and to offer various opportunities for consumption.

On the measurement of the symbolic qualities of premises, potential ABP methods should be able to examine the appropriate meaning, image and status of the specific corporation, and evaluate the ability of particular physical environments to present them in an understandable and acceptable manner.

The investigation concerning the importance of facilities for human performance and attitudes, the interplay between the organisation and facilities, and the different aspects of the performance of facilities under the concept of the organisation has been completed in this chapter. Having grasped a better understanding of the significance of facilities to business objectives, the work will continue with the assessment of current methods for measuring the performance of facilities and their efficiency to provide reliable information to the modern organisations about the suitability of their premises.

SECTION TWO

FOCUS OF CONCENTRATION

Assessing The Performance of Facilities

5.1 Introduction

Chapter two examined the concept of organisations and suggested the potential significance of facilities for the achievement of business objectives. The literature review recognised the importance of the individuality of corporations and the volatile character of the socio-economic environment. Furthermore, the close interaction of the operational environment with facilities was revealed, and the need for congruence of the specification of facilities by reference to the conditions specified by the operational environment.

The inadequacy of facilities to conform with changes of the organisational and external environment is responsible for the phenomenon of premature obsolescence. According to Brebner [1982], buildings and their parts are designed to satisfy specific requirements through the accommodation of particular functions. Still, they also express the current understanding of these needs and socio-cultural attitudes towards them [Neutra, 1956]. Since our understanding is occasionally primitive or inadequate, or the progress of our society unfolds new priorities, the physical environment may act against the objectives of the provider [Brebner 1982]. Jencks and Baird [1969] support the view that the inherited nature of permanence which characterises man made environment, undermines its ability to correspond to changing social structures, threatening to make it a subject of continual

anachronism¹. Lampuguanì mentions the obsolescence of the current meaning and aesthetics of the physical environment in a world of constant socio-cultural change, arguing for a durable architecture rising from the values found on the *formal world*, away from '*the periodic oscillations of taste, the ebb and flow of fashion*'² [Lampuguanì 1991, ed.]. Jones [1992] also argues that the values of eye-catching, exciting and surprising items of the fashion industry, transferred to contemporary architecture have resulted in the fast visual obsolescence of the physical environment. Whyman [Markus et al., 1968] argues that the main threat on the longevity of buildings are structural changes which prevent changes on performed activities, while Duffy supports that the premature obsolescence of facilities is even more apparent due to their inability to support tangible operational demands over time, more often relevant to the restructure of work and use of IT [Duffy, Laing and Crisp, 1993].

In chapter three the role of the human factor in the organisation and the importance of the physical environment for human performance were investigated. It was argued that today's definition of quality in the working environment has much broader boundaries than the traditional structuralistic approach, since modern work is mainly an intellectual activity. The dissemination of knowledge, the perception and interpretation of vast amounts of information by the employees, and the support of desired human behaviour are areas which the modern working environment is able to influence by supporting or restricting them.

Chapter four examined the interdependence of facilities with corporate communication. Current theories and practices were reviewed concerning the role of facilities in the implementation of corporate culture in the working environment, and

¹ Referring to the re-use of buildings and change of meaning, Jencks and Baird argue that '*against the permanent threat of obsolescence, buildings are reconstructed, refurbished and renovated, moderating the meaning of key elements of the old system to new ones which support the up-to-date minute needs creating the new 'syntagm'.* This change of elements meaning, drives to the recalculation of old semantic elements, trying to incorporate them into the new system of syntagmatic relationships which exist into the new environment' [Jencks, C. and Baird, G. (1969). *Meaning in architecture*, Barrie and Rockliff].

² Lampuguanì supports that it is the very speed of change observed today that imposes the use of constant values and references in architecture for the maintenance of a common language and minimisation of confusion and alienation [Lampuguanì, Vittorio, Magnago (1991). *Design and Durability*. In *Domus* (editorial)].

the benefits of facilities as carriers of corporate identity and corporate branding outside the organisation.

The chapter continues with an investigation of the suitability of current appraisal building performance methods to measure different aspects of the performance of facilities. The study, through a critical review, presents the main areas of interest of these methods, their advantages and drawbacks.

5.2 Approaching The Performance of Facilities Methods

...architects are highly selective in determining which problems they want to solve. Mies [*van der Rohe*], for instance, makes wonderful buildings only because he ignores many aspects of a building. If he solved more problems, his buildings would be far less potent.

[Paul Redolf, from Lang, 1987, pp. 227]

Today's corporations, facilities management organisations, suppliers of services, designers and users display a considerable interest in the systematic measurement of the performance of facilities beyond the issues of health and safety, or the economy of construction and operation. As was revealed in the previous chapters, the importance of facilities for corporate objectives is multimodal, influencing parameters such as productivity, economy, behaviour, culture and image. Attempting to appreciate the overall performance of facilities, questions on the contribution of facilities to the previous issues have to be addressed and comparably analysed. Yet, it appears that over the years, the evaluation of facilities and working environments has been approached through the fragmented perspective of different disciplines and contexts, according to the interests of the particular researcher or sponsor³.

³ The performance of different aspects of the man made environment in reference to human needs has attracted the interest of various disciplines. Among them, human factors psychology and environmental psychology, are concerned with the human-environment interaction and the effects of the physical environment to the users' behaviour. The Environmental Design Research Association (EDRA) has brought forward a model of five concepts that are considered as the key areas for research in environmental design: groups of users' places, behavioural phenomena, context and time circles. Accordingly, theories have been developed on purpose to explain the user-environment interaction through the link of the above concepts [Moore and Howell, 1985]. Altman [1973] suggests that over the years the most important

The study has identified three different approaches where ABP methods can be classified according to their focus of interest⁴: methods of environmental assessment, methods which consider a number of the organisational objectives, and methods which recognise diversities among organisations. The author wants to state that this categorisation is highly experimental and is in use here only as a tool for the better appreciation of the inventors' objectives and the priorities, advantages and limitations of the examined methods.

5.2.1 Methods of environmental assessment

The first systematic attempts can be traced back to the 1960s. During that period there was a tremendous euphoria and a lot of confidence in the scientific community in the potential and promise of the emerging technology. In the construction

models adopted by researchers for the study of behaviour-environment relationship are *the mechanistic, the perceptual/cognitive/motivational, the behavioural* and *the ecological*. Deriving from the human-engineering field of psychology, the mechanistic model is concerned with the design of facilities and equipment to conform to the physical needs of the human operator. *Ergonomics* was developed for the modification of the physical environment to fit the physical requirements of people. Techniques for the assessment of the physical environment originating from this approach are able to measure the quality of facilities in terms of the physical health and safety of the occupants, and the adaptation levels of the working environment to a variety of individual and group activities. The second model studies the individuals' perception of the environment, where users are perceived in terms of internal processes including the perceptual, cognitive, motivational and emotional reactions to stimuli from the environment. Studies deriving from this approach attempt to measure the psychological influence of the physical environment to the users' attitudes and behaviour, while there is also an interest in the treatment and manipulation of the physical environment by the users. The behavioural model is concerned with the behaviour of users that can be observed, recorded and analysed. From this approach studies have been obtained that investigate the impact of the working environment on the variety of activities performed by employees. The examined activities are parts of the occupants' working tasks or essential activities for the accomplishment of the users' social needs. Finally, the ecological model assigns equal importance to both the users and the physical environment, recognising their active interaction and their competence to shape each other [Altman, Irwin (1973). *Some perspectives on the study of man-environment phenomena*. In *Representative Research in Social Psychology*, No. 4, pp. 109-126].

- 4 The linear examination of ABP methods through time was rejected for two reasons. Firstly, due to the different interests of the developers, there is relevant discontinuity in the way the subject is approached, and secondly due to the observed evolution of the methods, over a period of years, sometimes it is difficult to define the time when the methods were developed.

industry the point of convergence was the development of computational models, able to predict the outcome of proposed design actions, and evaluation procedures for the rational and systematic comparison of different design approaches. At the outbreak of the human relations movements there was, at the same time, a gradual growth in the body of knowledge which is now called social and behavioural science. During this period genuine progress was made in branches of this science intending to deepen the ongoing understanding of human relationships and the users interaction with the physical environment. Architects became more conscious of the effects of the physical environment on human behaviour and the ability of different types of building to fulfil occupants' needs. It soon became patent that the possessed scientific knowledge, by architects, concerning the human-environment interaction was inadequate for a legitimate appraisal of the performance of buildings.

Further collaboration with social scientists resulted in the evolution of performance appraisal systems orientated on the satisfaction of the user's needs. Post Occupancy Evaluation (P.O.E.) was the most widely known measurement tool developed at that time, concentrating on the adequacy of facilities to meet the occupants' expectations⁵. P.O.E. was cultivated as a method of assessing whether or not design decisions made by architects and professionals delivered the performance needed by those who were to use the facilities⁶. Today's P.O.E. is able to provide a systematic evaluation of buildings in three categories: the *technical* e.g. infrastructure; sanitation; networks; services, the *functional* e.g. proper access; security; adaptability, and the *behavioural* e.g. territoriality privacy and interaction; image (Figure 5.1).

Though information derived from P.O.E. can be used as part of the briefing process of new facilities, its practical use in a more sophisticated assessment of the users requirements is limited. P.O.E. is a method accomplished on existing buildings in

⁵ Early P.O.E. studies yielded startling findings, such as significant inefficiencies, misfits between users and buildings, and a stronger than anticipated connection between building configuration and the formation of social relationships [Preiser, Wolfgang F., Rabinowitz, Harvey Z., White, Edward T. (1987). *Post-Occupancy Evaluation*, New York, Van Nostrand Reinhold].

⁶ 'P.O.E. is intended to compare systematically and rigorously the actual performance of buildings with explicitly stated performance criteria; the differences between the two constitute the evaluation' [Preiser, Wolfgang F., Rabinowitz, Harvey Z., White, Edward T. (1987). *Post-Occupancy Evaluation*, New York, Van Nostrand Reinhold].

use, investigating current issues on the operational level with moderate vision to strategic priorities and needs of the corporation.

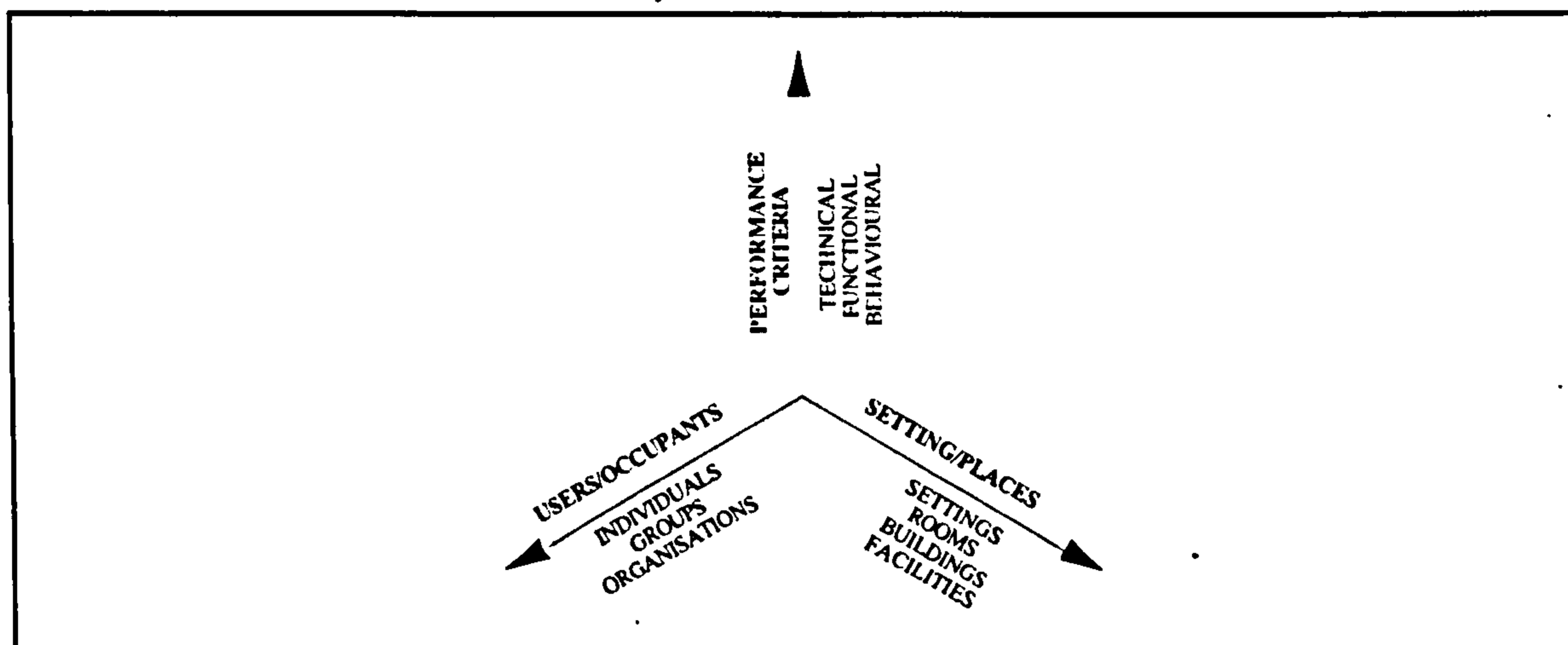


Figure 5.1 The three important dimensions in a P.O.E. The vertical axis represents the 'performance criteria' for the three categories of elements which are considered in buildings. The axis of 'setting/places' indicates the building scale at which the performance in the three categories is evaluated. The axis of 'users/occupants' of buildings identifies the different categories of building users [Preiser, Wolfgang F., Rabinowitz, Harvey Z., White, Edward T. (1987). *Post-Occupancy Evaluation*, New York, Van Nostrand Reinhold, pp. 39].

5.2.2 Methods which consider a number of organisational objectives

This category of studies focuses on the measurement of specific dimensions of the facilities, assessing the fulfilment of operational requirements. Studies which fail within this focus of interest are concerned with the technical issues of buildings and their main components, interpreting the facility more or less as a machine isolated from external influences. The appearance of these studies was mainly due to the emergence of environmental and cost effectiveness issues on building design and management, attributed to the energy crisis of the 1970s. During this period, the initial efforts to evaluate and monitor broader issues such as energy consumption, the performance of materials and cost in use of different kinds of building designs in anticipation to human comfort and physical needs can be detected.

The most popular approach to measuring the performance of facilities in this category is the matrix method. It is based on the attempt to compare the suitability of facilities for particular kinds of markets and corporations, concentrating on

specific requirements and building attributes. Whilst the above approach is able to provide the researcher with valid and reliable information on the comparative performance of assets on some categories of interest, still it seems that the actual organisational characteristics and management needs are taken for granted.

The recent attempt by the European Intelligent Building Group (EIBG) to pinpoint the size and prospects of the European market for the Intelligent Building⁷ is of some significance to this study, since it represents the interpretation of developers and IT suppliers, parties of considerable influence on the real estate market, of the quality of modern commercial premises [Evans, 1992]. However, partly due to the sponsors' interests, the efficiency and effectiveness of facilities were defined on rather functionalistic grounds. In addition, during the assessment of the design and management of the working environment, the focus of interest was the examination of technical solutions at the tactical level for the fulfilment of current functional, economical or social requirements. Even though the study has investigated extensively the application of IT in the working environment, the conclusions should be considered with caution, when it is claimed that the overall performance of facilities is appraised with reference to business objectives, since the study fails to discuss in depth the parameters and underlying forces which have influenced the decision making for the design of the examined case studies.

⁷ Even though invented over a decade ago, the Intelligent Building has been defined today by EIBG as the facility that 'maximises the efficiency of its occupants while at the same time allowing effective management of resources with minimum lifetime costs' [DEGW, Technibank (1992). *The Intelligent Building in Europe: Executive Summary*]. The emergence of the intelligent building has been hailed in some sectors as the potential solution in response to the requirements of diverse users in the areas of economic and technical wizardry [Murphy 1991]. However, the researcher is sceptical about the claims of IT suppliers who argue that the mere introduction and integration of IT in building management, work process and communications will accomplish the above mentioned objectives. By employing flamboyant terms such as the one of Intelligence, suppliers of IT products and services often capitalise on the occupants' relevant ignorance concerning the actual abilities and limitations of current technology. Far beyond the meaning of intelligence, the ability of buildings to achieve a beneficial balance (corporation, occupants, society) of the utilised resources for the users, operational cost and performance, depends on corporate objectives, the occupants' behaviour and the characteristics of the external environment. The application and management of IT in the working environment is an issue that should be examined in consideration with the business environment, the available resources and the users' culture.

The concentration on technology and the perception of the organisation as an information network is a valuable approach to the design and management of work process, yet, it should not permit the underestimation of the other functions of the facilities and the other organisational dimensions. However, without underestimating the importance of IT use in the modern working environment, its applicability may present certain resistances and limitations. The integration of IT in the social structure of the working environment is of particular importance for the corporation due to its consequence on the motivation and attitudes of the employees' [Worthington, 1992].

The Premises Audit is another method of assessing the performance of facilities aiming to the comparison of the cost-performance balance of the premise against other similar facilities. The method is based on the examination of the day-to-day cost for running the premise (property cost, operating cost, services cost and business support) analysed per floor area unit, and then checked against the performance standards of the occupier [Williams, 1993]. Despite the difficulties to find and construct databases of occupiers with similar objectives, the main disadvantages of the model is the inadequacy to examine the long term needs of the occupier and the performance of the spatial and qualitative characteristics of the premise. Hence, there is not any reference to the behavioural affordances of the premise, and issues such as communication, informal-supporting activities and identification are omitted.

Previous attempts have been received with scepticism on the grounds of their ability to offer a comprehensive method for the assessment of facilities. Most of the criticism is mainly due to their design intentions. They were developed to examine distinct aspects of the performance of buildings, concentrating upon fragmented issues, by which facilities have to be assessed [Becker, 1990]. Yet, in all these methods of building appraisal much less attention has been devoted to the social and psychological effects of the working environment on the user, a matter which particularly in the case of today's information dominated business environment is of equally substantial importance.

Furthermore, the failure of this category of studies to recognise any kind of influence and diversity of the external conditions and the users' behaviour, raises serious questions about the validity of the research findings and the reliability of recommendations, particularly in situations of different economical, political, cultural and infrastructure environments. Moreover, apart from the criticism which

accompanies these methods concerning their research orientation, very much favoured by their sponsors' interests (suppliers of any kind of facilities such as furniture systems, computer networks, facilities management services), they are accused of paying attention to a limited number of corporate indicators, particularly IT, and the examination mainly of the functional characteristics of facilities, constraining their use as comprehensive building appraisal models⁸.

Another important weakness of the examined models is the confusion regarding the specification of objectives to be achieved from facilities. As common practice, the contrasted use and demand of *performance specification* and *requirements* with *prescriptive specification* and *requirements* is observed. Prescriptive specifications describe *recipes of treatment* as opposed to end results, concerning specific approaches to the fulfilment of particular objectives. Prescriptive requirements are considered more manageable and applicable than performance requirements, due to the possible accuracy of the definition of the required specification. However, it is their inherited precision and concentration on the method rather on the end result which deprives them from handling more efficient approaches at the strategic level of design. Furthermore, the attention to specific solutions brings the curse of obsolescence to the development of knowledge and ideas, denying any sort of pluralism and innovation [CIB, 1982].

Most of the examined models measure the quantitative characteristics of the performance of facilities such as ambient conditions, the durability of materials and the distribution of space. However, the assessment of building performance should constitute an exercise of austere analysis and a scientific method of the study of the behaviour of the facility and its components in terms of the principles of corporate objectives and culture. In addition, the examined attempts to appraise the performance of buildings do not provide a reliable instrument for a comprehensive interpretation of the efficiency of facilities from the point of view of the

⁸ Criticising these attempts it should be mentioned here that not all of these exercises intended to offer a comprehensive tool measuring building performance. Some of them were originally designed to measure the office buildings' capacity to cope with the increasing demands of IT in the working environment. Yet, whatever the intentions, their complete underestimation of the social aspects of the working environment embodies the danger of the employees' resistance to new forms of work and high risk in inadequate investment. For more information about these exercises see at Davis et al, 1985; Becker, 1988; Murphy, 1991; Alexander et al, 1992; DEGW, Technibank 1992; DEGW, 1985; Duffy, 1983.

organisation. Qualitative aspects of buildings such as image and employee's satisfaction are treated superficially or broadly ignored, mainly due to the difficulty of their definition and evaluation. However, recent advances in the assessment methodology, making heavy use of indirect and intersected measures, provide some promising results concerning an objective and quantitative measure of the more elusive building aspects⁹.

5.2.3 Methods which recognise diversities between organisations

This category of ABP studies recognises the existence and the importance of some corporate dimensions, even though the corporation and its actual requirements are not directly researched. However, it can be said that these studies represent a degree of development in the sense that there has been some recognition of a number of corporate indicators and an attempt for their consideration in the evaluation praxis, even though a meticulous investigation of the involved organisational issues is far from adequate.

Markus and his colleagues at the BPRU at Strathclyde University proposed a cost-based building evaluation model which would combine the interacting elements of the environmental and activity systems of buildings with the requirements and objectives of the occupants and owners to be achieved in building performance [Markus, 1972]. The model consists of five parts (Figure 5.2). The first part of the model is the building system which includes the hardware of the building, the services and contents: The second part is the environmental sub-system which is composed of the spatial and physical environment. The third sub-system is the required activities which are expected to be supported by the examined building, while the fourth component is the objectives of the system, including the aims of the organisations, groups and individuals, forming a sub-system. The final component of the model is the resources system comprising of the resources allocated or extracted from the previous four sub-systems [Markus, 1968, 1972].

9 The experimental measures performed by Nasar and other scientists concerning the evaluation of aesthetic beauty and visual compatibility with a building's surroundings should be mentioned. The quality of a scenic or architectural beauty is evaluated by the numbers of visitors, the users' response to the place and the history of the site [Nasar, Jack L. (ed.) (1988). *The visual quality of the environment: Theory, Research and Application*. Cambridge, England, Cambridge University Press].

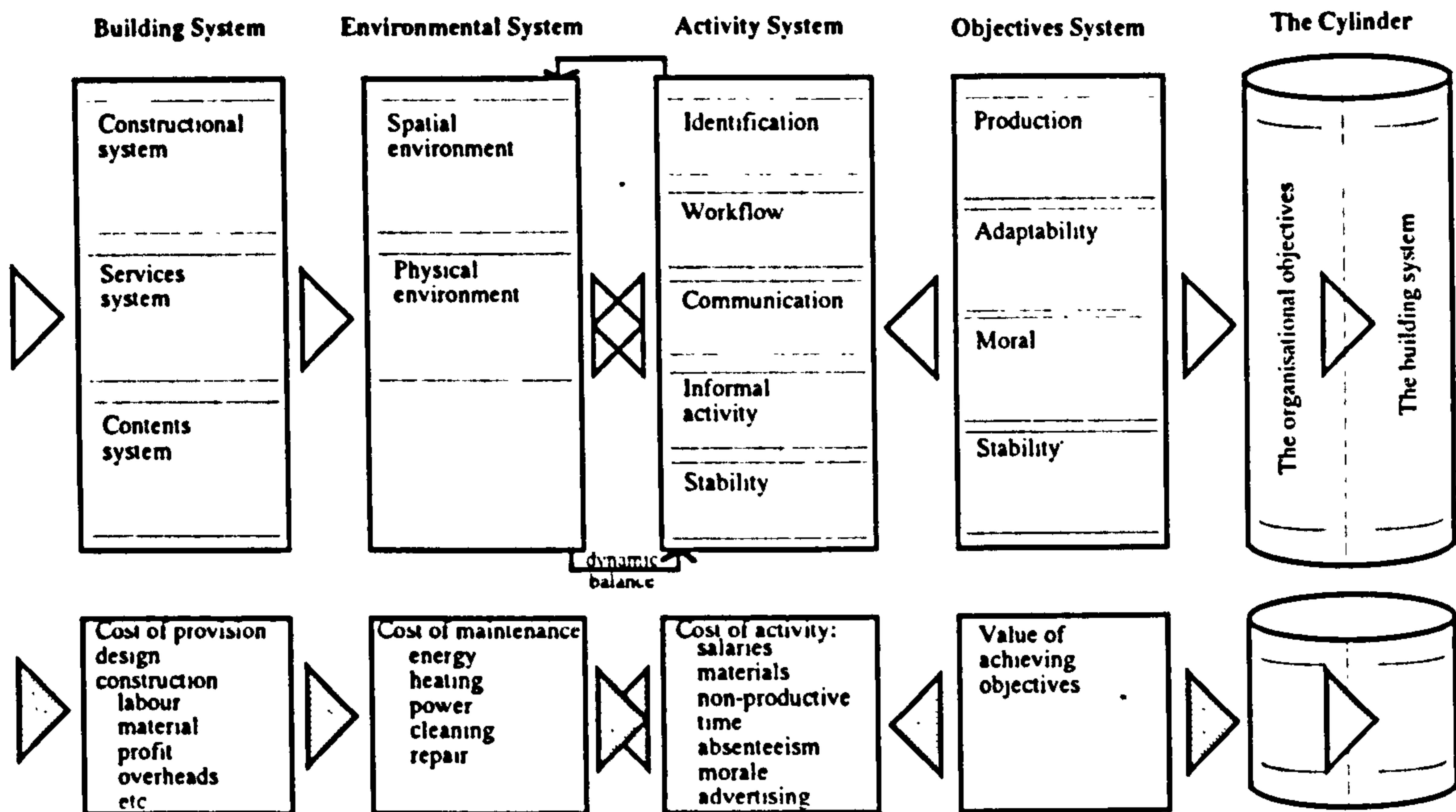


Figure 5.2 *The BPRU conceptual model for the optimisation of organisational resources [Markus, T., Whyman, P., Whitton, D., Maver, T. and Canter, D. (1968). The Comprehensive School. In RIBA Journal, September 1968, pp. 426]. Though it presents a very important attempt to relate resources allocated on different activities for the fulfilment of a specific objectives, there are difficulties in the quantification and evaluation of the sub-systems.*

The BPRU conceptual model is by far the most comprehensive method of evaluating the performance of buildings today. It was the first method to examine the overall resources optimisation in an explicit way concerned with the performed activities of the users and taking into account the organisational objectives. However, the model took into consideration a small number of objectives, though it is anticipated that further development of the system could enable the introduction of more objectives, bringing the model in line with the current organisational theories and the users' requirements. Furthermore, the model is assumed to be a closed system, without any interaction with the external environment, preventing the examination of parameters such as the cultural, social, economical and technological forces during the operational life of the building. Yet, the most problematic aspect of the model is the interpretation of the importance of sub-systems in a quantitative form, where the inputs and outputs could be compared and valued. Though some resources are easier to be measured, others such as corporate objectives are open to different interpretations affected by the external environment and the priorities of the provider. This can result in the break down of the balance of the system, since it is difficult to prove the value of sub-systems.

The most publicised attempt to assess buildings is the ORBIT series by DEGW. The original exercise examined the present and planned upheavals in the office environment and predicted the impact of IT upon office work process, the users' needs, space planning, facilities management, and the ambient environment¹⁰. The study consummated with recommendations for the design and planning of office buildings able to accommodate IT over time [Duffy, 1983]. The work raised the level of debate about the recognition of facilities as organisational infrastructure rather than mere containers of activities, however, it has not provided independent judgements, empirical data and practical guidance [Duffy, 1985].

In its statement of objectives, ORBIT-2 claimed that its purpose was the development of a systematic and comprehensive methodology of appraising the suitability of different buildings for specific needs of individual corporations [Davis et al., 1985]. The study recognised a number of organisational issues with a potential influence upon the performance of facilities over time. Furthermore, it developed a procedure to assess the performance of organisational indicators of relevant importance to business objectives (Table 5.1). A facility's efficiency was measured by examining the performance of the building on each pre-defined issue.

The study identified the need for four different surveys (organisational, IT, design strategies, facilities management) for the collection of information used on the definition of suitable levels of performance rates for the individual organisation. The rates of performance of particular buildings were compared to the hypothetical performance of an ideal building for the specific corporation, illustrated through a graphical representation. Yet, the real contribution of ORBIT-2 was the appreciation of the dynamic nature of organisations, being in a process of continuous transformation and change, and the recognition of the investors' demands for the provision of facilities capable to cope with tendencies of obsolescence¹¹ [Duffy, 1985].

¹⁰ The ORBIT claimed the association of facilities spatial and services features with corporational requirements about the use of IT on both office automation and automated building services [Davis, G., Becker, F., Duffy, F.; Sims, W. (1985). *Orbit-2: Organisations, Buildings, and Information Technology*. Norwalk, Con.: The Harbinger].

¹¹ ORBIT-2 was followed by ORBIT-2.1 which was a simplified building appraisal instrument orientated to the needs of facilities managers with limited time and resources. It reduced the number of important issues to fourteen and it was able to provide separate scores on the attributes of facilities for both under-

		Location	Building Shell	Building Services	Local distribution of services	Fitting out	Office furniture
ORGANISATIONAL ISSUES							
1	Change of total staff size	0	0	0	o	o	o
2	Attract or retain workforce	0	0			0	o
3	Communication of hierarchy, status and power		0	o		0	0
4	Relocation of staff		o	0	0	0	0
5	Maximising informal interaction	0	0			0	0
6	Human factors: ambient environment			0	0	o	o
7	Image to outside	0	0			0	0
8	Security to outside	0	0	o		o	
9	Security to inside			o	o	0	0
INFORMATION TECHNOLOGY ISSUES							
10	Connecting equipment			o	0	0	0
11	Changing location of cables			o	0	0	0
12	Environmentally demanding equipment		o	0	0	o	o
13	Protecting hardware operations			0	0		
14	Demand for power			0	0	o	
15	Relocating heat producing equipment		0	0	0	o	o
16	Human factors: workstations		o		0	o	0
17	Telecommunications to or from outside	0	o	0	0		

Table 5.1 *ORBIT-2 provided the first attempt for the correlation of identified key business issues and properties of facilities. The association was aided for the classification of construction elements according to their expected life cycle [Duffy, Francis (1985). ORBIT-2 - Know your building's IQ. In Facilities, Vol. 3, No 12, December 1985, p. 14].*

Unfortunately, the ORBIT series could tackle only part of the problem. It was rather concerned with the functional characteristics of facilities and the questions and problems created by the IT accommodation to buildings, than with the total impact of facilities to corporate objectives. In the study there are no procedures to be used to evaluate the design impact on the psychological and sociological well being of the occupants. Furthermore, there is not any means of examining the abilities of the estate market and construction industry to provide sufficient support to specific business requirements. Qualitative issues such as image and human factors are

performance and over-performance [Becker, Franklin, D, (1990). *The total workplace: facilities management and the elastic organisation*. Van Nostrand Reinhold, New York].

rather superficially examined and external factors such as long term trends, the users' behaviour and culture are ignored.

An interesting model proposed by Murphy [1991], identifies the users' interests with certain characteristics of facilities. The method claims the competence of measuring separately the satisfaction of four categories of users through the identification of different modules, describing the users' requirements in assessing terms (Table 5.2) [Alexander and Murphy; 1993].

User	Satisfactory Outcome	Components
Developer/provider	Marketability	Buildability Economy Quality
Organisation/F. Mgr	Manageability	Adaptability Maintainability Predictability
Individual	Habitability	Intelligibility Controllability Amenity
Community	Compatibility	Environmental Impact Amenity Ecological Sustainability

Table 5.2 *The model takes into consideration the needs of building constituents and proposes that the magnitude and interaction of the components can establish the degree to which the building achieves a satisfactory outcome for the specific user [Murphy 1991, p. 4].*

The above model gathers old and new issues for the assessment of the performance of facilities in one process and for the first time the interest of parties other than developers and tenants are described explicitly. However, the model takes the requirements of interested groups for granted without consideration of the real estate market capacities, the actual business demands, the available corporate resources, the behavioural characteristics of the occupants and the cultural traditions of the local community. Yet, there is not any means of examining the weight of factors such as business competitiveness, corporate culture and public pressure.

This generation of building appraisal models recognised the singularity of corporations and the importance of facilities to individual corporate objectives. Yet, the thesis supported here is that the isolated measurement of the performance of certain aspects of the physical environment cannot ensure the maximum profit from

investment and the impact of facilities to other organisational resources. Only when a building's capacities are measured against the specific corporate needs can a performance assessment can achieve sound validity (Table 5.3). The difficulty with similar appraisal models is on the description of the corporation, the eventual association of organisational dimensions to building capacities and the reliability and objectivity of the measurements.

Indicators of Building Performance	
<p><i>Financial</i></p> <ul style="list-style-type: none"> • Asset value of real estate portfolio • Income from leases and disposals • Expenses of real estate occupancy • Construction costs • Energy costs • Maintenance costs <p><i>Performance/productivity</i></p> <ul style="list-style-type: none"> • Quality of work • Quantity of work • Absenteeism • Innovation <p><i>Information Technology</i></p> <ul style="list-style-type: none"> • Networking IT • Changing location of cables • Protecting equipment • Electrical power capacity • Telecommunications 	<p><i>Space Use Efficiency</i></p> <ul style="list-style-type: none"> • Rental or usable/gross • Space/employee • Space/unit of income • Renovations required • Turnaround time • Change orders • Response time • Disruption <p><i>Organisational Issues</i></p> <ul style="list-style-type: none"> • Changes in work force size • Need to relocate employees • Ability to attract and retain staff • Security • Communication of status • Informal communication • Image to outside

Table 5.3 *The performance of facilities can be judged on a variety of corporate dimensions. Becker suggests the most important organisational demands against which a building can be assessed [Becker, Franklin, D, 1990. The total workplace: facilities management and the elastic organisation. Van Nostrand Reinhold, New York, pp. 267].*

The studies of the third paradigm represent a serious intention to investigate the influence of the corporation on the long term performance of facilities. However, the created impression is, that only a fraction of organisational issues is taken into

consideration and their treatment is considered rather fragmented. The taken for granted importance of the examined organisational issues appears rather unjustified and indifferent to actual needs by emphasising on opportunities through facilities than on real requirements. Yet, following the paradigm of studies from the previous categories, the meaning given to the operational environment is unclear, implying a partition of the corporate requirements without consideration of the wider socio-economical conditions.

Finally, the criteria used by RIBA and IFM for the annual competitions of Office Awards should be acknowledged, since they reflect the attitude of the designers, developers and corporations towards what are the most important parameters which constitute a high quality building for work¹². For the RIBA competition, the selected criteria was the presentation of a high standard of architectural and environmental design, focusing mostly on the aesthetic aspects of the buildings. For the IFM competition, the criteria were: identification of needs and brief; space planning, furniture, storage; interior design; environmental control, building services; cable management; building maintenance; health and safety; support tasks and central services; welfare provision; user response and satisfaction; cost effectiveness [Marmot, 1991]. The more comprehensive and all-around criteria evaluation of the IFM competition is apparent, while it is interesting that aesthetic appearance, the main criterion in RIBA competition, is missing.

¹² The criteria mentioned in this passage refer to the competitions organised by RIBA and IFM at the year 1991 [Marmot, Alexi (1991). *The Good Office: Post-occupancy Evaluation of Office Buildings*. In *Facilities*, Vol. 9, No. 12, pp. 10-13].

5.3 Limitations of Existing ABP Approaches

This chapter has displayed the characteristics and advantages of the main attempts to evaluate organisational buildings. It is apparent that the particular interest of every researcher has emanated to the production of methods with different orientations and particular points of view. However, the review also illustrated the constraints or inefficiencies of performed studies to provide a reliable comprehensive assessment of the performance of facilities under the organisational context. That suggests the absence of an appropriate theoretical background and in-depth understanding of the influence of facilities on business objectives. That can be partly explained on the grounds that the engaged studies which evaluate facilities have been derived from methodologies of the social science based on the tradition of modernity and the Teiloristic approach of perception and consumption of commercial buildings¹³.

Under the influence of natural science, social sciences separated the objective aspects of social life from the subjective ones. While objective phenomena such as human behaviour are likely to be observed and measured on the basis of universal parameters isolated by the multitude of subjective variables, subjective phenomena, such as meanings, intentions, motives and other experiences are rejected and left to the non-exact disciplines. That was supported under the claim that the difficulty for the observation of subjective phenomena imposed the need to leave them out of the scientific study, and to deny the existence of methodological problems, on their own, because of the presence of subjective factors, since they can be explained as the consequence of external phenomena, which are subjects of study of the natural science [Bauman, 1978]. The result of this trend was that subjective aspects of social life such as philosophy; aesthetics and ethics appeared in a different light, either they did not present any special problem to scientific study, or they had to be moved to the periphery of scientific-technological knowledge and its paradigm.

¹³ The modern technological culture is the heir to a tradition of success by the natural sciences that goes back to the seventeenth century. Social science, which developed in the nineteenth and twentieth century under the shadow of the achievement and success of natural science, aimed to emulate, in social knowledge, the same exploratory power already demonstrated by the natural sciences. The belief in social sciences was stretched by the assumption that there was not any significant difference in the form of examined subjects of the natural and social sciences [Carmagnola, Fulvio (1992). *Quality and Aesthetic Nature of Post-Industrial Technology*. In *Domus*, April 1992, pp. 28-32].

The notion of *quality* inherited from *modernity* excluded the non-measurable parameters and developed the objectivistic model of primary qualities of objects which was then placed at the centre of interest and knowledge of *modern episteme*¹⁴. The quantitative quality, indifferent to subjective and non-measurable variables, has predominated the production methods of this century and has introduced its implicit value dimensions of *uniformity, functionality, simplicity and reliability* into technology [Urmson and Rée, 1991].

