JUDGEMENT ANALYSIS AND DECISION MAKING IN PROPERTY DEVELOPMENT

by

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ABSTRACT

This thesis discusses a detailed investigation into the relationships between the decision makers' judgement of the decision making factors and the development outcomes of office and shop developments. Consequently the most appropriate method that could possibly assist in the attainment of consistent decision making outcomes is identified. This research has taken the period between 1985-1990 to study the circumstances that prevailed in two contrasting situations, that of the buoyant 1985-1988 economic environment and the sudden decline from early 1989 onwards. Taking this study period enabled the analysis of moderately successful office and shop developments that might not have been available if only the boom period of 1985-1988 had been considered.

From the whole population of property development companies in the United Kingdom, a sample of 123 companies was surveyed. Detailed interviews were carried out with 20 decision makers using the Repertory Grid Interview Technique to obtain information concerning the influence of the decision making factors on the decision makers' development achievements. The results of the study showed that the relationship varies between office and shop developments. On examining the external factors, notably the Timing factor, it was found that office development outcomes were more sensitive to the property market downturn than shop developments. Office development outcomes on the other hand were clearly not affected by Location but shop developments were heavily influenced by this factor. Thus, the study indicates that the external factors affect the outcomes of both office and shop developments, but for office development emphasis must be given to 'Right Timing' and for shop developments 'Right Location'.

This study also reveals that personal attributes or 'internal' characteristics of the decision makers affect the achievements in shop developments rather than offices. This implies that different expertise is needed to undertake office and shop developments. Shop developments require a more personal approach as they are oriented towards smaller and, to a certain extent, more 'specialised clients'. On the other hand, office developments are less specialised as they are for a wider and more mixed market. These are the reasons why achievements in shop developments are affected more by the personal attributes of the decision makers and the offices by external factors, with the exception of the 'Location' factor.

This study has identified the fundamental relationships between the decision makers' judgements of the decision making factors and their office and shop developments' achievements. Further, these facts have formed the groundwork for the establishment of the knowledge based system but time and man power constraints have made the practical completion of the KBS not feasible. Therefore, further detailed studies are required to complete the workable 'Property Development - Judgement and Decision Making Knowledge Based System' (JUDGEX) that will be a tool towards the improvement in property development decision making.

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CHAPTER 1

INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

Anyone familiar with the carrying out of property development will accept that they have to make many complicated decisions. In one way or another, objectively or subjectively, the developer or decision maker has to sort out or analyse the given information and then make the best decision that he can. However, in making decisions, decision makers tended to avoid hard, i.e. systematic and analytical data, and rely more on their intuitive judgement (Mintzberg 1975)[1]. Judgement refers to the cognitive aspects of the decision making process namely, decision makers' perceptions of and attitudes toward the external environment factors as well as the internal character and structure of the decision making organisation. These perceptions and attitudinal factors and characteristics are often labelled as soft data in the decision making process.

This concern for human information processing and choice capabilities has led to the study of descriptive, as opposed to prescriptive models of decision making behaviour. One can distinguish descriptive theory of human behaviour from prescriptive theory in that descriptive theory describes what people do, while prescriptive theory specifies what they should do. Kahneman and Tversky (1972[2a], 1973[b], 1979[c]) who carried on the work of Simon (1957)[3] and March and Simon (1958)[4], suggested that decision makers rely on a number of simplifying strategies called heuristics or rules of thumb, in making decisions. They are the standard rules that implicitly direct one's judgement. They serve as a mechanism for coping with the complex environment both external and internal surrounding the decisions. Heuristics are helpful, but their use can sometimes lead to severe errors (Bazerman 1990)[5]. What degree of correlation do the intuitive judgement or descriptive factors have with the outcome performance of the matter that one has decided? Specifically, does the intuitive judgement of the developers affect the outcome of the development carried out? In short therefore, are human cognitive limitations and willingness to accept risks the determining factor for performance? The answers to these questions will enable a greater understanding of the human behavioural aspects in the decision making process.

The quantitatively based approaches to decision making have developed a number of prescriptive techniques to assist in applied decision making strategies.

Developing and applying prescriptive decision making strategies with appropriate understanding of the human behavioural aspects or soft data will enhance the understanding and practice of decision making.

1.2   PURPOSE OF THE RESEARCH

Property development performance and analysis have produced a sparse literature as compared to the analysis of income earning properties. Further, theory of decision making that copes with risk, e.g. beta, probability, sensitivity and scenario analysis are more extensively researched in the general business area than in property development. By right, the theory and practice should also be undertaken by those concerned with the property development that is essentially concerned with the manufacture of a product in anticipation of an unknown future demand. Yet, the property development industry has largely ignored the methods of formal decision analysis adopted extensively in other industries.

The purpose of this research is to delve into three major areas of inquiry:

i.   What relationships do the external factors have with the development outcomes?

ii. To what extent do the decision makers' attributes correlate with their achievements?

iii. How do the decision makers' perception of the decision making factors affect their achievements?

The secondary objective is to identify "To what extent does the examination and analysis of external factors usually termed the 'hard data' and/or the intuitive judgement, i.e. deliberation, reasoning and acceptance of facts that is the 'soft data' contribute towards a greater influence in the decision makers' achievements and/or development outcomes?"

1.3   OBJECTIVES OF THE THESIS

This thesis sets out to make two contributions to the research relating to decision making in commercial property development.

The first contribution centres on the question of "What degree of correlation does intuitive judgement or soft data have with the development outcome and

decision makers' achievements in office and shop developments at the time of completion?". To date there is no research addressing this issue. This thesis thus makes a modest contribution towards addressing this deficiency.

The second contribution of this thesis, which is an extension of the first, is to lay the groundwork towards the establishment of the 'Property Development - Judgement And Decision Making' knowledge based system. It is suggested that the knowledge based system is one of the methods towards improving the decision makers' achievements by reducing the judgmental errors in the consideration of the decision making factors.

1.4   THE SIGNIFICANCE OF THE STUDY

This study is meaningful and significant to property development decision makers as evidenced by the following propositions:

1. The results will identify and establish the external factors and/or cognitive judgmental factors that influence the development outcomes or the decision makers' achievements. This information will assist in the design of the subjective cognitive model of the decision support system.

2. The results will determine the relationships between decision makers' consideration of the decision making factors and their achievements. It will enable companies to identify the personnel who possess the ability to be in the winning decision making team. On the other hand, it is possible to inculcate the others with the appropriate decision making skills.

3. The research aims to provide the basis for the establishment of a knowledge based system in the property development decision making process.

1.5   LIMITATIONS   OF THE STUDY

An important issue is how much to generalise from the data and how much to qualify the would-be conclusions. Descriptive research does not create laws and conclusions that apply beyond the subject matter that this thesis describes. Rather it will provide indicators for subsequent research to pin down and generalise. This particular study can be of important value in itself. This thesis can provide valuable information for establishing a subjective cognitive decision making model that will

then be a basis for designing the knowledge based system. This knowledge based system will be able to assist the UK property developers and decision makers in their decision making processes particularly in office and shop developments.

The sample frame is the entire population of 1230 property development and investor companies throughout UK derived from the combined list in the UK Directory of Property Developers, Investors and Finance and Estates Gazette Directory. Out of this population, 123 companies were randomly sampled, of which 41 usable responses (33 per cent) were received from the first questionnaire. A second questionnaire, requesting more detailed information, was sent to the 41 respondents of which 20 usable responses (49 per cent) were received. This sample is clearly biased as it is not drawn totally randomly. Thus, there is the possible danger in drawing conclusions about the universality of property development companies from this study.

The rise and sometimes rapid falls of the economic climate or market due to, among other factors, sudden policy changes or changes in interest rates are difficult to foretell over a short period, let alone a long time and for property development, once started, it is difficult to change. It has often happened that a new supply of office space comes on stream at a time when the upsurge in demand that stimulated development has begun to decline, leading to a cyclical pattern of over and under supply that appears to be a regular feature of property markets (Barras 1979)[6].

Recognising such a property market scenario, this research has taken the period between 1985-1990 to study the circumstances that prevailed in two contrasting situations, that of the buoyant 1985-1988 economic environment and the sudden decline from early 1989 onwards. Taking this study period also enabled the analysis of moderately successful office and shop developments that might not have been available if only the boom period of 1985-1988 had been considered.

1.6 GUIDE TO THE THESIS

Chapter One of this thesis serves as an introduction to the research. This chapter comprises the statement of the problem, the purpose of the research, the significance of the study, the limitations of the study and a preview of the research. Chapters Two and Three presents a synthesis of the related literature. Chapter Two presents the uncertainty, risk and the process of property development. Chapter

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Three discusses judgement and decision making approaches, their complexity, kinds of decision and decision making models.

Chapter Four presents the methodology to be used in this research. It describes the sample population and the sampling frame that has been selected; the data collection methods; the research instruments used in this study; and the procedures for analysis of the data. The detailed account of the execution of the mailed survey and the Repertory Grid interview is also explained.

Chapter Five presents the statistical results and the analysis on the questionnaire survey. The responses to the questionnaires are discussed with their frequencies and percentage distributions. The correlation between the major variables of the study are tested. Chapter Six analyses the Repertory Grid data emphasising the decision makers' constructs weighting and their relationships with the achievements

Chapter Seven discusses the knowledge based system (KBS) as one of the methods of improving the decision makers' development achievements. It also provides a useful theoretical background of the KBS towards the practical implementation in the property development decision making environment. Chapter Eight presents the conclusions and the discussion of this study's findings. Lastly, this chapter suggests several areas that would benefit from additional research.

CHAPTER 2

PROPERTY DEVELOPMENT

1.1 INTRODUCTION

This chapter provides a review of the literature relating to property development. The purpose of this review is to examine research reports and other literature appropriate to the objectives of the investigation.

The thesis follows the path of examining the entire property development process before focusing on the decision makers in their judgement of decision making factors, risks and uncertainties influencing property development outcomes. Little literature on this subject matter is available and only since the early 80's has there been some reports written on the property development process and related activities.

As such, this chapter begins with a discussion of the theoretical interest in property development or the lack of it, in the United Kingdom. This is followed by an explanation of the property development process; notably explaining the various stages involved in the process. The concluding sections discuss risks and uncertainties in the decision making stages of property development.

2.2 STUDIES IN PROPERTY DEVELOPMENT

Until recently there has been very little write up on this subject because traditional property developers have been reluctant to record their attitudes and methods. (Cadman and Crowe 1991)[1]. Further, they normally consider what they do as an art that it is difficult to systematise except in very general terms. Another reason for the neglect of the research into property development in the United Kingdom has been that the subject was peripheral to the interests of the established academic disciplines of Town and Country Planning, Land Economics and Geography (Healey and Barrett 1985)[2]. In the discipline of Estate or Land Management, this lack of academic interest is due possibly to the perception that the elements involved in property development are too subjective to enable any credible quantitative assessment and modelling.

Research into property development, so far, integrates the construction dimension with property development and focuses on particular sectors of development

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activity, notably (Ball 1983 [3], Dickens *et al.*, 1985 [4] and Smyth 1985 [5]) on the house building industry; (Barras 1984 [6a], 1985 [b], 1987 [c]) on office development; (Fothergill *et al.*, 1987 [7] and Adams 1986 [8a], 1987 [b]) on industrial development; and (Dawson 1983 [9] and Davies 1984 [10]) on the retail development field. These pieces of research have been supported by studies in property development which mainly looked at the interaction between development interests and public agencies (Barrett *et al.*, 1978 [11]; Barrett and Whitting, 1981 [12a], 1983 [12b]; Boddy, 1982 [13] Elson, 1982 [14]; Healey *et al.*, 1982 [15]; Barrett and Healey, 1985 [16]; McNamara, 1985 [17]; Rydin, 1986 [18]; Short *et al.*, 1986 [19]). These studies are richly grounded on empirical data, but have focused largely on institutional forms of explanation. The interests and strategies of decision makers and the nature of the relationships between them are identified but the link with what generates these interests and strategies are often weakly developed, though usually noted (Healey and Barrett 1990)[20].

Behavioural studies in which the contributions of the different decision makers in the development process are obviously much lesser in number. Goodchild and Munton (1985)[21] reviewed the role of landowners; Craven and Pahl (1967)[22] and Drewett (1973)[23] studied the activities of the developer; Barrett and Whitting (1980)[24], Underwood (1981)[25] and Simmie (1981)[26] looked at the role of the town planners. The developer is credited with most of the initiative in getting development under way and seeing it through to completion and the local authority planner with identifying development land and detailing the pattern of development by development control powers.

In the area of decision making in property development, the most notable work that identifies risks, uncertainties and decision making, albeit only in the land appraisal process, is that by Byrne and Cadman (1984)[27]. Similar studies in the USA were those of Montgomery (1976)[28]; Miles and Wurtzebach (1977)[29] and Peiser (1984)[30]. Why has the property development industry been ignoring the methods of formal decision analysis adopted extensively in other commercial industries? It is perhaps due in part to the entrepreneurial nature of the business and to the fact that most development companies are, with the number of employees, comparatively small. Further, the number of property developments undertaken by most property companies seldom exceeds double figures annually. Therefore, the formulation and implementation of policy do not require much of a formal structure. Even the largest property companies or the property departments of financial institutions, such as

insurance companies and pension funds, are small in management terms when compared with most commercial companies.

There are, however, reasons to suggest that a more formal approach to decision making may be timely. Firstly, property markets have become more institutionalised. The financial institutions and the pension funds and insurance companies in particular have an increasing influence upon the kind of developments that they undertake and the way in which they carry out the developments. For a description of the growth of financial institutions in property *see* Cadman and Catalano (1983)[31], Cadman (1984)[32] and Plender (1982)[33]. Secondly, the collapse of the property market in the mid 70's and late 80's exposed the paucity of analysis upon the carrying out of some schemes and dealt a serious blow to the once revered 'back of an envelope' calculation. Thirdly, the growth of a body of structured and systematic information is providing decision makers with a much improved framework of market data and management information systems. Fourthly, the continuing development of computer applications has made feasible forms of analysis that were previously both too time consuming and cumbersome and furthermore with the current existence of expert systems that provide decision makers with better decision support systems. Finally, as more and more people become involved in investment, particularly through pension schemes, the direction of investment is being subjected to much closer scrutiny and fund managers increasingly have to explain and justify their performance. However, most developers still have much faith in 'the seat of the pants' decision making. It is difficult to explain this to the outside world but this study aims to bring forward reasons to counter such faith and to rely more on scientific reasoning rather than suggesting pure 'luck' or conventional judgement to justify successful development outcome.

2.3 THE PROPERTY DEVELOPMENT PROCESS

Property development changes the physical environment and is a complex activity involving the use of scarce resources and for the various decision makers, the making of often risky decisions from inception to completion. For many, it is an exciting activity, involving entrepreneurial flair, risk assessment, patience, skill, experience and if successful, a great sense of satisfaction. For others, it is simply the construction of buildings, a physical process of production. It is not the intention of this thesis to deny either of these interpretations and, indeed, it is accepted that there are others that, while valid in themselves, are not appropriate to this study's purpose.

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'What is development?' The legal definition of development as contained in the 1971 Town and Country Planning Act:

> 'Development means the carrying out of building, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land.'

The (HMSO Report, 1975)[34] otherwise called the Pilcher Report gives the following definition:

> 'Development comprises the following tasks:
> (i) The perception and estimation of demand for new buildings of different types;
> (ii) The identification and securing of sites on which buildings might be constructed to meet the demand;
> (iii) The design of accommodation to meet the demand on the sites identified;
> (iv) The arrangement of short and long term finance to fund site acquisition and construction:
> (v) The management of design and construction; and
> (vi) The letting and management of the completed buildings'.

The above definition is close to the one that is needed for this study. This study's definition is as follows:

> 'The processes by which decision makers of development agencies, together or on their own, consider the various decision making factors to secure their economic and social objectives, by the improvement of land and the construction of buildings for occupation by others or themselves.'

Very limited information about or understanding of the development processes is available (Nabarro 1990)[35]. The most comprehensive textbook covering the property industry is that of Fraser (1984)[36] which explained the property market in the context of trends in the wider economy and the capital markets. Darlow (1988)[37] provides a good background to the development market and investment. There is no model of the development process that can be applied universally. However, for the purpose of this study, i.e. the investigation of decision makers' perceptions of property development decision making factors, the process can be viewed in eight stages as follows:

(i)   Inception

(ii) Evaluation

(iii) Acquisition

(iv) Design and Costing

(v)   Permissions

(vi) Commitment

(vii) Construction

(iix) Disposal/Let

The stage represents a typical sequence of activities in property development although this particular sequence is not a requisite, it does provide a reasonable framework for analysing the development process and creates a structured environment within which decision factors can be determined. This is illustrated by Fig. 2.1. Additionally, viewing development as a series of stages allows the necessary flexibility to adequately estimate decision implications at the relevant stages towards completion.

Fig. 2.1 The property development process
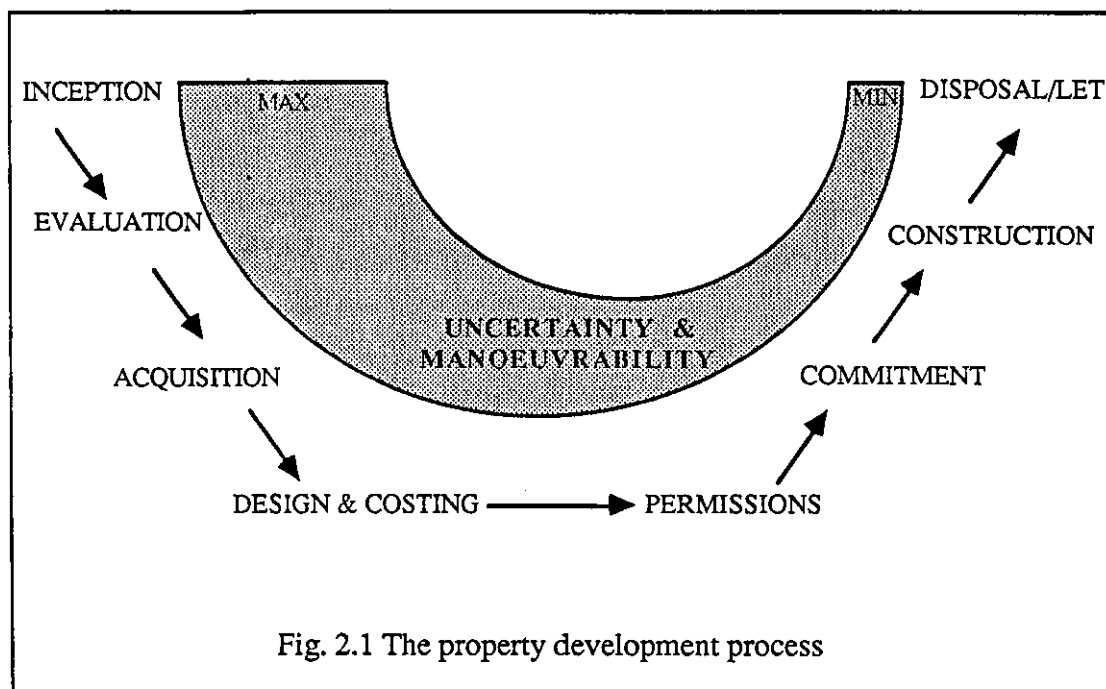
2.3.1 Inception

The inception stage is when the initiative to develop a site may be first triggered either directly from the owner of the site, the would-be user, or from a third party, such as a developer or agent, anticipating the demand or need for a particular use and seeking an appropriate location. The developer's judgement depends on his or her experience and knowledge of current and projected economic trends. This stage culminates with a very rough preliminary feasibility often termed as 'back of envelope' calculation. If at this stage, or any point up to the commitment stage, the proposed development appears unattractive, the idea may be shelved.

2.3.2 Evaluation

This stage together with acquisition, design and costing and permission stages may also be grouped as the pre-commitment stage. Evaluation is a vital stage in the

process and the responsibility for it usually rests with the developer. The evaluation process includes a more detailed feasibility study than that initiated in the inception stage *see* Taylor (1990)[38]. Services of consultants and experts with a wide range of sophisticated techniques of appraisal are relied upon, depending on the level of problems anticipated. The process of evaluation is necessary to ensure that the cost of development is reasonable with its purpose and is likely to be covered by a satisfactory return. For private sector development, this will include analysis of the market and the potential for profit on the risk to be borne.

The evaluation will also include a physical assessment of the site capabilities to support the proposed use. This will involve assessment of the site's load bearing capacity, access and drainage and the ability to connect the proposed development to the appropriate services and infrastructure provisions. In addition, the evaluation should anticipate likely underground problems such as geological faults, made up ground, presence of archaeological remains, physical impediments, e.g. contaminants and underground services.

Also all legal issues concerning the site must be assessed, including planning permission, ownership, rights of way, light, support and anything else that is likely to delay or incur cost to the process of development.

2.3.3   Acquisition

Where the developer is not the existing site-owner, it is necessary to establish who the existing owners of all the rights to the existing site are and what will be necessary to acquire them. Any error in establishing the extent of ownership and the cost or the time of acquiring the rights to the site may seriously affect the viability of the development.

Besides obtaining the rights over the site, the developer must also consider acquiring the appropriate finance. Access to finance must be arranged by the developer on the most favourable terms, both regarding the cost and flexibility. The developer will normally be concerned with arranging two types of finance: firstly, short-term finance or 'bridging finance' to cover costs during the development period; and secondly, long-term finance sometimes called 'funding' to cover the cost of holding the completed development as an investment or, alternatively, to have a buyer for the completed scheme.

2.3.4 Design and Costing

Design is an almost continuous process, getting progressively more detailed as the development proposal increases in certainty. The proposal may start virtually on the back of an envelope at the inception stage and progress through the stage of formulating the design brief to instructing architects and/or similar professionals to prepare detailed design plans as the need for planning permission and appointment of contractors becomes a necessity rather than a hope. The design brief is important for complex schemes as it sets the design parameters for an architect. The architect and/or possibly a planning consultant will be responsible for providing well thought out detailed design plans necessary for obtaining planning permission.

By the time the planning application is made, the plans should be in sufficient detail for a quantity surveyor to make a detailed estimate of the likely construction costs that will enable the developer to negotiate with contractors to start the implementation of the development.

2.3.5 Permissions

'The acquisition of planning permission from the planning authority can be a highly complex and technical activity, requiring detailed knowledge of the appropriate legislature and policies, as well as local knowledge of how a particular planning authority operates' (Cadman and Crowe 1991)[39].

The above problems make it necessary for developers to employ 'in house' experts or the use of consultants especially so when confronted with complex and difficult development proposals. The developer will thus need to make realistic initial estimates of the likely time and cost of obtaining the appropriate permission.

Sometimes developers have to be involved in additional planning agreements whereby they need to fulfil extra requirements called 'planning gains' as required by the local authority before permission is granted. Often such requirements impose additional development costs.

There are several other legal consents that may be necessary before a development may begin, including listed building consent (the right to alter or demolish a 'protected building'), the diversion or closure of a right of way and the actions necessary to connect with all the main services and infrastructure provisions. The prudent developer must clear all legal permission hurdles before commitment to the development.

2.3.6 Commitment

Developers will only give commitment to any major agreements related to the development when he or she is satisfied that all necessary preliminary work has been carried out to ensure that there is a reasonable chance of the development being produced on time, to a cost and quality that will meet the requirements of potential occupiers. Ideally, before any agreements are signed, making the developer liable for any major outlay of money, all appropriate inputs of land, finance, labour, materials and the acquisition of statutory permissions must have been satisfactorily negotiated.

2.3.7 Implementation

Once a commitment has been made, developers lose much of their previous flexibility of action and the main task in implementation is, therefore, to ensure that the development is carried out at the appropriate speed, quality and cost. This may be achieved through the expertise of a project and/or construction manager who co-ordinate the design and build functions in an optimal manner. Foreseeable problems need to be anticipated and appropriate action taken to avoid or minimise delay and extra cost, while changing market circumstances must be monitored such that any change in specification of the product can be made to maximise the return on the finished product.

Some factors will be outside the control or prediction of even the most astute project managers and developers. These may include extreme weather, strikes or major shifts in the local, national or international economic conditions. Effective implementation deals with those factors to minimise their harm to the particular development scheme. Implementing a major construction programme will normally take at least a year, often considerably longer. Many variables will inevitably alter and often not all in predictable ways.

2.3.8 Disposal, let

This stage of the development process, though the last, needs to be at the forefront of the developer's thoughts right from inception. No development is capable of success unless it finds a willing occupier and/or purchaser capable and prepared to pay a rent and/or purchase price that at least covers the developer's costs. If errors are made at the inception and evaluation stages in assessing the need or demand for the product, little can be done to redress the situation once construction begins.

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The leasing and selling strategies will need to have been formulated early in the scheme and updated, where possible and appropriate, during development. If developers are able to obtain a pre-let and/or pre-sale, then they obviously shift the risk and the chance of failure at early stage. Normally, however, this can be done only by foregoing an opportunity for greater profit.

The developer must decide how the letting and sales strategy is to be devised and at what point it would be sensible to let or sell. This decision may not be the developer's alone and may be heavily influenced by other parties such as the financiers.

The financial success of a development cannot be assessed until the building is complete, let or where appropriate sold. Frequently it may not be until the first rent review, some five years after occupation, that the picture will become entirely clear. That is precisely what contributes to the excitement and frustrations of property development *see* Bailey (1991)[40].

2.4 RISKS AND UNCERTAINTIES

As the developer moves up the stages of the development process, his knowledge of the likely outcome increases but, at the same time, the room for manoeuvre decreases *see* Fig. 2.1. Thus, while at the start of the process the developer has maximum uncertainty and manoeuvrability, at the end he knows much but can do little to change the outcome. The process is especially susceptible to risk and uncertainty because, once started, it is relatively fixed in time and place and further it aims at a very narrow sector of the consumer market.

2.4.1 Inception, implementation and disposal

In the first part of the development process, notably the inception to the commitment stage, the main types of uncertainties are the physical characteristics of the land, the characteristics of tenure and the nature and extent of use that the planning authority will permit. Most developers will attempt to identify and determine all these factors before committing themselves to the purchase of the land. For companies not having a large land bank, the land acquisition cost is often the first major commitment of capital and, as it comes at the start of the development process, it is then like a snowball, accumulating interest throughout the remainder of the development period.