The major concern of modern technology was the achievement of reliability and mass production through uniformity. Therefore, secondary qualities and individual needs were ignored since their consideration and satisfaction appeared to be in conflict with the primary objectives and needs of society. In the industrial society, the conditions of production and the culture of consumption are highly consistent with one another, while standardised production, common tastes, utilitarian and functional needs form a closely interconnected system. Mass production relies upon unskilled operators, specialised machines, uniform production and the assumption of a uniform market. As Carmagnola supports,

Modern quality can do nothing other than universalise, reduce or eliminate particular, individual cases. The technological object cannot be individual but must necessarily be the abstract representation of a class.

[Carmagnola 1992, p. 30]

However, today there is a severe criticism against the old paradigm of modernity. In the economically advanced western societies the Teiloristic model of perception which elevated efficiency to the equivalent levels of effectiveness, is not considered competent enough. The evolution of scientific theories based on the latest economical developments and their influence on the nature of science in conjunction with the appearance of *the conscious customer* of the post-industrial society, whose

¹⁴ The results achieved by natural sciences claimed to be universally accepted, since they presented an objectivity achieved by the impersonality of the observations and the mere application of mathematics to the object of study. The perfection of this discourse allowed natural sciences to become the dominant system of knowledge, while modern technology was concerned with the primary qualities of objects associated with the values. The superiority of modern technology over the previous form of production lies in its reliability and capacity to satisfy the *homogeneous demand of a uniform market under a utilitarian form of consumption* [Carmagnola, Fulvio (1992). *Quality and Aesthetic Nature of Post-Industrial Technology*. In *Domus*, April 1992, pp. 28-32].

tastes and habits are affected by morality and values instead of necessity, create serious questions about the legitimacy of the old paradigm affecting policies, decision making processes, and products [Naisbitt and Aburdene, 1990].

The post-industrial product is more than a commodity, it moves into the play dimension of symbolism and satisfaction which are higher than the practical dimension of utility. The post-industrial consumer does not choose mere products but brands; symbols and images. Through his commodities he is able to identify and present his own identity [Naisbitt and Aburdene, 1990]. In natural science too, historically associated with the primary qualities of objects and the objectification of phenomena, there is a shift of interest towards the concepts of purpose, intention and interpretation, areas of interest traditionally associated with humanistic disciplines¹⁵ [Carmagnola, 1992].

The ambition of post-industrial economy is to mass produce the individual and the diverse, using means similar to those employed in the industrial period to produce the always identical [Sartre, 1956]. Furthermore, the focus of interest in the production of the post-industrial age, has shifted under the influence of global economy and the philosophical movements of phenomenology and existentialism, from the search for uniformity and reliability to the satisfaction of the specific demands of the individual customer.

In the post-industrial society, the quality of products and services embodies an extended definition. Characteristics such as reliability, flexibility, durability and manageability are treated as the basic attributes which allow the product to be marketable, they are the basic requisites for the acceptance of the product by society. However, in a market already overcrowded by similar products, the real value of commodities depends on their secondary aspects such as the symbolic and aesthetic characteristics [Naisbitt and Aburdene, 1990].

¹⁵ For several decades in natural science a critical approach upon the doctrines of the classical paradigm is in progress. Aspects previously neglected by modern science have been taken into consideration and their significance to modern society has been emphasised. Though under the influence of modernity the understanding of phenomena had collapsed into their mere explanation, today the notion of meaning of things seems to be replaced by the *phenomenological* and *hermeneutical* concept of understanding, a reflection upon the capacities and limits of science [Bauman, 1978].

In the domains of research methodology and technology where there is a fluctuation of attention towards the secondary; the diversified; the individual and the non-standard, phenomena of qualitative nature are taken into consideration, subjects of inexact, interpretation and probability. The processes of perception and judgement of phenomena reaches a new status similar to the one which characterises the pre-scientific period. Technology and research methods, once used to base their strategies on serial reproduction of the identical, are now faced with constant regeneration and difference. While they have to overcome the difficulties from the fragmentation of knowledge under exact disciplines, they have to combine the acquired knowledge and redistribute it to the new areas of interest [Carmagnola, 1992].

The first category of the reviewed ABP studies, focused on the examination of ergonomics and physical needs of users, gives little consideration to the psychological and social dimensions of the physical environment. These studies were concentrated mainly on facilities already in use providing little attention to the long term performance of buildings. Besides, due to the absence of any procedures for the examination of the social and cultural conditions under which the methods are applied, the methods fail to provide the kind of knowledge by which recommendations could be drawn to predict the performance of facilities in different cultural and social environments.

Having identified a small number of organisational dimensions such as the IT use and the hierarchical organisational structure, the second category of ABP studies focuses on specific-clients. Concentrating on the operational-functionalist performance of facilities and taking into account a limited number of organisational indicators, assuming that all other corporate characteristics are irrelevant or of minor significance, these studies assess facilities by reference to identified business demands. However, such an approach, which produces this sort of demarcation, is unable to offer reliable information concerning the performance of facilities in relation to the real needs of corporations, since the attempted generalisation of the operational environment is too broad, taking the homogeneity of business, the cultural, economical and behavioural parameters for granted.

Despite the ongoing organisational theories which intimate the multidimensional role of corporations and the vast literature on behavioural studies describing the human-environment interaction, existing ABP models focus on technologically

driven methodological approaches or on short term behavioural studies, without consideration of the conditions found in the operational environment.

The third category of studies is the only one that recognises the diversities of organisational structure and the objectives between corporations. The advanced perception of the organisation, comparing with the previous studies, is expressed at the measurement process where the assessment of the performance of facilities is attempted against specific requirements of the management. However, even on these studies the focus of interest is limited to few variables. As a result, even though they recognise the existence of an active relationship between the business environment and the performance of facilities, they fall short of demonstrating a sound theoretical background for the comprehensive understanding of the actual interaction which takes place.

Furthermore, the latest approaches of ABP exhibit a strong interest in the influence of IT on the performance of facilities, particularly when they are funded by suppliers of sophisticated IT services and equipment, while on the other hand differentiations between individual cases on managerial, behavioural and economical issues are treated as rather insignificant parameters not forming a legitimate and quantitative aspect of facilities dimension. That may create the impression that the productivity of facilities is a sort of a well-defined environmental vacuum which exerts no influences, pressures, dangers and changes on any sort of external parameter. In other words, efficiency may seem to be influenced only by the functional attributes of facilities excluding the corporation, the ultimate users and the socio-economical system.

However, empirical research has to be carried out in order to examine the influence of the operational environment on the performance of facilities and how specific design approaches and facilities management practices are effective within particular business environments and cultures. Additionally, there appears to be very little collaboration and integration between behavioural, managerial and design studies of the physical environment. As a result, research on the performance of commercial premises is well orientated towards the utilitarian requirements of corporations, failing to distinguish the importance of the other corporate dimensions: business realities, managerial styles and the users' requirements.

From the above it appears that, existing ABP methods and studies underestimate the importance of the external environment and the influence of the economical and

socio-cultural parameters upon the performance of facilities. However, the operational environment represents a very significant factor for the long term behaviour of facilities and the fulfilment of managerial objectives, since it creates identical variations of demands, challenges and constraints for the individual facility. The failure to take these parameters into consideration connotes the homogeneity of the operational environment, something which could not be further from the truth. Yet, the attempt to define relationships between facilities and the environment without a proper recognition of the full extent of the influence of facilities to corporate performance, or the effect on the external environment to the behaviour of facilities, embodies the danger of misunderstanding and rather underestimating the significance of facilities to business objectives.

The investigation of the operational context is a necessary stage in the process of in-depth understanding of the forces influencing the performance of facilities. Their exclusion from the examination by ABP studies implies a sterile and de-contextualised approach with findings, at best of limited validity and at worst of misleading orientation and guidance.

5.4 Conclusions

Fractional and fragmented views of managerial, technological and behavioural studies fail to identify the spectrum of the economical and social impact of facilities to corporations and users. The main hindrance appears to be that aspects of the influence of facilities on the operational environment escape from investigation by merely categorising and studying the performance of facilities under different disciplines outside the organisational spectrum. However, the definition of the boundaries and the means with which the physical environment influence certain behaviours and attitudes, are some of the challenges that researchers face concerning the assessment of the performance of facilities.

Over the years, research conducted into the context of ABP has taken very little cognisance of the influence of the business conditions and the social environment on the performance of facilities. This has contributed to the creation of the impression that the operational environment is not a particularly important variable to warrant greater attention, and that many of the existing ABP models could be universally applicable regardless of different estate market conditions, business and socio-economical contexts. Furthermore, the lack of attention to the operational

environment's importance is particularly disturbing in view of the fact that over the last thirty years vast quantities of data have been collected, testifying its significance for the determination of desirable performance standards. Yet, the main reasons that the dimension of human-environment interplay has been overlooked is the fragmentation of science to disciplines restraining the dissemination of gained knowledge, the inefficiency of research units to commit interdisciplinary studies examining the concept in its totality, and the influence of research studies focusing on mainly strictly utilitarian and well defined issues which seem to have distorted and shifted the argument of the quality of facilities towards the fulfilment of quantifiable sub-concepts.

The literature review on Chapters 2-4 examined the importance of facilities for areas of organisational interest. This chapter revealed the inefficiency of existing ABP methods to produce a valid interpretation of the significance of facilities and potentialities to corporate objectives. Even the limited number of models which can be found to take into consideration the corporations' individual characteristics, do not examine more than a few corporate dimensions, very often combined with the investigation of secondary issues. Yet, the concentration of most of the building appraisal models on technical issues inevitably decrease their ability for in depth investigation and the provision of a satisfactory concept regarding the influence of particular business environments and corporational realities to facilities.

Contributing to the better appreciation of the physical environment to organisational objectives, the work continues with the examination of facilities as a means of corporate communication. A number of ABP models already embody the aspect of facilities as a means of corporate image. However, this study regards the concept of facilities as a means of corporate communication in a much broader way, since it employs information concerning the hard and soft issues of the organisational nature. Due to lack of research in the topic, the study has been orientated towards the examination of rather elementary questions:

- Do facilities communicate any meaningful information whatsoever to a group of stakeholders concerning the characteristics of the owner?
- If the answer to the previous question is positive, then what aspects of organisational nature can be reflected on facilities and the working environment?

The importance of these questions is suggested by the organisational theory which supports that corporate efficiency and the accomplishment of business objectives can be achieved when there is congruence between organisational resources and the elimination of internal conflicts. The findings of the study alone cannot fully justify the participation of this function of facilities in future ABP methods. However, in the case of encouraging results, the researcher recognises that more research should be conducted on the definition of the main characteristics of facilities which contribute to this function, and on the significance of facilities comparing to other means of corporate communication. Furthermore, the findings will be an indication of the potentially 'hidden' abilities of facilities to contribute to business objectives, urging for the enrichment of ABP methods with new dimensions.

In Pursuit of Attitudes

6.1 Introduction

There appears to be little solid empirical evidence demonstrating the ability of facilities to exert some sort of influence on corporate communication. Though very much underestimated by today's management, the expression of the owners' values and identity was one of the most important functions of buildings in the past, well recognised mainly by political and religious institutions [Jencks, 1977; Lang, 1987].

The main objective of the case study is to investigate the capacity of the physical environment, as it is expressed through corporate premises, to function as an effective corporate medium, able to present the structural and cultural characteristics of the corporation. Yet, as was seen in chapters III and IV, the act of communication is perceived as a two way interaction, thus the study eventually has to address the question of the users' ability to perceive and interpret facilities in the context of corporate identity.

Moreover, as was indicated earlier, human perceptions and attitudes are affected by a variety of parameters, such as personal interest in the specific corporation, personal contact with employees and advertising. This study examines how effective facilities are, alone or in conjunction with certain managerial policies, at presenting the corporate structure, culture and managerial style of the occupier. In summary,

the main interests of the attempted investigation can be described in the following research hypothesis:

Facilities and the appearance of the working environment reveal a variety of organisational characteristics about the occupier, which can be perceived and meaningfully interpreted by observers.

The respondents' ability to identify the corporate identity of organisations is also questioned. Corporate identity constitutes not only of the marketable attributes often found in corporate branding, but also of indicators such as organisational structure, purpose, culture, objectives (Figure 6.1).

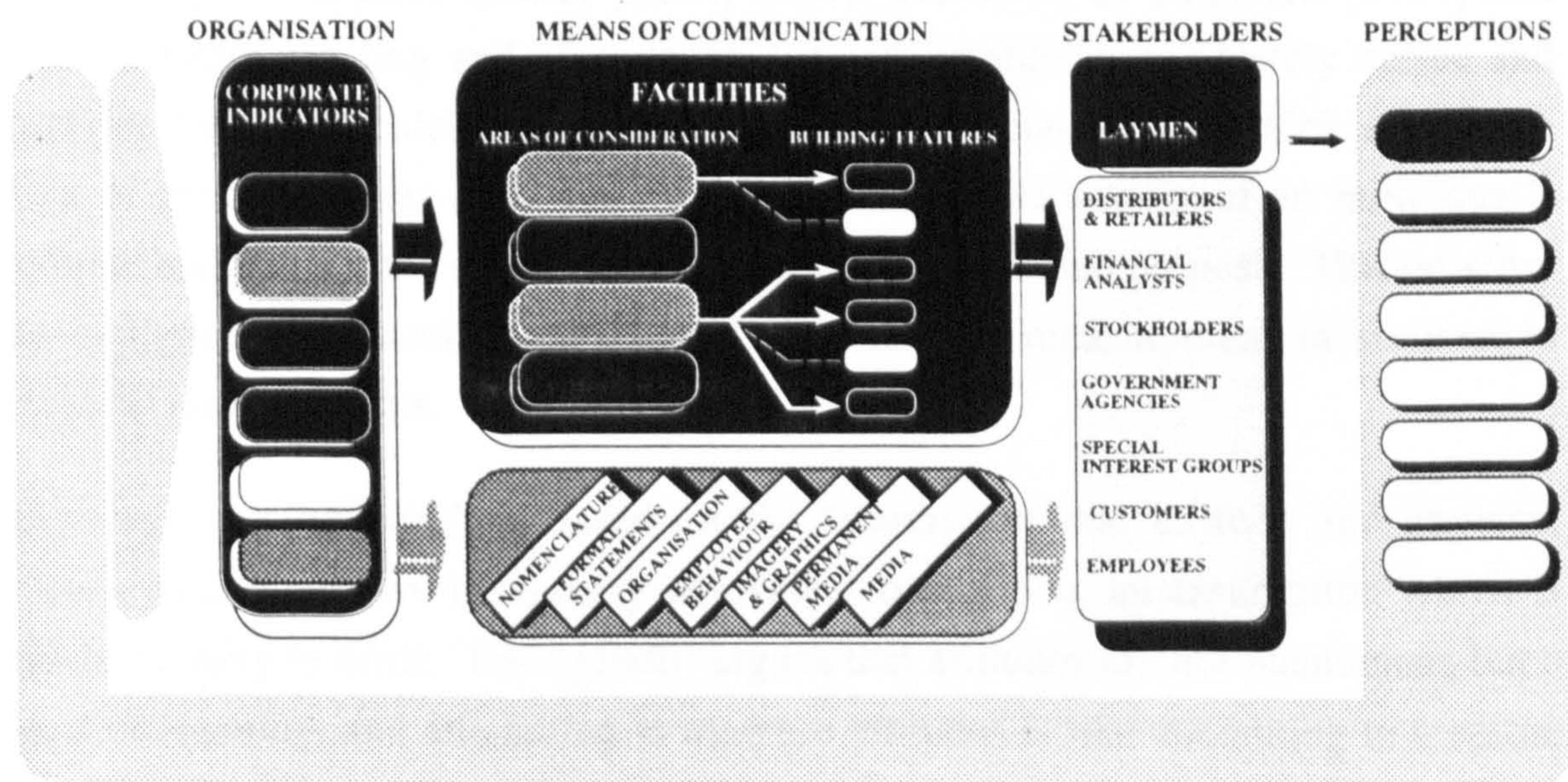


Figure 6.1 *It is perceived that corporate indicators are revealed to stakeholders through means of corporate communication, like facilities. The case study examines the observers ability to perceive the corporate indicators, and the influence of facilities branding on the observers primary impression of the owner.*

Furthermore, the study tests the competence of facilities, as they are designed today, to support the intended corporate images by influencing the stakeholders' attitudes. The thesis that values, images and meanings manifested from buildings, are not inherited features but manageable properties affixed to the asset, is examined.

The case study evolves in two chapters. This chapter covers the description of the adopted methodology and the design of the instrument employed to test the hypothesis, while the next one describes the statistical analysis of the findings.

6.2 The Selection of a Research Method

The measurement of attitudes is one of the main methodological problems of social psychology. Most of the basic tools which are in use today were created half a century ago. It appears that the basic problem of these methods is neither the lack of sophistication nor the mathematical and statistical treatment of the obtained data, but rather the *quality* of data obtained, prior to any analysis [Bell, Fisher and Loomis, 1978].

The traditional methodological approach for the measurement of attitudes is based upon the dictum '*everything which exists, exists to some degree*' [Lauer, 1971]. Attitudes are the subject of observation and description in terms of some metric, in the paradigm of applied science [Eiser, 1980]. However, as Thurstone [1928] first acknowledged, scaling and other techniques are unable to completely define and measure human attitudes. He argued that one of the main issues which arise is the lack of precision, that calls into question whether the *aspect* of an individual's attitude measured is the most relevant aspect of the intended purpose. This provides an explanation of possible unreliability of attitude measurement in contrast to physical measurements.

However, this approach is based on the assumption that attitude and physical measurements involve essentially equivalent operations, an assumption which is fundamentally in error. Eiser [1980] argues that attitudes are not phenomena but a kind of *meaning*, and attempting to measure attitudes is like attempting to measure meaning. Yet, instead of being measured, the meaning of a statement is a sort of a concept that should be attempted to be understood. Furthermore, the perception of attitudes as a kind of meaning implies that they cannot be expressed through a simplified or more abstracted form than they signify in their totality. Thus, any instrument of measurement or set of indices does not provide a simplified description of one's attitudes but a *summary* of our understanding of his/her expressive behaviour [Eiser, 1980].

The purpose for which this summary is intended defines the complexity of the summary and the aspects of one's behaviour which is emphasised. Furthermore, the summary takes the form of measurement when its function is to compare attitudes of individuals and groups. The value of attitude measurement scales depends on their

ability to present and compare the predisposition of individuals and groups in terms of more or less favourable and unfavourable attitudes towards a given issue.

The methodological approaches, used in environmental and cognitive psychology, for the examination of human response to environmental phenomena are classified under three categories: *experimental*, *correlational* and *descriptive* research. Due to the complexity of the subject and the broad field of questions, a plethora of measurement techniques been developed over the years¹ [Proshansky, Ittelson and Rivlin 1976].

The focus of interest of this study is the examination of *perceptions* from observers of facilities about an *issue*, the organisation. Correlational and descriptive research methods involve the study of *behaviours* as they occur in the physical environment rather than the study of attitudes and perceptions [Heimstra and McFarling, 1978]. Yet, as was mentioned in chapter three, attitudes are complex phenomena, and it is unrealistic to explain a behaviour as the result of a specific attitude. Hence, experimental research should be considered as the safest method of identifying the variables which cause the effects observed. In addition, through the manipulation of independent values, casual inference can be revealed [Bell, Fisher, and Loomis, 1978].

However, the conducting of *field experiments* is perceived as problematic in this work, on account of the operational limitations, time and budget constraints. Also, the impracticality of the movement of observers around a number of physical settings while they make the appropriate measurements, was considered too great.

Laboratory techniques seem efficient when attempting to examine the effects of simple environmental phenomena on singular dependent values. However, the artificial representation achieved by laboratory techniques is characterised by low external realism, therefore it was perceived as rather optimistic for the researcher to attempt to understand complex phenomena such as the users' perception of corporate indicators through such a technique.

Aspects of environmental psychology such as the people' perception of the environment and the factors which influence the users' attitudes are areas where *simulation techniques* can be successfully applied [Bell, Fisher, and Loomis, 1978].

¹ Appendix A contains a review of the research strategies and the instruments used in the field.

Simulation procedures provide the opportunity to study the observers' attitudes by asking them to perform the rating contingent on stimulus, based on any kind of verbal or printed material, of a range of facilities located home and abroad, thus minimising movement and cost. This method seems to be preferred by researchers studying environmental aesthetics in architectural interiors and exteriors, urban, natural and rural scenes [Kaplan and Kaplan 1985; Kaplan, 1977, 1985; Nasar, 1988a, Russell, 1988; Sadler and Carlson, 1982; Amadeo, Griffin, and Potter, 1983; Purcell, 1984].

Interviews seem the preferred technique when the researcher is looking for greater richness and spontaneity than questionnaires can offer. It can be said that the longer an interview and the more open question schedules it contains, the better it is in comparison to questionnaires [Oppenheim, 1992]. However, conducting valid interviews without biases is a task of daunting complexity, very often left to the professional field interviewer. Interview procedures require the interviewer to have high interpersonal skills, while even the researcher's characteristics such as sex, apparent age and background, skin, colour, accent, and manners are also relevant. Interviews are much more expensive and time consuming, factors which restrict voluntary participation and often prohibit the conduction of an adequate number of interviews and the production of a sufficient sample, especially from business-related public.

The use of photographic slides has the benefits of being easy to present to a small or large group of observers, while, they are inexpensive to produce and obtain, and they allow a wide variety of stimulus to be shown at one time. Furthermore, studies on the accuracy of colour photographic slides to reproduce and present the natural and human made environment have been shown to have high reliability [Seaton and Collins, 1972; Nasar, 1988a].

6.3 The Measurement Technique

The investigation of the proposed hypothesis was performed through a variation of the *semantic differential*. The employed technique was the completion of *questionnaires* through *group interviews*. The instrument consists of a variation of the original technique, namely the use of scales, specifically cultivated for this research instead of the scales developed by Osgood. That was necessary since the purpose of the study was the investigation of the ability of *stimuli* to provoke

attitudes on specific corporate dimensions, rather than the superficial examination of the observers' inclination towards the stimuli in terms of *evaluation, potency* or *activity* [Osgood, Suci and Tannenbaum 1957; Oskamp, 1977; Triandis, 1964].

To accomplish the study, a number of *bipolar corporate descriptors* had to be developed concerning the hierarchical structure, social responsibility, and corporate culture, in an attempt to provide appropriate semantic differential scales. Later, these bipolar corporate descriptors were presented to *observers* to investigate the significance of facilities in shaping initial corporate images. Furthermore, four independent variables were recognised, the observers, the facilities in study, the supporting information concerning the principles of facilities design, and the scales where the observers' attitudes were measured.

As was mentioned in chapter one, the researcher recognises the existence of various groups of people, the *stakeholders*, having a particular relationship with the corporation and sharing a distinctly different set of interests, although those of certain groups may overlap to some extent. The most important stakeholders corporations deal with are customers, distributors, financial analysts, stockholders, special interest groups, the general public and employees [Gray and Smeltzer, 1985]. It is perceived that groups are not isolated from each other and people could be located in more than one stakeholders group at a time, referring to their relationship with the corporation.

Corporate *premises* embrace all forms of real estate property and activities, from working environments and depots to recreational and leisure facilities. Even though once facilities were categorised by functions and designed to accommodate singular activities, under today's continuous need for adaptation to users requirements, there is a trend to integrate a variety of separate and interrelated tasks under the same roof, demands fulfilled by the design of hybrid forms of buildings [Davey, 1990; Duffy, 1992a]. Today's industrial estates claim a broader role inside the organisation by suggesting creative combinations between office work, prototype manufacture and social life.

As was proclaimed in chapter two, the organisation is in a situation of constant contact with the environment, declaring its existence and identity through the multimedia *means of communication* such as offered products and services, advertising campaigns, the acquired property, the management and the employees' actions. Yet, the intended message of this interaction, always has to mirror

properties and attitudes of the individual organisation such as the corporate philosophy, culture and values. Chapter four revealed that the management is aware of the impact of facilities as a sound means of expressing corporate identity. Furthermore, the management capitalises on the design of working environments in order to present a positive image inside and outside the organisation. In addition, it has been observed that under sophisticated corporate branding, considerable effort has been made to integrate and orchestrate different means of communication. Mediums such as facilities, are supported by verbal, printed, and other materials to present images beneficial to the corporation.

The purpose of corporate identity programmes is to influence public opinion and attitude in a way that eventually will evoke positive, or at least neutral behaviour, towards the corporation. Yet, due to the variety of people's interests, different stakeholders are concerned with specific *organisational issues*. As a consequence, the provision of an acceptable corporate image for specific groups will be the composed outcome of the organisation's performance on a number of these very issues. Any investigator of the impact of facilities on corporate identity has to specify the stakeholders targets and to examine the performance of facilities on presenting a positive corporate behaviour to the related areas of concern.

6.4 Interview Procedures

The interview consisted of four distinct segments, each requiring twenty to thirty minutes. The interviews took place at scheduled meetings in three lecture rooms of Strathclyde University with students and in a conference room of a private organisation with the employees of that organisation. Participants were told that they would be shown four office buildings and that after the examination of each building they were requested to express their attitudes towards the corporation which occupies each buildings in the study, in relation to specified organisational indicators by filling in a continuum of corporate bipolar descriptors.

During the process of the interviews, the observers were asked to state if they were familiar with the identity of the occupier of any of the buildings in the study. Observers who admitted the recognition of any of the objects in the study were later excluded from the statistical analysis as a precaution against any possible distortion of the participants' attitudes.

The respondents were able to observe eight slides of every building, in separate sections through a 35mm colour slide projector. The slides were presented in one of two orders, in purpose to mitigate possible order effects. Before the beginning of the interviews, observers were asked to fill in some personal data for statistical purposes and they were informed of the confidentiality of their responses and requirement for anonymity. Observers were asked to read all bipolar statements presented in the questionnaire and ask for clarification of any statement they thought ambiguous or vague. Finally, they were told that there are no correct or wrong answers and that they should answer the questions by expressing their true attitudes towards the occupiers of the buildings in the study. The name of the owner of the buildings was kept secret from the respondents during the interview on purpose to avoid any possible predisposition and interference by existing corporate images to the building appraisal.

The interviews were accomplished in two stages. At the beginning, the observers had to become familiar with the buildings in the study by a number of selected slides presenting the office buildings in site, the main views of the exterior of the building, selected and comparable aspects of the interior including the working environment and support areas, and final details of construction and furniture. At the same time the researcher informed the observers about the site and gave them some technical information concerning the building itself. Then, the observers were invited to describe their impression of the user of the building by rating corporations using the seven scale bipolar descriptors for every given item.

At this stage, the information acknowledged by the observers could be considered similar to the information that laymen, pedestrians or non irregular users possess about an office building. Nevertheless, a closer identification with a particular group of users should be avoided. Individual interests and psychological inclinations control personal sensitivity and interpretation of the signs received by the environment.

During the second stage, the researcher read out the *verbal text*, information about the issues to be addressed and objectives to be achieved by the design of the buildings, already agreed on by the developer and the architects. Then, the previous set of bipolar descriptors' scales was presented on another page and the observers were asked to fill it in again. The duplication of the same procedure for every building in the study was considered critical in the attempt to understand the observers' impression through the presentation of facilities into their context of

reference. In a society where intentions and ideas are highly judged, it is questionable whether the physical environment can reflect the desired by the corporation ethos.

The first part of the interview focuses on the supply of information about the observers' perception strictly from the functional, aesthetic and environmental point of view of the offices, without reference to the real issues which developers and designers were concerned about at the earlier phases of the design. It was predicted that the outcome of the data analysis could produce sufficient evidence about the quantitatively and qualitatively abilities of the examined buildings to communicate corporate meanings and values to laymen.

The second stage introduces the element of *corporate branding*. With the supply of information to the observers about the intentions of the developer, the extent of influence on the observers' attitudes of corporate promotion techniques based on building characteristics, a very common practice today, was investigated. The sub-hypothesis tested here is that 'the combination of facilities and appropriate supporting text is able to influence the way premises are perceived and differentiate observers' attitudes about the image of the corporation in charge'. It was assumed that the comparison of the observers' impression during the two stages could provide valuable information regarding the potential role of facilities in corporate communication programmes and eventually in corporate objectives.

6.5 The Selection of Observers

In the real world, information that people possess concerning the owners of corporate assets varies constantly. Facilities are experienced from the point of view of motorists, habitants, visitors, suppliers, contractors, employees. The individual cognition regarding the environment depends on the personal sensitivity of observing and interpreting the information perceived. Personal background, previous experience, interests, are the variables which influence the ability to interpret the world in a logical way [Jeffrey, 1965].

As customers of a corporation, by and large, human beings enjoy limited knowledge regarding the intellect and the particular objectives behind the design solutions to facilities and working conditions. The impression about the organisation from the physical environment is obtained mainly from views during short site visits in a

limited number of areas of the building. As far as the appreciation of the same building is concerned, the judgement is strongly influenced or even distorted, by the individual's expectations and the corporate image etched on the subconscious of the observer. Conversely, the employee's impression of facilities is largely based on long lasting experience. The knowledge concerning the building is not confined only to the affective appraisal of the physical environment, but it is supplemented by marketing procedures expressed through paraphernalia of verbal and printed materials (text), which link the instituted working environment with corporate principles and values, reinforcing the dominant culture or cultures. Besides, the opinion regarding facilities and the physical environment in work is very much influenced by psychological factors such as work satisfaction, loyalty and self identity through the corporation.

The two previous examples of the users of buildings illustrate the difficulty that the researcher meets while examining the observer's interpretation of the working environment. The above relationship is greatly depends on exogenous parameters strong enough to change or shape the domains where interactions take place and to influence the observer's sensitivity and interpretation of perceived signals.

The complexity of user-environment interaction has influenced the decision to prevent the participation of respondents with any kind of interest in the objects in study in this work. It was conceived that the influence of the owner's identity would distort the respondents' perception of the stimuli. Therefore, the case study was oriented towards the study of *laymen's* perception and attitudes. On account of the apparent absence of research studies and any relevant scientific evidence on the subject, the study had to concentrate on a relatively homogeneous group of observers. It was perceived that since the present study searches for basic information concerning the relation of corporate indicators with facilities, it was necessary to try and eliminate factors such as diversity among the observers.

The role of the observers was occupied by a number of undergraduate and postgraduate students recruited from Strathclyde University and the employees of a corporation in the electronics sector. The participation of two social groups of different distance to the business environment, one already engaged into the workforce and another that is expected to contribute to the production process in a short time, was perceived as adding to the external validity of the study and enriching our knowledge about how different social groups perceive corporations

through corporate premises and the conditions in the working environment (Figure 6.2).

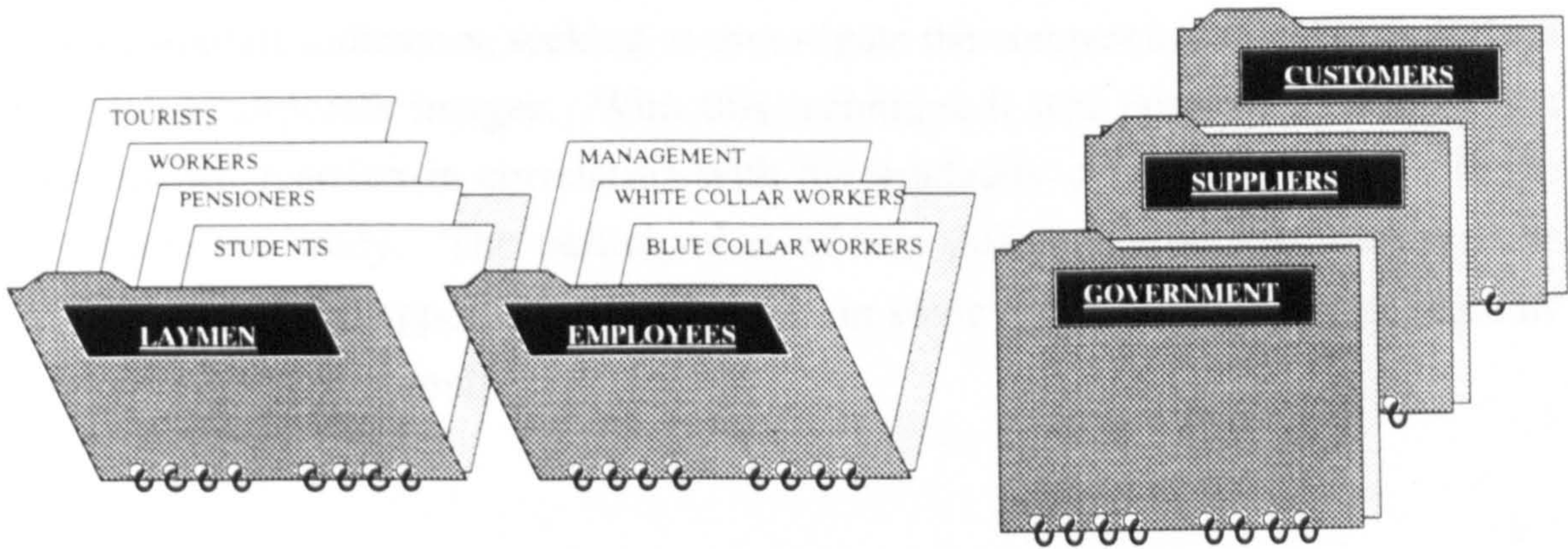


Figure 6.2 Even within the groups of stakeholders of a corporation certain sub-groups of different interests concerning the organisation can be found.

To complete the exercise, 84 observers voluntary participated. From these, 79 responses were qualified as valid, while five responses were disqualified, three because the respondents were familiar with the buildings in study, one because the respondent was not present at the introductory part of the exercise and one because the questionnaire was not fully completed. Table 6.1 shows the number of observers at the various stages by type.

Observers	1st Stage	2nd Stage	
		Original text	Falsification technique
Students	60 (65)	38 (42)	22 (23)
Employees	19	19	
Total	79 (84)	57 (61)	22 (23)

Table 6.1 The structure of the observers' distribution during the performed study.

Furthermore, we should mention here that the homogeneity of the observers' groups should be regarded as relevant. The students are considered homogeneous by reference to the issues of employment status, age, degree of education, yet heterogeneous concerning social background, economical situation and professional interests. The employees are homogeneous on account of employment status, and professional interest, but heterogeneous concerning age, education, social background.

The case study has taken the form of structured interviews where the respondents were called to examine photographic slides of four office buildings and then they were requested to identify the potential meanings and values derived from buildings and working environments. Moreover, they were asked to relate their impressions to given corporate indicators, seeking to investigate the competence of office buildings in shaping corporate images. With this technique it was possible to observe the respondents' reaction in correlation with the gradually closer familiarity with the objects in the study. The participation of two different groups of observers is justified due to the opportunity to examine, in some depth, the reaction of separate groups to the same stimuli.

6.6 The Selection of Buildings in Study

It is argued that there are two distinct kind of issues that have to be faced in the design of any research which seeks to explore a series of phenomena. Firstly, how a sufficiently heterogeneous sample of objects can be obtained for the study, and secondly the kind of measurements which have to been made in order to sample all significant ways in which the phenomena vary.

For the completion of this research four office buildings which demonstrated a high interest in presenting a positive corporate image were selected. Even though there are a number of different industrial estates and working environments, this work has concentrated on office buildings, recognising their dominance over commercial property and their significance to the establishment of future business environments. Four buildings were selected, a decision influenced by the observation that they could provide the benefits of a variety of identities of occupiers, and different approaches to perceive the working environment and corporation-users interaction, without overloading the task of the observers.

The importance of these buildings does not rest on their particular architectural style, age or construction methods. It was the combination of implemented design processes, the characteristics of the culture and objectives of corporations, the different perception concerning the quality of the workplace, and the difference of designers, users and the local community concerns, which were taken into consideration for the qualification of buildings in the study.

It has to be mentioned that only premises built in the last decade and originally designed to accommodate office activities were selected. Older buildings, well known properties and buildings converted to offices, even though they constitute the largest part of today's working environment, were avoided in order to reduce the risk of adding connotative semantic meanings. The final four objects of study were the outcome of the selection of a larger sample of modern office buildings which represent the latest ideas in office building design and organisation of work (Appendix B). The following factors were of particular importance for the qualification of the buildings in the final list:

- i. their capacity to portray a distinguishable image, able to provoke the extremities of judgement of the observers,
- ii. the correspondence to a variety of approaches reflecting different corporate cultures, priorities and public relations policies,
- iii. the representation of a variety of styles and schools of architecture of highly contrasting aesthetic impact,
- iv. the reflection of different views concerning the office building's relation to the organisational culture, and capacity to contribute to business objectives.
- v. the representation of different design processes and relationships between architects and users,

The first building in the study² is **The ARK**, a multi-tenant speculative monoblock office building in an inner suburb of London, which is temporarily empty³, designed by Ralf Erskine. The building, a dramatic transparent dome at an intersection of transport systems, is based on the idea of the theatre where the office floors surround the atrium and office plates open on to generous terraces. The envelope is flexible enough to accommodate a number of diverse office layout solutions satisfying the management approach of any occupant.

² These buildings are presented in alphabetical order. Later on, at the stage of analysis, buildings are called under the names **object A, B, C and D**, without any connection to the order that they are presented here.

³ October 1994.

The main values and principles which the building was designed upon were the satisfaction of advanced facilities management approaches, the incorporation of a wide variety of office uses, the perception of the building as a place to foster the maximum of casual social interaction and interchange of information, the capacity to accommodate corporations with decent managerial structures where 'workers are treated as educated grown ups, rather than recalcitrant serfs' [Davey, 1992].

The second office is the **Century Tower**, a monoblock speculative building for one main client in Tokyo, designed by Foster Associates. Constructed in one of the most expensive real estate properties in the world, the building maximises the value of the site by multiplying the price of land. It is composed of two transparent towers connected through a continuous narrow atrium and provides a column free pool of office space flexible to employ any form of office layout.