In the implementation stage the main factor of uncertainty is the cost of construction. This factor, which represents the second major capital commitment, is substantially determined at the start of the building contract with the builder. However, in most cases there will be some element of fluctuation allowed for in the contract and, in any event, the phasing of the construction and the length of the building period can never be exactly determined at the outset.

In the disposal and/or let stage the uncertain factors are rent and investment yield or capital price. As the building is physically fixed to a precise location, and because it has to be manufactured well in advance, the eventual product of property development is trapped within a particular social and economic framework that is largely beyond the developer's control. No developer of a speculative development project can be sure of the market conditions that will prevail as and when the development is completed.

2.4.2   Time

Risks include uncertainty, ambiguity, complexity and chance. There are elements that are more difficult to control and to a large extent have to be accepted as part of the development risk. One such element of uncertainty is that of time. Property development is a dynamic process and time runs through it as a constant source of uncertainty. Property development activities can seldom be put together and carried out within a year and most take several years to complete. Furthermore, because of the inevitable time-lag between the inception of the project and its completion, property development is especially vulnerable to broadly based, and local, social, economic and financial changes.

The rise and sometimes rapid falls of the economic climate or market due to among other factors, sudden policy changes or changes in interest rates are difficult to foretell over a short period, let alone a long time and for property development, once started, it is difficult to change. It has often happened that a new supply of office space comes on stream at a time when the upsurge in demand that stimulated development has begun to decline, leading to a cyclical pattern of over and under supply that appears to be a regular feature of property markets. (Barras 1979)[41].

However, by being able to identify those elements of uncertainty that are to some extent within their control, and by recognising the reality of uncontrollable uncertainty, developers have put themselves in a better position to make informed and measured decisions about their development undertakings.

2.4.3 Information

Well-informed decisions and decisions that explicitly face the problem of measuring uncertainty, depend substantially upon an adequate information base. Here, again, the property industry has been slow to develop. Until the early 80's there was little serious attempt to provide a quantitative assessment of the main variables of rent, cost and yields. It was traditional practice to depend upon the experience of the particular professional adviser such as the estate agent, architect or quantity surveyor.

However, over recent years, an increasing number of data sets has been produced measuring the performance of rents, building costs, investment yields and property prices and there is little doubt that this service will continue to expand and become more sophisticated, reliable and authoritative. This information when presented in a readily comprehensive form will provide developers with valuable information that will enable them, and their advisers, to make better assessments of uncertainty and risk.

2.5 SUMMARY

This chapter provides a summary of the complex activities involved in the cause of property development and outlines the main stages in the development process together with determining the uncertainties and risks that decision makers need to consider in the development stages. From this summary, it becomes apparent that to achieve a successful outcome skill, experience and often intuition are needed to identify uncertainty and recognise risk in making calculated and astute decisions. To further comprehend the decision making process the following chapter describes the judgemental factors involved in the process.

CHAPTER 3

JUDGEMENT AND DECISION MAKING

3.1 INTRODUCTION

This chapter describes the decision making process, focusing mainly, on the judgemental aspects that are involved. It commences by identifying the environment and the various factors that decision makers have to consider and competently manage before making the final decisions. This is followed by discussing the bounded rationality in decision making and the judgemental deficiencies. The chapter ends with explanation of methods to overcome the deficiencies and hence improving decision making and their outcome.

3.2 DECISION MAKING ENVIRONMENT

Property development is a complex decision making activity, involving entrepreneurial flair, risk assessment, patience, skill and, if successful, a great sense of satisfaction. Objectively or subjectively, the decision maker analyses available information and makes the best judgement. Judgement refers to the cognitive aspects of the decision making process namely, the decision makers' perception of and attitude towards the external environment factors as well as the internal character and structure of the decision making organization. These perceptions and attitudinal factors and characteristics are often labelled as soft data in the decision making process.

Property development decision makers make decisions that are made complex by several factors. As indicated by Fig. 3.1, first, the decisions are affected by external factors namely the economic determinants, location and project related factors. For example, a development project comprising a new shopping centre may be constrained by complex economic and social factors. The decisions that have to be made during the course of that development cannot be isolated from the social and economic environment but must take account of it. Second, decisions may be made complex by the nature of the decision makers i.e. their attitude towards risks, qualifications, skill and experience. Third, they are affected by internal factors which are the structure and character of the decision making organization. The organization may not have clear cut aims but a range of objectives and attitudes some of which may be in conflict with each other. Finally, the decisions themselves may be inherently complex. They may involve the consideration of a large number of variable factors and may present a range of alternative solutions which are not easily distinguished.

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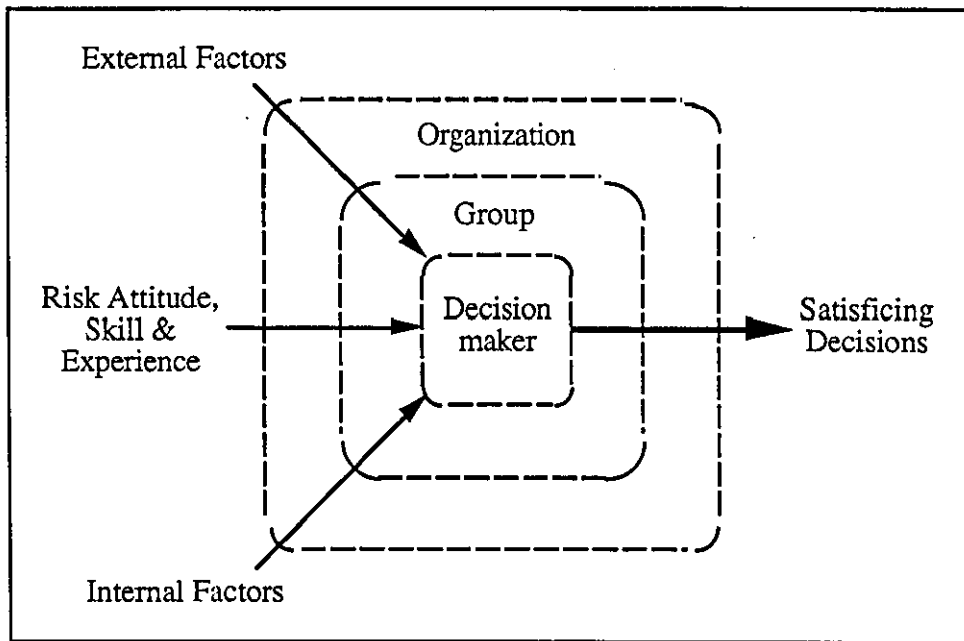
Fig. 3.1 Decision maker's environment
(Adapted from Harrison, 1981)

The concept of the decision making environment shown in Fig. 3.1 illustrates that the decision makers are bounded by their memberships in one or more groups that are, themselves, who are then circumscribed by the formal organization. Harrison (1981)[1] stated that "the decision maker must cope with exogenuous forces of economics, social, politics and technology. The impact of these factors is moderated somewhat by the permeable boundaries of the two larger aggregates within which choices are made. The initial impacts are felt first at the organizational level, secondary effects penetrate at the group level and the decision maker himself receives only the tertiary impacts from the environment." Within a property development organization, the three levels are interdependent and the decision maker's choices are bounded by:

    i) the group and organization of which they are a part

    ii) time and cost constraints

    iii) their own cognitive limitations.

Decision makers with greater cognitive ability, skill and experience will be able to reduce the blocking effect of the permeable boundaries by more extensive information acquisition. On the other hand, there may be occasion when the organization may assert greater authority to influence the final decision taken.

3.3 BOUNDED RATIONALITY IN DECISION MAKING

Judgement refers to the cognitive aspects of the decision making process. Under perfect knowledge and perfect judgement conditions, decision makers are assumed to perfectly define the problem, know all relevant alternatives, identify all decision making factors, accurately weigh all of the factors according to their preferences, accurately assess each alternative based on each factor and accurately calculate and choose the alternative with the highest perceived value.

However, in most decision making situations where the problem is complicated, highly unstructured and characterised by risk, complexity and uncertainty the decision maker's judgement is bounded in its rationality due to the decision maker's own limited decision making ability and capacity. These limitations keep decision makers from making the optimal decisions assumed in the rational model. Instead, March and Simon (1958)[2] suggest that decision makers will forego the best solution in favour of one that is acceptable or reasonable. That is, decision makers satisfice rather than maximise.

Simon (1967)[3] makes an interesting analysis of satisficing behaviour by describing:

" ... Models of satisficing behaviour are richer than models of maximising behaviour, because they treat not only of equilibrium but of the method of reaching it as well. Psychological studies of the formation and change of aspirational levels support propositions of the following kind: (a) When performance falls short of the level of aspiration, search behaviour (particularly search for new alternatives of action) is induced. (b) At the same time, the level of aspiration begins to adjust itself downward until goals reach levels that are practically attainable. (c) If the two mechanisms just listed operate too slowly to adapt aspirations to performance, emotional behaviour - apathy or aggression, for example - will replace rational adaptive behaviour. .... Decision makers must satisfice because they do not have the wits to maximise."

By this, the concept of satisficing behaviour means that the search for alternatives considers only two facets of the decision making situation, namely the expected utility of the best alternatives at hand and the expected cost of the search activity i.e. decision makers simply search until they find a solution that meets an acceptable level of performance, in short, they do not examine all possible alternatives. Beside external and internal constraints and cognitive limitations, as discussed in section 3.2, Harrison (1981)[1], states other factors which cause decision makers to satisfice:

i) Information

Decision makers may lack information or may act on inaccurate information; in other case, the range of alternatives may be affected.

ii) Time and cost constraints

There is a zone of cost effectiveness beyond which the pursuit of additional information can only lead to information of high cost but low value. Time pressure may also restrict the number of possible causes of action which can be explored.

iii) Precedent

Previous actions and established policies may automatically narrow the deliberations of decision makers. Previous action may prohibit consideration of a whole range of alternatives.

iv) Perception

The selective discrimination of the setting may effectively limit decision making. What decision makers 'see' is what they act upon. Through perception and judgement external and internal limitations gain their significance.

3.4   HEURISTICS AND BIASES

Further to the concept of bounded rationality and satisficing, Tversky and Kahneman (1974)[4] suggest that decision makers rely on a number of simplifying strategies called heuristics, or rules of thumb, in making decisions. The heuristics commonly adopted by decision makers are the availability heuristic, representative heuristic and anchoring and adjustment. In general, heuristics are helpful, but their use can sometimes lead to errors due to cognitive bias. Biases emanating from availability heuristics are ease of recall, retrievability and presumed associations. From the use of the representative heuristic the biases that may occur are insensitivity to base rates and sample size, misconception of chance, regression to the mean and the conjunction fallacy. Biases emanating from anchoring and adjustment are insufficient anchor adjustment, conjunctive and disjunctive events bias and over-confidence. Other general biases that may occur are hindsight and the confirmation trap.

3.4.1   Judgemental Heuristics

I) The   Availability   Heuristics

Decision makers assess the frequency, probability, or likely causes of an event by the degree to which instances or occurrences of that event are readily 'available' in memory (Tversky and Kahneman 1973)[5]. An event that evokes emotions and is vivid, easily imagined, and specific will be more 'available' from memory than will an event that is an unemotional in nature, dull, difficult to imagine, or vague. The availability heuristic can be a very useful decision making strategy, since instances of events of

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greater frequency are generally revealed more easily in our minds than events of less frequency. Consequently, this heuristic will often lead to accurate judgement. This heuristic is fallible, however, because the availability of information is also affected by other factors that are not related to the objective frequency of the judged event. These irrelevant factors can inappropriately influence an event's immediate perceptual salience, the vividness with which it is revealed, or the ease with which it is imagined.

ii) The Representativeness Heuristic

Decision makers assess the likelihood of an event's occurrence by the similarity of that occurrence to their stereotypes of similar occurrences. The cognitive processes underlying this phenomenon apparently involve examining the essential features of an event, then comparing these features to the features of a class of events to see if the event is representative of the class. In some cases the use of the heuristic is a good first-cut approximation; however, a clear problem is that decision makers tend to rely on such strategies, even when the information is insufficient and better information exists with which to make an accurate judgement.

iii) Anchoring and Adjustment

Decision makers make assessments by starting from an initial value and adjusting to yield a final decision. The initial value, or starting point, may be suggested from experience and historical precedent, from the way in which a problem is presented, or from random information. In ambiguous situations, a trivial factor can have a profound effect on the decision if it serves as a starting point from which one makes adjustments (Dawes,1988)[6]. Frequently, people will realise the unreasonableness of the anchor, yet their adjustment will often remain irrationally close to the anchor. It has been proved that regardless of the basis of the initial value, adjustments from the initial value tend to be insufficient (Slovic and Lichtenstein,1971[7]; Tversky and Kahneman,1974[4]). Thus, different values can yield different decisions for the same problem - all depending upon what the initial values are.

3.4.2 Cognitive Biases

The discussion of heuristics in section 3.4.1 suggested that individuals develop rules of thumb to reduce the information processing demands of decision making. These rules of thumb provide decision makers with efficient ways of dealing with complex problems that produce good decisions within a short time period. However, heuristics also lead managers to systematically biased outcomes. A cognitive bias refers to situations in which a heuristic is inappropriately applied by an individual in reaching a decision.

i) Biases Emanating from the Availability Heuristic

a) Ease of recall (based upon vividness and recency)

Tversky and Kahneman (1974)[4] argue that when an individual judges the frequency of an event by the availability of its instances, an event whose instances are more easily recalled will appear more numerous than an event of equal frequency whose instances are less easily recalled. They cite evidence of this bias in a lab study in which individuals were read lists of names of well known personalities of both sexes and asked to determine whether the lists contained the names of more men or women. Different lists were presented to two groups. One group received lists bearing the names of women who were relatively more famous than the listed men, but included more men's names overall. The other group received lists bearing the names of men who were relatively more famous than the listed women, but included more women's names overall. In each case, the subjects incorrectly guessed that the sex that had the more famous personalities was the more numerous.