The design has permitted the overall integration of space where the main issue is the production of work. That is achieved through the maximisation of interaction and provision of workplaces oriented to modular tasks rather than status.

The Headquarters of NMB, designed by Ton Alberts and located in a south-eastern suburb of Amsterdam was the third building to be examined. The design in a true *anthroposophical style*, apparently without two single parallel lines in the whole building, has been created around the idea of a long street. Identified as the best environmentally friendly office building in Europe, the building is a small village with each office of different shape, without air conditioning, but with the employee's total control of the ambient working conditions.

Due to the procurement system dominant in North Europe, the main challenges of the design were the achievement of an equilibrium between corporation versus individual, big versus small, centralisation versus intimacy. The management and employees had a very important role during the design process by working with the architect to fulfil the common objectives 'to achieve a better balance between the organisational and technical requirements on the one hand, and the satisfaction of needs of the staff both as bankers and as individuals on the other' [Duffy 1992a].

The last object in study was the Headquarters of SAS at Frösundavik in Stockholm by Niels Torp. Lined by five quasi-independent pavilions reflecting the departmental structure, the building is oriented towards a central glazed arcade along the ground floor, on which shops, catering and recreational facilities, and general

meeting places are located. Every employee enjoys his/her individual office with a window facing outside or the internal arcade, and has the right to open or close the door of his/her office.

The building is designed for a particular type of customers and embodies the organisation's individual approach. It is constructed to achieve a balance between individual and corporation's needs, togetherness and autonomy of the organisational units, and to offer an environment which supports interconnection and the exchange of thoughts and experience.

Questionnaires embodied eight 35mm colour slides for every one of the qualified office buildings, 32 in total, and the highest possible attention was given to a comprehensive and equal presentation of all buildings demonstrating both, the envelope and the working environment.

A body of research in psychology [Helson, 1964] holds that one's adaptation level, what one is *used to* and regards as normal, is pulled towards the anchor, or extreme element, in a series of stimuli. Thus the operative factor accounting for the reported impression might not have been the stimuli themselves, but the diversity of aesthetic impact of the buildings. To minimise the influence of these variances, the order of the appearance of buildings in the study was reversed for half of the observers. Yet, it was found impossible to entirely isolate the objects of study from each other.

6.7 The supporting text

In the second stage of the performed interviews, supplementary information was released concerning the corporations' objectives in constructing and occupying the buildings in the study (Appendix C). This information was the outcome of the critical collection and deduction of a number of interviews, corporate announcements and designers presentations published in official statements and journals, explaining the objectives of providers and clients through the design and occupation of buildings [Mackenzie 1991; Quantrill 1992; Van Dommelen and Noordegraaf, 1986; Davey 1992; Duffy 1989; 1992a, 1992b; Lemonick 1993; Grajewski & Hillier 1994].

A closer examination of values behind all four buildings reveals similar concepts of principles and ideas, and an intention of the developers to implement similar

cultures. However, operational differentiation and the architects' intellectual influence on the purposes and forms of applied architecture should be considered as the stronger sources of a variety of stylistic and organisational differences between buildings and applied solutions. The weight however, of every one of these factors, on the final result is difficult to estimate.

The developers of the buildings in study claim that apart from being based on specific cultures their facilities are able to communicate this culture. This claim is investigated in the first stage of the interview. The second stage examines the effect of the combination of visual and verbal stimuli on the observers' perception. The objects in study are supported by verbal text which was specifically allocated to them by the original designers and developers. The various texts, although expressing similar values and ideas, are different from each other. There are two potential biases which arise at this point.

First, it is difficult to evaluate the weight between the optical and verbal stimulus. It is possible that the verbal stimuli used for some of the buildings are stronger than others. Yet, it would be unfair to use the same stimuli for all buildings on the grounds that the selected verbal stimuli could contradict the real intentions of the individual developer, the one reflected by the form of the building.

The second difficulty is on account of the boldness of the verbal stimulus in comparison to the objects in the study. It could be suggested that the applied verbal text is too strong and its effects on the observers' attitudes are disproportional to real life situations. Alternatively, it could be suggested that the verbal text is too weak. In real life, observers are bombarded with a variety of verbal and written materials providing richer sources of information and unpredictable influence.

To investigate the significance of the above biases, a falsification technique was adopted. The researcher has changed the verbal text between buildings for a number of observers. The outcome of the statistical analysis on later stages between attitudes derived by the same buildings with different verbal stimuli could suggest the strength of different verbal texts. The result of the analysis of the same text applied to different buildings could indicate the boldness of verbal text in comparison to visual stimuli.

6.8 Developing Attitude Statements

From the beginning of this research it was understood that there was need to use a narrative tool appropriate to describe the corporation. However, the organisation theory is a collection of research programmes and loosely bonded themata, dominated by contemporary theory and philosophy [Clark, 1990]. Even though the literature on organisational analysis, does not lack authors proposing corporate representation models and principles [Pascale & Athos, 1986; Burrell & Morgan, 1979] there is an apparent absence of a framework able to describe the corporation by reference to its physical property.

Through the attempted review of literature in chapter two, this research has decided on fifteen indicators reflecting nine corporate dimensions for the prescription of the modern organisation (Table 6.2). The outcome of this review was the critical collection of indicators obtained by the functionalistic; structuralistic and behavioural approaches of the organisational theory.

DIMENSIONS	INDICATORS
ENVIRONMENT	stability
STRATEGY	business aggressiveness
STRUCTURE	centralisation configuration
TECHNOLOGY	restructure
SYSTEMS	flow of information
ABILITY TO LEARN	rationalisation stimulative creativity
SHARED VALUES	social responsibility values oriented (key beneficiary)
PERSONNEL	freedom of expression (formalisation) employee orientation
STYLE-PERSONALITY	social democracy transparency importance of public image

Table 6.2 *The identified set of corporate indicators under categories of organisational dimensions.*

The identified corporate dimensions are suggestive guidelines towards a holistic understanding of the organisational phenomenon, rather than fixed isolated domains of study. Moreover, even though the proposed indicators represent a number of approaches mirroring contemporary organisational theories, it would be naive for the researcher to claim the full exhaustion of all possible approaches to study and describe organisations. From this critical approach towards the organisation, a set of bipolar corporate descriptors was developed providing appropriate semantic differential scales to investigate the presentational and affective areas of facilities meaning with reference to the corporation (Table 6.3).

INDICATORS	SEMANTIC SCALES
ENVIRONMENT	
stability	turbulent • steady
STRATEGY	
business aggressiveness	defensive (goal setting) • Pro-active (learning processes)
STRUCTURE	
centralisation	centralised decision making • decentralised decision making
configuration	fixed departmental structure • flexible team working structure
TECHNOLOGY	
restructure	simplified use of technology • advanced use of technology
SYSTEMS	
flow of information	formal communication • informal communication
ABILITY TO LEARN	
rationalisation	reasonable • impulsive
Stimulative creativity	innovative • conservative
SHARED VALUES	
social awareness	socially responsible • socially detached
values oriented (key beneficiary)	economic (profit) • self actualising (employee)
PERSONNEL	
freedom of expression (formalisation)	inspirational • conformitive
employee orientation	independent • interdependent
STYLE-PERSONALITY	
Social democracy	authoritarian (use of power) • democratic (motivation)
Transparency	introverted • extroverted
importance of public image	low profile • high profile

Table 6.3 Corporate indicators and semantic scales. The study claims that corporations can be perceived and described in an acceptable manner for the kind of the study through the identified set of indicators and bipolar corporate descriptors.

Bipolar descriptors⁴ correspond to the extremes of different characteristics, approaches or policies of the examined dimension and they are the outcome of descriptive terms and expressions derived from manuals of the corporation's representation, [Drucker; 1955; Harvey, 1980; Morgan, 1986; Beardshow & Palfreman, 1990; Hassard & Pym 1990].

To prevent misunderstandings it has to be mentioned that the research recognises that in reality corporations partially embody both extremes. However, what distinguishes each corporation is the significance of every descriptor for its structure, culture and behaviour [Morgan, 1986; Beardshow & Palfreman, 1990].

Studying the interdependence between organisation and public, it is recognised that corporate indicators have different importance for various people. Different groups are concerned with particular aspects of the corporation, subject to the specific relationship between the corporation and the public. It is perceived that although the dimension of centralisation of authority is a meaningful constituent of corporate culture for the employees, it has insignificant value for a supplier or customer, as long as it does not interfere with personal interests.

Since this work concentrated on the study of corporate characteristics as perceived by laymen, an investigation to identify indicators potentially recognisable by the above group through corporate premises was prominent. Through a critical process of selection and deduction, the number of indicators suitable for examination was reduced to ten (Table 6.4). The decision about the number of the examined corporate indicators was also influenced by the pressure of technical issues, the production of a manageable and not very complicated questionnaire, avoiding the participants' indifference in the last stages of the interviews. Furthermore, care was taken that indicators eliminated from the last stage, presented minimum importance from the laymen's point of view.

During the design of the instrument, it was understood that bipolar corporate descriptors should be converted to an understandable form for observers, and so

⁴ The researcher recognises that a drawback of the adopted approach in describing organisations through bipolar descriptions is the exclusion of more dimensions of identified indicators. The expression of indicators through a form which presents a number of different approaches is likely to offer a more detailed understanding e.g. in organisational configuration the pair *fixed departmental structure-flexible team working structure*, could be replaced by *hierarchical, flat and matrix structure*.

attitude statements were chosen. It was perceived that for the non-specialist, corporate descriptors were highly abstract concepts, inclining towards ambiguity.

INDICATORS	SEMANTIC SCALES
SYSTEMS	
flow of information	formal communication • informal communication
ABILITY TO LEARN	
rationalisation	reasonable • impulsive
stimulative creativity	innovative • conservative
SHARED VALUES	
social awareness	socially responsible • socially detached
values oriented (key beneficiary)	economic (profit) • self actualising (employee)
PERSONNEL	
freedom of expression (formalisation)	inspirational • conformitive
employee orientation	independent • interdependent
STYLE-PERSONALITY	
social democracy	authoritarian (use of power) • democratic (motivation)
transparency	introverted • extroverted
importance of public image	low profile • high profile

Table 6.4 *Corporate indicators and semantic scales. The final set of indicators and bipolar corporate descriptors used at the study.*

Attitude statements are sentences which express a point of view, a belief, a preference, a position for or against an issue. They can be phrased in such a way that the respondents can either agree or disagree with the statement [Oppenheim, 1992]. The method this study adopted was the wording of bipolar attitude statements in a similar way to corporate statements and policies. However, bipolar statements were kept as short as possible, using familiar words and expressions (Table 6.5).

INDICATORS	SEMANTIC SCALES	
flow of information	Formal reports, memos and official meetings are the most important means of communication between employees	Informal presentations, round table meetings and social activities are the most important means of communication between employees
social awareness	The corporation believes that it should play an active role in resolving the social problems of its employees and the community	The corporation believes that the social problems of employees and the community are not its concern
values oriented (key beneficiary)	Policies of the corporation are oriented towards maximisation of profit	Policies of the corporation are based on employee' satisfaction through work
freedom of expression (formalisation)	Corporate culture evokes freedom of the employee's expression at work	Corporate culture evokes employee's conformity to company rules
employee orientation	Individual productivity is very important for the corporation	Team work productivity is very important for the corporation
Stimulative creativity	There is a spirit of innovation and change throughout the workplace	There is a spirit of conservation and permanence throughout the workplace
Social democracy	The corporation uses power such as rules and policies with its employees to achieve its objectives	The corporation uses common values and motivation with its employees to achieve its objectives
transparency	Information obtained by employees is perceived as confidential and the property of the individual	Information obtained by employees belongs to everyone and it should be distributed around the corporation
importance of public image	Contact with the public is considered rather undesirable	A positive public image is one of the key objectives
rationalisation	Corporation activities are based on well designed plans and risk should be avoided	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

Table 6.5 *Corporate indicators and semantic scales. The final set of indicators and bipolar statements used in this study.*

On the selection of bipolar descriptors it was perceived that in the present study expressions indicating the preference the observer shows to a particular type of organisation should be avoided. However, it was understood that in principle, corporate descriptors do not consist essentially of positive or negative meaning⁵.

⁵ The elimination of any positive or negative connotation resulted in the exclusion of the application of *Likert scales* at the earlier stages of the study. The attention of this research was the identification of

The performance of stimuli in categories of corporate descriptors is directly related to the business environment and corporate culture which establishes the desirable images of the corporation in charge. Doubtless, on the dimension of *social democracy*, it is desirable for the police force in a State with restricted rights to stimulate obedience, while in a more liberal State to evoke security and assistance.

On the construction of the questionnaire, each semantic scale was defined by bipolar descriptors with seven possible locations between them (Figure 6.3). The fourth location was considered as neutral in relation to the bipolar descriptors⁶. Each building in the set to be scaled was assigned a location on each of the scales used for differentiating that set of concepts (Appendix D).

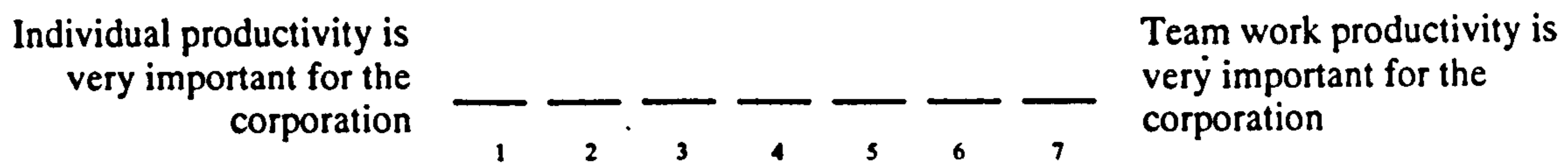


Figure 6.3 *One of the corporate indicators with its seven scale locations between bipolar corporate descriptors.*

Although bipolar descriptors do not imply any *favourable* or *less favourable* meanings, the observers' cultural-social backgrounds may give a possible connotation to statements on the grounds of humanity, ecology, responsibility. To minimise the *halo effect*⁷ the direction of scales is randomised so that the socially most desirable end falls on both sides of the page.

perceived structures, cultures and identities rather than the judgement of corporational policies, that possibly for some observers Likert scales could imply.

- ⁶ The selection of uneven number of steps was also taken in order to produce a neutral category or *midpoint*, to one side of which lie the favourable categories and to the other side the unfavourable ones. This is also because it has been observed that assessors are a little afraid of using the extreme categories, a phenomenon known as the error of *central tendency* [Oppenheim 1966].
- ⁷ The halo effect is expressed in both ways, through the influence of the observer by an overall feeling of like and dislike instead of paying separate attention to each examined item, or through the identification of the good (socially desirable) on one side of the page and the bad on the other side. Then there is the danger that the respondent (having made up his mind that he is favourably disposed towards the object of ratings) may run down the page always checking for a position on the side that is relevant to his disposition, without actually reading the items or giving each of them separate thought [Oppenheim, A., N. (1966). *Questionnaire design and attitude measurement*. Heinemann, London, pp. 85].

The scales were intentionally contrived to encourage guessing, so as to obtain attitudes and first impressions. It should be clear too, that the aim of the questionnaire was not an *objective* assessment, but rather a snap judgement or guess, expressing the attitude of the observers.

6.9 Conclusions

The paradigm of the present work seeks to investigate the significance of facilities for users' interpretation of corporate structure, culture and values, and to address the issue of the capacity of facilities of multi-dimensional contribution to business effectiveness. The study examines the performance of facilities as means of corporate communication in an approach which comprises most of the corporate dimensions found in today's organisation theory.

The chapter provided information about the methodological approach to the subject, the decision making about the inclusion or exclusion of variables and the concerns about the reliability of the exercise. It is suggested that corporate indicators displayed to laymen are not the only ones, also that bipolar descriptors and statements do not always portray the only approach investigating the subject. Nevertheless, within the limits of this research, the author argues that both corporate dimensions and bipolar descriptors represent a starting point for further research.

In the next chapter the examination of facilities as means of corporate communication will be completed through the statistical analysis of the findings of the case study.

Extracting Identities

7.1 Introduction

This is the second part of the case study involving a description of the statistical analysis and a discussion of the reliability of the findings. The statistical analysis is organised in four sections¹. The first part consists of information regarding the ability of observers to recognise the identified organisational indicators and to make a meaningful interpretation of corporate character. The second part is concerned with the differences in attitudes between the two groups of observers, the third section deals with the influence of the verbal text on the observers' attitudes, and the fourth part presents the results of the analysis concerning the performance of buildings in the study as a means of corporate communication.

The chapter will come to an end with the concern of the author about the validity of the findings, the danger of over-interpretation of the analysis and the generalisation of conclusions due to the limited scale of the study and the difficulty of the subject.

1 The statistical analysis was conducted with the help of SPSS 6.1 for Windows and the Statistical Analysis package of Excel 4 for Macintosh. A part of the performed analysis is presented in this chapter. The complete statistical analysis accompanied with figures can be found in Appendix E.

7.2 On Indicators

The first concern about the analysis of indicators was with respect to their correlation and interdependence. The examination of possible overlapping of the meaning of indicators was important since confusion of their perceived meaning by the observers could be an indication of bad design of the questionnaire or low recognition of corporate indicators through the buildings. The performed analysis which examined the correlation of indicators for individual buildings perceived by students in the first stage of the exercise did not reveal any patterns across the buildings (Table 7.1). The correlation between indicators was comparatively low and scattered, indicating relevant independence. This implies that the indicators may mean something different to the observers when applied to different buildings.

STUDENTS-1st STAGE BUILDING A										
	11	12	13	14	15	16	17	18	19	10
11	1									
12	-0.3	1								
13	0.51	-0.1	1							
14	-0.4	0.07	-0.3	1						
15	0.3	0.07	0.46	0	1					
16	0.22	0.06	0.04	0.12	-0.1	1				
17	0.31	-0.2	0.42	-0.4	0.35	-0.3	1			
18	0.74	-0.4	0.37	-0.3	0.55	-0.1	0.48	1		
19	0.27	0	0.18	-0.1	0.37	0.28	0.23	0.23	1	
110	0.25	-0.2	0	-0.4	-0.2	-0.4	0.08	0.21	0	1

STUDENTS-1st STAGE BUILDING B										
	11	12	13	14	15	16	17	18	19	10
11	1									
12	-0.3	1								
13	0.14	-0.1	1							
14	-0.4	0.15	0	1						
15	0.01	-0.3	0.18	0.1	1					
16	-0.4	0.09	-0.1	0.33	0.15	1				
17	0.35	-0.4	0.31	-0.2	0.16	-0.1	1			
18	0	-0.2	0.25	-0.2	0.35	0	0.35	1		
19	0.2	-0.2	0.07	0.04	-0.1	-0.1	0.2	-0.2	1	
110	0.22	-0.2	0.23	-0.3	0.25	-0.1	0.18	0	0.12	1

STUDENTS-1st STAGE BUILDING C										
	11	12	13	14	15	16	17	18	19	10
11	1									
12	-0.1	1								
13	0.31	-0.4	1							
14	-0.2	0.48	-0.4	1						
15	0.09	-0.2	0.36	0	1					
16	-0.1	0.37	-0.4	0.56	-0.1	1				
17	0.32	-0.3	0.44	-0.4	0.24	-0.3	1			
18	0.21	-0.2	0.14	-0.1	0.37	-0.1	0.44	1		
19	0.27	-0.1	0.44	-0.2	0.29	-0.2	0.57	0.36	1	
110	-0.1	-0.3	0.25	-0.6	0	-0.2	0.24	0	0.01	1

STUDENTS-1st STAGE BUILDING D										
	11	12	13	14	15	16	17	18	19	10
11	1									
12	-0.6	1								
13	0.41	-0.4	1							
14	-0.5	0.42	-0.2	1						
15	0.23	-0.1	0.22	-0.1	1					
16	0	0.34	-0.1	0.12	0.13	1				
17	0.39	-0.4	0.55	-0.2	0.21	0	1			
18	0.46	-0.5	0.15	-0.4	0.41	-0.1	0.33	1		
19	0.24	-0.2	0.42	-0.1	0.15	-0.1	0.11	0.16	1	
110	0.38	-0.3	0.12	-0.3	0.1	-0.1	0.31	0.26	0	1

Table 7.1 Correlation analysis of the examined indicators for all buildings at the first stage. There were no observed patterns concerning correlated indicators between the buildings.

However, the above analysis could not reveal hidden correlations across the buildings. Data obtained by all observers in the first stage was subjected to factor analysis which is able to concentrate indicators which are consistently used by observers into separate dimensions. The oblique factor analysis extracted two factors with a correlation of 0.41. It is considered that there is a dependence between indicators within the factors when the varimax factor loading for individual indicators is over 0.40 (Table 7.2). The first factor embodies eight indicators with higher loading on formalisation (0.83), social democracy (0.72), creativity (0.71),

flow of information (0.70), *values orientation* (0.67), *social awareness* (0.55), *image* (0.54) and *rationalisation* (0.48). The second factor indicated the dependence of only two indicators, *orientation* (0.69) and *transparency* (0.47).

ITEMS	INDICATORS	FACTOR 1	FACTOR 2
I1	flow of information	0.69	0.15
I2	social awareness	-0.55	-0.03
I3	values	0.66	0.05
I4	formalisation	-0.83	0.17
I5	orientation	-0.03	0.69
I6	creativity	-0.70	0.13
I7	social democracy	0.72	0.10
I8	transparency	0.25	0.47
I9	image	0.53	0.05
I10	rationalisation	0.48	0.07

Table 7.2 The performed factor analysis revealed the existence of two main dimensions. The negative correlation of some dimensions is not of actual importance, since it is explained on the grounds of bipolar descriptors' location in the distributed questionnaire.

The relatively low degree of the factors' loading between the indicators and the performed factor analysis implies that there is no overlapping of the observers' perception of the meaning of individual indicators.

The next analysis to which the indicators were subjected to was an analysis of variance, *Tests involving Buildings within subject effects*' (Appendix E). This tests whether the differences between groups are larger than the differences within the group. The results of the first test showed that the difference in attitudes between the subject groups, students and employees, was marginal. The second test revealed that there are indeed significant differences in the observers' attitudes towards the various buildings. An analysis of individual indicators showed that only on the dimension of *employee orientation* (independence-interdependence) there were no significant differences (significance of $p > .05$). The insignificance of the differences between the buildings on the indicator of orientation implies either that the observers did not perceive the indicator meaningfully, or that all buildings have provoked similar attitudes.

Another important comparison among the indicators is their degree of *meaningfulness* and *homogeneity* of judgement. Meaningfulness of judgement is the characteristic on which indicators were compared about their extremity, or meaningfulness. Since the middle point of semantic differential scales is taken as an

index of meaningfulness, departure from the midpoint may be referred to as meaningfulness. The appropriate measure is the generalised *distance function* D, computed as the multidimensional distance of each concept from the origin [Osgood et al., 1957]. In this study, mean scale values for each building were used to compute the D (distance) among indicators.

Homogeneity of judgement is the agreement of attitudes between observers and is reflected through the mean standard deviation for all buildings for each corporate indicator. The scores of the indexes for meaningfulness and homogeneity of all indicators for students on both stages of the exercise are presented in figure 7.1².

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
meaningfulness of judgement										
1st stage	1.61	1.06	1.20	1.45	0.28	1.98	1.09	0.58	1.31	1.24
2nd stage	2.57	2.24	1.37	2.33	0.51	2.71	2.11	0.95	1.98	1.11
homogeneity of judgements										
1st stage	1.38	1.52	1.61	1.43	1.72	1.43	1.36	1.40	1.53	1.52
2nd stage	1.40	1.51	1.80	1.44	1.86	1.41	1.42	1.49	1.63	1.67

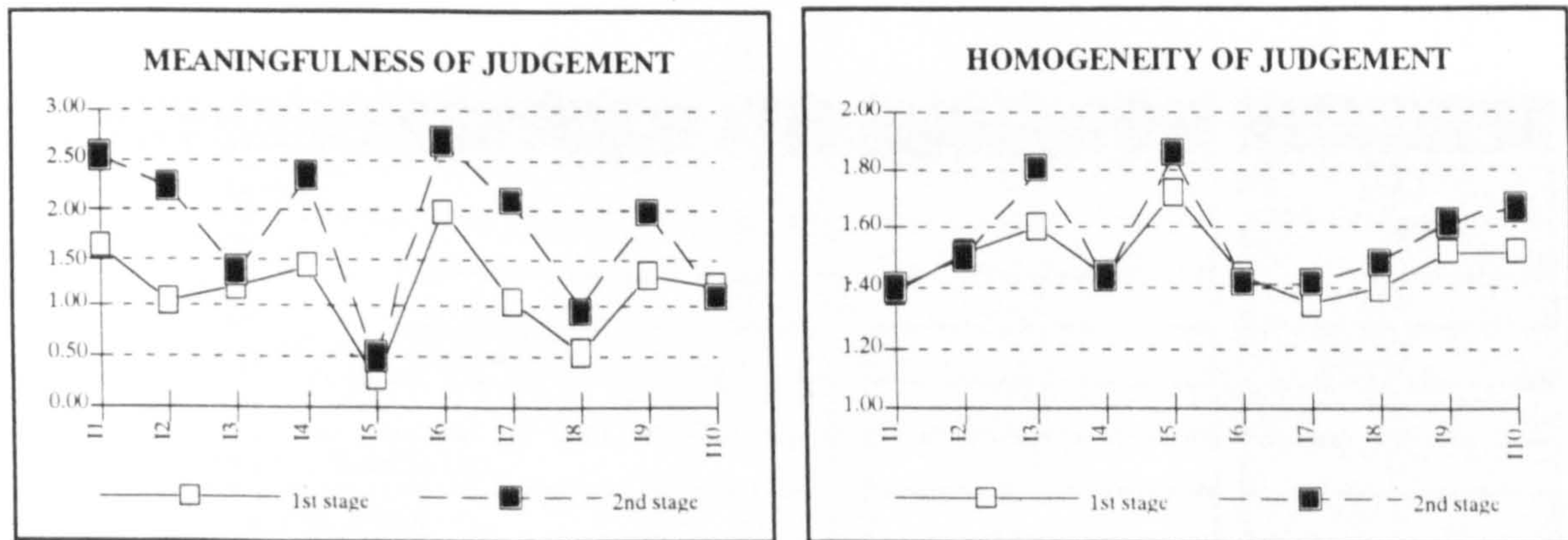


Figure 7.1 The meaningfulness and homogeneity of attitudes towards corporate indicators for both stages.

From the findings there is an apparent improvement between the stages on the index of meaningfulness for all indicators except for the last one, *rationalisation*, where the meaningfulness is slightly reduced. Yet, this improvement is not equal for all indicators implying either their different vulnerability to the verbal stimuli or the disproportional weight of the text used with the different indicators.

2 The number of samples used on the estimation of meaningfulness and homogeneity were 38 for both stages.

The index of homogeneity of judgement seems to contain less dramatic variations between the indicators, although there are differences between them. The effect of the text is significantly milder than the one in the meaningfulness. Moreover, it seems that in most indicators the homogeneity of judgement has decreased during the second stage. The low score on meaningfulness, the high score on heterogeneity and the insignificant differences of attitudes between the buildings (under the previously described F-test) on the indicator of *orientation* indicate that the buildings in the study do not influence the observers' attitudes on this organisational dimension.

Furthermore, the above degree of meaningfulness of corporate indicators can be perceived as a causal measurement of the ability of buildings to communicate parts of the identity of their occupiers. Table 7.3 illustrates the influence of buildings on the observers' attitude for the examined corporate indicators for both stages of the study. Indicators higher in the rank demonstrate a dependence on the presence of buildings, while indicators lower in the rank illustrate a moderate interdependence from the stimuli.

CORPORATE INDICATORS	1st PHASE	2nd PHASE
stimulative creativity	1	1
flow of information	2	2
social democracy	3	4
freedom of expression (formalisation)	4	3
rationalisation	5	8
values oriented (key beneficiary)	6	7
importance of public image	7	6
social awareness	8	5
transparency	9	9
employee orientation	10	10

Table 7.3 *Buildings demonstrated an ability to influence the laymen's attitude regarding corporate characteristics. Here the indicators and their dependence from buildings in the study are presented.*

The indicators of *stimulate creativity* and *flow of information* which occupy the first and second places respectively during both stages are considered the characteristics of occupiers better recognised by the observers. *Social democracy* and *freedom of expression* hold the third and fourth places during both stages but in a different order. Though in the fifth place in the first stage, the clarity of *rationalisation* decreases in the second stage moving to the eighth place. The *orientation of values* and the

importance of public *image* share the sixth and seventh place, while *transparency* of management and employee *orientation*, at the bottom of the table during both stages seem to be the indicators with the highest levels of independence from the optical and verbal stimuli. However, the researcher recognises that the sample for the production of this table is quite small, thus the results of the table should be treated with caution. Instead of real differences, variations and changes between corporate indicators and between stages could be partly due to statistical error.

A different approach to the analysis of indicators is about the inclination of the observers' attitudes to change, as soon as the observers receive new information about the buildings. In figure 7.2 shows the average propensity for change of the observers' attitudes for all indicators and for all buildings between the two phases.

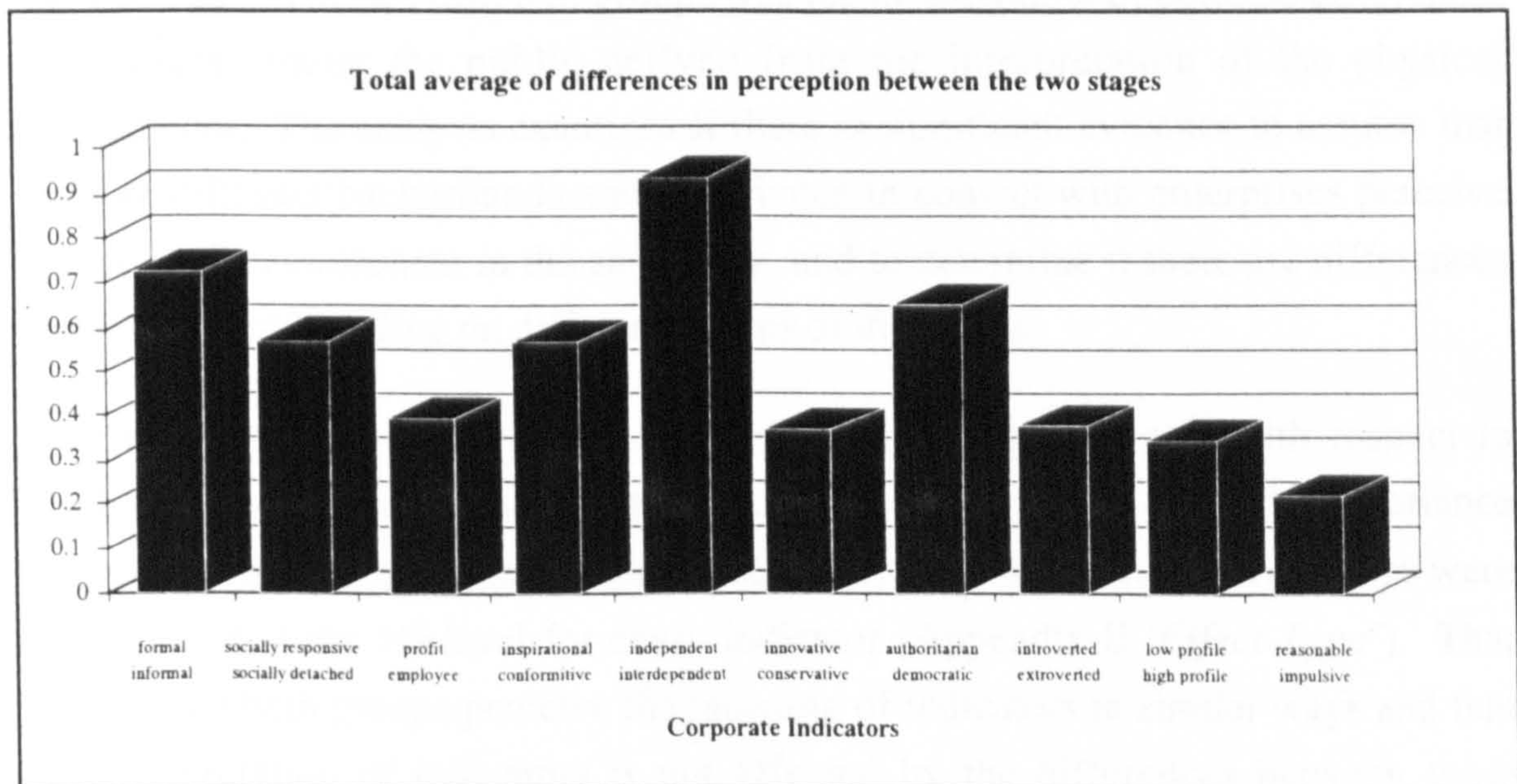


Figure 7.2 The absolute average influence of building branding for the examined corporate indicator.

To evaluate the propensity of every indicator the average change between the two phases between the four buildings was used³. Significant differences on the

3 The formula used for the evaluation was $P_x = \{|AA_x - BA_x| + |AB_x - BB_x| + |AC_x - BC_x| + |AD_x - BD_x|\} / 4$, where P_x is the average propensity for the x indicator, AA_x , AB_x , AC_x and AD_x are the scores of the four buildings on the meaningfulness of judgement for the indicator x at the first stage, and BA_x , BB_x , BC_x and BD_x are the scores of the four buildings on the meaningfulness of judgement for the indicator x at the second stage of the interviews.

vulnerability of indicators to the text were observed. For example, the indicator of *orientation* (independence-interdependence) is more than four times stronger than the one of *rationalisation* (impulsive-reasonable).

However, the researcher recognises that these differences in the indicators between the two stages could be heavily affected by the characteristics of the text, emphasising on particular dimensions of the organisation. Thus, any conclusions should be premature until further research is conducted with a variety of texts and forms of communication to the observers and the users of buildings.

7.3 On Observers

This study was completed with the aid of students and employees. The logic behind the participation of two different groups was the investigation of possible differences of attitudes among the public derived from the interpretation of the physical environment. The analysis examines if there is significant evidence to assume that users of different backgrounds and experience in contact with enterprises perceive the physical environment in the same way, and to determine if there are differences on the effect of branding on different groups of the public.

The first concern in comparing the two respondent groups was with respect to similarities or differences in the perception of indicators. The analysis of variance showed that the multivariate and individual differences between the two groups were insignificant at the .05 level for every indicator (Appendix E '*Effect Type*'). That implies that both groups perceive the meaning of indicators in similar ways and that the interpretation of indicators is not affected by the differences between these groups.

However, the above analysis could not reveal any attitudinal differences by reference to particular buildings. While the perceived meaning is the same for both participating groups, there could be differences in the judgement of specific indicators between the buildings. Further analysis was contacted to obtain greater clarity of the similarities and differences of attitudes. There was use of t-tests for independent samples examining the hypothesis that there are no significant differences between the means of the two groups for each indicator for all buildings (Table 7.4).

The results show that the observers' attitudes were similar for almost all indicators in three buildings. Only on the indicator of *rationalisation* (reasonable-impulsive), was there significant disagreement between the two groups. The difference in the perception of this indicator extended to all four buildings, shows an inclination of the employees to perceive organisations as more reasonable than students do.

	flow of information		social awareness		values		formalisation		orientation		creativity		social democracy		transparency		image		rationalisation	
	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP	STUD	EMP
BUILDING-A																				
Mean	4.4	4.35	2.63	2.9	4.28	4.7	3.03	2.7	3.22	3.15	3.12	3.1	4.97	5.25	4.07	3.4	5.47	5.05	2.65	3.5
Variance	2.58	4.13	2.07	1.04	3.29	2.22	1.73	1.38	2.82	2.03	2.48	1.67	1.29	1.78	2.37	1.94	2.02	2.68	1.66	2.47
Observations	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0	
df	78		78		78		78		78		78		78		78		78		78	
t	0.11		-0.8		-0.9		1.01		0.16		0.04		-0.9		1.72		1.09		-2.4	
P(T<=t) two-tail	0.91		0.45		0.36		0.32		0.87		0.97		0.36		0.09		0.28		0.02	
t Critical two-tail	1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99	
BUILDING-B																				
Mean	5.68	4.9	3.28	3.8	4.35	3.95	2.75	2.9	4.58	4.2	2.27	2.75	5.03	4.7	5.13	4.65	4.72	4.55	4.7	3.9
Variance	1.44	2.62	2.44	2.8	2.81	3.84	1.31	3.25	3.09	2.17	2.1	3.14	1.9	2.64	1.37	2.13	2.34	3.63	2.11	2.41
Observations	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0	
df	78		78		78		78		78		78		78		78		78		78	
t	2.31		-1.3		0.89		-0.4		0.88		-1.2		0.9		1.5		0.4		2.1	
P(T<=t) two-tail	0.02		0.21		0.38		0.66		0.38		0.23		0.37		0.14		0.69		0.04	
t Critical two-tail	1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99	
BUILDING-C																				
Mean	2.92	4.45	4.15	3.8	2.33	3.8	4.75	3.8	3.78	4.9	3.78	3.7	3.23	4.2	4.13	5.15	3.3	4.5	2.63	3.9
Variance	2.72	3.52	2.88	1.96	2.29	3.33	2.83	2.59	3.36	3.04	3.12	2.01	2.11	2.91	2.32	2.24	2.52	2.89	3.35	1.88
Observations	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0	
df	78		78		78		78		78		78		78		78		78		78	
t	-3.5		0.83		-3.6		2.21		-2.4		0.19		-2.5		-2.6		-2.9		-2.8	
P(T<=t) two-tail	0		0.41		0		0.03		0.02		0.85		0.02		0.01		0.01		0.01	
t Critical two-tail	1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99	
BUILDING-D																				
Mean	5.57	5.6	2.45	2.95	4.78	5.25	2.43	1.6	3.83	3.65	1.97	2	5.32	5.6	5.03	5.1	5.37	5.45	4.67	5.4
Variance	1.47	2.15	1.3	2.68	2.65	1.99	1.98	0.67	2.79	3.29	1.19	1.58	1.95	2.15	1.76	2.52	2.24	2.16	2.09	1.73
Observations	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20	60	20
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0	
df	78		78		78		78		78		78		78		78		78		78	
t	-0.1		-1.5		-1.1		2.5		0.42		-0.1		-0.8		-0.2		-0.2		-2	
P(T<=t) two-tail	0.92		0.13		0.26		0.01		0.68		0.91		0.44		0.85		0.83		0.05	
t Critical two-tail	1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99		1.99	

Table 7.4 The results of t-tests of the two samples (students-employees) assuming unequal variances for all indicators in all buildings. The shaded areas indicate insignificant differences on attitudes between the two samples.