Because of our susceptibility to vividness and recency, Tversky and Kahneman suggest that we are particularly prone to overestimating unlikely events. For instance, if we actually witness a burning house, the impact on our assessment of the probability of such accidents is probably greater than the impact of reading about a fire in the local newspaper. The direct observation of such an event makes it more conspicuous to us.

b) Retrievability (based upon memory structures)

When asked whether there are more words in the English language that start with an *r* or that which have *r* as the third letter, majority responded "that start with an *r*". Unfortunately, that is not the right answer. Kahneman and Tversky (1973)[8] explain that people typically solve this problem by first recalling words that begin with *r* (like *ran*) and words that have an *r* as the third letter (like *bar*). The relative difficulty of generating words in each of these two categories is then assessed. If we think of our mind as being organised like a dictionary, it is easier to find lots of words that start with an *r*. The dictionary, and our minds, are less efficient at finding words that follow a rule that is inconsistent with the organising structure-like words that

have an *r* as the third letter. Thus, words that start with a particular letter are more available from memory, even though most consonants are more common in the third position than in the first. Individuals are biased in their assessments of the frequency of events based upon how their memory structures affect the search process.

c) Presumed associations

People frequently fall victim to the availability bias in their assessment of the likelihood of two events occurring together. In assessing the association between two dichotomous events, there are always at least four separate situations to be considered, but our everyday decision making commonly ignores this scientifically valid fact (Bazerman 1990)[9]. For example in considering the relationship between drug usage and delinquency, most people typically remember several delinquent drug users and assume a correlation or not based upon the availability of this mental data. However, proper analysis would include recalling four groups of observations: drug users who are delinquents, drug users who are not delinquents, delinquents who do not use drugs and non delinquents who do not use drugs. Chapman and Chapman (1967)[10] have noted that when the probability of two instances are in our minds, we usually assign an inappropriately high probability that the two events will co-occur again. In short, events co-occurring is judged by the availability of perceived co-occurring. Furthermore, the overwhelming impact of this bias toward presumed associations prevented individuals from detecting other relationships that were, in fact, present.

II) Biases Emanating from the Representativeness Heuristic

a) Insensitivity to base rates

Individuals tend to ignore base rates in assessing the likelihood of events when any other descriptive information is provided, even if it is irrelevant. This may be illustrated by the following problem:

Mark is finishing his MBA at a prestigious university. He is very interested in the arts and at one time considered a career as a musician. Is Mark more likely to take a job in the management of the arts or with a management consulting firm?

Most people approach this problem by analysing the degree to which Mark is representative of their image of individuals who take jobs in each of the two areas. Consequently, they usually conclude 'in the management of the arts.' However, this response overlooks relevant base rate information. Reconsider the problem in light of the fact that a much larger number of MBA graduates take jobs in management consulting than in the management of the arts - relevant information that should enter into any reasonable prediction of Mark's career path.With this base rate data, it is only reasonable to predict 'management consulting'. Judgemental biases of this type frequently occur when individuals cognitively ask the wrong question.

An interesting finding of the research carried out by Kahneman and Tversky (1972[11], 1973[8]) is that subjects do use base rate data correctly when no other information is provided. Thus, people understand the relevance of base rate information, but tend to disregard these data when descriptive data are also available.

b) Insensitivity to sample size

The importance of sample size is fundamental in statistics but Tversky and Kahneman (1974)[4] note that it "is evidently not part of people's repertoire of intuitions". They first discovered this bias toward ignoring the role of sample size even when these data were emphasised in the formation of the problem, in testing the following research problem:

A certain town is served by two hospitals. In the larger hospital about 45 babies are born each day, and in the smaller hospital about 15 babies are born each day. As it is known, about 50 percent of all babies are boys. However the exact percentage varies from day to day. Sometimes it may be higher than 50 percent, sometimes lower. For a period of one year, each hospital recorded the days on which more than 60 percent of the babies born were boys. Which hospital do you think recorded more such days?

The larger hospital?   (21)

The smaller hospital?   (21)

About the same?   (53)
(i.e. within 5% of each other)

The values in parentheses represent the number of individuals who chose each answer. Sampling theory tells us that the expected number of days on which more than 60 percent of the babies are boys is much greater in the small hospital, since a large sample is less likely to stray from the mean. However, most subjects judged the probability to be the same in each hospital, effectively ignoring sample size.

c) Misconception of chance

The logic concerning misconceptions of chance can be explained by what has been termed the gambler's fallacy. After holding bad cards on ten hands of poker, the poker player believes that he is due for a good hand. Tversky and Kahneman (1974)[4] note that "Chance is commonly viewed as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium. In fact, deviations are not corrected as a chance process unfolds, they are merely diluted".

In some situations, our minds misconceptualise chance in exactly the opposite way. In sports, we often think of a particular player as 'being on a good streak'. If a favourite tennis player has won his last four games, is the probability of his winning the next game higher, lower, or the same as the probability of his winning without the preceding four wins? Most sports fans, sports commentators, and players believe that the answer is 'higher.' In fact, there are many biological, emotional and physical reasons that this answer could be correct. However, it is wrong (Gilovich, Vallone and Tversky 1985)[12].

Tversky and Kahneman's (1971)[13] work shows that misconceptions of chance are not limited to gamblers, sports fans or laymen. Research psychologists also fall victim to the 'law of small numbers.' They believe that sample events should be far more representative of the population from which they were drawn than simple statistics would dictate. The researchers put too much faith in the results of initial samples and grossly overestimate the replicability of empirical findings. This suggests that the representativeness heuristic may be so well institutionalised in our decision making processes that even scientific training and its emphasis on the proper use of statistics may not effectively eliminate its biasing influence.

d) Regression to the mean

Regression to the mean concept , although statistically valid, has been proved counter intuitive. Kahneman and Tversky (1973)[8] suggest that the representativeness heuristic accounts for this systematic bias in judgement. They argue that individuals typically assume that future outcomes will be maximally representative of past outcomes. Thus, one tends to naively develop predictions that are based upon assumption of perfect correlation with past data.

In some unusual situations, individuals do intuitively expect a regression to the mean effect. When an estate agent sold six houses in one month (an abnormally high performance), his co-agents did not expect similar performance in the following month. When an average student scored an extremely high marks in one term, his friends did not expect a repeat performance the following term. Why is regression to the mean more intuitive in these cases? This is because the performance is so extreme that we know it cannot last. Thus, under very unusual circumstances, we expect performance to regress. However, we generally do not recognise the regression effect in less extreme cases.

How do managers respond when they do not acknowledge the regression principle? Consider an employee with very high performance in one performance period. He (and his boss) may inappropriately expect similar performance in the next period. What happens when his performance regresses toward the mean? He (and his boss) begin to make excuses for not meeting expectations. Obviously, they are likely to develop false explanations and may inappropriately plan their future efforts.

e) The conjunction fallacy

Statistics may be able to demonstrate that a conjunction, that is, a combination of two or more descriptors, cannot be more probable than any one of its descriptors, but the conjunction fallacy (Tversky and Kahneman, 1983)[14] predicts and demonstrates that a conjunction will be judged more probable than a single component descriptor when the conjunction appears more representative than the component descriptor.

The conjunction fallacy can also operate based on greater availability of the conjunction than one of the unique descriptors (Yates

and Carlson, 1986)[15]. That is, if the conjunction creates more intuitive matches with vivid events, acts, or people than a component of the conjunction, the conjunction is likely to be perceived falsely as more probable than the component. For example, Tversky and Kahneman (1983)[14] found experts (in July 1982) to evaluate the probability of

> 'a complete suspension of diplomatic relations between the USA and the Soviet Union, some time in 1983'

as less likely than the probability of

> 'a Russian invasion of Poland, and a complete suspension of diplomatic relations between the USA and the Soviet Union, some time in 1983.'

Suspension is necessarily more likely than invasion and suspension but a Russian invasion followed by a diplomatic crisis provides a more intuitively viable story than simply a diplomatic crisis.

Thus individuals falsely judge that conjunctions i.e. two events co-occurring are more probable than a more global set of occurrences of which the conjunction is a subset.

III) Biases Emanating from Anchoring and Adjustment

a) Insufficient anchor adjustment

Studies have found that people develop estimates by starting from an initial anchor, based upon whatever information is provided, and adjusting from there to yield a final answer. Slovic and Lichtenstein (1971)[16] have provided conclusive evidence that adjustments away from anchors are usually not sufficient to negate the effects of the anchor. In all cases, answers are biased toward the initial anchor, even if it is irrelevant. Different starting points yield different answers. Tversky and Kahneman (1973)[17] named this phenomenon anchoring and adjustment.

In a fascinating study of an anchoring and adjustment in the property market, Northcraft and Neale (1987)[18] surveyed an association of estate agents who indicated that they believed that they could assess the value of properties to within 5 percent of their true or appraised value. Further, they were unanimous in stating that they did not factor the listing price of the property into their personal estimates of its 'true' value. Northcraft and Neale then asked four groups of

professional estate agents and undergraduate students to estimate the value of a real house. Both agents and students were randomly assigned to one of four experimental groups. In each group, all participants were given a ten page packet of information about the house that was being sold. The packet included not only background on the house, but also considerable information about prices and characteristics of other houses in the area that had recently been sold. The only difference in the information given to the four groups was the listing price for the house, which was selected to be + 11 percent, + 4 percent, - 4 percent and - 11 percent of the actual appraised value of the property. After reading the material, all participants toured the house, as well as the surrounding neighbourhood. Participants were then asked for their estimate of the house's price. The final results suggested that both agents and students were significantly affected by the listing price (the anchor) in determining the value. While the students readily admitted the role that the listing price played in their decision making process, the estate agents flatly denied their use of the listing price as an anchor for their evaluations of the property - despite the evidence to the contrary. This study provides convincing data to indicate that even experts are susceptible to the anchoring bias. Furthermore, experts are less likely to realise their use of this bias in making decisions.

b) Conjunctive and disjunctive events bias

This bias may be understood by studying this problem:
Which of the following appears most likely? Which appears second most likely?

a) Drawing a red marble from a bag containing 50 percent red marbles and 50 percent white marbles.

b) Drawing a red marble seven times in succession, with replacement (a selected marble is put back in the bag before the next marble is selected), from a bag containing 90 percent red marbles and 10 percent white marbles.

c) Drawing at least one red marble in seven tries, with replacement, from a bag containing 10 percent red marbles and 90 percent white marbles.

The most common answer in order of preference is B-A-C. Interestingly, the correct order of likelihood is C (52 percent), A (50 percent) and B (48 percent) - the exact opposite of the most common

intuitive pattern. This result illustrates a general bias to overestimate the probability of conjunctive events - events that must occur in conjunction with one another (Bar-Hillel,1973)[19] - and to underestimate the probability of disjunctive events - events that occur independently (Tversky and Kahneman,1974)[4]. Thus, when multiple events all need to occur (problem B), we overestimate the true likelihood, while if only one of many events needs to occur (problem C), we underestimate the true likelihood.

Tversky and Kahneman (1974)[4] explain these effects in terms of the anchoring and adjustment heuristic. They argue that the probability of any one event occurring (for example, drawing one red marble) provides a natural anchor for the judgement of the total probability. Since adjustment from an anchor is typically insufficient, the perceived likelihood of choice B stays inappropriately close to 90 percent, while the perceived probability of choice C stays inappropriately close to 10 percent.

c) Over-confidence

Since the work of Alpert and Raiffa (1969)[20], over-confidence has been identified as a common judgemental pattern and demonstrated in a wide variety of settings. The best established finding in the over-confidence literature is the tendency of people to be most over-confident of the correctness of their answers when asked to respond to questions of moderate to extreme difficulty (Fischhoff, Slovic and Lichtenstein,1977[21]; Koriat, Lichtenstein and Fischhoff, 1980[22]). That is, as individuals' knowledge of a question decreases, they do not correspondingly decrease their level of confidence (Nickerson and McGoldrick,1965)[23]. However, individuals typically demonstrate no over-confidence, and often some under-confidence, to questions with which they are familiar. Thus one should be most alert to over-confidence in areas outside of one's expertise (Bazerman, 1990)[9].

As to why over-confidence exists, Tversky and Kahneman (1974)[4] explain over-confidence in terms of anchoring. Specifically, they argue that when individuals are asked to set a confidence range around an answer, their initial estimate serves as an anchor which biases their estimation of confidence intervals in both directions. As explained

earlier, adjustments from an anchor are usually insufficient, resulting in an overly narrow confidence band.

To eliminate over-confidence, Lichtenstein, Fischhoff and Philips (1982)[24], have found that giving people feedback about their over-confidence based on their judgements has been moderately successful at reducing this bias. Second, Koriat, Lichtenstein and Fischhoff (1980)[22], found that asking people to explain why their answers might be wrong (or far off the mark) can decrease over-confidence by getting individuals to see contradictions in their judgement.

Serious problems may result from the tendency of being over-confident. While confidence in one's abilities is necessary for achievement in life, and perhaps to inspire confidence in others, one needs to monitor one's over-confidence to achieve more effective professional decision making.

iv) General Biases

a) The confirmation trap

Most of us seek confirmatory evidence and exclude the search for disconfirming information from our decision process (Bazerman,1990)[9]. However, it is typically not possible to know something to be true without checking for possible disconfirmation.

Wason (1960)[25], showed human tendency to ignore disconfirming information. He presented subjects with a three number sequence 2-4-6. The subjects' task was to discover the numeric rule to which the three numbers conformed. To determine the rule, subjects were allowed to generate other sets of three numbers that the experimenter would classify as either conforming or not conforming to the rule. At any point, subjects could stop when they thought that they discovered the rule.

Wason's rule was 'any three ascending numbers' - a solution which required the accumulation of disconfirming, rather than confirming, evidence. For example, if one thought the rule included, 'the difference between the first two numbers equalling the difference between the last two numbers', one must try sequences that do not conform to this rule to find the actual rule. Trying the sequences 1-2-3,

10-15-20, 122-126-130, and so on, will only lead into the confirmation trap. In Wason's experiment, only 6 out of 29 subjects found the correct rule the first time that they thought they knew the answer. Wason concluded that obtaining the correct solution necessitates "a willingness to attempt to falsify hypotheses, and thus to test those intuitive ideas which so often carry the feeling of certitude".

It is easy to observe the confirmation trap in the decision making processes. In making a tentative decision to buy a new car or to hire a particular employee, most people will search for data that support the decision before making the final commitment. However, the existence of the confirmation trap implies that the search for challenging, or disconfirming, evidence will provide the most useful insights. For example, in confirming the decision to hire a particular employee, it is probably easy to find supporting positive information on the individual, but in fact the key issue may be the degree to which negative information on this individual, as well as positive information on another potential applicant, also exists.

b) Hindsight

Research on hindsight bias (Fischhoff,1975)[26] demonstrates that people are typically not very good at recalling or reconstructing the way an uncertain situation appeared to them before finding out the results of the decision. Our intuition is sometimes accurate, but we tend to overestimate what we know and distort our beliefs about what we knew beforehand based upon what we later found out. This phenomenon occurs when people look back on the judgement of others, as well as of themselves.

Tversky and Kahneman (1974)[4] explained that anchoring may contribute to hindsight bias when individuals interpret their prior subjective judgements of probabilities of an event's occurring in reference to the anchor of knowing whether or not that outcome actually occurred. Since adjustments to anchors are known to be inadequate, hindsight knowledge can be expected to bias perceptions of what one thinks one knew in foresight. Further, to the extent that the various pieces of data on the event vary in terms of their support for the actual outcome, evidence that is consistent with the known outcome may become cognitively more salient and thus more available in memory

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(Slovic and Fischhoff, 1977)[27]. This will lead an individual to justify a claimed foresight in view of 'the facts provided'. Finally, the relevance of a particular piece of data may later be judged important to the extent to which it is representative of the final observed outcome.

3.4.3 Heuristics and Biases in Practice

It should be emphasised that more than one heuristic can be operating in the decision making processes at any one time. Bazerman (1990)[9], further stressed that:

"Our minds adopt these heuristics because, on average, any loss in quality of decisions is outweighed by the time saved. Second, the foregoing logic suggests that we have voluntarily accepted trade-offs associated with the use of heuristics. But in reality, we have not. Most of us are unaware of their existence and their on-going impact upon our decision making. The difficulty with heuristics is that we typically do not recognise that we are using them, and we consequently fail to distinguish between situations in which their use is more and less appropriate. The key to improved judgement, therefore, lies in learning to distinguish between appropriate and inappropriate uses of heuristics".

3.5   IMPROVING DECISION MAKING

Decision makers aspire to make good decisions although "the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behaviour in the real world ..." (Simon, 1957)[28] which results in judgemental errors. However, there are a number of correcting strategies that help to adjust decision makers' intuition towards rationality in making decisions. Bazerman (1990)[9] suggested four alternative and complementary strategies for making better decisions namely:

  i) acquiring experience and expertise
  ii) debiasing judgement
  iii) using linear models based on expert judgement
  iv) adjusting intuitive predictions

i) Acquiring experience and expertise

Many of the biases that have been discussed in section 3.4.2 have been tested by the researchers on student samples. Thus, one optimistic possibility is that experts or experienced decision makers making important decisions might be far less affected by biases. This is certainly an important issue, since knowing the impact of obtaining experience and expertise might be a key to more effective decision making. Neale and Northcraft (1989)[29], propose that biased decision making outcomes may be eliminated or ameliorated through the development of expertise. Neale and Northcraft view

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experience simply as repeated feedback, while expertise requires that decision makers have a conceptual understanding of what constitutes a rational decision making process and that they recognise the biases that limit the rationality of the decision making process. Thus, to develop expertise, decision makers need to acquire a better idea of how to make rational decisions and how to avoid biases. Neale and Northcraft refer to expertise as developing a 'strategic conceptualisation'.

Developing expertise, as defined by Neale and Northcraft, specifically avoids the danger of 'mindless' learning. It requires constant monitoring and awareness of our decision making processes. It does not simply rely upon the feedback of uncertain, uncontrollable and often delayed results. The final benefit of developing a strategic conceptualisation concerns transferability. If one asks many experienced decision makers how they do what they do, they will often tell that it is an art that comes from years of observation and experience. But what they are really saying is that they do not explicitly know how they do what they do. This obviously reduces their ability to pass on their knowledge to others. Thus a final drawback of experience without expertise is that it limits the ability to transfer knowledge to future generations or to test it against a 'standard ' framework.

II) Debiasing judgement

Debiasing refers to a procedure for reducing or eliminating biases from the cognitive strategies of the decision maker. Fischhoff (1982)[30] has provided the most extensive discussion of procedures for debiasing judgement. He proposes four strategies namely: warning about the possibility of bias; describing the direction of the bias; providing a dose of feedback; and offering an extended programme of training with feedback, coaching, and whatever else it takes to improve judgement. Research on the hindsight bias (Fischhoff,1977)[31] has shown that even when biases are explicitly described to subjects and subjects are asked to avoid the bias, the bias remains. However, research on the over-confidence bias has found that intensive, personalized feedback is moderately effective in improving judgement (Bazerman and Neale, 1983[32]; Lichtenstein and Fischhoff,1980[33]). Overall, debiasing is a difficult process that must be guided by a psychological framework for changing.

III) Using linear models based on expert judgement

One mechanism for debiasing consists of using an expert's knowledge to build a linear model that stimulates judgement in making future decisions. The statistical technique that is typically used is regression analysis. This approach necessitates that an expert make decisions on a large number of cases, each of which is defined by the same

set of factors. A regression equation is then developed for that expert which describes his habitual model for making decisions. This procedure, refered to as policy capturing has been used to investigate performance appraisal (Naylor and Wherry,1965[34]; Zedeck and Kafry,1977[35]) and other managerial and non-managerial applications.

Researchers have found that linear policy capturing models produce superior predictions across an impressive array of domains. In addition, research has found that more complex models produce only marginal improvements above a simple linear framework (Bazerman,1990)[9]. Dawes (1979)[36] argues that, the underlying reason why linear models work well, is that people are much better at selecting and coding information (such as what variables to put in the model) than they are at integrating the information (using the data to make a prediction). Einhorn (1972)[37] illustrates this point in a study of physicians who coded biopsies of patients with Hodgkin's disease and then made an overall rating of severity. The individual ratings had no predictive power of the survival time of the patients - all of whom died. The variables that the physicians selected to code did, however, predict survival time when optimal weights were determined with a multiple regression model. The point is that the doctors knew what information to consider, but they did not know how to integrate this information consistently into valid predictions.

In addition to the difficulty we have in integrating information, we are also unreliable. Given the same data, we will not always make the same decision. Our decisions are affected by mood, subjective interpretations, random fluctuations, and the like. In contrast, a linear model will always make the same decisions with the same inputs. Thus the model captures the underlying policy that the expert uses without the random error that the expert adds in making decisions. Further, the expert is likely to be affected by a number of the biases that inappropriately impact specific cases. In contrast, the model includes only the actual data that is empirically known to have predictive power, not the salience or representativeness of that or any other available data.

Finally, a number of other procedures exist, that, like the policy capturing methodology, try to model what experts do. These alternative procedures deal with the wider domain of general decision making and problem solving. Examples include recent developments in artificial intelligence and knowledge base expert systems. These paradigms seek to provide knowledge representations and inference mechanisms to the computer in ways that allow for capturing and improving on what experts know about human problem solving processes (Hayes-Roth, Waterman and Lenat, 1983)[38].

iv) Adjusting intuitive predictions

The nature of managerial work requires reviewing the tentative decisions of others, transforming recommendations into decisions, and adjusting previously made decisions. The managerial decision maker also wants to include the content of others' decisions and recommendations. Often, an initial decision is made with more information than the manager cares to re-evaluate. However, the manager is aware that these decisions are influenced by a set of biases. How can the manager systematically adjust the decisions of others to account for biases in order to make better final decisions?

Kahneman and Tversky (1982)[39] have formalised this process into a five step procedure: selecting a comparison group; assessing the distribution of the comparison group; incorporating intuitive estimation; assessing the predictability of the analyst's forecast; and adjusting the intuitive estimate. These five steps provide a clearly delineated process for debiasing an individual's forecasting intuition by adjusting for the regression to the mean bias. The formal procedure will typically improve the forecast. More important, a manager who understands the process can use this understanding to intuitively assess the degree to which an initial estimate should be regressed to the mean.

Bazerman (1990)[9] has also devised a model for adjusting a wide range of biased decisions in both individual and multi-party contexts. Broadly, it involves three phases. First, we need to accurately perceive and analyse the context within which the decision is being made. Next, we need to distinguish the potential biases surrounding the decision and its decision makers. Finally, we need to identify and make the appropriate logical adjustments for that decision. This judgement improvement technique can be used to evaluate and adjust our own, as well as other's, intuitive judgements in a variety of situations.

3.6   SUMMARY

This chapter has explained the inherent judgemental deficiencies that decision makers have to be wary of and conscientiously consider to accomplish good decisions and successful outcomes. Humans are not 'bad' decision makers, but we do fall short of objectively rational behaviour. In addition, there are specific ways in which our minds fail to achieve rationality.

However, as discussed in the final section of the chapter, there are a number of correcting strategies that help to adjust decision makers' intuition towards rationality in making decisions. One of the strategies is to use the decision makers' expert knowledge to develop a knowledge based system that will simulate judgement in making future decisions. To establish the system one requires the understanding of the theoretical framework and its practical implementation. This will be discussed in Chapter 7.

CHAPTER 4

RESEARCH METHODOLOGY

4.1   INTRODUCTION

This research programme was designed to examine the relationships of the hard and soft data with development outcomes and decision makers' achievements. The research design used was:

a) To survey a sample of 123 companies from the whole population of property development companies in the United Kingdom.

b) To select a smaller sub-sample of 20 from the list of survey respondents and utilise the Repertory Grid Technique to obtain information concerning the influence of the decision making factors on decision makers' development achievements.

c) To use the responses obtained from the survey and the Repertory Grid interviews to extract information on the major variables set in the objectives of this research.

c) To analyse the responses obtained from the survey and the Repertory Grid interviews to support or discount the suppositions made.

4.2   RESEARCH QUESTIONS TO BE STUDIED

The previous chapters have revealed the lack of literature on the relationships of property development decision makers' analysis of the hard data and perception of the soft data with their development achievements. It has been found that in making decisions, the decision makers in the general business area, tended to avoid hard i.e. systematic and analytical data, and rely more on their intuitive judgement or soft data (Mintzberg 1975)[1]. Further, theory of decision making that copes with risk e.g. beta, probability, sensitivity and scenario analysis are again more extensively researched in the general business area than in property development. By right, the theory and practice should also be undertaken by those concerned with the property development which is essentially concerned with the manufacture of a product in anticipation of an unknown future demand. Yet, the property development industry has largely ignored the methods of formal decision analysis adopted extensively in other industries.

The reasons which explained the lack of research and literature on property development were that the developers have been reluctant to record their attitudes and methods (Cadman and Crowe 1991)[2]. Secondly, they normally consider what they do as an art which is difficult to systematise except in very general terms. Thirdly, this neglect of the research into property development in the United Kingdom has been because the subject has been perceived as peripheral to the interests of the established academic disciplines of town and country planning, land economics and geography (Healey and Barrett 1985)[3]. Finally, in the discipline of Estate or Land Management, this lack of academic interest is due possibly to the perception that the elements involved in property development are too subjective to enable any credible quantitative assessment and modelling

The above shortcomings on the other hand signify a vast array of unknown factors that could be investigated. However, because of time and financial limitations this research could only concentrate on the following suppositions:

Supposition 1
The respondents' degree of success in their achievements of office and shop developments would be more strongly influenced by the 'soft data' or the intuitive judgement i.e. the deliberation, reasoning and acceptance of facts, rather than the 'hard data' i.e. the examination and systematic analysis of external factors.

Supposition 2
The respondents with better personal attributes i.e. those possessing academic and professional qualifications, high experience and positive attitudes towards risk would attain a higher degree of success in their achievements of office and shop developments than those having the opposite characteristics.