The analysis of the results for the students and employees of the perception of the physical environment and attitudes about the occupiers showed that there are no significant differences between the groups for most of the buildings. However, the findings suggest that building C creates different patterns of attitudes for the two groups of observers, in contrast with the rest of the buildings which are perceived in similar ways. Hence, building C demonstrates that particular buildings may be perceived in different ways from various parts of the public. Still, there should be further research to examine the particular building's attributes or group characteristics potentially responsible for this discrepancy of attitudes.

7.4 On the Visual and Verbal Text

This part of the analysis investigates the influence of building branding on the observers' attitudes. The capacity of the visual and verbal stimuli to provoke attitudes and images concerning the characteristics of the occupiers is examined. Still, an important question on this debate is the ability of the buildings to represent and support organisations with different structural and cultural characteristics. One of the variances of the case study was the presentation of the buildings with text different from the original to a number of observers. This 'falsification' procedure was expected to provide some insights on the influence of the developers' intentions on the observers' attitudes, and investigate if different managerial styles can be successfully supported by the same properties. Furthermore, that was an attempt to examine the relevant weight of buildings and text.

In figure 7.3 the tendency of the observers' attitudes to change, and the various densities of preferred choices for the indicator of *flow of information* (formal-informal) is visible. The differences between the buildings are often substantial. For instance, when the capacity of building A to provoke a clear attitude is in contrast to the almost noisy observers' response for building C. Furthermore, the impact of the text presented at the second phase on the observers' initial response can be observed.

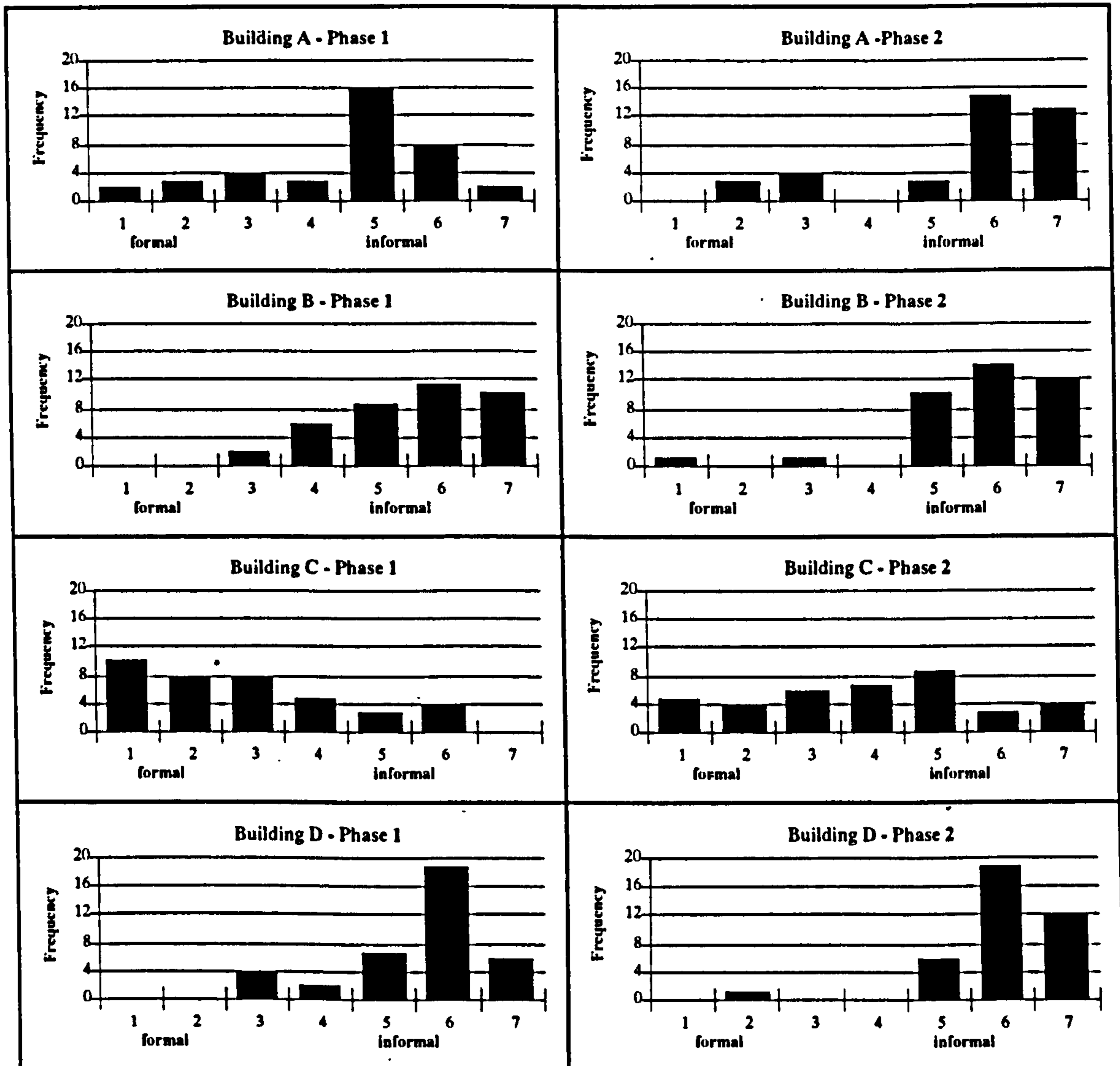


Figure 7.3 The response of 38 students to the first corporate indicator 'Flow of Information: formal-informal' for all buildings for both phases.

However, the above figure provides only an idea about the tendencies to be expected, without examining the actual significance of change for the observers' attitudes. Figure 7.4 shows the results of t-tests for two paired samples for the examination of significance of change for the observers' attitudes between the stages. The analysis did not reveal any patterns between the buildings. The change in the observers' attitudes was more visible in building A. Apart from the dimensions of *values* and *formalisation* where changes were marginally insignificant, there were significant differences between the stages for the rest of the indicators. On the other side of the scale, building D presented a more robust influence on the observers' attitudes by achieving insignificant changes between the stages on three dimensions, *flow of information*, *orientation* and *creativity*. The rest of the buildings presented a balance between significant and insignificant changes of

indicators, four and six significant changes for buildings B and C respectively. However, the contribution of indicators to the balance of significant changes of attitudes varies, without establishing any readable patterns between buildings .

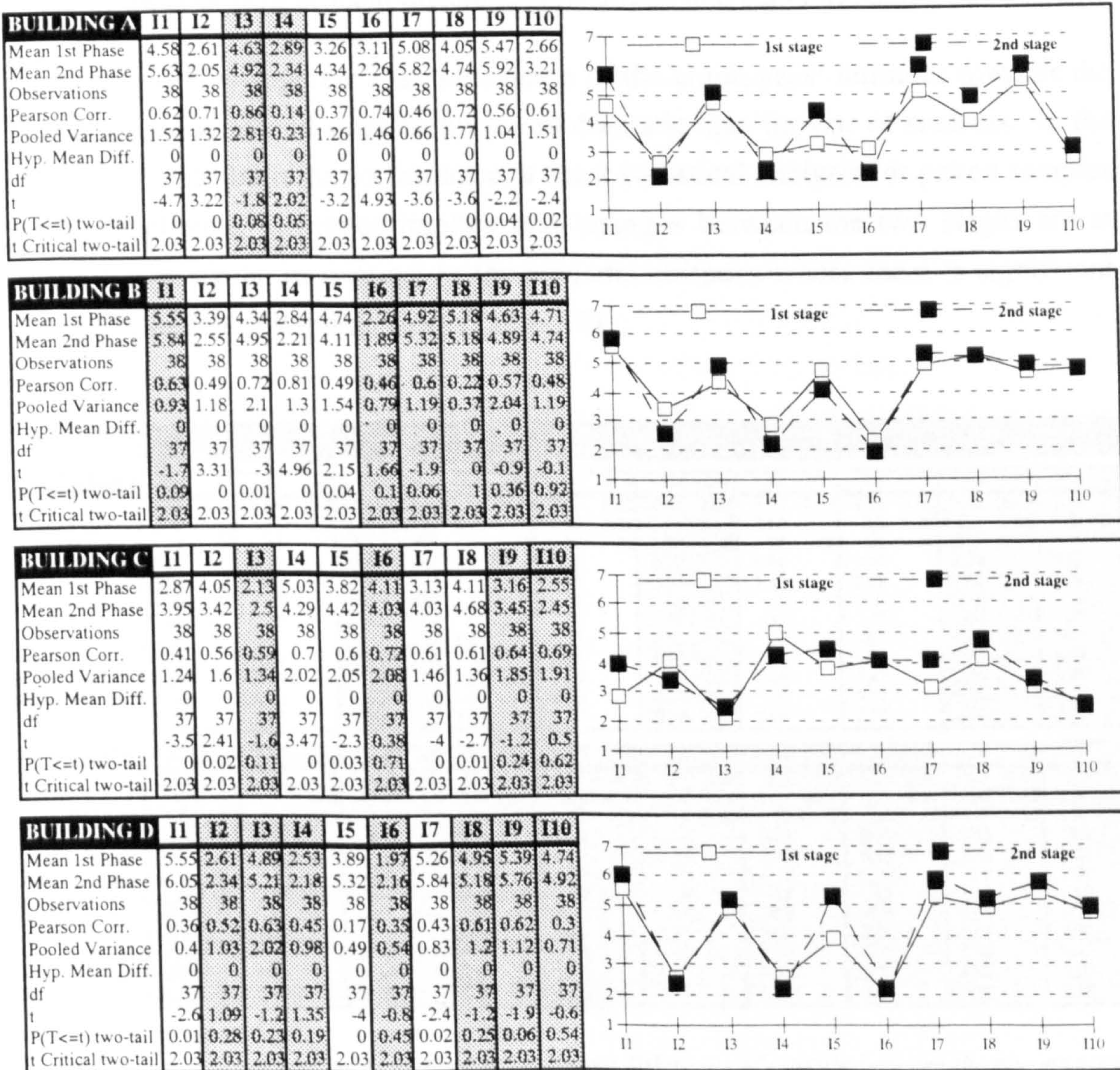


Figure 7.4 The results of t-test paired analysis for two samples of means perceived in the different phases of the exercise. The shaded areas indicate insignificant differences in attitudes between the stages. The graphical representation of means for each building shows the differentiation due to the use of the text.

Further tests were engaged to examine tendencies between the buildings (Appendix E ‘Tests involving Stage Within-Subject Effect’). The results of average multivariate tests of significance of difference between the two stages (separate analysis for students and employees) showed that there was not significant disagreement (significance of $p > .05$), while the same test for both groups together showed that

there were significant differences (significance of $p > .05$). F-tests on indicators within the two groups implied that there was not significant difference for five out of ten indicators between the stages (*flow of information, formalisation, creativity, social democracy* and *rationalisation*), while F-test for both groups presented only two indicators of insignificant difference (*creativity* and *rationalisation*).

Furthermore, it is apparent that the change of the employees' attitudes towards the indicators at the second stage is much less dramatic than the one of students. In the case of the third building for instance, a t-test statistical analysis for paired samples to the employees' attitudes implies that changes between the two stages are at insignificant levels, in contrast to the students attitudes where there is significant change in six out of ten indicators (Table 7.5).

BUILDING C	flow of information		social awareness		values		formalisation		orientation		creativity		social democracy		transparency		image		rationalisation		
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	
STUDENTS																					
Mean	2.87	3.95	4.05	3.42	2.13	2.3	5.03	4.29	3.82	4.42	4.11	4.03	3.13	4.03	4.11	4.68	3.16	3.45	2.55	2.45	
Variance	2.71	3.35	3.51	2.3	1.9	2.69	2.95	2.81	3.56	3.28	2.91	2.89	2.12	2.73	2.2	2.28	2.3	3.66	3.06	2.47	
Observations	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	
Pearson Corr.	0.41		0.56		0.59		0.7		0.6		0.72		0.61		0.61		0.64		0.69		
Pooled Variance	1.24		1.6		1.34		2.02		2.05		2.08		1.46		1.36		1.85		1.91		
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0		
df	37		37		37		37		37		37		37		37		37		37		
t	-3.5		2.41		-1.6		3.47		-2.3		0.38		-4		-2.7		-1.2		0.5		
P(T<=t) one-tail	0		0.01		0.05		0		0.01		0.35		0		0.01		0.12		0.31		
t Critical one-tail	1.69		1.69		1.69		1.69		1.69		1.69		1.69		1.69		1.69		1.69		
P(T<=t) two-tail	0		0.02		0.11		0		0.03		0.71		0		0.01		0.24		0.62		
t Critical two-tail	2.03		2.03		2.03		2.03		2.03		2.03		2.03		2.03		2.03		2.03		
EMPLOYEES																					
Mean	4.45	4.65	3.8	3.9	3.8	3.45	3.8	3.6	4.9	4.7	3.7	3.85	4.2	4.5	5.15	5.05	4.5	3.95	3.9	3.55	
Variance	3.52	3.82	1.96	4.41	3.33	4.05	2.59	2.88	3.04	2.85	2.01	1.4	2.91	2.79	2.24	1.21	2.89	2.89	1.88	2.16	
Observations	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Pearson Corr.	0.63		0.55		0.5		0.39		0.22		0.47		0.26		0.35		0.61		0.6		
Pooled Variance	2.32		1.61		1.83		1.07		0.65		0.79		0.74		0.57		1.76		1.22		
Hyp. Mean Diff.	0		0		0		0		0		0		0		0		0		0		
df	19		19		19		19		19		19		19		19		19		19		
t	-0.5		-0.3		0.81		0.49		0.42		-0.5		-0.7		0.29		1.64		1.23		
P(T<=t) one-tail	0.3		0.4		0.21		0.31		0.34		0.31		0.26		0.39		0.06		0.12		
t Critical one-tail	1.73		1.73		1.73		1.73		1.73		1.73		1.73		1.73		1.73		1.73		
P(T<=t) two-tail	0.59		0.8		0.43		0.63		0.68		0.62		0.52		0.77		0.12		0.23		
t Critical two-tail	2.09		2.09		2.09		2.09		2.09		2.09		2.09		2.09		2.09		2.09		

Table 7.5 Comparison of t-test analyses on the difference of attitude between the two stages of building C for students and employees. The shaded areas indicate insignificant differences on attitudes between the two stages.

This can possibly be explained by the fact that employees are more familiar with public relations and branding procedures, thus much less impressed by the text which advertised 'good causes' and managerial objectives. It should also be acknowledged that differences between the two phases are the consequence of principles and values referred to the statements of corporations for the individual buildings. Hence, it is not an accident that the largest scores of the differences between the two phases were detected on corporate indicators indirectly suggested in most statements. That is also evident of the collective strength of environmental

experience and communication techniques which highlight features embodied in the design of buildings and are capable to support pursued cultures and images.

7.5 On Buildings

The examination of the individual performance of buildings is of particular importance to the study. The ability of buildings to present desirable information to users can be examined. As was supported before, the existence itself of a commercial property already provokes the creation of images and attitudes by the public, especially concerning the power and wealth of the occupier. The analysis of buildings aims to investigate two hypotheses: a. the strength of different design approaches, as they are presented through the selected buildings, to influence the observers' attitudes towards the occupier, providing some kind of differentiation and identity and b. the support of different corporate identities by the same design solutions.

Figure 7.5 shows the signature of all buildings for the first phase of the experiment. Although the principles of design between buildings for most of the indicators are comparable, it seems that building C stays separate for most of the indicators. In fact, if the scores it achieves are compared to the developers' intentions, it fails to communicate the desired corporate image on seven out of ten indicators.

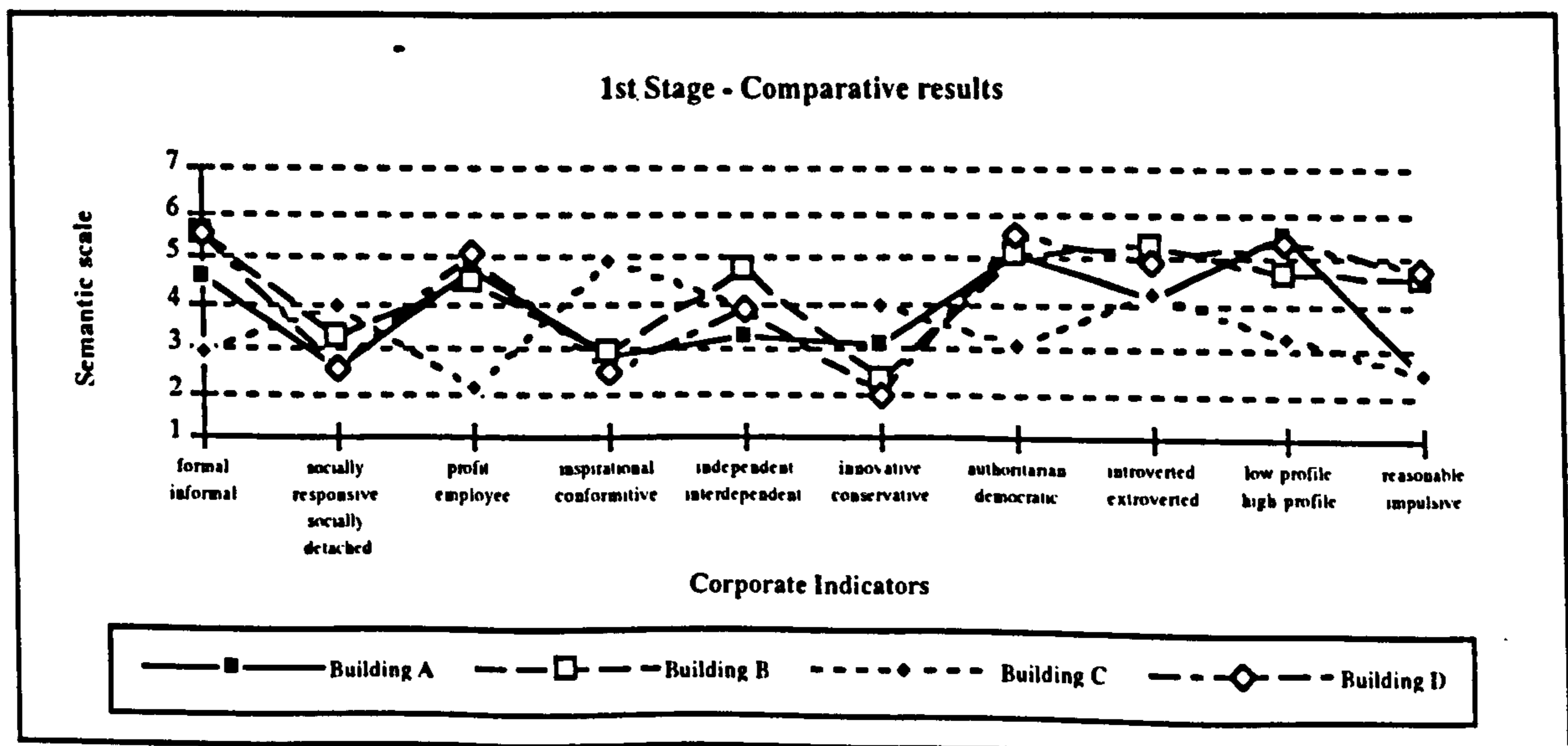


Figure 7.5 Comparative scores of students for all corporate indicators and all buildings in study for the first phase.

Yet, apart from the differences in the observers' attitudes towards the occupiers of the buildings, there were significant differences in attitudes between the two stages and between the buildings for each indicator (Figure 7.6). If the text is not the only factor responsible for these differences, then it should be assumed that the buildings themselves or some of their particular features and properties have various levels of accessibility to different interpretations, provoking a range of different attitudes. Some attributes of the buildings are strong enough to provoke similar attitudes in different social environments, while others are vulnerable to particular conditions.

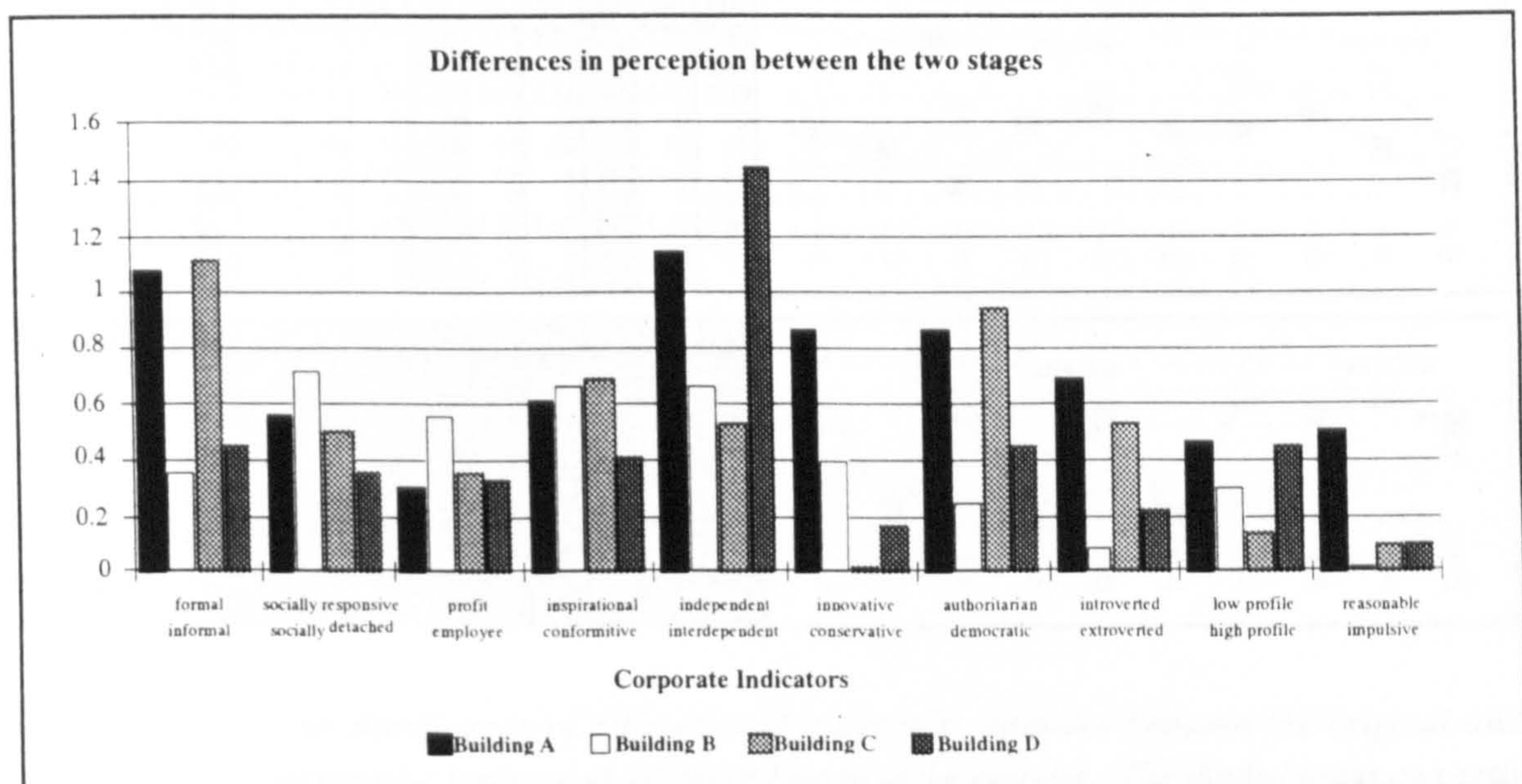


Figure 7.6 *Changes in observers' attitudes between the stages for all indicators. The variety of change between buildings initiate questions about the existence of associations between architectural forms and corporate images.*

This hypothesis was partly tested with the variance of falsification. A number of observers was exposed to a text different from the original one. The alternative text was supplied by one of the other buildings in the study. For the completion of the study two pairs of buildings were presented to observers with the same texts, buildings A and C, and buildings B and D. Still, the same text was used with two different buildings. This variance could provide information about the comparative weight of different texts used in the study and the behaviour of buildings supported by different branding (Figure 7.7).

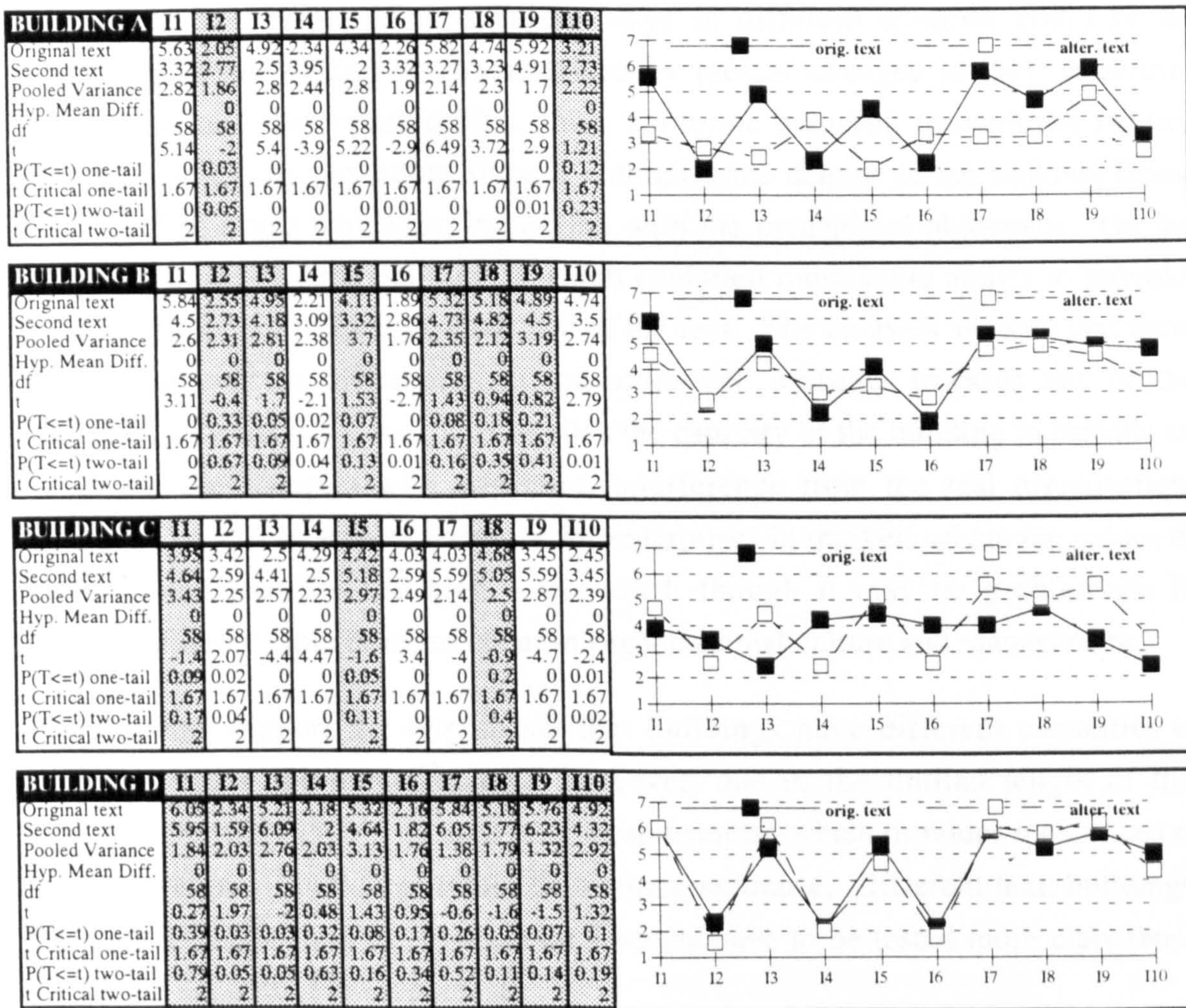


Figure 7.7 The significance of difference of observers' attitudes between the original and alternative text used at the second stage of the exercise. The shaded areas on t-tests for individual samples indicate insignificant differences in attitudes between the samples.

The analysis of the findings shows substantial diversities in the observers' attitudes between the two pairs. The significant differences on attitudes for individual buildings with different text in the first pair were much higher than the ones in the second pair, indicating that the text used with the buildings A and C was stronger or less alike than the text for buildings B and D. However, this does not explain the differences found between buildings within the pairs. In the first pair of buildings with the stronger text, there were some areas of insignificant difference, yet, these occurred in different indicators for each building. To the same extent for the second pair, areas of significant differences found in building B were not observed in building D.

Building A can be considered to maintain the highest capacity on flexibility between the participating buildings to serve different managerial styles. This ability of the

building to be interpreted in different ways in different contexts could be an advantage for the occupiers characterised by radical changes in their structure, culture and customer relationships. Yet, corporate branding through the facility should be a delicate procedure since it embodies the danger of the building being interpreted in forms which are in conflict with the managerial objectives. On the other side of the scale is building D which exhibited remarkable ability to provoke the same strong attitudes independently of the text. The analysis showed that there were no significant differences in the observers' attitudes towards any of the indicators between the texts. That implies the capacity of the building to provide an image for the occupier with minimum interference from the real organisation. Building D could be seen as adequate for enterprises in markets where the values of tradition and stability are highly respected, though it may be problematic in conditions where rapid changes occur in organisational culture and management.

The findings support the hypothesis that buildings have different capacities to support various corporate images. However, due to the limited length of this research, the study should be seen only as an exercise which provides indications of the competence of buildings rather than strong evidence. Different text, buildings, architectural styles and their particular features have to be tested more elaborately for further support of the argument.

Furthermore, the results of the study suggest that not all buildings exhibit the same degree of clarity in provoking a corporate image. Although the performance of buildings vary for each indicator, figure 7.8 records the average overall performance of buildings for the representation of corporate identity with reference to the selected corporate indicators, by comparing the observers' agreement and homogeneity of judgement for both stages of the exercise.

A review of the results of the initial attitudes of the observers for all buildings indicates rather equivalent levels of significance on the index of meaningfulness for the three first buildings, while building D presents exceptionally high levels of clarity. At the second stage, there is substantial increase in the levels of meaningfulness for all buildings except building C, where the clarity about the occupier decreases significantly.

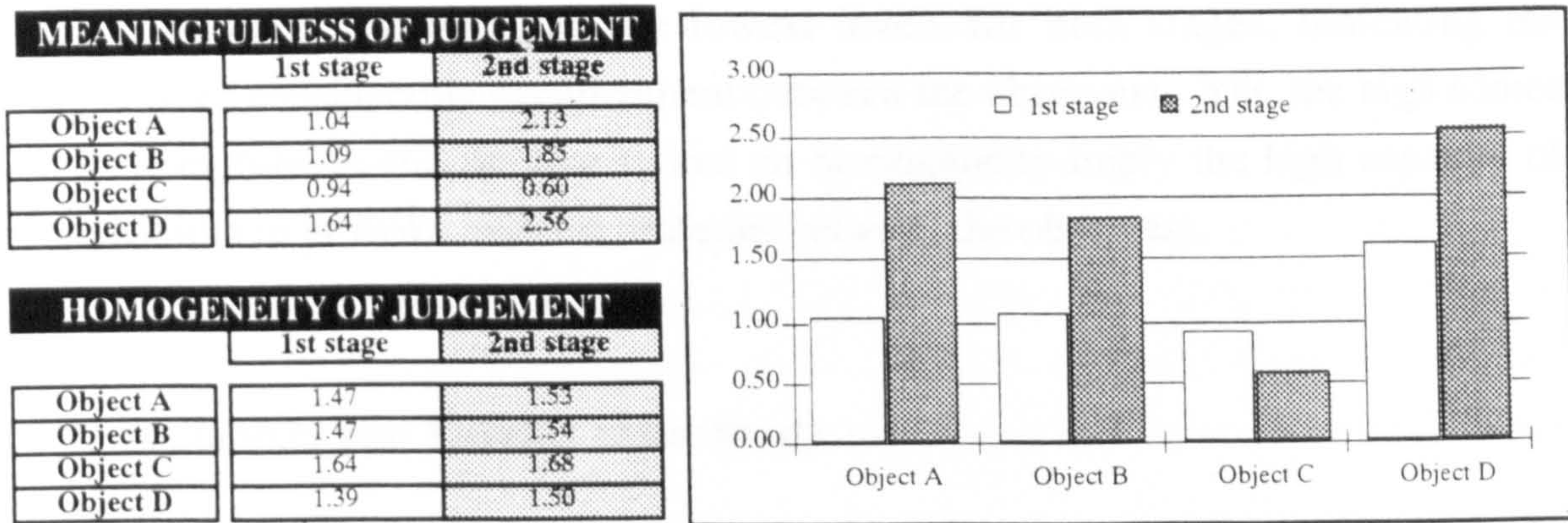


Figure 7.8 *The results of the analysis on the meaningfulness and homogeneity of judgements for all objects in the study and the overall performance of buildings for the presentation of a solid corporate image. The improvement of performance for most buildings in the second phase where visual experience is supported by branding is apparent.*

Furthermore, the homogeneity of judgement in the second phase for all objects of the study has achieved moderate higher scores. That could be interpreted as an indication that corporate branding based on attributes of buildings is able to influence the observers' attitudes invariably of the direction of corporate cultures.

Buildings A and B show similarities by displaying a moderate capacity to influence the initial corporate identities. Moreover, they demonstrate a great capacity to exploit corporate branding. Particularly in the case of building A, the clarity achieved at the second stage is twice as much as the initial one.

Building C achieves the lowest scores in the study and it is the only building which actually receives a lower score at the second stage of the exercise. Though at the first stage the perceived meaningfulness is not far from the rest of the buildings, the results from the second stage indicate that there is a conflict of design intentions and perceived attitudes by the public. In that case, the building practically fails to present a meaningful corporate image, it creates confusion to the observer and acts as an obstacle to the interaction between corporation and observers, rather than as a means of communication.

Building D can be considered as the most successful building in presenting a solid corporate identity. In the first stage it achieves the highest rate on meaningfulness with considerable distance from the rest of the buildings, while it seems to perform equally well at the second phase too, where it obtains the highest rate on clarity. However, on the measurement of homogeneity of judgement it does not perform as

well. In fact it has obtained the lowest levels for both stages, indicating the existence of considerable disagreement between the observers. Yet, the high scores on meaningfulness and the low scores on homogeneity imply the high capacity of this building to provoke extreme attitudes between the observers.

7.6 Reliability and Validity of the Study

In social science research, a number of biases and problems arise which increase the error component in data, leading to low reliability and reduced validity. It is important for these types of bias to be considered at the design stage of research. For understanding the interplay between man and the physical environment, an approach had to be applied which took the social and cultural setting into consideration. The appropriate conditions had to be produced where it was possible to trace the details from the respondent without the loss of totality.

Data was collected in this research by means of structured questionnaires. The study recognised the existence of a number of sources of bias associated with the adopted method of research, the employed technique, the process of interviews, the selection of objects for the study, the design of the research apparatus, the sampling process and the field-work stage. The effort to eliminate the errors and to achieve the control of these variables was realised through a process of exclusion, maintenance of a constant environment and randomisation.

However, a cautious approach should be taken to the generalisation of the findings of the study. The case study, through the procedure of questionnaires, attempted to imprint and reflect the attitudes of the observers concerning the examined characteristics of the occupiers of the premises. Yet, since an attitude is a complex phenomenon and its appreciation relies highly on the questionnaire (actual question form and wording, on context, emphasis), the medium of objects in study (slides, selection of specific photographs, the physical conditions where interviews take place), and the mood of the respondents at the particular time of the interviews, the results should be perceived as a compound of the relatively *stable* observers' attitude and of these other, *momentary* determinants [Oppenheim 1966].

Moreover, particular attention should be given to a number of controlled variables of this research of which the researcher is unable to estimate the true significance in shaping the final results. Most of observers were students, educated above average,

most of them of British origin, with strong expectations and demands from the environment in which they live, the presentation of objects in study was performed through projectors loaded with 35mm colour slides, giving some space for misunderstanding of the perception of office buildings, and finally, the buildings of the study are not commonplace office buildings but rather *flagships*, places of exceptional design and construction quality for the demonstration of a strong corporate image, providing a rather positive dramatic impression, to a middle class observer.

7.7 Conclusions

The present case study should be seen as an effort to provide some insight into what has very often been considered abstract, unknown, and highly subjective material about people's reaction and attitudes towards corporate communication, using physical assets and different working environments as a stimulus.

The statistical analysis suggests that corporate identity can indeed be reflected through the physical environment. The observers' experience through the premises creates attitudes towards the characteristics of the occupier. Yet, different organisational dimensions are mirrored through the physical environment with different clarity, subject to the kind of indicator and the type of building or architectural form.

Differences were found in the perception of buildings between the groups of observers, mainly at the second phase of the study and particularly concerning some aspects of the organisation. Moreover, text's influence on attitudes was found to be dissimilar between groups.

It was observed that some of the buildings could provoke the same attitudes, no matter what text accompanied them, while others depending on their text could generate different attitudes. In addition, different buildings with the same stimuli could provoke different attributes. The combination of some buildings and text was proved to provoke more cohesive and compact attitudes than others.

Having concluded the statistical analysis, the work continues with the interpretation of the findings under the context of corporate objectives, and the consequences of ABP methodology are discussed. Furthermore, building on the conclusions of the

literature review and the findings of the case study, the last part of this work would be a discussion on the objectives and methodology of future ABP methods. This will be followed by the presentation of a novel method, based on the new insights on the nature of organisations, their relationship with the socio-economic environment, and the new significance of facilities to the organisation.

SECTION THREE

INTERPRETATION AND DISCUSSION

Facilities for the Post-Industrial Era or towards New ABP Methods

8.1 Introduction

The first section of the work was occupied by the significance of premises to business objectives. It examined the functional and supporting role of the physical environment to the existence of the organisation, the role of facilities in the optimisation of employees and work-teams performance, and the symbolic dimension of premises.

The second part reviewed the current ABP methods and their capacity to offer a reliable measurement of the performance of facilities with reference to business objectives. Furthermore, the case study was concerned with the examination of the ability of facilities to function as a means of communication of the organisational structure and culture.

The chapter opens with the interpretation of the findings from the case study under the context of the organisation and the examination of the significance of the conclusions for the definition of the performance of facilities and ABP methodology. Later, building on the findings of the literature review and case study, the chapter is occupied with a discussion of the methodology of ABP studies, which is to offer tools able to deal with the real issue: the satisfaction of corporate objectives. At the last part of the chapter, an example of a new methodological approach is outlined.

This should be perceived as an example of a new generation of methods, where the focus of concentration for ABP methods is the organisation and the operational environment, which define objectives and risks, needs and constraints rather than the final product.

8.2 Corporate Communication Dimension of Facilities

The study shows that some buildings provoke more or less the same attitudes for all groups of observers, while others provoke different ones. That indicates the existence of specific features of the buildings themselves which are open to different interpretations, influencing the observers' attitudes about the occupier. What creates this discrepancy is unknown, though it is possible the different distance of students and employees from the working environment may have some association with the phenomenon. Nevertheless, it is important that some buildings can provoke different kinds of attitudes to different observers. The discovery of what attributes of the physical environment are responsible for particular kind of perceptions can be seen as a subject for further research, since that knowledge can be used to the advantage of an occupier who wants to disseminate different messages to different stakeholders, while reducing the risk of provoking unintentional attitudes through the physical environment¹.

Facilities, like any other commodity, are the subjects of advertisement and branding. The construction and occupation of premises, often depends on the ability of designers and developers to communicate the concepts behind the design of their proposals and their ability to emphasise the benefits of the particular properties for the users. In addition, management frequently uses premises and what they represent as indirect means of corporate branding. This is common practice particularly when the target groups are the internal public.

¹ As was mentioned in chapter III, there is a large number of studies in environmental aesthetics examining the symbolic meaning of different spatial configurations and quality of materials, attempting to investigate their influence on human perception [Lang, 1982; Kaplan, 1979; Russell, 1988]. Most of the studies are concerned with the affective qualities of the environment. Though some studies examine the impact of the physical environment on the observers' perception of the occupants at the context of the individual, there are not any studies, at least to the knowledge of the author, dealing with the perception of the occupant at the context of the organisation.

The analysis of facilities branding indicates that the support of premises by text affects some aspects of the observers' attitudes. Yet, the tendency and importance of influence depends on both, the text and the building. In addition, the effect of the text on the students and employees' attitudes seems to vary, with the employees' attitudes less affected by facilities branding. These findings imply that the paraphernalia of supporting materials, based on properties of the buildings, and used today by enterprises on corporate branding exercises, could have different impact on the attitudes of the internal and external public. Further research should be conducted on the weight and strength of different forms of stimuli, and the way they influence the users' attitudes towards the organisation.

The examination of attitudes towards particular buildings demonstrated the ability of different design approaches and architectural styles to provoke perceptions of the occupier in a variety of directions and intensities. Yet, apart from displaying different corporate images, buildings also manifested a variety of clarity, the robustness to present the organisational characteristics. The presence of the text significantly improved the dimension of clarity in most buildings, demonstrating that the existence of congruent means of corporate communication has a much stronger effect on the public's attitudes than isolated stimuli.

Furthermore, the study showed that some buildings accompanied by the appropriate text are able to support different organisational identities, while others present a firmness to be identified with a particular kind of organisation. This may have important implications on organisations within sectors characterised by rapid change, and on the design of speculative buildings where developers look for organisations with particular demands on image.

In conclusion, the analysis suggests that the physical environment is able to influence, to some degree, the laymen's impression of the characteristics of organisations, therefore facilities should have a role to play in corporate communication and public relations exercises. Besides, the optimum exploitation of physical resources can be achieved when apart from the fulfilment of operational requirements, facilities are able to contribute to corporate branding and support the desired managerial style and corporate image.

The management, through assets, the working environment and other means of corporate communication, has to achieve the identification of employees with the corporation, factors beneficial to corporate mission, and eliminate the employees'

alienation, factors obstructive to organisational objectives. Outside the organisation, a positive image is also essential, since the attitude of the public may prove critical to the success of corporate objectives (Figure 8.1).

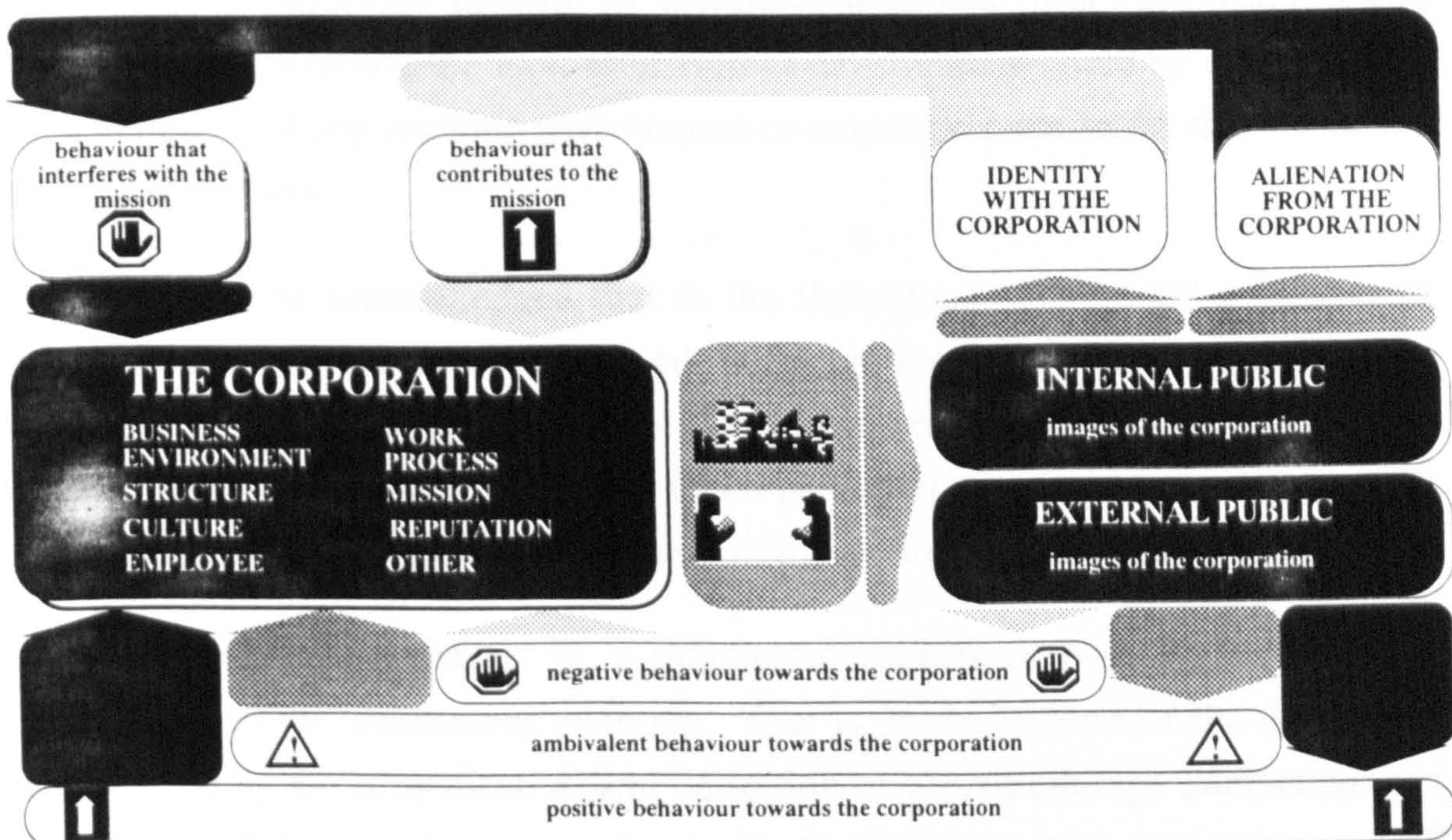


Figure 8.1 *Facilities managers have to understand the human-environment relationship, to maximise the impact of positive perceptions and eliminate potentially hazardous attitudes.*

In addition, it seems that corporate identity and image should be introduced to the facilities managers' agenda, since physical assets can influence communication between the internal and external customers. One of the facilities manager's tasks is to come to grips with the relevant elements of the physical environment which communicate the corporate identity. If these elements are identified and the way they affect attitudes is understood, then the facilities manager may be in a position to manipulate them, to be consistent with the organisational culture, helpful to the implementation of the management's values and policies, improving the organisation's image.

Yet, the demonstration of facilities as a means of corporate communication has important implications for the reliability of existing ABP methods, since this dimension of the performance of the physical environment is absent from their areas of concern. The importance of this attribute to enterprises, is subject to the specific industrial sector and socio-economical environment where the individual

organisation operates. Furthermore, the significance of the case study is on the provision of evidence for the existence of organisational dimensions, other than the traditionally considered, which may be affected by the kind of corporate premises.

The methodology of the case study and the developed tool could be applied for the assessment of corporate identity of different buildings from organisations and investors. Furthermore, the tool, after further development could be employed for the assessment of any working environment or corporate premise for this dimension of the organisation.

Yet, it should be acknowledged that in the theoretical background a number of methods and instruments developed in cognitive psychology and used in environmental assessment was revealed. The combination of different methods, a practice very often in use in this field, could provide more accurate findings and the opportunity for a more refined assessment of the environmental behaviour.

As was supported in chapter V, a number of aspects of building behaviour is excluded from the assessment methods. That is partly because of the difficulties experienced by the identification and definition of users-buildings interaction, and the absence of appropriate measurement tools. As a consequence, current ABP methods concentrate on easily quantifiable dimensions of buildings, bypassing more qualitative issues.

However, this study has provided evidence that significant and valuable knowledge already exists in other domains of knowledge. Cognitive and environmental psychology is just one of the apparently fragmented fields of knowledge from which ABP researchers could extract considerable amount of information. Furthermore, in the paradigm of the case study, research instruments already in use at these fields can be adopted or new ones can be developed specifically for the assessment of buildings.

Further research at the other domains of knowledge could emanate to the development of evaluation models in particular aspects of building performance, at the paradigm of current ABP models. Because of their specific subject and defined objectives, these flexible models could be effortlessly applicable and performed with low budget studies.

Moreover, this work has provided evidence indicating that on more ambitious efforts, where the researcher is preoccupied with the overall performance of

premises, the consideration of knowledge from other disciplines has to be examined. In that case, a more sophisticated study of the design of the applied instrument must be accomplished. The main difficulties in such attempts are identified firstly by the clarification of organisational priorities and expectations from the premises, and secondly by the definition of the importance of different aspects of the building.

It is recognised that whatever the scope of the study, the efficient use of an evaluation method relies on the knowledge of the following assumptions:

- *the requirements of users*, considering that the term *user* can extend from the single corporation to the design and construction team, the ultimate users, the local community, others,
- *the context* within which the facility operates and the requirements that have to be met through the facility. The context consists of the business, real estate and socio-economic dimensions,
- *predictive methods* which evaluate the behaviour of facilities and performance in use.

It is perceived that the satisfaction of the first two assumptions is a matter of the management's realisation of the span of corporate responsibility, risk and values. Yet, the fulfilment of the third assumption is a much more complicated matter, it depends on the acquired body of knowledge. It is recognised that the impact of the attributes and characteristics of buildings in business dimensions will always be a subject of controversy. However, it is expected that the improvement of our body of knowledge in a number of specific concepts, accrued from research and practical experience, will aid to a deeper quantitative interpretation and provide more workable and unambiguous methods of study and instruments [CIB, 1982].

In chapter IV it was indicated that existing ABP methods lack the appropriate theoretical background for the overall examination of the significance of facilities for the organisational performance. Taking advantage of the knowledge obtained at the previous parts of this work, the chapter continues with an overview of the methodology that future ABP methods should be based on.

8.3 On the Evaluation Praxis

The organisational theory, environmental psychology and the findings of this research indicate that apart from their functional importance, corporate premises have implications on a number of issues which affect organisational effectiveness. Yet, the influence of facilities on the performance of these organisational dimensions is subject to the conditions of the operational environment and the characteristics of the particular organisation. Thus, reliable assessments of the performance of facilities should take into account parameters analogous to corporation objectives, the requested by the management culture in the workplace, the desirable image, the ability of industry to support the applied technology, the users' expectations and society's concerns.

However, the literature review revealed that existing appraisal models and studies concentrate on the final product, the building itself without enough consideration of the financial and environmental limitations, potential business opportunities and particular corporate objectives. Yet, the development of a measurement tool, which though departing from the study of the individual organisation and the operational environment could be able to appraise the impact of the presence of buildings on the overall performance of the corporation, would be for the benefit of organisations (Figure 8.2).

Rather than focuses on fragmented issues of dubious importance, ABP methods have to question the multiplicity of the ways that facilities can serve corporate objectives under the particular socio-cultural and economical domain. What kind of organisation would the facility be a part of? What culture, structure and managerial priorities would there be? What kind of interdependence exists between the corporation and society and how can facilities satisfy both? Where and in what directions is the tendency for the change of the current conditions and how can facilities contribute to the long term profitability of the client?

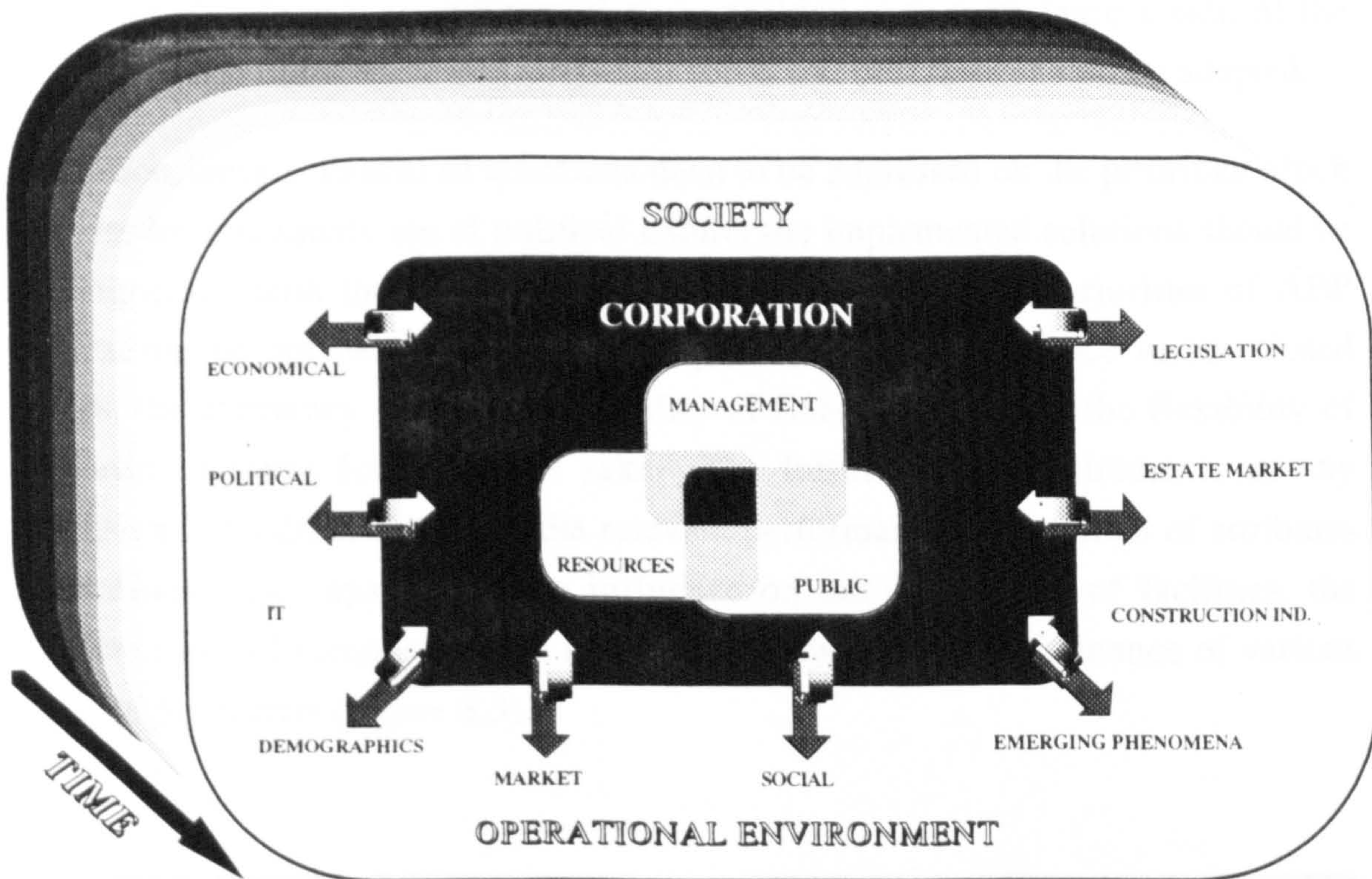


Figure 8.2 *Facilities should be viewed under the perspective of the corporation, performing in a dynamic and turbulent environment where priorities, objectives and values are under continuous scrutiny and change.*

The act of performance assessment is the practice of thinking and working in terms of ends rather than means. Hence, the appraisal of the performance of facilities should be concerned with *what* objectives a facility is requested to accomplish and *if* it is successful in these, rather than *how* it achieves them or the description of *how* these objectives should be fulfilled. The selection of the design approaches to accomplish the objectives is critical only in the tactical level in terms of whether the means are capable of reliably accomplishing the aims for a defined period of time.

Under the existing ABP practice it is taken for granted that the areas of corporate interest have been successfully identified and almost universally accepted. However, corporations are unique entities with specific characteristics and requirements operating in different conditions. Thus a single index of business priorities reflected on a physical-spatial environment should be considered as a rather restrictive if not inadequate practice. Moreover, the significance and order of examined issues in similar exercises, embraces the dimension of a political praxis, since they can be seen as a statement of the management concerning the interests and culture of the organisation. Considering the implications of such acts on the perception, attitudes and behaviour of the internal and external public, a process

during which interests are addressed and unfolded with a strategic vision of the corporation and users' short and long term needs and prospects should be adopted.

In addition, since a number of questions need to be addressed on the priorities which facilities have to satisfy are of political nature, the implemented solutions should be in congruence with the corporate style of management. The priorities of ABP applications do not lie on measuring the percentage of open space versus closed offices, the efficiency of BMS, the quality of final materials, or the flexibility of supporting systems for their own sake. The fulfilment of requirements on any dimension of facilities rely upon the relevant performance of a number of attributes of facilities. Yet, apart from the influence on the dimensions of facilities, the characteristics of components are inclined to influence the performance of various business parameters (Figure 8.3).

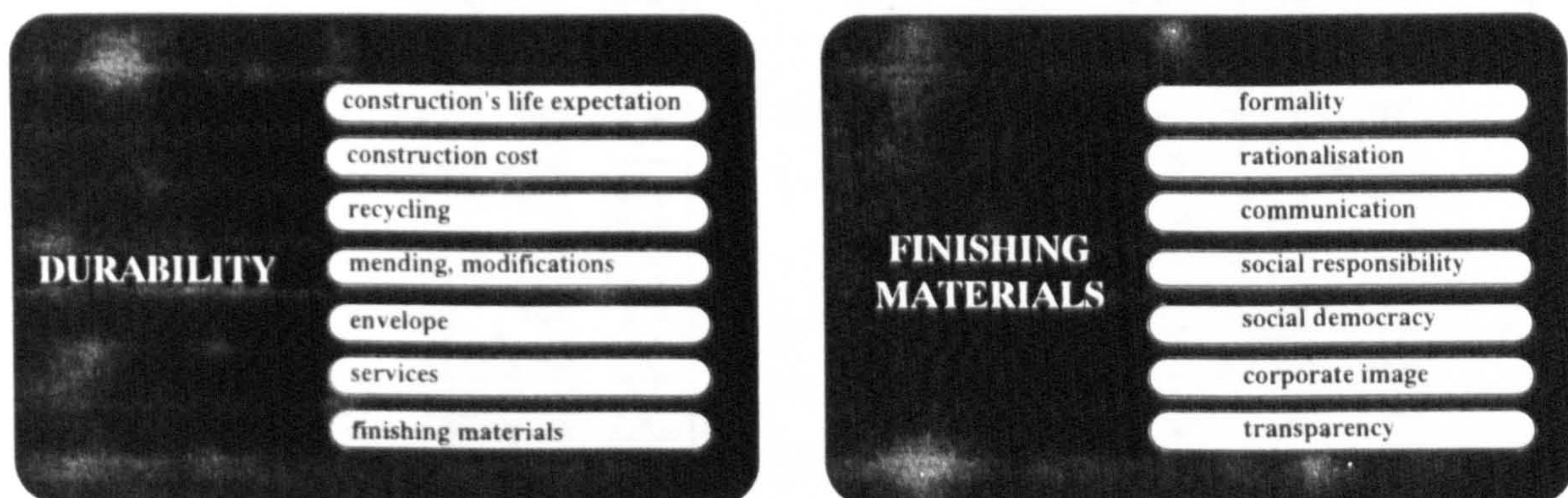


Figure 8.3 *The performance of any dimension of a facility is the outcome of the balance of various-attributes of the building. Yet, the characteristics of the physical environment are able to influence the performance of more than one business issues.*

Thus, apart from the objective of an ABP method to measure the performance of the attributes of facilities handling particular organisational issues, it is a requisite that it will ensure that selected design and construction solutions do not have restrictive impacts on other, not directly associated business affairs. ABP methods have to define who the real client is and what the requirements, the extent of available resources, and to understand the dynamics of the social and economical environment where corporations operate.

The consistency of corporate nature with the physical environment is not an ambiguous association. Since it is accepted that the same functional objectives can

be achieved through the application of different design approaches, the implemented physical environment can be regarded as the visible evidence of organisational structure and culture, managerial style and the conditions of the operational environment (Figure 8.4).

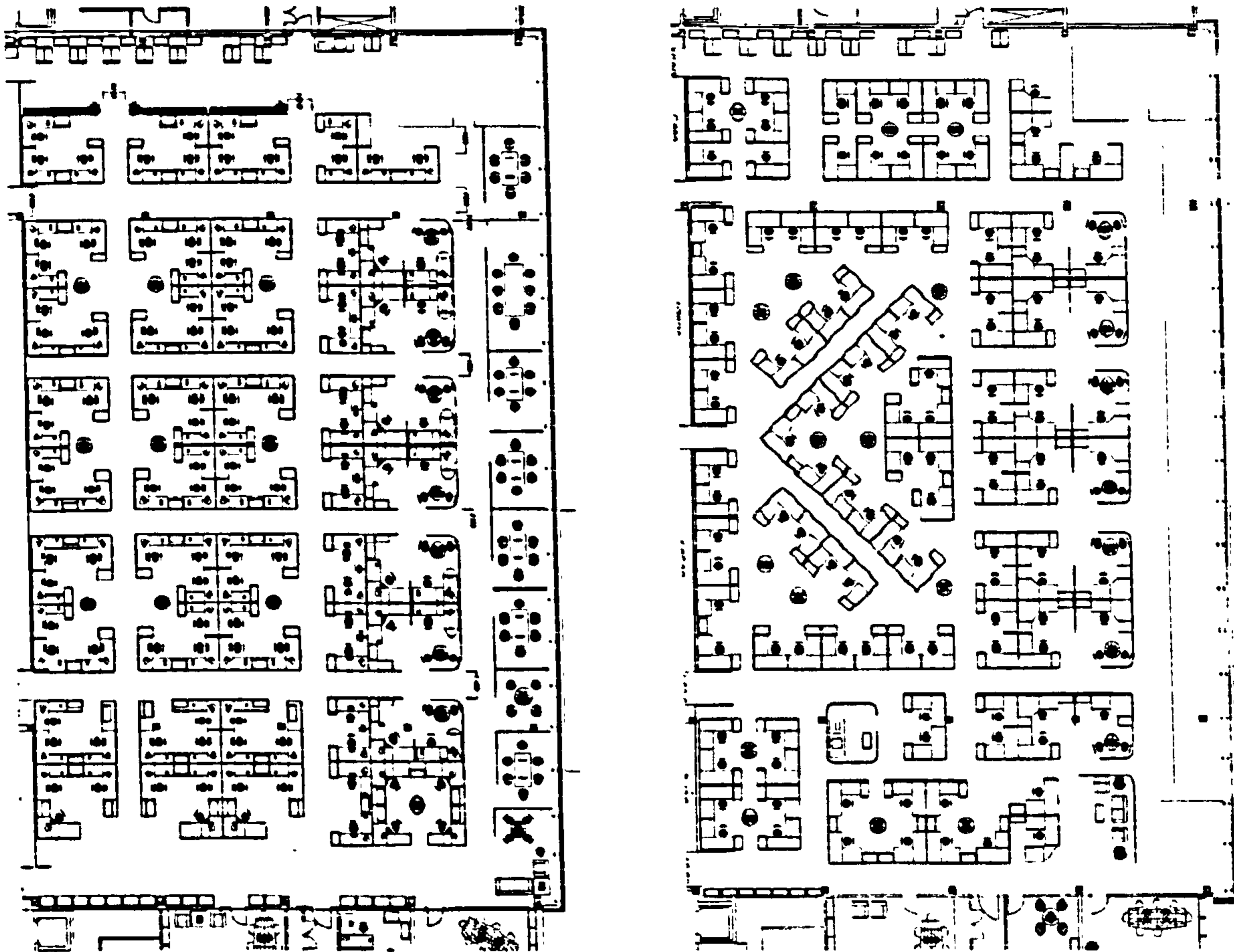


Figure 8.4 *Two proposals of office layouts achieving the same number of workstations and similar work-team structures. Yet, the one on the left could imply a more formal departmental structure and a demand for compliance to organisational rules, while the one on the right could suggest an employee' oriented organisation where intuition and freedom of expression are of greater importance.*

Thus, at the measurement praxis of the physical environment, the coherence of the organisational and socio-economical context with the reasoning behind the decision-making of the selection of applied techniques and design solutions which fulfil the business requirements should be tested (Figure 8.5).

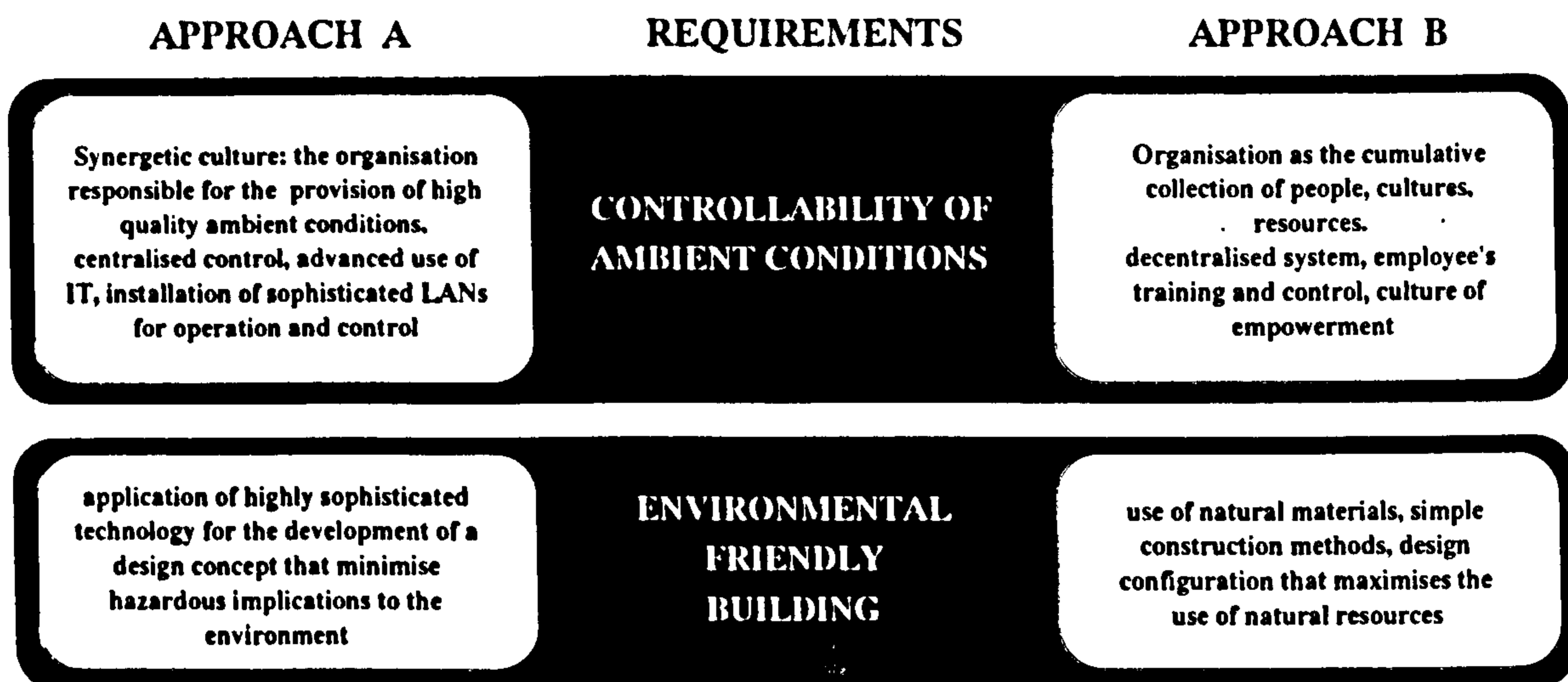


Figure 8.5 *The fulfilment of business requirements can be expressed through extremely different approaches. The suitable proposal depends on issues such as corporate culture, industry's maturity, and users' awareness.*

There is a variety of approaches to fulfilling fragmented objectives such as the functionality of the physical setting, the low operational cost, image, health and safety issues. However, the selected proposals are often not fully compatible, initiating serious compromises which emanate only partial success of the ability of facilities to promote corporate objectives. The author supports that only through a process of enquiry on long term corporate objectives, the operational environment and the cross-examination of the influence of the physical environment on organisational dimensions, can the real requirements and potentials of facilities be revealed.

The examination of proposed solutions to particular issues under the frame of the strategic plan could permit the deeper understanding of their interaction and define the optimum configuration through the elimination of incompatible approaches. Yet, since the consistency of the attributes of facilities with the socio-economic environment is subject to specific corporate aims, resources, and socio-economic conditions of the environment, it cannot be accepted as pre-defined, as long as the latter varies, being a unique combination in each case.

ABP methods should be concerned with the identification of the organisational and environmental issues which determine the extension of corporate objectives affected by the attributes of the physical environment. They should be able to specify the required levels of the performance of facilities on every engaged attribute taking the

organisational limitations and the external constraints over the expected period of operation of facilities into consideration².

In view of their active rather than passive role, ABP methods should embrace a more comprehensive approach in order to recognise and measure more accurately the performance of facilities with reference to the requirements of the occupiers and the variations of the operational environment. It seems that the familiar reactive approach of current *Assessing Building Performance* applications should be replaced by the more appropriate proactive approach of *Assessing Building Potential* on business objectives. The motive behind this approach is that the existence of premises influences all dimensions of corporate performance, while the definition of their exact effect on the business is the subject of ABP procedures. From this point of view, the operational environment is not considered as homogeneous and static, providing new potential roles and more risks to premises.

² Yet, it has been argued that there is no assurance that the selected proposals, no matter whether traditional or novel, will fulfil the expectations of providers and users until periodic explicit post occupancy evaluations are performed [CIB, 1982].

8.4 The Evaluation Team

During the assessment of a building, it has to be considered and stated explicitly which and whose values are used in establishing the evaluation procedures, criteria and judgements. The author recognises that the participation of organisational members in the research team is a key element for the achievement of the objectives of any exercise of the evaluation of the premise. Investigating the process of evaluation, inevitably, it has to pay attention to the values behind the goals and objectives of the users of the evaluation. Thus, the performance criteria used in the evaluation should be developed from intentions and aims which themselves derive from values held by the interested parties of the building under study [Preiser et al, 1987].

Yet, distinctions should be made between participants of different interests concerning the property. Three kinds of interested groups have been identified about the facility. Groups concerned with the construction, maintenance and performance of particular construction materials and products e.g. manufacturers; groups interested in the levels of performance of facilities and services e.g. suppliers of services; and groups with a wider spectrum of interests about the long term performance of facilities and their impact on corporations, the users, society, the environment e.g. facilities managers, architects, official bodies, activists.

The procedure for the identification of the real interests of providers and consumers, the establishment of an equilibrium between requirements and accepted levels of services, and the specification of performance rates of the dimensions and attributes of facilities, carries a connotation of risk, in terms both of known sources of uncertainty and of possible errors of judgement. Yet, as was stated earlier, apart from the consequence in the decision making of the approaches of handling the operational issues of the workplace, the selection of participants and their authority in the evaluation process, is a highly political action since their views on the priorities of corporations, the facilities objectives and society's values will be reflected in the final model. Therefore, the role and given power to stakeholders as participants on such exercises may not reflect their actual significance to the corporation.

Yet, even the responsibilities allocated to the research team could vary in degree according to the scope of the study and circumstances. The balance of responsibility

transferred to the team is analogous to the weight and number of business issues which have been identified and taken into consideration by the senior management. Though the management is responsible for locating the interested parties invited to participate in a typical exercise, it is considered that it is beneficial for both the corporation and society when the number of interests taken into consideration represent a broader range of the production and consumption spectrum.

There are indications from previous practices that the participation of other interested parties is beneficial in competitive and sensitive business environments where feelings of symbiosis, opportunity and reliance prevail over the relationship of industrialists and the public. Even though final decisions involve a great deal of politics and power, nevertheless the researcher supports that the investigation of a plethora of broader issues, concerning the impact of buildings on the corporation and users, comprise the benefit of a comprehensive approach able to improve understanding and generate knowledge between the organisation's members.

In terms of assembling information, the involvement of possible important business dimensions and the process of establishing performance criteria, exercises based on the co-operation of different interested parties could be capable of considering contributors who represent a number of interests in society through a procedure which promotes the integration of ideas and the building of knowledge. Thus, it should be argued that such exercises enhance the production of design solutions which facilitate the achievement of a more rationalistic equilibrium between business requirements and social expectations.

8.5 Towards a New Methodological Approach

The true measure of a modern work lies in its intention to propose, perhaps only in small measure, a vision of what life might become

[Peter Ahrends, Lecture at the South Bank Polytechnic, 14.1.91]

The CFM in Strathclyde University has developed a conceptual model for facilities management which describes the relationship between business objectives and facilities [Alexander, 1993b]. Locating the organisational objectives at the top of the diagram, the model suggests that proactive facilities management should achieve an organic relationship between business needs, operations, facilities and assets,

departing from the examination of business demands at a strategic level (Figure 8.6) [Alexander, 1993b].