Supposition 3
Adopting the concept of satisficing behaviour, the respondents with better personal attributes i.e. those possessing academic and professional qualifications, high experience and decision making involvement and positive attitudes towards risk would in their consideration of decision making factors, focused their attention on the key factors and maximised the consideration and weighting on these factors and subsequently attained a high degree of success. On the other hand, those having the opposite characteristics would

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consider more factors in attempting to attain a similar degree of success, thereby losing sight of the relative importance of key factors resulting in a lesser number of factors given very high weighting.

Amidst the many still unknown elements in the area of decision making in property development, this research was undertaken to determine the relationships of Decision Makers' Achievements and the Judgemental Factors of Property Development in the United Kingdom. The main research questions were:

(i)   What relationships do timing, location and capital size have with the development outcomes?

(ii) To what extent do the decision makers' education, training, experience and risk attitude correlate with their achievements?

(ii) How do the decision makers' perceptions of the decision making factors affect their achievements?

(iv) To what extent does the examination and analysis of external factors usually termed the 'hard data' and/or the intuitive judgement i.e. deliberation, reasoning and acceptance of facts i.e. the 'soft data' contribute towards a greater influence in the decision makers' achievements and/or development outcomes?

4.3   DATA COLLECTION METHODS

4.3.1 Nature and Source of Data

The data derived for this study was not found to be available from other sources. Therefore, collection of primary data was inevitable. The research methods adopted consisted of gathering data from decision makers in property development of various property development companies. The data sought were of three major types:

(i)   Facts and opinions on the factors which influenced the office and shop developments' outcomes as perceived by the decision makers.

(ii) Facts and opinions of factors correlating the decision makers' degree of success with their attributes.

(iii) Facts and opinions of factors correlating the decision makers' degree of success with their consideration of the decision making factors.

In the process of selecting a suitable research method, several considerations specific to the problem associated with data collection from the target group were considered. The choice between the following alternative research methods was based upon the review of such methods by Blum and Naylor (1968)[4] and methods described by Buckley, Buckley and Chiang (1974)[5], Seltiz et al (1981)[6] and Stammers and Patrick (1975)[7].

(a) Group methods were deemed totally unsuitable due to the anticipated reluctance of decision makers to reveal publicly their 'art' of decision making.

(b) Diary and Time log techniques were not acceptable because of the time consuming nature of the process.

(c) A method that was thought to be particularly appropriate to the study was the Survey method. This method was selected for the following reasons (Buckley, Buckley and Chiang 1974)[5]:

   i) The survey method was likely to be the only method of retrieving information about the past histories of individuals especially if the data is sensitive or considered private to an individual.

   ii) The survey method is a good technique for the exploration of attitudes, values, beliefs and motives. It has the ability to capture people's impression about themselves, their environment and their responses to changing conditions. Furthermore, generalisability is one of the strongest points of the survey method.

   iii) Data collection by survey is efficient as it can be structured in order to obtain specific information from a wide population.

   iv) The data is standardised in that respondents are assumed to react to the same stimuli.

   vi) As a form of data collection in social research, survey methods are comparatively cheap, simple and easy to administer.

   vi) The opportunity to analyse data through a variety of standard statistical procedures.

4.3.2. Data Collection Techniques

Before firming up on the research design a number of data collection techniques were examined. These were Questionnaires, Interviews, Personality Tests and Repertory Grid Technique. A brief description of each of these techniques of data collection is given below:

I) Questionnaire Survey

A questionnaire asks the respondent to supply information pertinent to the subject of a study. Questionnaires can be self administered and group administered and may contain close-ended or open-ended questions. A questionnaire survey is one of the most widely used data collection techniques in social research. It is particularly suited for collecting data from a large sample in a population which is scattered over a wide geographical area.

II) Interviews

Interviews are a universal and powerful fact-finding technique which can be used for many different purposes and in many different ways. The purpose of interviews is to gather relevant information through face to face contact. This information may concern events, work activities, knowledge, behaviour, attitudes, opinions, values, habits, perceptions, etc.

The use of interviewing as a data collection technique yields several advantages and disadvantages which can be summarised as follows:

a) Answers to questions are more likely to be spontaneous and may, in some circumstances, more accurately reflect the true situation than a considered answer. With a considered opinion, the respondent may give the response he considers the researcher is looking for, or the response which the respondent considers reveals him to be a better person than the true answer would.

b) In complex cases, leading questions may unintentionally be asked during the interview.

c) The researcher has the opportunity to personally evaluate each respondent.

d) Ambiguity in question or response may be clarified by the interviewer immediately.

e) The interviewer may sometimes lead the responses by imposing too much on the conversation.

III) Personality Tests

The area of personality was seen by both this researcher and his supervisor as a particular area to examine. The aspect of personality has been featured in organisational behaviour and decision making literature. The behavioural sciences namely psychology, anthropology and sociology provide much of the foundation for the understanding of individual behaviour in organisations. Factors in the organisational context such as technology, policies, and informal norms may constrain behaviour. Other factors, such as goals, leadership, and rewards, may induce behaviour and focus it in a particular direction. Potential influences filter through personal attitudes via perception, cognition, and motivation. The effect of various stimuli on behaviour depends on how they are perceived and thought about by the individual. Therefore, the aspects of personality i.e. perception, cognition and motivation are considered important in the decision making process.

In considering the type of tests, it was recognised that some tests are not suitable for measuring the type of information required by this research. On examining the choices available, the following tests were considered:

a) Locus of Control - was considered, but tends to be extremely long.

b) Extrovert and introvert test - was considered but needs a very large sample size.

However, as the sample size obtained was small, it was thus decided that the decision makers' personality aspects that were necessary to fulfil the objectives of this study would be sufficiently elicited through the use of the Repertory Grid Technique Interviews. The psychological tests were therefore not pursued further.

IV) Repertory Grid Technique

The Repertory Grid Technique was introduced in 1955 by a psychologist named George Kelly (1955)[8]. The theory underlying the use of Repertory Grid was Kelly's Personal Construct Theory. The theory states that as each person progresses through life, he builds for himself a construct or a representative model of the world which is used to guide his behaviour. Throughout his life, he questions, explores, revises and replaces these constructs in the light of predictive failure, thus allowing him to make better predictions.

Kelly [8] asserted that, since birth, we build up a set of expectancies or hypotheses which reflect our past experiences. The crucial point, argued Kelly, is

that these hypotheses influence and condition our present experience and our anticipation of the future. They are like a pair of 'spectacles' through which we get information, thus affecting what we see and how we see it. Kelly called these 'spectacles' a construct system and termed the individual hypothesis a construct. It therefore follows that if we can find ways of knowing a person's construct system then we should be in a position to predict his or her behaviour.

Stewart, Stewart and Fonda (1981)[9] indicated that constructs possess certain unique properties. They suggested that these unique properties must be understood in order to facilitate communication and understanding of the Repertory Grid Technique. These are as follows:

a) The medium through which perception occurs is the construct system.

b) Construct systems are unique to individuals and develop throughout their life.

c) A construct is an expectation, feature or quality which distinguishes some objects from others. It is an axis of discrimination to all thinking operations - a reference axis upon which one may project events in an effort to make sense of what is going on. A construct always involves a basic contrast of similarity and difference.

d) Constructs are linked together in a hierarchical manner to form a construct system.

e) The psychological processes of two persons are similar to the degree in which both of them construe certain sets of similar experience.

f) Similarly, to the extent that one person construes the construct processes of another, he or she may play a role in a social process involving the other.

g) The constructs most useful to us are those which discriminate best between events.

h) Constructs have a limited range over which they operate.

The Repertory Grid Technique originally was used as a tool in clinical psychology to investigate the relationship between patients and their families, friends and colleagues and to assess the relationships between a patient's cognitive map about people. It was first used in industry by Market Research experts as a method of eliciting consumers' views on products. Although it has yet to be used in establishing relationships of Decision Makers' Achievements and the Judgemental Factors of Property Development, it has been used extensively in similar management decision making situations in other industries. The Repertory Grid Technique has two main contents:

i) Elements

This is the subject of investigation which may be in the form of people, situations, or abstract ideas. In this research, the elements were the office and shop developments which had highly successful, successful and moderately successful outcomes.

ii) Constructs

These are the bi-polar distinctions or 'qualities' of the element which the respondents used to describe or discriminate the elements.

Teo (1990)[10] quoted Smith (1978)[11] who states that the production of a repertory grid is deceptively simple. These are:

a) The object of a decision maker's thoughts is obtained.
b) The qualities he uses to describe the objects are elicited.
c) The grid is produced with the elements along the top of a matrix. Then, say using a five point scale the decision maker works along the matrix rating each element on each construct.
d) Computer analysis is applied to the results using sophisticated statistical techniques to analyse the underlying structure of the data.

The Repertory Grid Technique is a tool for uncovering an individual's view of the world. Its procedure is closely linked to the theoretical roots of Kelly's definition of a construct. As put forward by Kelly, a construct is "in its minimum context, a way in which two elements are similar and contrast with the third".

Basically a construct is a dimension which may evolve when considering a particular set of elements. It is the qualities of the element attached by a person. However, given its dimensionality, a construct can usually be applied to a further range of elements, thus allowing one to extract matrices of inter-relationships between constructs and between elements.

It was observed (Kelly 1955)[8] that constructs do not exist in isolation but are closely linked to one another in a more or less coherent and hierarchical manner. A person's constructs may be grouped into two categories namely: "core" constructs and "peripheral" constructs. "Core" constructs are those which are of central importance to the individual. This type of construct often remains very stable and is more resistant to change. On the contrary, "peripheral" constructs are subject to changes and occur at different levels of an individual's construct system.

Laddering is a technique of moving between construct levels. Given a construct, one can either ladder "upwards" towards the central construct by asking which pole of that construct is more important to the individual and why. For example, in investigating the constructs of an individual about location of development and the construct "good/poor" is elicited. It is possible to obtain further constructs (if location is good, it is close to residential area and vice versa) by asking the "why" question. This process may be repeated until the central construct of the respondent is revealed. Similarly, constructs could also be laddered "downwards" by using the "how" or "what" questions instead to obtain more specific constructs.

4.3.3 The Repertory Grid Interview Procedure

There are many well established methods used in practice to elicit the construct system of individuals. The most typical approach suggested by Pope and Keen(1981)[12] involves the following steps:

i) Defining the purpose of the grid
ii) Selection of elements
iii) Elicitation of constructs
iv) Ratings of elements of each construct
v) Analysis of Grid

I) Defining the purpose of the grid

This is the most important preliminary consideration before beginning the process of eliciting elements and construct. Two issues must be clearly addressed and answered at this stage.

a) What is the topic to be investigated?
b) What is the intended use of the grid information?

It was essential that adequate time and consideration should be given to defining the purpose of the investigation. With a clear objective defined, it is then possible to select representative elements and elicit constructs which are appropriate to the purpose of the exploration.

The second issue on the intended use of the grid information has an influence on the format and procedure of grid elicitation. There are various ways in which the grid information could be used. The following list provides some examples of its potential usage:

i) a conversation with oneself

ii) gathering of information about an individual's views on a particular topic

iii) a comparison of the viewpoints of two people in terms of either:

    a) degree of agreement between, or

    b) the degree to which either can gauge the other's point of view

iv) an exploration of the nature and sharing of construing within a group

v) monitoring of changes in perspectives

I I) Selection of Elements

This involves the selection of a set of elements representative of the area of investigation. Elements may consist of objects, events, situations, pictures, buildings or people. They could be provided by the researcher or elicited personally from the respondents. The choice between elicited and provided elements depends on the researcher and also the purpose of the investigation. However, it is important that adequate groundwork should be done to ensure that the selected elements are representative of the nature of the problem to be investigated. Normally, this would entail discussion or conversation with the potential subjects so that a common understanding could be achieved between the researcher and the subjects.

Generally, there are four distinct ways of generating elements namely:

I) Supply elements (Provided elements)
The elements are provided by the researcher.

II) Provide role or situation description
The researcher provides a description of a certain role, object or situation and the respondent is requested to provide examples to fit the description.

III) Defining a "pool"
The respondent is asked to "name five effective managers" or "to list five leisure activities he or she indulges in".

Iv) Elicit through discussion
The researcher discusses the topic of investigation with the respondent providing guide-lines and prompts to elicit the appropriate elements.

Teo (1990)[10] indicated that there has been controversy arising from the debate on the usefulness of using provided and elicited constructs. However, he quoted Adams-Webber (1969)[13] who suggested that, "Although normal subjects prefer to use their own elicited constructs to describe themselves and others, both

kinds of dimensions seem to be functionally similar when the grid technique is employed to assess the structural features of their cognitive systems".

Another question commonly asked is, "What is the ideal number of elements in a grid? If the grid is to be analysed on a computer, it is probably unwise to have less than six or seven because below that number the analysis can easily become distorted, but it should be possible to provide adequate coverage of the chosen topic with no more than twelve elements. (Easterby-Smith,1980)[14].

III) Elicitation of Constructs

This is the process of obtaining constructs from the respondents. Normally the elicitation of constructs is carried out by presenting a random set of three elements at a time to the respondent and inviting him or her to think of similarities and differences between the elements. The standard question is:

> "In what ways are the two of these alike and different
> from the third in terms of .... (purpose of study)?"

Kelly (1955)[8] suggested six principal approaches to the elicitation of constructs:

I) Triadic construct elicitation
In this method the respondent is presented with three elements at a time from a list of representative elements and asked to distinguish in what ways two of the elements are alike and different from the third. The respondent is then requested to name the emergent pole and the implicit or contrast pole which discriminate the elements. The two contrasting poles of the construct are then recorded.

II) Dyadic construct elicitation
This is a method used when the respondent finds it difficult to supply any constructs (Keen & Bell ,1980)[15]. In this method, only two elements are presented to the respondent so that he or she will be able to discriminate the differences or similarity between them more easily.

III) Free response construct elicitation
Through conversation, respondents provide their personal constructs instinctively.

Iv) Supply constructs
This is the fastest way to generate constructs whereby the researcher provides pre-determined constructs for the respondent to assign the necessary weighting or rating.

v) Laddering

This technique is normally used in conjunction with one of the above methods after some constructs have been elicitated. It involves asking the respondent a series of "Why" or "How" questions so as to elicit more specific constructs.

v i) A combination - of the above methods.

It was suggested [(Stewart & Stewart 1981)(10)] that an important point to remember in elicitating constructs was its relevance to the purpose of the investigation. Basically, there are three different types of constructs which may arise from the elicitation process:

I) Sensory-perceptual

These constructs are normally elicited when investigating the perceived attributes of objects or situations. For example, the elicitation of personal constructs of quality controllers who are working on a production line.

II) Behavioural/Inferential

These constructs reflect upon the behaviour of the subjects on certain persons or situations. For example, it would be appropriate to elicit behavioural constructs of shoppers or consumers.

III) Feelings/Attitudinal

These constructs describe the feelings or attitude of individuals towards certain persons, objects or situations such as the constructs of workers when working on production lines.

Another important question to consider therefore is, "How many constructs should be included in the Repertory Grid?" Kelly suggested that it is vital to elicit several constructs in order to explore an individual's world of meaning. However, as put forward by Pope and Keen (1981)(12):

> "One is not aiming to encapsulate the whole of an individual
> construct system but only that part of it which is relevant to the
> defined purpose."

Thus, it is necessary to achieve a balance between eliciting sufficient numbers of constructs and the practical constraints present. Nevertheless, there are some criteria and limitations to consider when eliciting constructs:

i) The constructs elicited must cover the range of constructs which the individual feels are important to the area under consideration. Construct

elicitation should continue until the individual indicates that his repertoire of constructs for that particular range of events is exhausted.

ii) The elicitation of constructs can be exhausting both for the person completing the grid and the person carrying out the grid interview. Thus, the researcher should be careful not to stretch beyond the limits of exhaustion. Otherwise, the constructs obtained may be unreliable and inaccurate.

iii) In many circumstances there may be time limit constraints on behalf of either the individual or the person conducting the grid interview which may well impose a limitation on the number of constructs which are elicited at any one session.

iv) It is necessary to consider the limitations of computer software used for the analysis, such as the number of constructs and elements.

iv) Rating of elements of each construct

The original approach adopted by Kelly was to use a dichotomous form of grid whereby respondents were asked to place ticks or crosses across elements for each construct. However, this method does not permit finer discrimination between elements or constructs. Furthermore, as noted by Bannister (1968)[16], the dichotomous grid may produce spurious relationships, possibly due to lopsidedness (too many ticks and few crosses or vice versa) on a particular construct.

In recent years two popular forms of grid have emerged. These are rating (Fransella and Bannister,1977)[17] and ranking (Bannister and Mair,1968)[18] grids. Generally, in practice it is less confusing for the respondents to rate elements than ranking them, especially when there is a large number of elements. Thus, rating of elements is commonly used whereby the respondent is free to assign rating along a linear scale from the emergent pole to the contrasting pole of each construct. It has to be noted that in this study the term weighting is synonymous to rating.

Rating or weighting on 5-point or 7-point scales allow for slightly more discrimination on each construct and it may be quite important to allow the opportunity to make these finer distinctions. Ranking scales provide very much greater discrimination, but this may force the subject to indicate differences between elements where he really sees no difference. There is also the tendency for the ranking to be made in relation to the emergent pole of the construct, without taking much account of the contrasting pole. This means that the construct may

only be partially incorporated into the grid and this is increasingly likely if there are more than eight or ten elements.

The choice between rating and ranking methods depends largely on the purpose for which the grid is designed, but (Shaw,1980)[19] notes that about 70 percent of published studies use rating methods. One important aspect of rating scales is that they provide an opportunity to check whether the elements really are in the range of convenience of all the constructs - and thus if the grid has been constructed correctly. Although the subject should be asked to complete ratings for all elements on all constructs, he can also place a mark, such as an asterisk, in any box where he feels that the construct is not really applicable to that element. If many of the elements are felt to lie outside the range of convenience of the constructs there may be a fundamental fault in the design of the grid.

v) Analysis of grid

Once the grid is fully completed, the element by construct matrix is then analysed for its underlying structure and content. As noted by Teo [10] there are five principal methods of analysing the full grid data namely:

I) Frequency count analysis

This analysis simply counts the number of times a particular construct or element occurs from all the respondents. It is commonly used to identify general trends among groups of people. This analysis is frequently employed when the elements are discrete and well defined and have consistent meanings to the subjects.

II) Content analysis

In content analysis, all elements or constructs are grouped into different categories with respect to their similarity in content. A frequency analysis is then performed to determine the distribution of various elements or constructs in these categories.

III) Visual focusing

This technique is normally used on a raw grid with ticks and crosses rather than on a rated grid. In a ticks and crosses grid, it compares the degree of agreement of each construct across the elements and produces a matrix of agreement scores for all possible pairs of elements. Similarly, it is also possible to compare the degree of agreement of various elements over different constructs.

iv) **Cluster analysis**

The clustering technique (Shaw and Thomas,1976)[20] attempts to group or cluster similar elements or constructs so as to exhibit certain patterns of the original grid data. Several computer packages such as PEGASUS and FOCUS developed by Shaw and Thomas (1976)[20] are available for performing cluster analysis. These programmes usually produce a linear re-ordering of elements or constructs to highlight similarities in the way in which they are construed. A typical computer printout may consist of the following information:

a) The original raw data
b) A matching score matrix of the relationships between all pairs of elements.
c) A matching score matrix of the relationships between all pairs of constructs.
d) A statement as to which constructs (if any) should be reversed.
e) A re-ordered grid with tree diagrams attached showing the patterns of relationships in the data.

v) **Principal Component analysis (Factor analysis)**

This method of grid analysis is based upon two matrices of similar measures:

i) an element matrix which includes the measure of similarity of every element with every other element, and
ii) the construct matrix which shows the measure of similarity of all pairs of constructs.

These measures of similarity are viewed as distances in space or dimension. This analysis extracts the major dimensions which then describe each of the elements or constructs to these dimensions.

The Principal Component analysis is a statistical technique commonly used to identify a relatively small number of factors that can be used to represent the relationships among sets of many interrelated variables. It is performed in four steps namely:

i) The computation of a correlation matrix of all variables to determine the association among various variables.
ii) The second step involves factor extraction where a number of factors (dimensions) necessary to represent the data are determined.

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iii) The third step, rotation, focuses on transforming the factors to make them more interpretable.

iv) Lastly, a score for each factor is computed for each case.

The Manchester Computer Centre have the Grid Analysis Package which includes INGRIDA, SERIES and DELTA programmes that can undertake cluster analysis, principal component analysis as well as analysing the intraclass relationships between elements and constructs of the Repertory Grid. The main output of these programmes provides the following information:

i) listing of raw data

ii) table of construct statistics and construct correlation matrix

iii) table of element statistics and element correlation matrix

iv) table of principal components

v) graphical output of elements and constructs on major dimensions.

4.4 RESEARCH STRATEGY ADOPTED

Although several data collection methods were considered, the methods actually used were:

i) Questionnaire Survey

ii) Repertory Grid Interviews.

The reasons for the adoption of these data collection techniques and the sequence in which this investigation has been undertaken are as follows:

4.4.1 The Questionnaire Survey

Two questionnaires were prepared and mailed to the respondents. The first questionnaire comprised very simple questions pertaining to the company background, their development activities and matters related to the decision making factors in property development. The second follow up questionnaire requested further details to the questions asked in the first questionnaire. The reason why these details were not asked in the first questionnaire was because of wanting a high response rate which might not be achieved if questions that were too demanding were initially presented.

For the purpose of this study, the mailed survey method was adopted. This method has the following advantages:

a) The mailed questionnaire survey is cheaper than other methods of Survey research.

b) A widely spread sample is possible with the mailed questionnaire survey. It is therefore of special value for scattered populations, such as the population of this study.

c) The mailed questionnaire avoids the problems associated with the use of interviews i.e. interviewer errors or interviewer bias which may seriously undermine the reliability and validity of survey results.

d) Mailed questionnaires are suitable with questions demanding a considered rather than an immediate answer, in particular, if the answer requires consultation of documents. As in the case of this research, some of the questions, particularly in the second questionnaire, required such answers. Thus, it would be both preferable and more accurate to use a questionnaire that can be filled in by the respondent in his own time.

However, the use of the mail questionnaire survey as a method of data collection has been severely criticised by a number of researchers (Kerlinger (1973)[21], Adam & Stacey (1956)[22], Dillman (1972)[23]). The method suffers from several major disadvantages such as poor response rates, response bias, the general nature of questions and the inability, on the part of the researcher, to verify the information provided. Nevertheless, several researchers suggested that these deficiencies could be overcome by using a variety of techniques. Techniques such as preliminary notification (Levine & Gordon (1958)[24], Robin (1963)[25], Heaton (1965)[26], Myers & Haug (1984)[27]) and follow up (Robin (1963)[25], Eckland (1965)[28]) could have a significant effect on improving the response rates. Other techniques such as Questionnaire Length, Return Envelopes, Personalisation, and Cover Letter have also been used.

Therefore, to ensure a good response, the following techniques have been followed by this researcher:

a) Preliminary notification - this was conducted by short telephone calls to the property managers/directors or his/her representative prior to sending the questionnaire.

b) The first survey questionnaire was divided into four main sections while the second was in two sections.

c) Response to all questions in the first questionnaire were in a multiple choice format which only needed either a tick or filling in figures in the boxes provided. In the second questionnaire, responses to all questions,

except two, were in a multiple choice format which needed either a circle or filling in figures in the boxes provided. This format was chosen to achieve simplicity and facilitate completion.

d) A covering letter stating the purpose of the research was enclosed.

e) Personalisation of cover letter by addressing the questionnaire to the property manager/director of each firm.

f) A stamped, addressed return envelope was enclosed.

g) Two follow-up procedures were performed after mailing the questionnaire, the first by telephone and the second by mail.

a) Design and Structure of the Questionnaire

In designing the survey questionnaire, several guide-lines proposed by various writers such as Moser & Kalton (1971)[29], Lewis & Fox (1969)[30], and Sinclair (1975)[31] were followed. According to Sinclair (1975)[31], there are five main issues to be considered. These are:

    i) Definition of objectives and resources.

    ii) Coverage

    iii) Sampling Method

    iv) Probability of non-response.

    v) Questionnaire wording.

In addition to the above considerations, another point to consider was questionnaire length. According to Moser and Kalton (1971)[29], the temptation is always to cover too much - to ask everything that might turn out to be interesting. Research evidence on the effect of questionnaire length on response rate has been mixed. Berdie (1978)[32], Kanuk & Berenson (1975)[33] indicated no correlation between length of questionnaire and lack of response. However, the position that length is not critical has less support when considering industrial or business populations. Jobber (1986)[34] pointed out that business managers, especially those in small firms, work under rigid time constraints. Thus, he suggested, any attempt to distract these managers away from their business will be viewed as an intrusion on their time and will be resented. Heberlain and Baumgartner (1978)[35] on the other hand, indicated that the single most important factor in assuring high response rates is whether or not surveys are judged to be current and important to the respondents. This was supported by Forsgren (1986)[36] who suggested that response rates depended on the respondent's interest in the subject. If the content of the questionnaire is viewed to be important and the respondent knowledgeable, a high response rate can be attained.

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As in the case of this study, the subject of the investigation, that is relationships of degree of achievements with consideration of decision making factors, is an inquisitive and yet unknown subject matter and it is perceived that the respondents i.e. the decision makers are able to provide the information required. However, taking into consideration the suggestions from both sides, a compromise was made between getting as much information one could from the questionnaire and ensuring that it would be returned. In the final analysis, it was decided that a mailed questionnaire which could be completed in not more than thirty minutes would be appropriate and would provide sufficient information for the survey.

b) Preliminary questionnaire design

A questionnaire comprising questions which attempted to obtain the data required for the study as outlined in Chapter One was drafted. The draft form was then presented to colleagues and the author's supervisor to invite comments and suggestions. As a result, a series of discussions were held separately with each of the persons mentioned. These discussions proved to be very useful. Several comments and suggestions were received. The draft was then refined and a more comprehensive 'measuring instrument' was finally developed. This process was carried out on both occasions in preparing the first and second questionnaires.

c) Pilot Assessment of questionnaire

Prior to the main study, the completed first questionnaire was tested on decision makers i.e. property managers/directors of five property companies in London. The pilot tests were separately conducted with each of the decision makers. The ensuing discussions with the decision makers highlighted some deficiencies and ambiguities in the draft questionnaire and some constructive and helpful criticism was received. Some of the questions were said to be difficult for the decision makers to understand and it was suggested that the questions be amended. Additionally, a number of questions were viewed as ego-threatening and would elicit defensive responses from the respondents. It was then determined that the required data could be obtained by rewording such questions.