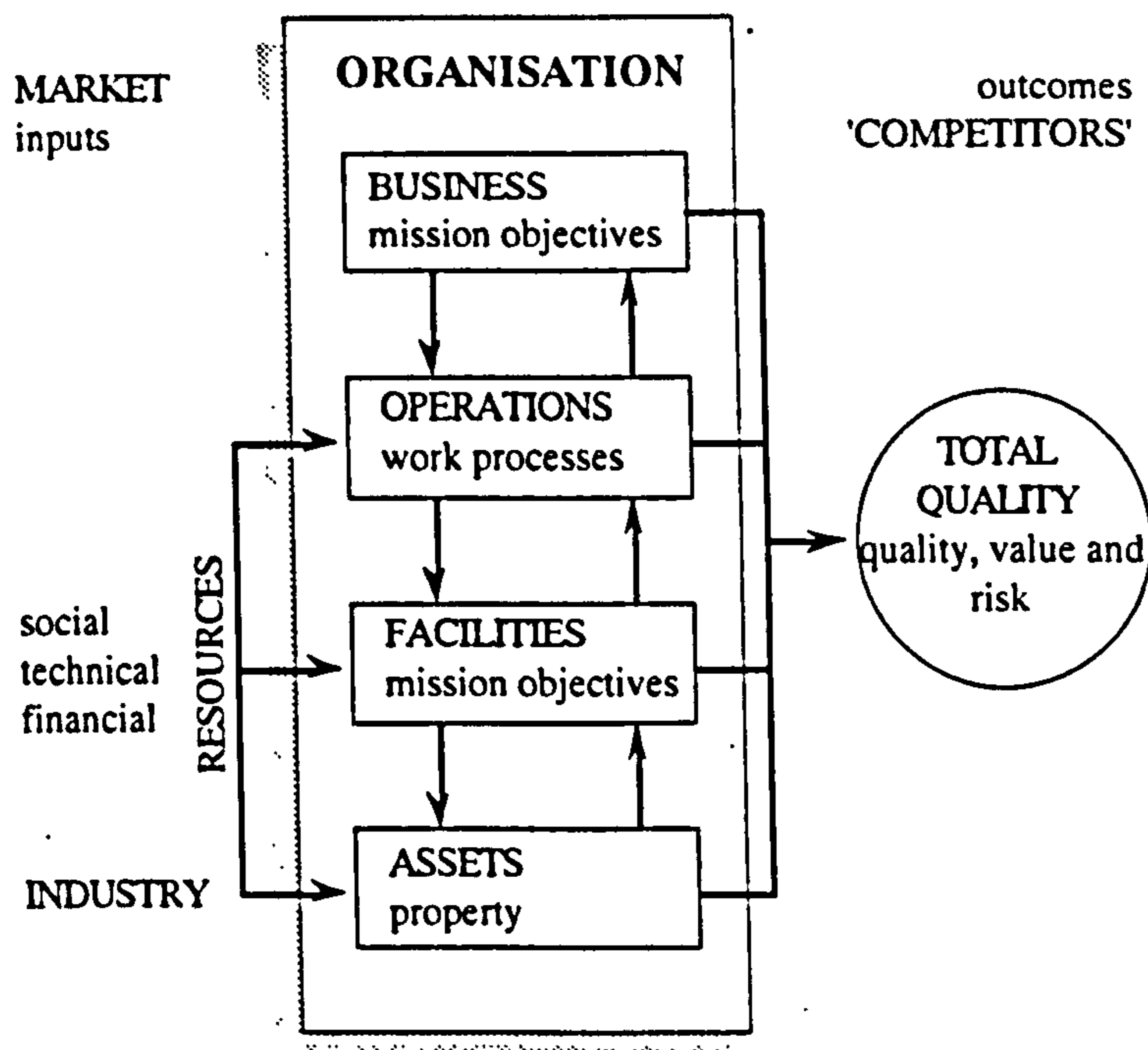


Figure 8.6 *The physical environment should be seen as part of the organisation where business demands define the priorities which assets have to satisfy [Alexander, Keith (1993b). Facilities Management: The Quality Journey. In Facilities Management 1993, Centre for Facilities Management and Hastings Hilton Publishers Ltd, pp. 81].*

The traditional approach to the inquiry into organisational demands is expressed through the argument *'what are the business characteristics which may influence the performance of facilities'*. However, this work suggests that the argument should be reversed, and the paradigm of the above model for facilities management, should be elevated to the organisational domain by adopting a proactive perspective to the issue. Hence, the principal question should be *'in what ways are facilities able to contribute to the overall corporate objectives over time'*. The superiority of this approach is centralised on the capacity to transfer the investigator's attention from the object of response (the facility) to the stimulus (business demands), and reveal complicated links between systems of corporate parameters and systems of facilities features, otherwise ignored. The identification of real business requirements can be achieved through the study of information derived from the corporation mission and objectives, the business plan, the implemented corporate culture and the current departmental plans e.g. personnel, finance, production.

Perceiving the assessment of facilities from the organisational perspective the focus of interest is the *overall corporate effectiveness* rather than the efficiency of particular attributes of buildings. Thus, in a comprehensive assessment of the

performance of facilities, an analytical procedure should be conducted, adequate for the diagnosis of the corporation's real demands and limitations, the conditions of the business environment and the definition of what is important to be measured.

The analytical stage of an ABP is considered of particular importance by the author. However, as long as the current models concentrate on the use of benchmarking, they underestimate the importance of particular corporations' demands, the users requirements and the estate market conditions. Since the homogeneity of the business, social and physical environment cannot be guaranteed, these exercises may produce outcomes of low external validity and conclusions or recommendations of questionable gravity.

Under this perspective, an effective and reliable model of assessing the performance of facilities from the organisation's perspective could be initiated by a study consisting of three main parts: the investigation of the *operational environment*, the examination of the *attributes of building* presenting a capacity to influence the performance of corporate indicators, and the definition of *interactions* which take place between business indicators and the characteristics of facilities (Figure 8.7).

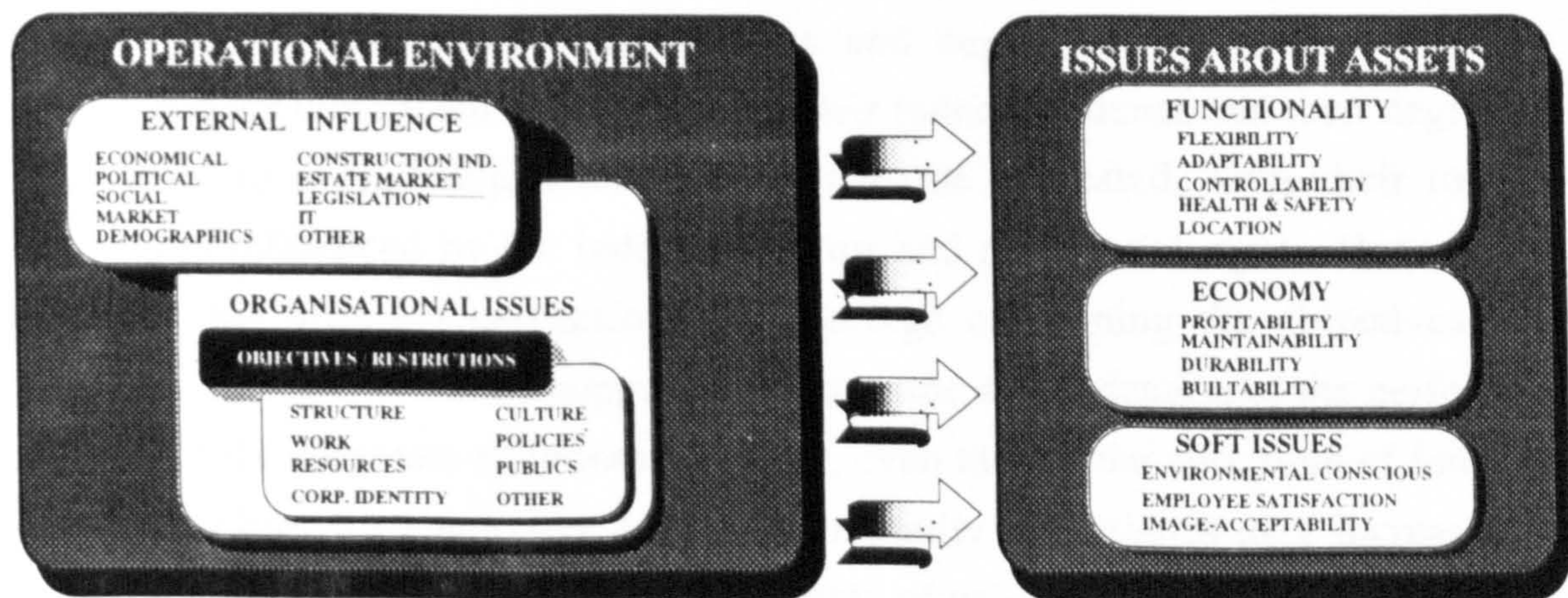


Figure 8.7 At the assessment process of the performance of facilities two related banks of issues have to be defined, parameters and indicators of the business environment potentially relevant to assets performance and facilities' targeted-issues. The correlation between these different domains should be achieved through the use of sophisticated pre-defined or real time constructed networks.

The study of the operational environment could identify external parameters and organisational indicators of potential interdependence with the attributes of facilities and examine the hierarchy of priorities within the corporate strategy. External

parameters depict the main characteristics of the conditions where facilities operate, and the economic and social equilibrium within which organisations exist. Their trends influence organisation policies and priorities of the strategic plan over time, therefore, their thorough examination is a means of predicting future business requirements and the measurement of potential risk concerning the early obsolescence of facilities.

Furthermore, the analysis of the operational environment could reveal important attributes of facilities which need to be examined for the support of business objectives. Yet, it would be rather clumsy and simplistic to emphasise on the measurement of individual parameters, since it is recognised that facilities are complex systems where the successful support of business objectives is a rather synergetic outcome, the combination of a number of factors of various significance. The important aspect of this stage of the exercise is the identification of the context-*issues* of facilities on which corporate requirements could be reflected and a consistency with the physical environment could be attempted.

The interdependence between business issues and attributes of facilities is a matter of limited applicability, since it is directly affected by the participants' beliefs and the particular circumstances of the exercise. It is generally accepted that the performance of individuals, work teams and supporting systems within the corporation are closely banded. However, their interdependence and their degree of importance to overall objectives is difficult to be evaluated, since their role in business is influenced by the industrial sector and managerial style. Hence, it is expected that different perceptions may emerge concerning the objectives that facilities and systems should support, subject to the sophistication of the performed analysis of the corporate environment. Thus, even though the allocation of funds to leisure facilities for employees and the community in statistics may increase the work-floor cost per product and seem as waste of valuable resources in the finance report, in a more sophisticated analysis it may appear as a strategic investment, aiming at generating considerable long term benefits through the improvement of public relations, higher levels of employee loyalty, the attraction of higher quality human resources and the achievement of some tolerance from the community in future industrial disputes.

It is considered that in such ambitious exercises, the responsible team consisting of facilities managers, designers, representatives of the interested parties inside and outside the organisation, departing from the definition of the scope of the study and

available resources, should examine the priorities and actual requirements of the business plan. This procedure can eventually define the domains of strategic importance concerning the characteristics of the examined asset and settle the patterns of business-asset interaction (Figure 8.8).

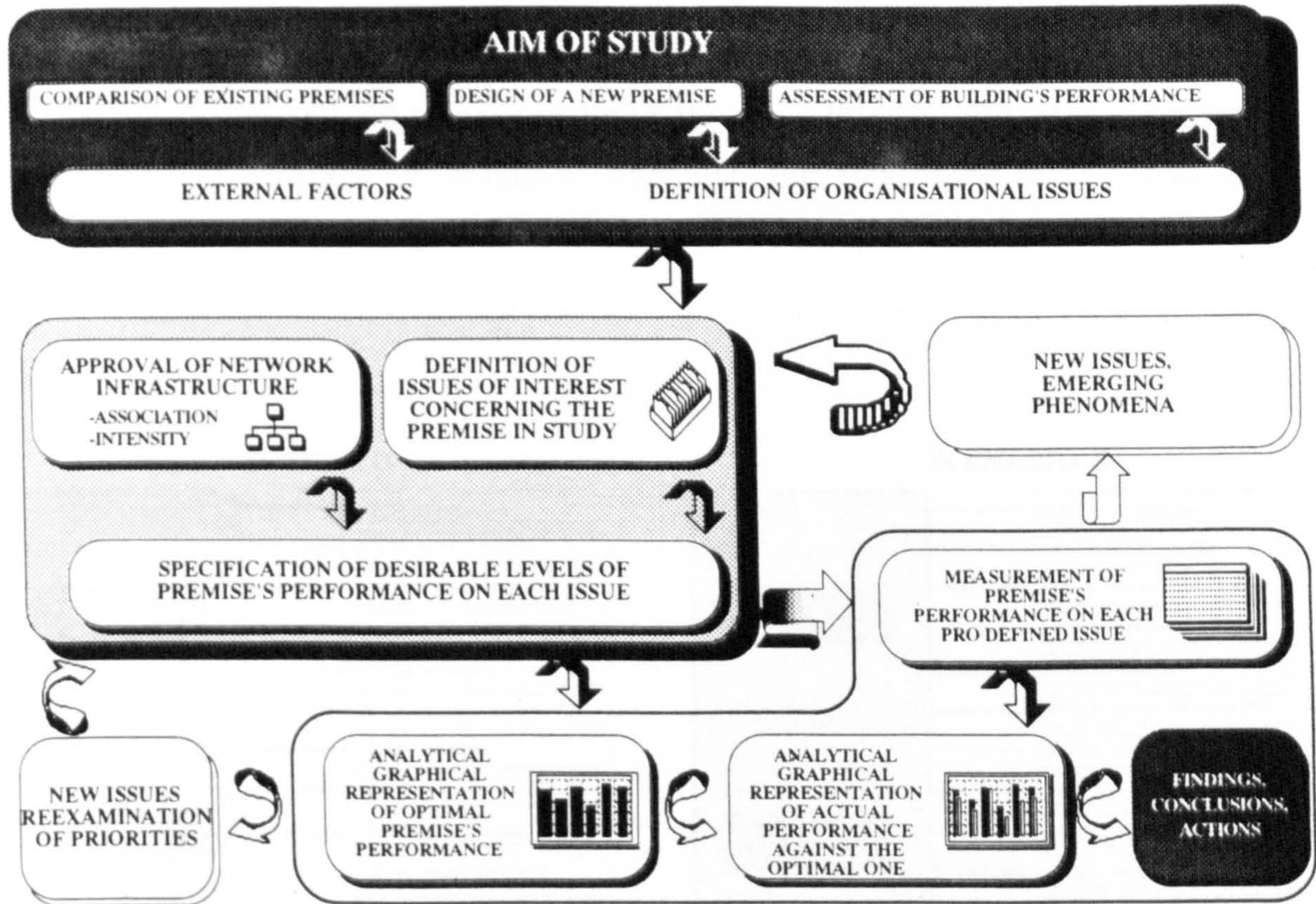


Figure 8.8 The outlined approach departs from the norm by examining the corporation and business environment in association with the specific asset. The relative significance of corporate indicators defines the important issues of assets to be examined, and the specification of their desirable performance. This operation can be continuous and able to examine different scenarios and priorities.

The outcome of the above procedure will be the definition of business related issues of particular interest for the team and an agreement on the desired levels of the performance of the building in the areas which influence these issues. During the act of evaluation, the performance of buildings is measured against a number of performance criteria previously established, reflecting the vision of the strategic plan, business culture and main interested parties.

Models designed under this approach should analytically consider all possible business indicators, inside and outside the corporation, which may have a beneficial or restraining potential interaction with the operation of the examined premise. The

identified parameters of the operational environment and attributes of buildings could be structured in a thematic classification and be proposed for consideration by the operators of ABP applications (Appendixes F & G). In addition, the identified categories could have an open ended structure, giving research teams the freedom to add other issues of interest or eliminate indicators where possessed information is unsuitable or beyond the scope of the particular study.

The relation of business parameters to the features of buildings is considered multidimensional, and could vary in intensity according to particular conditions. The choice of prefixed associations and also the flexibility for reviews and modifications by the participants of the demands of the particular exercise could be provided (Figure 8.9).

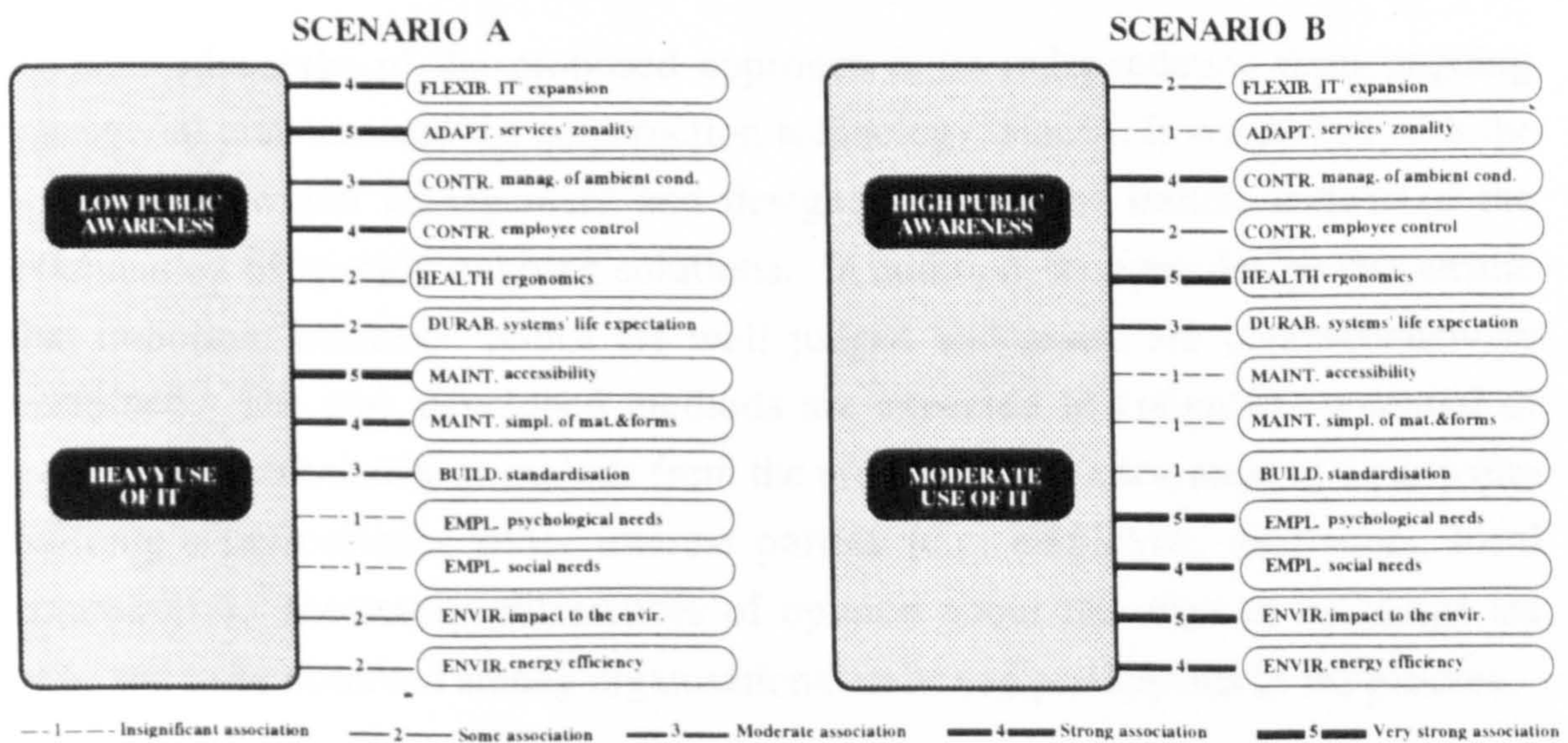


Figure 8.9 One of the advantages which the proposed approach offers over previous methods is the provision of a flexible interaction between corporate indicators and characteristics of buildings. Links' intensity can vary and they can be established or altered on-line.

It is understandable that due to the complexity of the approach, technically speaking, the optimisation of benefits of such procedures could be accomplished if the frameworks and databases are designed under the platform of expert system software. Such a platform has the capacity to provide not only the advantage of on-line step to step guidance and advice, but also an intelligent interface which allows forward-backward operation and effortless links of modifications.

An interesting development for the author could be if the ultimate goal of some of these methods is not the design of a monolithic all-purpose model of building appraisal. Instead, they could concentrate on the requirements of the individual corporation and the requirements for a supporting physical environment in specific time, place and business circumstances, a process which is expressed through the production of customised models.

Under this direction the gained experience could be generated into national or even international databases regarding the corporations' priorities, important external factors, and organisational indicators where the attributes of the physical environment have some kind of significance. This approach also has an educational dimension, since corporations will be in a position to judge the other users' approaches to similar requirements having the opportunity to critically investigate the driving forces behind decision making.

Another advantage of the proposed approach is its independence from ongoing managerial practices and the construction technology, since it is concerned with the approach in which management and designers tackle the issues, instead of the examination of specific ongoing solutions. In addition, its open design can ensure that important business' issues are well judged and assets are comprehensively examined. The new developed methods are expected to assign the potential of management to embody or exclude from the process of the assessment of a particular building's performance other interest parties (e.g. employee, customers, local community). Inevitably, differences of opinion about the aims of buildings are expected to be observed among organisational units and participants in the process.

Models of the described approach, designed to accommodate the aims of users with diverse interests, will eventually produce both objective and subjective criteria of the performance of buildings. It is both inescapable and intentional that the final assessing performance models, the corporate indicators' association with features of individual buildings, and the established performance criteria would be and express the style and culture of the representatives that constitute the individual corporation (e.g. stockholders, management, employees, customers).

The outlined methodological approach overcomes the limitations of previous efforts which evaluate corporate assets referring to the needs of the anonymous corporation. That is achieved by taking into consideration the organisational indicators, the

physical properties of buildings in the study, and by introducing the attributes of assets of a qualitative nature into the evaluation praxis.

8.6 Conclusions

The physical environment has the dynamism to influence, intervene and determine to a large percentage the organisational competence. The unique importance of the physical environment is based on its ability to bias corporate performance through its influence on a number of indirect factors such as the employee's moral and loyalty to the corporation, corporate image and flexibility of exercised managerial styles.

The evidence suggests the need to redefine the concept of *performance*, embodying elements of the actual business and socio-economical environment, while further research should be conducted on the domains of management of corporate identity through premises, human behaviour and design processes under the organisational perspective.

The maximisation of the contribution of facilities to corporate objectives can be achieved only when the dimensions of behavioural and psychological requirements of the users as individuals and groups are embraced [Mikellides, 1980]. The very concept of the model of man, used by designers, developers and corporations, is the most significant factor impacting on the ability of facilities to take advantage of corporate resources. Different design proposals offer different opportunities for behaviour, though it is accepted that they cannot cause them by themselves. Yet, affordances of behaviours which the physical environment encourages have consequences on the employees' overall commitment to corporate objectives and the generation of desirable organisational images.

The study has provided evidence suggesting that a large part of the knowledge valuable on ABP methodology is ignored or overlooked by the researchers, being fragmented within different disciplines. Furthermore, useful research instruments have been generated in scientific fields, which could be adopted or modified for the design of advanced or supplementary ABP models.

The current approaches adopted by ABP methods which aim to the measurement of pre-defined attributes of facilities, is recognised by this study as too narrow and restrictive. Future ABP studies should bestow more elaborate coverage of the

influence of the operational environment and human behaviour, if their findings about building performance are to become more legitimate and widely applicable. Today, many of their findings can be debated and refuted precisely because they are not obtained under the organisational context, but under the domains of fragmented disciplines pursuing specific objectives.

The purpose of a perceptive evaluation praxis should be the assessment of particular proposals through a process which recognises the specific situation at hand. ABP models should be able to initiate a discourse for the provision of evidence regarding the context of assessment and the spectrum of required investigation. Furthermore, they should be able to identify and evaluate the weight of potential issues being addressed through the study of the particular client and context.

This work finishes in the next chapter with the presentation of a summary of the findings of the study, their significance for business managers, and the implications to the relevant professions and domains of knowledge.

Epilogue

9.1 Introduction

The main objective of the work was to investigate the importance of premises for corporations and examine the reliability of existing ABP methods. To achieve this, the study was concerned with the physical environment's significance for the performance of major organisational issues such as employee interaction, corporate communication and corporate efficiency. In the previous chapter, the findings of the literature review and case study were analysed and interpreted under the context of the assessment of the performance of facilities. Having a deeper understanding of the physical environment's role in corporate objectives, the work concludes with the interpretation of the results of the study in the organisational context and examines its effects on the business' managers involvement in the design and management of premises.

The new insights into organisational dimensions whose performance may be affected by the physical environment, will inevitably create new demands on the existing design procedures and practitioners responsible for delivering working environments. The work will come to an end with a summary of the foregoing theoretical arguments, a discussion of the implications of the findings in the domains of design practice, facilities management, facilities assessment, and finally with recommendations for further research on the examined topics.

9.2 Research Conclusions

The bird's nest is absolute Functionalism, because the bird is not aware of its own death.

[Sverre Fehn]

Through the work the researcher found that the misinterpretation of the buildings' functionality, as technical efficiency in operational and economical terms, which characterises the main stream of modern architecture and a large part of modern science are responsible for the weakness of contemporary building environments and their inability to house and support other less visible human activities, yet essential for the fulfilment of corporate activities. Areas of traditional discourse of architecture and environmental psychology such as human-environment interaction, symbolism, and the identification of culture through the environment seem to be neglected [Mukarovsky, 1981; Relph, 1976]. Aalto [1978] supported that the attention of modern architecture to rationalisation was not wrong in principle¹. However, he argued that rationalisation of architecture cannot be achieved if it is not concerned predominantly with humanism and psychology, where technical methods are the vehicles to the fulfilment of the current objectives.

In addition, the current process of rationalisation and globalisation of the financial sector has a major influence on the design of facilities. The procurement system is held responsible to a great degree for the inefficiency of facilities to cope with modern demands. A disturbing result of contemporary procurement systems is the alienation of the *developer client*, *corporate client* and *user client* found in the

¹ Lewis Mumford discussed about functionality '*This [the self imposed poverty of Functionalism] does not mean, as some critics have hastily asserted, that Functionalism is doomed: it means rather that the time has come to integrate objective functions with subjective functions: to balance off mechanical facilities with biological needs, social commitments, and personal values... the doctrine that form follows function was [not] a misleading one. What was false and meretricious were the narrow applications that were made of this formula... When the whole personality is taken into account, expression of symbolism becomes one of the dominant concerns of architecture...*' [Mumford, Lewis (1975). *Function and Expression in Architecture*. In Davern, Jeanne, M. (ed.), *Architecture as a Home for Man*, New York, Architectural Record Books, pp. 155-158].

construction industry². The estate market driven investment on facilities, through non-differentiation of design, focuses on the main stream of clients for the limitation of risk. The above is claimed to have both beneficial consequences such as the non customisation of facilities to specific corporations and users' requirements providing flexibility and low production cost; and also negative ones, contributing to the blank anonymity of modern architecture, the degradation of the performance of facilities and the partial exploitation of the role of facilities as means that contribute to corporate objectives and envelopes of social activities [Duffy, 1992a; Jencks, 1977].

Even though the multidimensional existence of human nature is widely recognised today, yet, in most existing facilities the psychological and social requirements receive less attention, being perceived as secondary issues of minor significance [Perin, 1970]. Though the organisational theory has progressed vastly in the past century, the physical environment still reflects the principles of Taylor's managerial approach at work, contradicting with the requirements of modern organisation for teamwork, and the need to learn and adapt. In addition, the demands for more technical inputs to minimise risk and ensure the facilities' marketability, have created new specialists, of greater importance than the architect to the eyes of the developer. Facilities under the new regime become less of a political statement and symbol of the social structure and production, and more of an alternative kind of investment where the financial system assembles and allocates capital, looking for profit in return.

However, the significance of premises for business appears as an issue of concern for corporations, since it may affect organisational issues such as the attraction and keeping of high quality employees and the capacity for change. Instead of a series of handling and operations, the employees' work is perceived today as a continuum of a

² The problem of current procurement system to man made environment is depicted by Jencks who accordingly comment '*In large office projects, design suffers because no one has control over the whole job from beginning to end, and because the building has to be produced quickly and efficiently according to proven formulae (the rationalisation of taste into clichés based on statistical averages of style and theme). Furthermore, with large buildings the architecture has to be produced for a client whom no one in the office knows, and who is, in any case, not the user of the building. In sort, buildings today are nasty, brutal and too big because they are produced for profit by absentee developers, for absentee landlords, for absent users whose taste is assumed as clichés*' [Jencks, Charles (1977). *The language of post-modern architecture*. Academy Editions, p. 27].

variety of decision making, communication and actions requiring employee's optimal physiological and mental conditions, parameters very much affected by the physical and spatial qualities of the physical environment. Facilities influence productivity through the affordances of the physical environment to support the implemented work processes, individuals and work teams' tasks, and through the creation of a working environment which nourishes the feelings of learning and innovation.

Yet, architecture goes beyond expressing the utilitarian needs of its occupiers. It is the ability of the physical environment to appeal to the intellectual dimension of users which is of particular importance to modern enterprise. Facilities embody meaning, the physical environment can be perceived as a statement of the culture, values and balance of power between the stakeholders, contributing to the largely overlooked but significant for the organisation dimension of corporate communication. Lorenz [1986] supports that when studying the physical environment as a system of signs, design stimulates new ideas and improves the organisation's information about its business environment. Then, innovation arises by associative thinking and transfer operations.

The work has illustrated the capacity of facilities to present recognisable corporate images, while the potential danger of designing facilities which display contradictory attributes of the occupier has been acknowledged. This implies that the corporate image presented by facilities embodies a qualitative dimension rather than a quantitative one. In the case of the performance of facilities as a corporate symbol, the question at stake is not the provision of a strong or weak image but rather the presentation of an appropriate image, able to demonstrate what the occupier stands for and the cultural characteristics and values of stakeholders.

Yet, the performance of the facility as a means of corporate communication does not rely only on the design characteristics of the physical environment. The case study has provided evidence on the managerial dimension of this attribute. Perceived by users, the physical environment is one of the stimuli found in every day life contributing to our understanding of the world. The coexistence of different stimuli may bolster or hinder the attitudes initiated by the presence of premises.

Apart from the organisations' need to ensure that facilities promote a desirable image, the management with an interest in corporate identity should encourage the dissemination of information from different sources of communication, so as to be

tuned towards the generation and support of the desired image. The introduction of facilities' branding can be perceived as an important concern of the management, since it is capable of increasing the symbolic value of premises and making the dissemination of corporate culture more effective, particularly among the internal public.

The study has shown that the physical environment has a broad effect on the occupiers' behaviour and performance. Yet, the limitations of the existing ABP models in offering reliable findings of the true performance of facilities under the context of the organisation were also revealed. Under current practice, the management's requirements and constraints are not balanced, while the socio-economical environment is ignored. Moreover, it appears that the perceived influence of corporate premises on business affairs is reduced to limited issues which happen to be comfortably measured by modern scientific methods. However, this has its drawbacks, since the importance of facilities to the performance of organisational dimensions may be underestimated.

Furthermore, the accuracy and validity of current ABP methods is undermined by their failure to consider the external parameters and examine facilities as part of the business and social environment. That is a consequence of the limited objectives of the examined studies, inhibiting further elaboration of the wider business environment, work process and users behaviour. Technically, to do this is not wrong, since existing models attempt to measure particular areas of the performance of buildings and examine the effectiveness of facilities in meeting business objectives through the satisfaction of specific requirements. However, they are deficient as they fail to discuss explicitly the influence of external variables. Furthermore, this may convey an unspoken message about the concepts and perceptions of boundaries of what is considered to be important issues for the particular client and for the specific business environment. A perception which does not even remotely reflect the corporation's entire operational environment, in some cases may cause a shift towards the fulfilment of issues not distinctively significant.

In this regard, researchers and consultants, often by ignoring the potentialities, limitations and inequalities between environments and corporations, and assuming the findings of studies deriving from fragmented areas of science as valid, attempt to extend the conclusions of the studies beyond the restricted context of research, producing guidelines on the investment of premises, the design of facilities and management packages (see guidelines from DEG, 1985; 1992). However, this

should be treated with caution, since proposed solutions may be incompatible with the operational and social environment and be inconsistent with the requirements of the particular corporation.

9.3 On Business Managers

Corporations undergo assiduous departmental or catholic shrinking, expanding, renovating, divesting, merging and reorganising. They behave as living organisms with an unrelenting need for adaptation to their environment. The corporations' response time to changes in the business environment has a decisive effect on their success or failure. Their business strategy is restrained by the inner aptitude of aggregate flexibility to new opportunities and challenges.

The physical environment has the dynamism to influence, intervene and determine a large percentage of the organisational competence. The significance of premises in functionalistic terms, the generation and maintenance of a physical setting where the actual production of work takes place is apparent. However, the unique importance of premises is their ability to bias corporate performance by influencing a number of indirect factors with an impact on business objectives, such as the employees' moral and loyalty to the corporation, the corporate image and the flexibility of management styles [Wilson, 1985].

Moreover, it seems that the greatest benefits can be grasped when decisions concerning the physical environment are subject to broader consultation within the organisation. Corporations gradually realise the advantages of the employees participation in the decision making for the design of the physical environment and the management of working conditions [Kleeman, 1992, Becker, Sims and Davis, 1991]. The direct estimation of the significance of the users' participation in the decision making-about the conditions of the working environment is problematic. Yet, there appears to be a parameter which enhances the employees' satisfaction, their better use of facilities and greater responsibility³ [Kleeman, 1992]. Apart from

³ Indications for the significance of users participation in corporate affairs often come from exercises that often include financial benefits and changes in management style and culture. Furthermore, Kleeman [1992] condemns the attempt of various researchers to produce overall improvements in business

commissioning and approving the investment in the premises, the management should be responsible for the communication of the concepts behind the design of the physical environment within the organisation.

The allocation of resources and long term management of premises demand sound understanding of the conditions of the external environment, the structure and culture of the organisation, and the influence of the physical environment on business objectives. Furthermore, the rationalisation of decision making about the sort of premises which the organisation needs is essential for the achievement of maximum turnover from the investment. The assessment of the corporate strategic plan and its interpretation of the requirements in settings and services is considered as a delicate task where senior management should have a leading role. The appreciation of the potential contribution of the physical environment to business parameters such as corporate reputation, the employees' moral and operational efficiency, is responsible for the selection of priorities to be fulfilled by premises and for setting criteria on the desirable performance of attributes of the physical environment. However, as Duffy and Tanis argue

though the new gurus talk about vision or strategic intent of companies, usually architects and suppliers of physical space are not given much opportunity to the link the process of designing office space with such strategies

[Duffy and Tanis 1993, p. 6]

On account of the significance of facilities to organisational performance and the wide range of goals to be achieved, it is argued that the design and management of the physical environment requires the attendance of senior managers [Duffy and Tanis, 1993]. The shift of change in the production of work, values and priorities of employees, and the uncertainty of the socio-economical conditions demand a physical infrastructure able to enhance organisational innovation and the ability to learn. Thus, to achieve the maximum turnover from facilities, the strategy for the acquisition and management of the physical environment should be shaped simultaneously with the organisational strategy [Alexander, 1994].

performance by multiplying isolated measures as futile, since the overall corporate performance is the result of synergetic productivity gains rather than the summation of individual indicators.

According to Oakley [1990], managers are concerned with *design for profit*, while designers are concerned with the improvement of the environment, the elevation of taste in art and design, or even the generation of social changes. Yet, the final product should be the fruitful association of people from different backgrounds with the same objective [Palshøj, 1990]. Involving managers and designers from the beginning of the conception of 'what the objectives to be accomplished through the physical environment are', a broader and deeper understanding of the occupier from the consultants, designers and suppliers is achieved. That provides the opportunity for the business requirements and designers' concerns to be reflected in the final design.

Enlightened clients are always necessary for the design of revolutionary premises as they are able to take advantage of the social, economical and technological changes occurring within society. Business managers are the key players for the design of premises approached as investments of strategic advantage, directly linked to the vision of the business' long term plan, and able to enhance organisational efficiency. Senior management's expectations can be realised only through their early involvement in the specification of objectives to be achieved and defined in the brief, and through their persistent demand for reliable tools to assess the performance of the premises in use.

9.4 Recommendations and Further Research

The consideration of premises at a senior managerial level is possible to initiate a process for the redefinition of the performance of facilities, the re-examination of the current design approaches, the context of facilities management and the assessment of the physical environment. Considering the effectiveness of premises, researchers, designers and facilities managers have to pay particular attention to the operational environment. The optimisation of corporate performance can be achieved only when there is a consistency in the organisational elements over time. That implies that the maximisation of the performance of facilities cannot be defined and achieved outside the organisational context, ignoring the influence of the physical environment on corporate indicators and excluding potential indirect business advantages. Palshøj [1990] supports that the involvement of designers and executives in any design process is essential for the demonstration of managerial and users' concerns,

bringing together different skills and creating the embryo of the most suitable solution.

Furthermore, the nature of corporations encompasses formally defined structures and informal activities and interactions, both reflected on the physical environment under ideal circumstances. Recognising the important role of the working environment as a communication tool between management, employees, consumers, shareholders etc., senior managers expect to use premises for the development and implementation of their business strategies [Gorb, 1990]. Yet, the use of facilities to express corporate personality is of somewhat elusive and delicate nature requiring skilful handling. The danger for the designer appears in two levels, at the selection of the appropriate organisational values to be mirrored through facilities, and at the effective presentation of those values through the attributes of facilities.

However, the knowledge of designers concerning market conditions, the clients requirements and users' characteristics has often been characterised as limited and inadequate in both qualitative and quantitative terms, product of the *social* and *administrative gaps* between designers and ultimate users⁴ [Zeisel, 1974]. Thus, the adopted design praxis, outcome of the current socio-economic conditions should be re-examined. More opportunities should be given to designers for further research into the users' characteristics, and efforts should be made to encourage the participation of the ultimate users in the decision making process.

One of the main concerns of modern management is the provision of assurance by the designers on the delivery of facilities and working environments able to handle the operational short and middle term requirements efficiently, capable of contributing to long term corporate effectiveness and able to satisfy the legal and ethical demands of socio-cultural context. Though the legal system is mature in terms of protecting the developers and occupiers from the designers' misconduct concerning obligations on functional, ergonomic and environmental issues, there is not yet an instrument to evaluate the performance of facilities in terms of an organisation's soft issues.

4 Social gap occurs when discrepancies exist between the designers, developers, and users' values, resulting from differences in cultural background, education and income, while administrative gaps happen when designers deal only with developers, bypassing direct contact with the users [Michelson, William (1968). Most People Don't Want What Architects Want. In *Transaction*, Vol. 5, No. 8, pp. 37-43].

Contributing to this domain of knowledge, the work has examined a particular area of importance for organisations, the corporate identity. The evidence of the work indicates that there are disciplines outside the traditional area of concern of ABP methodology, where researchers could find valuable information about the significance of premises for organisations. The work supports that the real evaluation of facilities can be achieved only when the subject is studied under a perspective where the knowledge of different disciplines is collected and analysed together.

Moreover, research instruments have been developed under different disciplines able to evaluate particular aspects of the environment. Following the paradigm of this case study, researchers have to examine those tools and their applicability in the evaluation of different parameters of buildings.

Apart from the domains of cost reduction and delivering services to employees, facilities managers should get involved in corporate identity, advertisements and public relation exercises. The co-ordination of resources towards the same objectives is an issue often undermined by departmental or divisional fragmentation. Facilities managers can succeed in maximising the contribution of premises to corporation objectives only by virtue of close co-operation with other departments such as human resources and public relations.

Yet, the examination of the significance of the physical environment for corporate identity is far from adequate. This study was long enough to provide some glimpses of evidence on the perception of organisations through their premises for a very limited number of observers and buildings. Future research should focus on four dimensions (Figure 9.1), the perception and initiation of attitudes from other categories of public, the examination of corporate image derived from other premises and industrial installations which accommodate clerical work, customer service and supporting activities, and the further investigation of other corporate dimensions, able to be meaningfully represented by corporate assets and the working environment. These dimensions have to be investigated under the different socio-economical contexts within which the premises are designed to operate.

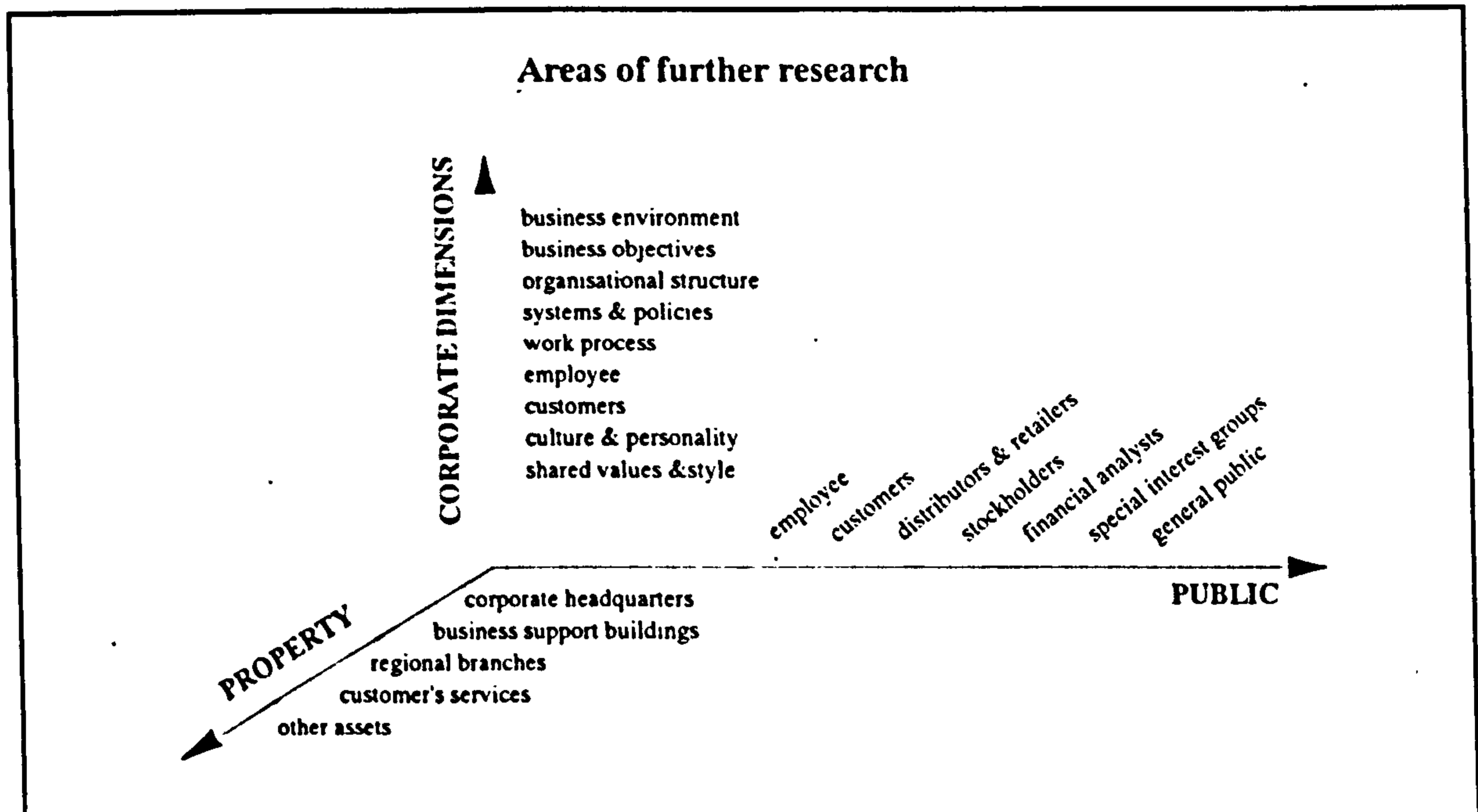


Figure 9.1 *Future studies about the influence of corporate assets to corporate identity should be concentrated on the identification and investigation of corporate dimensions, property and public under specific operational environments.*

9.5 Conclusions

The main concern of the work was the overall contribution of premises to corporate objectives. In order to ascertain the importance of the physical environment, it was necessary to devote much energy to the concepts of organisational theory, sociology, psychology, aesthetics and semiology, domains not commonly associated with the areas of research offered by theorists and practitioners studying the subject. On the way to this objective, knowledge from various scientific domains relevant to the subject of study was examined and some insights were extracted. Inevitably, the forwarded arguments have also raised many issues and questions, yet, on account of their relative periphery to the main objectives and the limited extent of this study, they have been put aside, only partly examined.

The study has indicated that today, management increasingly recognises the influence of corporate premises to overall organisational performance and their ability to play an important role in the improvement of organisational effectiveness [Wilson, 1985]. These abilities derive from the special character of facilities as the backbone and supporting environment of corporate affairs. Apart from their potential in reducing the overall cost of operational activities and to provide

sufficient amenities and services to employees and customers, benefits derive from the implementation of corporation's business strategies with minimum resistance from the physical setting, the nourishment of new management practices and work patterns, the support of an adequate image both inside and outside the corporation, and the reinforcement of existing cultures and set of values for the accomplishment of corporate objectives.

The author suggested that the assessment of the facilities' overall performance has some credibility only when it is conducted under the appropriate organisational and socio-economical context. The social context, where the organisation operates, determines the conditions and tolerance of organisational behaviour, while within the organisation, the management of change, learning, decision making, culture and communication are areas of increasing attention.

The work has provided evidence on the inadequacy of the current procurement system for providing premises able to achieve an all around performance. These deficiencies have been located at the levels of the design praxis, the adopted process to specify corporations requirements since the exchange of information between sponsors, designers and users is frequently very low e.g. in speculative buildings [Mitchell, 1974]; designers training on the grounds of their poor knowledge concerning the relationship between the built environment and human perception, attitudes and behaviour [Brolin, 1976]; the poor interpretation of buildings efficiency reduced to mere operational functionality [Mukarovsky, 1981]; and the reduced archetype of users and human nature, often employed at the decision making process [Stringer, 1980].

The study indicated that the physical environment has the strength to influence a large number of organisational dimensions such as human behaviour and public opinion. Through the examination of facilities as means of corporate communication, the work has contributed to the domain of knowledge by providing evidence on the ability of premises to influence attitudes held about the identity of the occupiers. The analysis of the results of the case study and the conclusions of the literature review empowered a further discussion about the efficiency of current ABP methods and the shape of the ones to come.

Furthermore, it was argued that there is not a reliable assessment tool available to ensure developers that they obtain the maximum of profit from their investment, and users obtain the provision and operation of physical environments suitable to their

requirements. The recognition of the impact of premises on a number of corporate indicators opens a wide area of facilities with potentially improved performance within the organisational context.

Studies like this are conducted to benefit designers, environmental scientists and consultants on corporate identity programmes. However, the author recognises that the impact of those works on the way facilities are designed and managed is very limited as long as they do not come to the attention of the main beneficiaries, the business managers. Yet, this can only be achieved when there is persistent research into the subject and publication of continuous evidence on the significance of premises. The enlightenment of senior managers could trigger the improvement of the working environment, the rationalisation of investment on corporate premises and improved business efficiency.

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APPENDICES

Appendix A Review of Attitude Methodology

A.1 Research Strategies

There are a variety of research strategies from which research on environmental and cognitive psychology can be initiated. The measurement techniques and research methods employed in the above fields have been derived from other behavioural sciences and research problem areas [Proshansky, Ittelson and Rivlin 1976]. In the literature, the classification of the applied methods under three categories based on the control which the researcher exerts over the situation, where the observation takes place and over the conditions which influence subjects' behaviour is common.

Under the first category, which called *experimental research*, are employed methods in which variables and conditions can be manipulated by the researcher and there is direct control over the behaviour of participants. *Correlational research* is the category at the other end of the spectrum, where there is no manipulation of variables and where the relationship of naturally occurring environmental variations with different responders' dimensions is judged. The last category, *descriptive research*, which is located between the previous ones, combines methods that occur in a particular environmental context [Michelson 1975; Bell, Fisher and Loomis, 1978]. This text gives a brief overview of these categories, followed by a more detailed discussion of the *measurement techniques* used by environmental and cognitive psychology.

A.1.1 Experimental research

Under the category of experimental research the researcher is able to systematically vary certain aspects of a situation, *independent variables*, which are the conditions whose effects are investigated. The variation of independent variables can be appraised by observing their effects on issues that may be of some interest to the researcher, *dependent variables* [Heimstra and McFarling, 1978].

In the investigation of environmental phenomena, experimental design employs two techniques to safeguard internal validity and better interpretation of the observed phenomena. First, only interdependent variables are allowed to vary between experimental conditions, and second there is a random selection of subjects and participant groups to experimental treatments [Kerlinger, 1973].

Methods of experimental research can be classified under three categories, *laboratory experiments*, *field experiments* and *simulations*. Laboratory experiments, as the title implies, are conducted in laboratory settings, applying traditional methodologies to investigate the effects of environmental variables. These methods are used when the clear and meaningful interpretation of observations compel the systematic isolation of individual causes. The limitations and criticism of these methods are focused on their incompetence to understand complex environmental phenomena, since observations happen in artificial settings of some distance from the real world, generally characterised by low experiential realism.

Field experiments overcome many of the problems experienced by laboratory techniques by undertaking studies in field settings. Yet, by retaining randomisation of subjects and controlling the independent variables, they are not experientially valid as field studies which examine the uncontrolled natural setting.

When is intended an increased experiential realism and external validity over laboratory methods, while for a variety of reasons field research cannot be conducted, simulation methods are used. Field research may be inadequate due to difficulties to locate the appropriate field setting or the inability to achieve a satisfactory degree of control of independent variables. Simulation methods create *near real* setting conditions by introducing real world variables into the artificial setting [Bell, Fisher and Loomis, 1978].

A.1.2 Correlational research

Correlation methods use the real world setting to observe and study of naturally occurring variations, and use recordings of changes and advanced statistical techniques to interpretate the observations. The researcher does not rely on the willingness of subjects to participate, but he observes and records the behaviour of his/her interest [Heimstra and McFarling, 1978]. Methods of this category are weak on interpreting casual relationships but useful for studies concerned with the association between naturally occurring situational variations and other variables. Yet, the *direction* of the relationship between two variables, the definition of the *antecedent* and *consequent*, is difficult to be determined without an experiment. Correlational studies tend to have high external validity and experimental realism since the context of research involves the natural setting.

There are two kind of correlational studies, *field* studies and *quasi-experimental* design studies. In field studies there is no randomly assignment of subjects, nor any manipulation of the independent variables. However, since *experimental rigor* is absent, the internal validity is low and low in ability to make casual conclusions. Quasi-experimental design is a variation of the field study, designed to limit the problems of low internal validity of the original studies by attempting some control of the independent variables [Christensen, 1977].

A.1.3 Descriptive research

In contrast to the previous ones, this kind of research describes reactions which occur within the environmental context, rather than providing information about casual relationships and correlation among variables. Descriptive methods are employed either for pilot studies, to gain initial insight into an area of interest before the main research, or after the formal research for better interpretation of the observations [Selltiz, Wrightsman, and Cook, 1976].

There are two forms of descriptive research, *surveys* and *observations*. Survey is the collection of data from populations by personal contact with people, and they are conducted to generate information about beliefs, attitudes, values and feelings concerning environmental phenomena [Marans, 1975]. Even though survey is a valuable tool to investigate human reaction to environmental conditions, there are questions concerning the validity of the findings, since it is difficult the truthfulness and permanence of subjects' responses to be tested.

Observation is a research method that measures human behaviour in environmental contexts and particular issues. Observations, in contrast to surveys, do not require close contact with subjects, therefore they are free from bias of *reactive* nature. Yet, like the latter ones, they often lack a control group of participants, which creates questions about the validity of the findings and limits the range of applied analysis.

A.2 Measurement Techniques

One of the characteristics of environmental psychology is the frequent employment of multi-method research strategies. That is justified on accounts of the inefficiency of single methods to investigate and answer the questions which are studied. Furthermore, the use of a range of measurement techniques is common by researchers for the better understanding of the effects of experimental conditions [Altman, 1979].

Measurement techniques can be common to all or used by different research methods. Lozar [1974] detected two kind of techniques, *self-report measures* and *non self-report measures*. The applied techniques briefly described beneath are organised upon Lozar's differentiation and they have been the most common in use by researchers in environmental psychology.

A.2.1 Self-report Techniques

In self-report techniques subjects have an active role in the provision of information about the examined issue. Self-reports are applied in environmental psychology when the focus of the investigation is on attitudinal and perceptual concepts of subjects, rather than on the actual behaviour. For the successful application of self-report techniques the correct interpretation of the applied concepts by subjects is essential.

Questionnaires. Questionnaires are constructed in a wide range of forms which permit the collection of information concerning a variety of issues about the subjects. Questionnaires are inexpensive to produce and distribute, and they are used for *factual* and *emotive* responses.

Questionnaires can be *standardised* or *non-standardised*. Standardised questionnaires use directed or closed questions through multiple-choice or matching

responses, where a range of possible alternatives are offered to respondents. Such kind of questionnaires can be pre-tested and can ensure high validity and reliability. Non-standardised and open-ended questionnaires are commonly used as exploratory devices to reveal hidden dimensions or variables concerning the examined issues. Standardised questions can provide more relevant and comparative responses, whereas open-ended questions can offer richer replies expressing feelings, motives or behaviour more spontaneously. Questionnaires, in relation to the module of respondents, can also be classified as *self-administered* or *group-administered* [Bradburn, 1983].

Questionnaires should be seen unsuitable for respondents of poor literacy, the very old and very young, where the opportunity to correct misunderstandings is limited, where there is no control over the order that questions are answered and there is risk of high percentage of incomplete questions. Furthermore, the categorisation of responses and further analysis may prove difficult when questions permit various interpretations.

Interview techniques. Interviews are justified as a research instrument when there is a demand for numerous open-ended questions or when a hidden agenda has to be discovered. There are two kind of interviews, *exploratory* and *standardised*. Exploratory interviews or depth interviews are brainstorming and heuristic, applied to develop the concept of studying. Therefore they very often are used at the initial stages of a survey concerning factual or attitudinal information. Exploratory interviews are used to understand participants' thoughts and feelings regarding the topics of concern [Oppenheim, 1992]. Standardised interviews, like standardised questionnaires, are more formal and their purpose, in contrary to exploratory interviews, is data collection.

Interviews have several advantages and disadvantages over questionnaires. Through interviews the investigator has the opportunity to establish rapport with participants and to stimulate the trust often needed to probe sensitive to the participant issues. It is possible inconsistencies or vague on responders' answers to be clarified, perceptions, feelings and attitudes can be described in depth, and new topics of interest or underestimated issues can be revealed. Furthermore, relevant studies show that response rates and participants' motivation are much higher on interviews than on questionnaires [Rosenthal and Rosnow, 1991]. However, interviews are much more costly to implement, they need adequately experienced personnel for their conduction, there is a risk of responders to report *socially desirable* attitudes

and actions instead of the actual ones, and frequently the analysis of the obtained results is more complicated.

Rating scales. Scales generally consist of a number of items or statements with which the respondents are asked to agree or disagree. Thurstone [1935], a renowned psychologist, produced in 1935 the so called *factor analysis*, a statistical procedure for identifying and measuring the fundamental dimensions that account for the variation to be observed in any set of phenomena. Factor analysis enabled the application of a large number of measurement procedures to a sample of objects. Since then, factor analysis has been a tool widely used by psychologists studying intelligence, personality, interests, emotions, rates of learning, and even word meanings [Oppenheim, 1966].

Scaling techniques which capitalise on the advances of statistical analysis, are used to provide information concerning participants' impression of an issue, object or subject, on a continuum of relevant to the study dimensions. The dimensions are pre-defined and selected from an item pool of relevant statements. Series of these scales are often linked together in order to provide combined areas of specific interest.

There is a number of different forms of rating scales. *Likert scales* is a technique where an issue is examined through participants' placement on an attitude continuum for each scale on a range of extreme positive to extreme negative within a range of equal appearing intervals. Items are arranged in a way that one side of the scale could represent a favourable attitude towards the examined issue while the other represent an unfavourable. By locating a number to every interval, the final score of all scales can indicate the attitude of respondents to the examined issue. An important precondition in Likert scales is that the items should be consistent and homogeneous. Criticism on Likert scales concerns that the same total score can be achieved in different ways, embodying the possibility of items having different meaning for respondents of identical scores.

In *bipolar adjective scale*, participants are asked to express their impression concerning an issue along a number of scales between two adjectives of opposite meaning. Through the scales, the researcher is able to examine respondents' attitude concerning an issue on a number of different dimensions.

In an attempt to define an *image*, Osgood originated a technique called the *semantic differential*¹ [Osgood, Suci, and Tannenbaum 1957]. The technique was used to give an objective assessment of the connotative meaning of concepts by evaluating what interpretation a concept might receive from people in terms of dimensions which have been previously empirically defined. Some criticism about the application of bipolar adjectives concerns the quality of information derived by using *denotative* and *connotative* items², and the fact that some items may have double meaning or more than one opposite meanings [Bechtel, 1975].

Multidimensional scaling is a statistically based technique which estimates the distance between items of interest. Regarding of how items are perceived as similar or dissimilar to each other, they are located close or far apart drawing a psychological map. Multidimensional scaling analysis is applied to map the structures of set of stimuli as perceived by respondents, or to map the similarities and differences between individuals or groups in terms of their reaction to a specific stimulus [Eiser, 1980].

Projective techniques. There are situations where the co-operation and frankness of respondents is in doubt. Respondents' taboos, fears, desire to present a personality of higher status and social acceptance, are some of the motives that may affect the obtained responds. Moreover, there are times when respondents are unaware of attitudes lying into their subconscious. Researchers attempt to overcome these problems by applying indirect methods, *projective techniques*, where the purpose of the study is less obvious, thus it is easier to penetrate in depth the personality of the respondent. Projective techniques are often used in combination with other research techniques and employed in sensitive for the respondent issues such as self-image and values, and on search of stereotypes, attitudes and predisposition.

1 Osgood's semantic differential involved repeated judgements of a concept against a series of descriptive polar-adjectival scales. Since this concept can indeed be something as abstract, it has been used in various ways such as the evaluation of corporate image [Bolger's J., F., How to evaluate your company image. in *Journal of Marketing*, Vol. 24 pp. 7-10].

2 Denotative are objective descriptions of the setting of activity or of primary characteristics of an issue, while connotative objectives describe secondary qualities and represent an affective or expressive dimension of the responder's perceptions or attitudes [Bell, Paul, A.; Fisher, Jeffrey, D.; Loomis, Ross, J. (1978). *Environmental Psychology*, W. B. Saunders, England].

Oppenheim [1966] argues that projective techniques can break through the barriers of awareness, irrationality, inadmissibility, self-incrimination and politeness. There are four approaches of projective techniques. The method of *association* of respondents' first reaction to a continuum of stimulus is based on the assumption that spontaneity is able to bring insights into respondents' underlying attitudes. Through the employment of *fantasy*, where respondents are requested to do a projection about the context of a stimuli or to create a story about it, underlying worries and fears can be revealed. The use of *ambiguous stimuli* requires the rational interpretation of the stimuli and the assignment of meaning, a process which discloses information about respondents' attitude towards the stimuli. The *conceptualisation* of stimuli in order or to groups reveals information of individuals' cognitive mapping and order of values.

The most popular projective instruments are *sentence completion*, *cartoons*, *picture interpretation*, *stories*, *pseudo-factual questions* and *play techniques*. In sentence completion, as the name suggests, participants are called to complete a number of sentences. Incomplete sentences can be open or a number of responses can be available to the respondent to select. The cartoons technique presents a drawing with one or more empty *balloons* indicating speech which the respondent has to fill in. In picture interpretation the researcher presents drawings or pictures and the respondent has to create a story or to answer questions concerning the stimuli. In stories techniques, a brief account of some events is presented and at the end the respondent is asked to make a choice between the characters of the story or to explain the motivation behind the actions of characters. Pseudo-factual questions are techniques where the respondent is asked seemingly innocuous questions of knowledge or belief, often containing false statements. This technique is based on the assumption that the predisposition or attitude of a respondent towards the issue creates a bias to the received answer. In a play technique various objects are exposed to respondents who are asked to talk about them or to perform an action with them, like sorting or constructing. Play techniques are used more often with children and mentally handicapped people.

Since projective techniques embody a kind of interpretation of responses in *deeper levels*, responses have to be coded, scored and classified, tasks often difficult for the researcher. The ability of the researcher to make meaningful inferences is critical to the analysis of responses and it is subject to his/her experience and knowledge of the history and social environment of the respondents.

Other self-report measures. In addition to the previously described self-report methods, other less popular techniques are used depending on the particular interests of the investigator. *Cognitive mapping* is a technique which creates in paper the image of the mind concerning an object or an issue. Through the method is possible to measure how participants code spatial information about concepts such as the environment or even the stereotype of other nations [Oppenheim, 1992].

In self-recorded *diaries*, participants record their actions or kind of events for a period of time. Therefore diaries are more often employed when the researcher is interested about behaviour than perceptions or attitudes. The main bias of this technique is the possible modification of respondents' behaviour in order to write something in the diary or to present a more socially acceptable self-image [Rosenthal and Rosnow, 1991].

Finally, *sociometry* is a method originally developed to present the patterns of preferences among people and groups. The method can be applied only to *closed groups*, which means that every member is able to make and receive nominations of preference. The technique is possible to distinguish grouping patterns, in-grouping and out-grouping rejections and to indicate relations between different qualities of individuals [Moreno, 1960].

A.2.2 Non self-report Techniques

Non self-report techniques are very important especially in the field research of environmental psychology, since the focus of research is in the study of subjects' behaviour in the natural environment under the influence of minimum biases.

Observational techniques. Direct observation is the technique where the researcher observes and records peoples' behaviour and interaction within an environmental setting. Direct observation can be informal, which means that anything is observed is recorded, or formal or discriminative, where specific settings are pre-selected and particular behaviour is recorded [Lofland, 1973]. Through observation techniques behavioural patterns which even the participants are not aware of, or actions that self-report methods wouldn't reveal are possible to be studied. Yet, often there are difficulties to identify one behaviour from another, or maybe the pace of occurred activity is too quick or vague for proper recording and interpretation.

Barker [1968] developed two observational techniques: the *behaviour setting methods* and the *behaviour specimen recording method*. Behaviour setting methods are informal observations where observers take samples of activities occurred in a place on a number of scales in different hours and for a large period of time. Viewers are generally free to record in unstructured format any activity is observed. That results on the recording of unusual events which may be useful on later explanation of observed activities [Barker, 1968]. Behaviour specimen recording is the method where a continuous observation of an individual's behaviour over a period of time is performed and all activities and actions of the subject are recorded [Barker and Wright, 1955]. Data are categorised into *behaviour episodes*, and later they can be analysed by reference to the setting, the situation, or to the attitude of the individual [Bell, Fisher and Loomis, 1978].

Behaviour mapping is the observation of peoples' behaviour in a specific environmental setting. The observer records actions occurred in the setting in pre-defined categories of activity or interaction. Behavioural mapping is used to describe different activities in a specific environment, or to compare activities occurred in a setting in different situations [Ittelson, Rivlin, and Proshansky, 1976].

Instrumentation. There are situations where human observation is inefficient or impossible on accounts of accuracy, time, cost, kind of environmental setting or type of measured functions. In such situations, researchers employ a number of instruments such as photographic equipment, video recorders, special equipment (e.g. odometers), detectors of changes of physiological conditions of participants (e.g. galvanic skin response, biochemical analysis of urine samples, Palmar Sweat Test) [Bell, Fisher and Loomis, 1978].

Task performance. This technique is used to study the effects of the environment or specific components of the environment to human ability to perform. Through this technique, the correlation of the quality of ambient conditions with psychological conditions such as stress, anxiety and frustration is possible. Common task performance techniques are the *stroop colour-word test* and the *frustration tolerance tasks* [Feather, 1961].

Indirect measures. The last category of measurement techniques is concerned with procedures which involve data collected after the examined action has taken place. Indirect methods are categorised on *physical traces* and *archival records*. Physical traces are evidences which are interpreted as clues of actions or specific behaviour. Data obtained by physical traces should be treated with caution, since

there is no control over the participants' selection and the environmental conditions. Archival records is the examination of documents produced independently from the study and possibly not intended to be examined.

A.3 Criteria for the Evaluation of Environmental Research

The degree which a particular research instrument produces the same results in different occasions is the measure of its *reliability*. The theory of reliability is that any result or score from an instrument is made up of two components, the true score and the error score. Generally speaking, the larger the error score, the less reliable that instrument is, even though an instrument can still be reliable and have a large error component if the error is systematic. Reliability can be expressed in a number of ways, yet the most common is the coefficient of correlation between two sets of scores obtained by the same instrument.

Validity is the extent to which what is intended to be measured, is actually measured, therefore it is a measure of the truthfulness of answers. There are four types of validity: internal validity, external validity, construct validity and experiential realism, all present to any design methodology [Cook and Campbell, 1975].

Internal validity is concerned with whether an observed relationship between two or more variables represent a *real* finding, or whether it is caused by spurious variables not taken into consideration by the researcher [Bell, Fisher and Loomis, 1978]. Differences of the experimental procedures between subjects, bias in the selection of subjects and the use of inaccurate measurement techniques are the most common causes for low internal validity. *Construct validity* is the ability to generalise from the experiment to the theory being tested. A threat to construct validity is when the manipulation of variables by the researcher results to the misrepresentation of particular elements of the theory or model. *External validity* is the extent to which findings of the experiment can be generalised from the particular context from which the research was performed to other settings. The external validity of a study depends on the realism of the experiment and the accuracy of independent variables to represent real settings. *Experiential realism* is a joint function of the extent to which the experimental manipulation as operationalised, has an impact upon the subject and the representative of events which occur in the real world.

Although they appear to be independent of each other, the four types of validity are closely intertwined. Consequently, maximising one type of validity may reduce

another. According to the aims of the study, the researcher has the choice to place a value on one type of validity relative to another [Cook and Campbell, 1975].

Appendix B Pool of Visual Stimuli

No	Corporation	Industrial Sector	Location	Type	Characteristics	Corporational and Design Values of Buildings
1	The Ark		London	Oper.	Speculative	Individuality, Social Amenities, Social Place, Office and Personality Oriented
2	BA	Aviation	Heathrow	HQ	Purpose Built	Corporate Change, Social Responsibility, Community Awareness, Interaction, Autonomy of Units, Informal Communication, Social Democracy
3	Barr & Stroud	Opto-electronic	Glasgow	Oper. Fact.	Purpose Built	Single status, Organisational Change, Flexibility
4	Canary Wharf		Docklands London	HQ, Oper.	Speculative	Flexibility, Organisational Change, High Tech Office, Team working, Social Amenities, Symbolism
5	Chiat/Day	Advertising	Venice, California	HQ	Purpose Built	Informal Communication, Strong Sense of Identity, Symbolism. Stimulative Creativity,
6	Coopers & Lybrant (Embankment Place)	Accountancy	London England	HQ, Oper.	Purpose Built	Internal Communication, Networking, Flexibility, Team working, Lightness of Touch
7	IBM	Electronics	Business Park, Bedfont Lakes, Middlesex	Oper.	Speculative	High Tech Office. Informal Communication, Transparency, Stern Rigour
8	IBM	Electronics	Kuala Lumpur, Malaysia	Oper.	Purpose Built	Creativity, Strong Sense of Identity, Green Issues
9	International Bank of Japan, Bracken House	Finance	City of London	HQ	Rebuilt	Formalism, Functionalism, Flexibility, Organisational Change, Interaction
10	Ionica	Telecommunications	Business Park England	HQ	Speculative	Low Energy, Environmental Issues, Green Issues, High Tech Office
11	Kajima Corp.	Construction	Tokyo	HQ	Purpose Built	High Tech Office, Social Democracy, Practicality, Social Amenities
12	Kuhl AG	Publication	Industr. Area, Frankfurt	HQ	Purpose Built	Green Issues, Informal Communication, User Friendly, Team working,

No	Corporation	Industrial Sector	Location	Type	Characteristics	Corporational and Design Values of Buildings
13	Legal & General Assurance Society	Finance	suburb, Surrey	HQ	Purpose Built	Green Issues, Energy Efficient, Social Facilities, Families' Access, Hierarchy, Formality, Central Control
14	Lloyd's	Finance	London	HQ	Purpose Built	Flexibility, Organisational Change, High Tech Office, Interaction, Networking, Local Control, Symbolism, Strength
15	Log ID	Publication	Laur, Germany	HQ	Purpose Built	Interaction, Informal Communication, Green Issues, Energy Efficient, Local Control
16	M&G Ricerche	Chemical Research Centre	Industr. Area, Rome	HQ	Purpose Built	Interaction, Stimulative Creativity, Green Issues,
17	NMB	Finance	Amsterdam	HQ	Purpose Built	Individuality, Green Issues, Local Control, Work Group, Corporate Structure, Informal Communication Users' Participation
18	Obunsha Century Tower	Publication	Tokyo	Oper.	Speculative	High Tech Office. Informality, Flexibility, Organisational Change, Comfort
19	Pearl Assurance	Finance	Business Park Peterborough	HQ	Purpose Built	Hierarchy, Individuality, High Tech Office
20	Rover Japan	Automobile	Tokyo	HQ	Purpose Built	Flexibility, Informal Communication, Transparency, Symbolism
21	Royal Insurance	Finance	Business Park Peterborough	Oper.	Purpose Built	Openness, Lightness, Equality, Universality, Local Environmental Control
22	SAS	Aviation	Stockholm	HQ	Purpose Built	Interaction, Serendipity, Networking, Social Support, Social Amenities, User First Attitude, Togetherness, Autonomy of Units, Local Control, Respect, Trust, Stimulative Creativity, Informal Communication, Social Democracy
23	Western Morning News	Publication	Business Park, Plymouth	HQ Fact.	Purpose Built	Strong Sense of Identity, Symbolism, Romanticism, Social Democracy

THE ARK

- emphasis on interaction and informal communication
- emphasis on work floor flexibility
- respect on employees' individuality
- provision of social amenities to users
- office building as a social place emphasising social life
- a place as a theatre of serendipity and creativity

CENTURY TOWER

- built on the idea of the office building as a pool of interconnected activities
- emphasis on business objectives
- emphasis on interaction and informal communication
- emphasis on work floor flexibility
- emphasis on informality
- employee comfort
- provision of social amenities

NMB

- reflection of the corporate structure
- balance between business requirements and employee needs
- emphasis on work group
- emphasis on informal communication
- respect on employee' individuality
- local environmental control of the workplace
- respect of green issues and use of environmental friendly design

SAS

- built on the idea of the office building as a linear village
- autonomy of organisational units
- support of the feeling of networking and togetherness
- local environmental control of the workplace
- support of feelings of respect and trust
- provision of social amenities
- emphasis on social democracy

**University of Strathclyde
Centre for Facilities Management**

**contribution of office buildings to business
objectives: developing a framework measuring
building performance**

Letter of Introduction

Dear Respondent

This questionnaire is part of a Centre for Facilities Management doctoral research project, studying the ways that office buildings influence long term business objectives.

The aim of the questionnaire is to examine how the public perceives the corporate identity of corporations from their office buildings.

We would greatly appreciate if you could give us 15 minutes or so of your time in order to complete the attached questionnaire.

Please note that there are no right or wrong answers and your responses are confidential.

Thank you in advance for your help

Gregory A. Cambitsis

Personal data form

A1	Age:	Under 20 years	_____
		20-24	_____
		25-29	_____
		30-39	_____
		40-49	_____
		50 and over	_____
A2	Gender:	Male/female	_____
A3	Education	Secondary education	_____
		Some graduate experience	_____
		Graduate	_____
		Some post graduate experience	_____
A4	Occupation	(please specify field or subject)	_____

When an office building has been presented, you are asked to consider each concept (bipolar statement) and place a check in the blank in which you feel the concept (bipolar statement) lies.

Please, describe your perception concerning the management and culture of the corporation occupying the above office building in association to ten given schematic scales. Please rate the corporation in accordance to seven possible locations between bipolar descriptors.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

Formal reports, memos and official meetings are the most important means of communication between employees	—1	—2	—3	—4	—5	—6	—7	Informal presentations, round table meetings and social activities are the most important means of communication between employees
The corporation believes that it should play an active role in resolving the social problems of its employees and the community	—1	—2	—3	—4	—5	—6	—7	The corporation believes that the social problems of employee and the community are not its concern
Policies of the corporation are oriented towards maximisation of profit	—1	—2	—3	—4	—5	—6	—7	Policies of the corporation are based on employee's satisfaction through work
Corporational culture evokes freedom of employee's expression in work	—1	—2	—3	—4	—5	—6	—7	Corporational culture evokes employee's conformity to company rules
Individual productivity is very important for the corporation	—1	—2	—3	—4	—5	—6	—7	Team work productivity is very important for the corporation
There is a spirit of innovation and change throughout the workplace	—1	—2	—3	—4	—5	—6	—7	There is a spirit of conservation and permanence throughout the workplace
The corporation uses power such as rules and policies with its employees to achieve its objectives	—1	—2	—3	—4	—5	—6	—7	The corporation uses common values and motivation with its employee to achieve its objectives
Information obtained by employees is perceived as confidential and the property of the individual	—1	—2	—3	—4	—5	—6	—7	Information obtained by employees belongs to everyone and it should be distributed around the corporation
Contact with the public is considered rather undesirable	—1	—2	—3	—4	—5	—6	—7	A positive public image is one of the key objectives
Corporation activities are based on well designed plans and risk should be avoided	—1	—2	—3	—4	—5	—6	—7	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

Been informed about the principles and values implemented during the design process of the office building and accepted by the corporation, please describe your perception concerning the management and culture of the corporation occupying the above office building in association to previous given schematic scales.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

<p>Formal reports, memos and official meetings are the most important means of communication between employees</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Informal presentations, round table meetings and social activities are the most important means of communication between employees</p>
<p>The corporation believes that it should play an active role in resolving the social problems of its employees and the community</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>The corporation believes that the social problems of employee and the community are not its concern</p>
<p>Policies of the corporation are oriented towards maximisation of profit</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Policies of the corporation are based on employee's satisfaction through work</p>
<p>Corporational culture evokes freedom of employee's expression in work</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Corporational culture evokes employee's conformity to company rules</p>
<p>Individual productivity is very important for the corporation</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Team work productivity is very important for the corporation</p>
<p>There is a spirit of innovation and change throughout the workplace</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>There is a spirit of conservation and permanence throughout the workplace</p>
<p>The corporation uses power such as rules and policies with its employees to achieve its objectives</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>The corporation uses common values and motivation with its employee to achieve its objectives</p>
<p>Information obtained by employees is perceived as confidential and the property of the individual</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Information obtained by employees belongs to everyone and it should be distributed around the corporation</p>
<p>Contact with the public is considered rather undesirable</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>A positive public image is one of the key objectives</p>
<p>Corporation activities are based on well designed plans and risk should be avoided</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan</p>

Please, describe your perception concerning the management and culture of the corporation occupying the above office building in association to ten given schematic scales. Please rate the corporation in accordance to seven possible locations between bipolar descriptors.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

Formal reports, memos and official meetings are the most important means of communication between employees	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Informal presentations, round table meetings and social activities are the most important means of communication between employees
The corporation believes that it should play an active role in resolving the social problems of its employees and the community	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation believes that the social problems of employee and the community are not its concern
Policies of the corporation are oriented towards maximisation of profit	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Policies of the corporation are based on employee' satisfaction through work
Corporational culture evokes freedom of employee's expression in work	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporational culture evokes employee's conformity to company rules
Individual productivity is very important for the corporation	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Team work productivity is very important for the corporation
There is a spirit of innovation and change throughout the workplace	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	There is a spirit of conservation and permanence throughout the workplace
The corporation uses power such as rules and policies with its employees to achieve its objectives	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation uses common values and motivation with its employee to achieve its objectives
Information obtained by employees is perceived as confidential and the property of the individual	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Information obtained by employees belongs to everyone and it should be distributed around the corporation
Contact with the public is considered rather undesirable	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	A positive public image is one of the key objectives
Corporation activities are based on well designed plans and risk should be avoided	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

Been informed about the principles and values implemented during the design process of the office building and accepted by the corporation, please describe your perception concerning the management and culture of the corporation occupying the above office building in association to previous given schematic scales.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

Formal reports, memos and official meetings are the most important means of communication between employees	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Informal presentations, round table meetings and social activities are the most important means of communication between employees
The corporation believes that it should play an active role in resolving the social problems of its employees and the community	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation believes that the social problems of employee and the community are not its concern
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Corporational culture evokes freedom of employee's expression in work	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporational culture evokes employee's conformity to company rules
Individual productivity is very important for the corporation	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Team work productivity is very important for the corporation
There is a spirit of innovation and change throughout the workplace	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	There is a spirit of conservation and permanence throughout the workplace
The corporation uses power such as rules and policies with its employees to achieve its objectives	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation uses common values and motivation with its employee to achieve its objectives
Information obtained by employees is perceived as confidential and the property of the individual	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Information obtained by employees belongs to everyone and it should be distributed around the corporation
Contact with the public is considered rather undesirable	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	A positive public image is one of the key objectives
Corporation activities are based on well designed plans and risk should be avoided	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

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There is a spirit of innovation and change throughout the workplace	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	There is a spirit of conservation and permanence throughout the workplace
The corporation uses power such as rules and policies with its employees to achieve its objectives	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation uses common values and motivation with its employee to achieve its objectives
Information obtained by employees is perceived as confidential and the property of the individual	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Information obtained by employees belongs to everyone and it should be distributed around the corporation
Contact with the public is considered rather undesirable	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	A positive public image is one of the key objectives
Corporation activities are based on well designed plans and risk should be avoided	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

Been informed about the principles and values implemented during the design process of the office building and accepted by the corporation, please describe your perception concerning the management and culture of the corporation occupying the above office building in association to previous given schematic scales.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

<p>Formal reports, memos and official meetings are the most important means of communication between employees</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Informal presentations, round table meetings and social activities are the most important means of communication between employees</p>
<p>The corporation believes that it should play an active role in resolving the social problems of its employees and the community</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>The corporation believes that the social problems of employee and the community are not its concern</p>
<p>Policies of the corporation are oriented towards maximisation of profit</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Policies of the corporation are based on employee' satisfaction through work</p>
<p>Corporational culture evokes freedom of employee's expression in work</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Corporational culture evokes employee's conformity to company rules</p>
<p>Individual productivity is very important for the corporation</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Team work productivity is very important for the corporation</p>
<p>There is a spirit of innovation and change throughout the workplace</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>There is a spirit of conservation and permanence throughout the workplace</p>
<p>The corporation uses power such as rules and policies with its employees to achieve its objectives</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>The corporation uses common values and motivation with its employee to achieve its objectives</p>
<p>Information obtained by employees is perceived as confidential and the property of the individual</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Information obtained by employees belongs to everyone and it should be distributed around the corporation</p>
<p>Contact with the public is considered rather undesirable</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>A positive public image is one of the key objectives</p>
<p>Corporation activities are based on well designed plans and risk should be avoided</p>	<p>— 1 — 2 — 3 — 4 — 5 — 6 — 7</p>	<p>Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan</p>

Please, describe your perception concerning the management and culture of the corporation occupying the above office building in association to ten given schematic scales. Please rate the corporation in accordance to seven possible locations between bipolar descriptors.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

<p>Formal reports, memos and official meetings are the most important means of communication between employees</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Informal presentations, round table meetings and social activities are the most important means of communication between employees</p>
<p>The corporation believes that it should play an active role in resolving the social problems of its employees and the community</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>The corporation believes that the social problems of employee and the community are not its concern</p>
<p>Policies of the corporation are oriented towards maximisation of profit</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Policies of the corporation are based on employee's satisfaction through work</p>
<p>Corporational culture evokes freedom of employee's expression in work</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Corporational culture evokes employee's conformity to company rules</p>
<p>Individual productivity is very important for the corporation</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Team work productivity is very important for the corporation</p>
<p>There is a spirit of innovation and change throughout the workplace</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>There is a spirit of conservation and permanence throughout the workplace</p>
<p>The corporation uses power such as rules and policies with its employees to achieve its objectives</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>The corporation uses common values and motivation with its employee to achieve its objectives</p>
<p>Information obtained by employees is perceived as confidential and the property of the individual</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Information obtained by employees belongs to everyone and it should be distributed around the corporation</p>
<p>Contact with the public is considered rather undesirable</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>A positive public image is one of the key objectives</p>
<p>Corporation activities are based on well designed plans and risk should be avoided</p>	<p>—1— 2 —3— 4 —5— 6 —7—</p>	<p>Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan</p>

Been informed about the principles and values implemented during the design process of the office building and accepted by the corporation, please describe your perception concerning the management and culture of the corporation occupying the above office building in association to previous given schematic scales.

Note: The 4th location is considered as a position giving neutral, irrelevant or unjustified relation of the bipolar descriptors with the office building.

Formal reports, memos and official meetings are the most important means of communication between employees	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Informal presentations, round table meetings and social activities are the most important means of communication between employees
The corporation believes that it should play an active role in resolving the social problems of its employees and the community	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation believes that the social problems of employee and the community are not its concern
Policies of the corporation are oriented towards maximisation of profit	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Policies of the corporation are based on employee's satisfaction through work
Corporational culture evokes freedom of employee's expression in work	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporational culture evokes employee's conformity to company rules
Individual productivity is very important for the corporation	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Team work productivity is very important for the corporation
There is a spirit of innovation and change throughout the workplace	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	There is a spirit of conservation and permanence throughout the workplace
The corporation uses power such as rules and policies with its employees to achieve its objectives	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	The corporation uses common values and motivation with its employee to achieve its objectives
Information obtained by employees is perceived as confidential and the property of the individual	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Information obtained by employees belongs to everyone and it should be distributed around the corporation
Contact with the public is considered rather undesirable	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	A positive public image is one of the key objectives
Corporation activities are based on well designed plans and risk should be avoided	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	Corporation activities are based on impulsive activities and intuition and risks are viewed as part of the plan

E.1 Correlation of Scales

STUDENTS-1st STAGE

BUILDING A

	flow of info	soc awareness	values	formalisation	orientation	creativity	social democr	transparency	image	rationalisation
flow of info	1									
soc awareness	-0.302	1								
values	0.5076	-0.059	1							
formalisation	-0.439	0.0725	-0.331	1						
orientation	0.3045	0.069	0.4593	-0.036	1					
creativity	0.2208	0.0635	0.0403	0.1226	-0.053	1				
social democr	0.3086	-0.249	0.4229	-0.39	0.3475	-0.319	1			
transparency	0.7396	-0.384	0.371	-0.31	0.555	-0.113	0.4783	1		
image	0.2718	-0.009	0.1803	-0.07	0.3676	0.2799	0.2334	0.2326	1	
rationalisation	0.2467	-0.157	-0.012	-0.441	-0.179	-0.409	0.0836	0.2061	-0.038	1

STUDENTS-1st STAGE

BUILDING B

	flow of info	soc awareness	values	formalisation	orientation	creativity	social democr	transparency	image	rationalisation
flow of info	1									
soc awareness	-0.314	1								
values	0.1377	-0.059	1							
formalisation	-0.363	0.1495	-0.047	1						
orientation	0.0113	-0.257	0.1807	0.1008	1					
creativity	-0.371	0.0907	-0.092	0.3328	0.1456	1				
social democr	0.3535	-0.423	0.3087	-0.178	0.1615	-0.128	1			
transparency	0.0037	-0.225	0.2519	-0.241	0.349	-0.029	0.3548	1		
image	0.1982	-0.157	0.0731	0.0429	-0.099	-0.1	0.1969	-0.158	1	
rationalisation	0.221	-0.221	0.2322	-0.256	0.2489	-0.113	0.1758	-0.03	0.1232	1

STUDENTS-1st STAGE

BUILDING C

	flow of info	soc awareness	values	formalisation	orientation	creativity	social democr	transparency	image	rationalisation
flow of info	1									
soc awareness	-0.1	1								
values	0.3124	-0.368	1							
formalisation	-0.195	0.4762	-0.43	1						
orientation	0.0935	-0.188	0.3645	-0.02	1					
creativity	-0.14	0.3681	-0.4	0.558	-0.117	1				
social democr	0.3198	-0.345	0.4416	-0.39	0.2448	-0.298	1			
transparency	0.2148	-0.176	0.1406	-0.065	0.3662	-0.126	0.4432	1		
image	0.2658	-0.105	0.4414	-0.165	0.2886	-0.202	0.5688	0.3568	1	
rationalisation	-0.056	-0.291	0.2463	-0.561	-0.049	-0.248	0.2415	-0.024	0.0122	1

STUDENTS-1st STAGE

BUILDING D

	flow of info	soc awareness	values	formalisation	orientation	creativity	social democr	transparency	image	rationalisation
flow of info	1									
soc awareness	-0.598	1								
values	0.4067	-0.366	1							
formalisation	-0.473	0.4186	-0.224	1						
orientation	0.2273	-0.146	0.224	-0.086	1					
creativity	-0.023	0.3388	-0.137	0.123	0.1288	1				
social democr	0.3929	-0.398	0.5477	-0.215	0.2139	-0.042	1			
transparency	0.4627	-0.533	0.1526	-0.39	0.407	-0.131	0.3307	1		
image	0.2353	-0.249	0.4194	-0.068	0.1521	-0.105	0.1141	0.1623	1	
rationalisation	0.3826	-0.268	0.1242	-0.279	0.1034	-0.059	0.3082	0.2646	-0.036	1

E.2 Analysis of Variance

58 cases accepted.
 0 cases rejected because of out-of-range factor values.
 22 cases rejected because of missing data.
 2 non-empty cells.

1 design will be processed.

***** Analysis of Variance -- design 1 *****

Tests involving Between-Subjects Effects.

***** Analysis of Variance -- design 1 *****

Tests involving Between-Subjects Effects.

EFFECT .. TYPE

AVERAGED Multivariate Tests of Significance (S = 1, M = 4, N = 22 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.26410	1.68675	10.00	47.00	.112
Hotellings	.35888	1.68675	10.00	47.00	.112
Wilks	.73590	1.68675	10.00	47.00	.112
Roys	.26410				

Note.. F statistics are exact.

Multivariate Effect Size

TEST NAME Effect Size

(All) .264

EFFECT .. TYPE (Cont.)

Univariate F-tests with (1,56) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	1.11838	221.52171	1.11838	3.95574	.28272	.597	.00502
I2	14.00092	369.24046	14.00092	6.59358	2.1234	.151	.03653
I3	9.20827	531.77664	9.20827	9.49601	.96970	.329	.01702
I4	10.36679	243.67632	10.36679	4.35136	2.3824	.128	.04081
I5	1.46190	246.31612	1.46190	4.39850	.33236	.567	.00590
I6	6.62087	247.43947	6.62087	4.41856	1.4984	.226	.02606
I7	.81470	223.60987	.81470	3.99303	.20403	.653	.00363
I8	.17723	322.81414	.17723	5.76454	.03075	.861	.00055
I9	1.86054	261.99507	1.86054	4.67848	.39768	.531	.00705
I10	3.81579	328.99671	3.81579	5.87494	.64950	.424	.01147

***** Analysis of Variance -- design 1 *****

EFFECT .. TYPE (Cont.)

Univariate F-tests with (1,56) D. F. (Cont.)

Variable ETA Square

***** Analysis of Variance -- design 1 *****

EFFECT .. CONSTANT

AVERAGED Multivariate Tests of Significance (S = 1, M = 4 , N = 22 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.99641	1304.34516	10.00	47.00	.000
Hotellings	277.52025	1304.34516	10.00	47.00	.000
Wilks	.00359	1304.34516	10.00	47.00	.000
Roys	.99641				

Note.. F statistics are exact.

Multivariate Effect Size

TEST NAME Effect Size

(All) .996

EFFECT .. CONSTANT (Cont.)

Univariate F-tests with (1,56) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	10280.9804	221.52171	10280.9804	3.95574	2598.99991	.000	.97891
I2	3928.87161	369.24046	3928.87161	6.59358	595.86322	.000	.91409
I3	7918.20827	531.77664	7918.20827	9.49601	833.84569	.000	.93707
I4	3483.33230	243.67632	3483.33230	4.35136	800.51526	.000	.93462
I5	7318.63431	246.31612	7318.63431	4.39850	1663.89242	.000	.96744
I6	3404.27604	247.43947	3404.27604	4.41856	770.44885	.000	.93224
I7	10350.7630	223.60987	10350.7630	3.99303	2592.20548	.000	.97885
I8	9418.15137	322.81414	9418.15137	5.76454	1633.80845	.000	.96686
I9	10076.4295	261.99507	10076.4295	4.67848	2153.78122	.000	.97466
I10	6189.76407	328.99671	6189.76407	5.87494	1053.58740	.000	.94953

***** Analysis of Variance -- design 1 *****

Tests involving 'BUILDING' Within-Subject Effect.

***** Analysis of Variance -- design 1 *****

Tests involving 'BUILDING' Within-Subject Effect.

EFFECT .. TYPE BY BUILDING

AVERAGED Multivariate Tests of Significance (S = 3, M = 3, N = 78 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.24968	1.46160	30.00	483.00	.057
Hotellings	.28814	1.51431	30.00	473.00	.042
Wilks	.76507	1.48822	30.00	467.37	.049
Roys	.17044				

Multivariate Effect Size

TEST NAME Effect Size

Pillais	.083
Hotellings	.088
Wilks	.085

EFFECT .. TYPE BY BUILDING (Cont.)

Univariate F-tests with (3,168) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	56.95848	636.72039	18.98616	3.79000	5.00954	.002	.08211
I2	5.14377	429.94243	1.71459	2.55918	.66998	.572	.01182
I3	38.11129	495.46414	12.70376	2.94919	4.30754	.006	.07143
I4	18.93330	448.36842	6.31110	2.66886	2.36472	.073	.04052
I5	31.68279	733.11678	10.56093	4.36379	2.42013	.068	.04143
I6	13.23621	503.10000	4.41207	2.99464	1.47332	.224	.02563
I7	16.38031	463.47961	5.46010	2.75881	1.97915	.119	.03414
I8	20.24332	388.36875	6.74777	2.31172	2.91894	.036	.04954
I9	24.09477	646.47204	8.03159	3.84805	2.08719	.104	.03593
I10	64.24465	500.84803	21.41488	2.98124	7.18322	.000	11369

***** Analysis of Variance -- design 1 *****

EFFECT .. BUILDING

AVERAGED Multivariate Tests of Significance (S = 3, M = 3, N = 78 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.92545	7.18216	30.00	483.00	.000
Hotellings	1.64705	8.65616	30.00	473.00	.000
Wilks	.29791	7.95613	30.00	467.37	.000
Roys	.50992				

Multivariate Effect Size

TEST NAME Effect Size

Pillais	.308
Hotellings	.354
Wilks	.332

EFFECT .. BUILDING (Cont.)

Univariate F-tests with (3,168) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	146.54469	636.72039	48.84823	3.79000	12.88871	.000	.18709
I2	85.51446	429.94243	28.50482	2.55918	11.13826	.000	.16590
I3	274.21473	495.46414	91.40491	2.94919	30.99321	.000	.35627
I4	250.17468	448.36842	83.39156	2.66886	31.24614	.000	.35814
I5	29.06210	733.11678	9.68737	4.36379	2.21994	.088	.03813
I6	185.54655	503.10000	61.84885	2.99464	20.65316	.000	.26944
I7	151.43203	463.47961	50.47734	2.75881	18.29680	.000	.24627
I8	37.64849	388.36875	12.54950	2.31172	5.42864	.001	.08837
I9	222.56029	646.47204	74.18676	3.84805	19.27906	.000	.25610
I10	229.64120	500.84803	76.54707	2.98124	25.67627	.000	.31437

***** Analysis of Variance -- design 1 *****

Tests involving 'STAGE' Within-Subject Effect.

***** Analysis of Variance -- design 1 *****

Tests involving 'STAGE' Within-Subject Effect.

EFFECT .. TYPE BY STAGE

AVERAGED Multivariate Tests of Significance (S = 1, M = 4, N = 22 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.28227	1.84846	10.00	47.00	.078
Hotellings	.39329	1.84846	10.00	47.00	.078
Wilks	.71773	1.84846	10.00	47.00	.078
Roys	.28227				

Note.. F statistics are exact.

Multivariate Effect Size

TEST NAME Effect Size

(All) .282

EFFECT .. TYPE BY STAGE (Cont.)

Univariate F-tests with (1,56) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	8.82400	66.69539	8.82400	1.19099	7.40897	.009	.11684
I2	2.93876	79.59572	2.93876	1.42135	2.06758	.156	.03561
I3	1.73413	47.02664	1.73413	.83976	2.06503	.156	.03556
I4	6.97205	70.32105	6.97205	1.25573	5.55218	.022	.09020
I5	2.86988	122.75296	2.86988	2.19202	1.30924	.257	.02285
I6	5.33798	58.22237	5.33798	1.03969	5.13422	.027	.08398
I7	6.58625	81.23487	6.58625	1.45062	4.54029	.038	.07500
I8	.20065	48.50625	.20065	.86618	.23164	.632	.00412
I9	.84538	54.42401	.84538	.97186	.86986	.355	.01530
I10	10.71670	80.54408	10.71670	1.43829	7.45101	.008	.11743

***** Analysis of Variance-- design 1 *****

EFFECT .. TYPE BY STAGE (Cont.)

Univariate F-tests with (1,56) D. F. (Cont.)

Variable ETA Square

***** Analysis of Variance-- design 1 *****

EFFECT .. STAGE

AVERAGED Multivariate Tests of Significance (S = 1, M = 4 , N = 22 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.50764	4.84579	10.00	47.00	.000
Hotellings	1.03102	4.84579	10.00	47.00	.000
Wilks	.49236	4.84579	10.00	47.00	.000
Roys	.50764				

Note.. F statistics are exact.

Multivariate Effect Size

TEST NAME Effect Size

(All) .508

EFFECT .. STAGE (Cont.)

Univariate F-tests with (1,56) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
11	20.30676	66.69539	20.30676	1.19099	17.05033	.000	.23341
12	17.18876	79.59572	17.18876	1.42135	12.09324	.001	.17760
13	7.42379	47.02664	7.42379	.83976	8.84035	.004	.13634
14	9.93757	70.32105	9.93757	1.25573	7.91376	.007	.12382
15	21.50782	122.75296	21.50782	2.19202	9.81188	.003	.14909
16	.26901	58.22237	.26901	1.03969	.25874	.613	.00460
17	16.82763	81.23487	16.82763	1.45062	11.60028	.001	.17160
18	11.50237	48.50625	11.50237	.86618	13.27938	.001	.19168
19	6.67297	54.42401	6.67297	.97186	6.86620	.011	.10922
110	2.52704	80.54408	2.52704	1.43829	1.75698	.190	.03042

***** Analysis of Variance -- design 1 *****

Tests involving 'BUILDING BY STAGE' Within-Subject Effect.

***** Analysis of Variance -- design 1 *****

Tests involving 'BUILDING BY STAGE' Within-Subject Effect.

EFFECT .. TYPE BY BUILDING BY STAGE

AVERAGED Multivariate Tests of Significance (S = 3, M = 3, N = 78 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.20745	1.19601	30.00	483.00	.221
Hotellings	.22891	1.20304	30.00	473.00	.215
Wilks	.80432	1.19975	30.00	467.37	.218
Roys	.12395				

Multivariate Effect Size

TEST NAME Effect Size

Pillais	.069
Hotellings	.071
Wilks	.070

EFFECT .. TYPE BY BUILDING BY STAGE (Cont.)

Univariate F-tests with (3,168) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	10.05467	158.64145	3.35156	.94429	3.54927	.016	.05960
I2	5.82281	216.10822	1.94094	1.28636	1.50886	.214	.02624
I3	10.14822	205.27204	3.38274	1.22186	2.76852	.043	.04711
I4	2.54038	173.40789	.84679	1.03219	.82039	.484	.01444
I5	4.49005	297.39572	1.49668	1.77021	.84548	.471	.01487
I6	.89333	148.01184	.29778	.88102	.33799	.798	.00600
I7	4.71384	159.05987	1.57128	.94678	1.65959	.178	.02878
I8	9.24296	186.23980	3.08099	1.10857	2.77924	.043	.04728
I9	4.25530	188.31151	1.41843	1.12090	1.26544	.288	.02210
I10	4.37677	179.78487	1.45892	1.07015	1.36329	.256	.02377

***** Analysis of Variance -- design 1 *****

EFFECT .. BUILDING BY STAGE

AVERAGED Multivariate Tests of Significance (S = 3, M = 3, N = 78 1/2)

Test Name	Value	Exact F	Hypoth. DF	Error DF	Sig. of F
Pillais	.60703	4.08415	30.00	483.00	.000
Hotellings	.82569	4.33945	30.00	473.00	.000
Wilks	.49472	4.22123	30.00	467.37	.000
Roys	.32709				

Multivariate Effect Size

TEST NAME Effect Size

Pillais	.202
Hotellings	.216
Wilks	.209

EFFECT .. BUILDING BY STAGE (Cont.)

Univariate F-tests with (3,168) D. F.

Variable	Hypoth. SS	Error SS	Hypoth. MS	Error MS	F	Sig. of F	ETA Square
I1	22.02019	158.64145	7.34006	.94429	7.77307	.000	.12189
I2	14.60729	216.10822	4.86910	1.28636	3.78518	.012	.06331
I3	16.11374	205.27204	5.37125	1.22186	4.39597	.005	.07279
I4	8.05762	173.40789	2.68587	1.03219	2.60211	.054	.04440
I5	82.26591	297.39572	27.42197	1.77021	15.49078	.000	.21668
I6	10.27264	148.01184	3.42421	.88102	3.88663	.010	.06490
I7	4.23108	159.05987	1.41036	.94678	1.48963	.219	.02591
I8	19.04468	186.23980	6.34823	1.10857	5.72650	.001	.09277
I9	5.73806	188.31151	1.91269	1.12090	1.70638	.168	.02957
I10	4.66987	179.78487	1.55662	1.07015	1.45459	.229	.02532

E.8 Descriptive Statistics - 1st Phase

BUILDING A

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	4.4	2.633	4.283	3.033	3.217	3.117	4.967	4.067	5.467	2.65
Standard Error	0.207	0.186	0.234	0.17	0.217	0.203	0.146	0.199	0.183	0.166
Median	5	2	5	3	3	3	5	4	6	2
Mode	5	2	5	2	2	2	6	4	6	2
Stand. Deviation	1.607	1.438	1.814	1.314	1.678	1.574	1.134	1.539	1.42	1.287
Variance	2.583	2.067	3.291	1.728	2.817	2.478	1.287	2.368	2.016	1.655
Kurtosis	-0.6	0.226	-1.11	-0.84	-0.93	-0.89	-0.86	-0.83	1.047	0.261
Skewness	-0.59	0.998	-0.37	0.446	0.491	0.61	-0.44	-0.38	-1.11	0.841
Range	6	5	6	5	6	5	4	5	6	5
Minimum	1	1	1	1	1	1	3	1	1	1
Maximum	7	6	7	6	7	6	7	6	7	6
Sum	264	158	257	182	193	187	298	244	328	159
Count	60	60	60	60	60	60	60	60	60	60
Cont. Level 95%	0.407	0.364	0.459	0.333	0.425	0.398	0.287	0.389	0.359	0.326

BUILDING B

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	5.683	3.283	4.35	2.75	4.583	2.267	5.033	5.133	4.717	4.7
Standard Error	0.155	0.202	0.216	0.148	0.227	0.187	0.178	0.151	0.198	0.188
Median	6	3	5	3	5	2	5	5	5	5
Mode	7	3	5	2	6	1	5	6	5	6
Stand. Deviation	1.2	1.563	1.676	1.144	1.759	1.448	1.377	1.171	1.53	1.453
Variance	1.44	2.444	2.808	1.309	3.095	2.097	1.897	1.372	2.342	2.112
Kurtosis	-0.88	-0.84	-0.93	0.318	-0.77	2.237	0.305	1.309	-0.37	-0.78
Skewness	-0.51	0.198	-0.31	0.724	-0.57	1.419	-0.67	-0.79	-0.44	-0.34
Range	4	6	6	5	6	6	6	6	6	5
Minimum	3	1	1	1	1	1	1	1	1	2
Maximum	7	7	7	6	7	7	7	7	7	7
Sum	341	197	261	165	275	136	302	308	283	282
Count	60	60	60	60	60	60	60	60	60	60
Cont. Level 95%	0.304	0.396	0.424	0.29	0.445	0.366	0.349	0.296	0.387	0.368

BUILDING C

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	2.917	4.15	2.333	4.75	3.783	3.783	3.233	4.133	3.3	2.633
Standard Error	0.213	0.219	0.196	0.217	0.237	0.228	0.188	0.197	0.205	0.236
Median	3	5	2	5	4	4	3	4	3	2
Mode	1	5	1	4	5	6	3	5	3	1
Stand. Deviation	1.65	1.696	1.515	1.684	1.833	1.767	1.454	1.523	1.587	1.832
Variance	2.722	2.875	2.294	2.835	3.359	3.122	2.114	2.321	2.519	3.355
Kurtosis	-0.89	-0.76	2.062	-0.46	-1.16	-1.28	-0.6	-0.74	-0.79	-0.09
Skewness	0.512	-0.42	1.466	-0.47	-0.08	-0.08	0.33	-0.41	0.327	0.995
Range	5	6	6	6	6	6	5	6	6	6
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	6	7	7	7	7	7	6	7	7	7
Sum	175	249	140	285	227	227	194	248	198	158
Count	60	60	60	60	60	60	60	60	60	60
Cont. Level 95%	0.417	0.429	0.383	0.426	0.464	0.447	0.368	0.385	0.402	0.463

BUILDING D

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	5.567	2.45	4.783	2.433	3.833	1.967	5.317	5.033	5.367	4.667
Standard Error	0.157	0.147	0.21	0.182	0.215	0.141	0.18	0.171	0.193	0.187
Median	6	2	5	2	3.5	2	5	5	6	5
Mode	6	3	5	2	3	1	5	6	5	5
Stand. Deviation	1.212	1.141	1.627	1.407	1.669	1.089	1.396	1.327	1.495	1.446
Variance	1.47	1.303	2.647	1.979	2.785	1.185	1.949	1.762	2.236	2.09
Kurtosis	0.747	0.858	-0.01	2.041	-0.89	2.608	1.538	-0.38	0.263	-0.22
Skewness	-1.05	0.799	-0.76	1.445	0.183	1.454	-1.1	-0.47	-0.91	-0.57
Range	5	5	6	6	6	5	6	5	5	6
Minimum	2	1	1	1	1	1	1	2	2	1
Maximum	7	6	7	7	7	6	7	7	7	7
Sum	334	147	287	146	230	118	319	302	322	280
Count	60	60	60	60	60	60	60	60	60	60
Cont. Level 95%	0.307	0.289	0.412	0.356	0.422	0.275	0.353	0.336	0.378	0.366

E.9 Descriptive Statistics - 2nd Phase

BUILDING A										
	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	5.632	2.053	4.921	2.342	4.342	2.263	5.816	4.737	5.921	3.211
Standard Error	0.26	0.21	0.31	0.211	0.323	0.205	0.206	0.269	0.215	0.28
Median	6	2	6	2	4.5	2	6	5	6	3
Mode	6	1	6	2	7	2	7	6	7	3
Stand. Deviation	1.601	1.293	1.908	1.3	1.99	1.267	1.27	1.655	1.323	1.727
Variance	2.563	1.673	3.642	1.691	3.961	1.605	1.614	2.74	1.75	2.982
Kurtosis	0.417	3.378	-1.11	4.481	-1.25	0.136	0.995	-0.74	2.791	-0.4
Skewness	-1.27	1.796	-0.62	1.808	-0.18	0.989	-1.14	-0.54	-1.7	0.654
Range	5	5	6	6	6	4	5	6	5	6
Minimum	2	1	1	1	1	1	2	1	2	1
Maximum	7	6	7	7	7	5	7	7	7	7
Sum	214	78	187	89	165	86	221	180	225	122
Count	38	38	38	38	38	38	38	38	38	38
Cont. Level 95%	0.509	0.411	0.607	0.413	0.633	0.403	0.404	0.526	0.421	0.549

BUILDING B										
	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	5.842	2.553	4.947	2.211	4.105	1.895	5.316	5.184	4.895	4.737
Standard Error	0.198	0.246	0.272	0.211	0.315	0.195	0.236	0.223	0.324	0.274
Median	6	2	5.5	2	4.5	1.5	6	5.5	6	5
Mode	6	2	6	2	6	1	6	6	6	6
Stand. Deviation	1.22	1.519	1.676	1.298	1.942	1.203	1.454	1.373	1.997	1.688
Variance	1.488	2.308	2.808	1.684	3.772	1.448	2.114	1.884	3.989	2.848
Kurtosis	5.953	1.123	-0.4	2.475	-1.25	2.49	0.379	1.881	-0.83	-0.46
Skewness	-1.95	1.261	-0.82	1.544	-0.25	1.587	-1.03	-1.28	-0.73	-0.59
Range	6	6	6	5	6	5	5	6	6	6
Minimum	1	1	1	1	1	1	2	1	1	1
Maximum	7	7	7	6	7	6	7	7	7	7
Sum	222	97	188	84	156	72	202	197	186	180
Count	38	38	38	38	38	38	38	38	38	38
Cont. Level 95%	0.388	0.483	0.533	0.413	0.618	0.383	0.462	0.436	0.635	0.537

BUILDING C										
	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	3.947	3.421	2.5	4.289	4.421	4.026	4.026	4.684	3.447	2.447
Standard Error	0.297	0.246	0.266	0.272	0.294	0.276	0.268	0.245	0.31	0.255
Median	4	3	2	5	5	4	4	5	3	2
Mode	5	3	1	5	6	6	5	6	1	1
Stand. Deviation	1.83	1.518	1.64	1.675	1.81	1.7	1.652	1.509	1.913	1.572
Variance	3.349	2.304	2.689	2.806	3.277	2.891	2.729	2.276	3.659	2.47
Kurtosis	-0.85	-0.32	-0.26	-0.87	-0.9	-1.06	-0.68	-0.25	-1.17	0.22
Skewness	-0.06	0.354	0.951	-0.23	-0.5	-0.22	-0.04	-0.57	0.244	1.05
Range	6	6	5	6	6	6	6	6	6	5
Minimum	1	1	1	1	1	1	1	1	1	1
Maximum	7	7	6	7	7	7	7	7	7	6
Sum	150	130	95	163	168	153	153	178	131	93
Count	38	38	38	38	38	38	38	38	38	38
Cont. Level 95%	0.582	0.483	0.521	0.533	0.576	0.541	0.525	0.48	0.608	0.5

BUILDING D										
	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
Mean	6.053	2.342	5.211	2.184	5.316	2.158	5.842	5.184	5.763	4.921
Standard Error	0.155	0.275	0.32	0.238	0.277	0.24	0.212	0.229	0.208	0.273
Median	6	2	6	2	6	2	6	6	6	5.5
Mode	6	1	6	2	6	1	6	6	6	6
Stand. Deviation	0.957	1.697	1.975	1.468	1.71	1.48	1.305	1.411	1.283	1.683
Variance	0.916	2.88	3.9	2.154	2.925	2.191	1.704	1.992	1.645	2.831
Kurtosis	7.604	1.177	0.035	4.804	1.232	3.544	4.486	-0.38	3.708	0.029
Skewness	-2.06	1.46	-1.13	2.1	-1.34	1.878	-1.85	-0.65	-1.56	-0.98
Range	5	6	6	6	6	6	6	5	6	6
Minimum	2	1	1	1	1	1	1	2	1	1
Maximum	7	7	7	7	7	7	7	7	7	7
Sum	230	89	198	83	202	82	222	197	219	187
Count	38	38	38	38	38	38	38	38	38	38
Cont. Level 95%	0.304	0.54	0.628	0.467	0.544	0.471	0.415	0.449	0.408	0.535

E.10 meaningfulness of judgment

E.11 homogeneity of judgments

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
meaningfulness of judgment										
1st stage										
<i>Object A</i>	0.3352	1.9453	0.3989	1.2216	0.5429	0.8006	1.1641	0.0028	2.1717	1.8012
<i>Object B</i>	2.4107	0.3663	0.1170	1.3407	0.5429	3.0166	0.8483	1.4024	0.3989	0.5048
<i>Object C</i>	1.2805	0.0028	3.4910	1.0533	0.0339	0.0111	0.7542	0.0111	0.7091	2.0949
<i>Object D</i>	2.4107	1.9453	0.8006	2.1717	0.0111	4.1060	1.5956	0.8975	1.9453	0.5429
2nd stage										
<i>Object A</i>	2.6620	3.7922	0.8483	2.7486	0.1170	3.0166	3.2971	0.5429	3.6904	0.6233
<i>Object B</i>	3.3934	2.0949	0.8975	3.2022	0.0111	4.4321	1.7313	1.4024	0.8006	0.5429
<i>Object C</i>	0.0028	0.3352	2.2500	0.0838	0.1773	0.0007	0.0007	0.4681	0.3054	2.4107
<i>Object D</i>	4.2133	2.7486	1.4654	3.2971	1.7313	3.3934	3.3934	1.4024	3.1087	0.8483

homogeneity of judgments

1st stage										
<i>Object A</i>	1.5357	1.4433	1.7151	1.2690	1.6875	1.5560	1.1480	1.4877	1.3899	1.4384
<i>Object B</i>	1.2013	1.5861	1.7286	1.2418	1.6055	1.4082	1.3633	1.2489	1.7922	1.4870
<i>Object C</i>	1.6468	1.8737	1.3788	1.7162	1.8867	1.7052	1.4551	1.4849	1.5162	1.7506
<i>Object D</i>	1.1554	1.1750	1.6240	1.5020	1.6892	1.0523	1.4646	1.3940	1.4054	1.3888
2nd stage										
<i>Object A</i>	1.6010	1.2934	1.9085	1.3002	1.9902	1.2667	1.2704	1.6552	1.3230	1.7267
<i>Object B</i>	1.2198	1.5192	1.6757	1.2978	1.9423	1.2034	1.4539	1.3726	1.9972	1.6875
<i>Object C</i>	1.8299	1.5180	1.6399	1.6751	1.8104	1.7003	1.6520	1.5086	1.9129	1.5717
<i>Object D</i>	0.9571	1.6970	1.9749	1.4678	1.7101	1.4801	1.3054	1.4114	1.2826	1.6827

	flow of information	social awareness	values	formalisation	orientation	creativity	social democracy	transparency	image	rationalisation
meaningfulness of judgment										
1st stage	1.61	1.06	1.20	1.45	0.28	1.98	1.09	0.58	1.31	1.24
2nd stage	2.57	2.24	1.37	2.33	0.51	2.71	2.11	0.95	1.98	1.11

homogeneity of judgments

1st stage	1.38	1.52	1.61	1.43	1.72	1.43	1.36	1.40	1.53	1.52
2nd stage	1.40	1.51	1.80	1.44	1.86	1.41	1.42	1.49	1.63	1.67

meaningfulness of judgment
1st stage 2nd stage

<i>Object A</i>	1.0384	2.1339
<i>Object B</i>	1.0949	1.8508
<i>Object C</i>	0.9442	0.6035
<i>Object D</i>	1.6427	2.5602

homogeneity of judgments
1st stage 2nd stage

1.4671	1.5335
1.4663	1.5369
1.6414	1.6819
1.3851	1.4969

ISSUES ABOUT THE OPERATIONAL ENVIRONMENT

EXTERNAL INFLUENCE

ECONOMICAL	gross domestic product inflation monetary & fiscal policy direct intervention international environment
POLITICAL	political stability government attitude about the ind. sector government regulation international environment
LEGISLATION	current legislation international environment
MARKET	power of interest parties intensity of competition international environment
DEMOGRAPHICS	availability of employee unemployment levels of training and education
ESTATE MARKET	quantity & quality of the market characteristics of location
SOCIAL & CULTURAL	power of publics attitude of publics about the ind. sector general attitude about social issues pressures & influences international environment
IT	speed of technological change in the ind. sector availability of technology, supply & support IT & telecommunication systems international environment
CONSTRUCTION IND.	sophistication of construction industry capacity of construction industry available technology in construction industry
EMERGING PHENOMENA	

ORGANISATIONAL ISSUES

CORPORATE OBJECTIVES	profit-non profit
STRUCTURE	centralisation configuration formalisation flow of information
CULTURE & POLICIES	balance of power corporate philosophy
WORK	specialisation standardisation IT future expansion
CORP. IDENTITY	C.I. programme social responsibility green policies
RESOURCES	employee cultural characteristics cost level of functional expertise
ASSETS	location of capital resources capital restrictions net assets' characteristics

ISSUES ABOUT FACILITIES

SOFT ISSUES

ECONOMY

FUNCTIONALITY

FLEXIBILITY	main use/uses type of tenancy ability for partial use	PROFITABILITY	cost/exchange value functionality, accessibility space efficiency	CONTRIBUTION TO COMMUNITY INFRASTRUCTURE	amenities offered to public impact to social life
ADAPTABILITY	capacity for space' extension & expansion capacity for IT' extension & expansion spatial modularity layout compatibility spatial flexibility zoning, load bearing capacity systems' capacity services' zonality	MAINTAINABILITY	accessibility documentation & schedules	IMAGE & SOCIAL ABSORPTION	image symbolism & meanings aesthetics & aesthetics of durability
CONTROLLABILITY	management of ambient conditions security & disaster prevention employee control	DURABILITY	life expectation construction cost recycling, upgrading, modifications durability of materials services' life expectation finishing materials	ENVIRONMENTAL FRIENDLY	recyclable & sustainable materials energy efficiency use of alternative resources impact to the environment
HEALTH & SAFETY	materials & equipment dangerous facilities & equipment ergonomics visual environment acoustical environment temperature air movement/ventilation humidity	BUILDABILITY	simplicity of materials & forms specification & standardisation dismantle	EMPLOYEE SATISFACTION	psychological needs social needs interdependence with the city
LOCATION	accessibility to local infrastructure land's economical characteristics proximity to suburban and business centres				
ENVIRONMENTAL CONSCIOUS					