The questionnaire was also tested for the time it would take to complete it. From the pilot study, it was found that it would require approximately 25 to 30 minutes to complete. This was considered acceptable.

The questionnaire was then restructured with some additions of the questions that were important and elimination of questions that were of lesser importance, together with a good deal of format and order changes which took account specifically of logical progression. A 27 question revised form was finalised. It should be noted that similar processes were undertaken in the preparation of the second questionnaire.

4.4.2 The Repertory Grid Technique

It was decided at the outset of this research to adopt this technique to establish the decision makers' perceptions of the decision making factors since it has been used extensively in similar management decision making situations although mainly in different industries. However, both the researcher's supervisor and senior academic in the Loughborough University of Technology business school had previous successful experience in applying the Repertory Grid Technique in their research and this experience and knowledge was drawn upon for this research.

The Repertory Grid Technique was thus utilised to determine the following:
i. the relationships of the economic, local and project factors with the office and shop developments' outcomes;
ii. the relationships of the decision makers' attributes with their degree of achievements in office and shop developments; and
iii. the effect of the decision makers' perceptions of the decision making factors on their degree of achievements in office and shop developments.

The main benefit of this technique may be summarised as follows:
i. The absence of observer bias as the decision makers give their own frames of reference. This technique allowed this researcher to obtain a mental map of how the decision makers consider the factors affecting the office and shop development outcomes.
ii. Reducing the review by experts because the constructs or maps obtained are not interpreted by experts but discussed with the decision makers themselves, thus the degree to which data is treated by interpretation is reduced.
iii. It allowed the decision makers to make explicit what is implicit in their thinking processes i.e. how they perceive the factors influencing the development outcomes.
iv. It allowed this researcher to identify the major types of dimension held by decision makers of various personal attributes in their perceptions of factors affecting the development outcomes and in what way these constructs are inter-related.
v. The technique facilitates the comparison of the perceptions held by different groups of decision makers classified by their attributes and degree of achievements.

However, since this is the first time this technique is being used to establish the relationships of Decision Makers' Achievements and the Judgemental Factors of Property Development , it needs to be further validated. It has also to be noted that in eliciting the weightings to supplied constructs all the respondents must be able to give consideration to all the constructs otherwise there may be a fundamental fault in the design of the grid. Other limitations are mentioned in Section 4.3.3.

Prior to interviewing the decision makers, a series of three pilot studies were conducted by this researcher in order to gain some experience in the mechanics of the Repertory Grid technique.

In the first trial, the technique was tested on two postgraduate students in the Department of Civil Engineering, Loughborough University of Technology. This initial test was essential as it allowed this researcher to gain a practical knowledge of the technique and gain confidence in using it. Next, the instrument was tested on property managers of three property companies. This second pilot study not only enabled this researcher to determine the precise scope of the investigation and the information required, but to gain further confidence in using the technique. The information provided and comments received were very useful and were used to modify the repertory grid questions. Once the instrument was ready, it was tested on three property managers and this researcher's supervisor. This pilot study indicated that the instrument was operational and was able to collect the kind of information required by the study.

The understanding and the piloting of repertory grids was an important part of this thesis. Although, at the beginning, they are quite difficult to use, this research technique and the concept of personal constructs on which they are based proved invaluable.

4.5 IDENTIFICATION OF THE POPULATION AND SELECTION OF A SAMPLING FRAME

The sample frame was the entire population of property development and investor companies throughout the UK, derived from the combined list of the UK Directory of Property Developers, Investors and Financiers (1990)(37) and Estates Gazette Directory (Feb. 1992)(38). The first step undertaken was to check the entries. The names of the companies listed in both directories were cross-checked with each other and the names which appeared in both were noted and deleted as necessary. The aim of this process was to avoid duplication i.e. to ensure that the company was represented only once. On completion of the task a total of 1230 property companies was obtained.

Once the population of of property companies was prepared, the size of the sample for the study was decided. At first sending questionnaires to all of the 1230 companies in the list was considered, but due to financial constraints, it was decided that this was not practicable. A convenient number of 123 companies which represented 10 percent of the total population of property companies was chosen.

The sampling procedure that was chosen was by taking every tenth company name in the list. Once chosen, an initial telephone contact was made to each of the 123 companies selected. This initial contact served two purposes:

    i) to obtain the name of the property manager/director
    ii) to confirm the firm's correspondence address

so that the questionnaire could be personally addressed to the right person and the right address. Research evidence has shown that pre-contact is effective in increasing response rates (Stafford (1966)[39], Heaton (1965)[26], Ford (1967)[40] and Allen et al (1980)[41]). There is a limited number of studies which suggest that this technique may reduce response rates (Childers & Skinner (1979)[42], Jobber & Manderson (1983)[43]). For the purpose of this study, however, it was believed that the disadvantage of pre-contact was offset by the advantage. The pre-contact was essential to enable the survey instruments to be sent directly to the right individuals. As a result of this pre-contact, subsequent inquiry could be made directly to the individuals concerned.

In order to reduce the set-back of pre-contact the strategy used was to make only very brief contact. At the time of the initial contact, the researcher introduced himself to the person who took the call. He or she was then asked to provide information about the following:

    a) What are the types of properties that the company develops?
    b) What is the company's address?

It was believed that the person who took the call would be able to answer these very general questions without reference to any other person. The strategy adopted proved to be very successful. In most cases the person who took the call was able to provide answers to the questions posed. Only in a number of cases, he or she was unable to provide the answer while in other cases they were unwilling to provide the information due to strict company policy of not providing company information over the phone. In such cases the call was referred either to the property manager himself or other senior staff who were available at the time of the contact.

All the companies called carried out office and shop developments. The person who answered the call was then asked whether a questionnaire could be sent to the property manager or director. All gave positive answers and the name

of the property manager or director and the correspondence address of the company was then requested.

Although every care had been taken to ensure that the sample was representative of the population selected, there is no intention here to make any claim to that effect. Until a more acceptable sampling frame comes into being, such a claim could be questionable. Nevertheless, the sample chosen met the requirements of the study and, it is hoped, the findings of this study will, in the manner interpreted, be indicative of the relationships of achievements with decision making factors of the population sampled.

4.6   ADMINISTRATION OF THE SURVEY

Within one week after making the initial contact, the first questionnaire together with a letter of introduction from the Department and a stamped addressed envelope was sent to the companies contained in the final list of 123 firms. All the questionnaires and accompanying documents, which were addressed to the property manager or director, were mailed by the end of the third week of February, 1992. A sample of the first questionnaire is given in Appendix A.

During the first week after mailing, 15 responses were received. This was followed by 5 and 4 responses in week 2 and 3 respectively. A follow up was made to non-respondent companies in the third week. The timing of the follow-up follows that of William & Weschler (1970)[45] who suggested a cut off point of 17 days after the initial mailing. This first follow up was a short telephone call which served to remind the property managers of the questionnaire and to request their response. Nine respondents indicated that they did not receive the questionnaire and requested another copy, which was subsequently sent on the same day. Eleven of the companies called said that the questionnaire was received but the property manager was on holiday or just returned from holiday. However, all promised to look into the matter as soon as time permitted. During week 4, 5 and 6 after the original mailing, 5, 6 and 4 responses were received respectively.

In week 7 another follow up was made to the non-respondents. This second follow up which was a memo, again requesting their response, was attached to the original covering letter and a questionnaire. This procedure follows the suggestion by Futtrell & Lamb (1981)[46] who indicated that at least one follow-up with a questionnaire was required.

By the end of the tenth week after original mailing, a total of 47 (38%) questionnaires were returned. Of these, 37 (30%) were usable. Of the remaining 10, 2 were blank, 8 were incomplete. In addition to these questionnaire returns, four letters and two memos were also received from the companies explaining reasons for not responding.

In a further effort to increase response rates, some companies were again contacted by telephone. The property managers were told how important their participation was to the success of the study and were persuaded to respond to the questionnaires. As result, some positive responses were received from the property managers. Subsequently, by the end of May 1992, 4 more responses were received bringing the total number of usable responses to 41 (33%). In the end, although the total number of responses for this study was small (51), the percentage of usable returns (33%) was considered acceptable.

A second follow up questionnaire which requested further details to the questions asked in the first questionnaire, was sent to the 41 respondents in June 1992. The above processes were repeated to get as many returns as possible. Finally, in September 1992, 20 usable responses (49 percent) were received. All these 20 respondents agreed to be interviewed by this researcher. A sample of the second questionnaire is given in Appendix B.

4.7 ADMINISTRATION OF THE REPERTORY GRID INTERVIEW

The interview schedule to elicit views, perceptions and attitudes from property development decision makers was prepared. A sample of the interview schedule is given in Appendix C. Two interviews were carried out, the first during the months of October - December 1992 and the second during the months of March - May 1993. Appointments were made with each individual respondent prior to the interview. Before commencing the first interview, a brief introduction to the purpose of the study was given. This approach was important to acquaint the interviewees with the context of the study.

The first part of the interview elicited answers on the factors influencing the outcomes of the office and shop developments that the interviewees had been involved in during the period of 1985-1990. The main purpose of this part of the interview was to have the individuals provide constructs (the perceptions of the interviewees) on at least six developments (elements) i.e. one each for office and shop developments of highly successful, successful and moderately successful outcomes which were chosen randomly from each company. A maximum of

twelve developments i.e. two each for office and shop developments of highly successful, successful or moderately successful outcomes were chosen randomly from each company.

In most of the interviews, the triadic method of construct elicitation was utilised. In a number of cases, the dyadic method seemed to be more appropriate. In this latter method, only two elements (instead of three as in triadic method) were presented to the interviewees so that they were able to discriminate between the differences or likeness of them more easily. The procedure was repeated until all the elements had been presented. The elements were presented to the interviewees by way of small cards which had the development details of location, inception and completion dates and amount of realised capital values written on it. The details were found to be sufficient for the interviewees to recall the specific developments.

Once elicited, the constructs obtained were then written down on a preprinted form and the interviewees were asked to rate these constructs on a 5-point scale. Where appropriate, more specific questions were asked to elicit more specific constructs. This is called the laddering process.

In the second interview the 20 respondents were supplied with the constructs which was the list of all the constructs obtained from the first interviews excluding repetitions. Using the same elements that had been chosen for each respondent in the first interview, the respondents were asked to rate the supplied constructs on a 5-point scale. The respondents were asked to elicit more constructs but none was able to come out with any, indicating the completeness of the constructs.

4.8 DECISION ON ANALYSIS OF DATA

The analysis of data, which was designed to fulfil the stated purpose of this study, consists of six sections. These are as follows:

i. Frequency analysis of the questionnaire responses.

ii. Analysis of factors influencing development performances and decision makers' achievements.

iii. Analysis of relationships between decision makers' constructs and their achievements.

iv. Correlation analysis between constructs weighting and achievements of all decision makers.

v. Correlation analysis of constructs weighting of decision makers grouped by their achievements.

vi. Correlation analysis of constructs weighting of decision makers grouped by their attributes.

For the purpose of frequency and correlation analysis, the Statistical Package for Social Sciences (SPSS-X) was used. The SPSS-X was chosen for the following reasons:

a) It is a well tried and tested statistical package.

b) It is flexible in data manipulation.

c) The statistical tests to be used in the analysis were all provided in the package.

d) The package is updated to take account of new developments in statistical analysis.

The Grid Analysis Package software at the Manchester Computer Centre and the recently developed software at Nottingham University for analysing the Repertory Grids were tried to analyse the data obtained from the Repertory Grid interviews but, unfortunately, all the softwares were limited in their abilities to process the data the way the researcher required. The Grid Analysis Package softwares were not able to present comparison of relationships between selected group of constructs and the software at Notingham University could only present relationships of single element or construct and not between multiple elements or constructs.

Due to the software limitations, the resarcher then used the SPSS-X to carry out the frequency count analysis on the constructs. This analysis simply counts the number of times a particular construct occurs from all the respondents. The purpose was to identify the general trends of thought processes of the respondents. Secondly, using the non-parametric Spearman Test for correlation statistic in the SPSS-X software, the correlations between decision makers' achievements and the weighting of every construct were examined.

Thirdly, the content and cluster analyses of the constructs were carried out. In the first part the relationships between construct weighting and the decision makers grouped by their achievements were examined and finally, the relationships between constructs weighting and the decision makers grouped by their attributes were then investigated.

4.9 SUMMARY

The choice and strategy for the collection of data for the present study has been discussed. Two methods of data collection were utilised. These were the Mailed Questionnaire Survey and the Repertory Grid interview. On the whole, the data collection strategy proved successful. The research instruments used yielded the kind of information needed for this study. The analysis of the data proceeded using the Statistical Package for the Social Sciences (SPSS-X). The next two chapters present the results of the analysis.

CHAPTER 5

ANALYSIS OF THE SURVEY

5.1 INTRODUCTION

The primary objectives of this research are to investigate:

i) To what extent do the decision makers' Education, Training, Experience and Risk Attitude correlate with their Achievements?

ii) What relationships do Completion Timing, Location and Capital Size have with the Development Outcomes? and

iii) How do the decision makers' Perceptions of the decision making factors affect their Achievements?

The secondary objective is to identify:

'To what extent the decision makers' systematic examination and analysis of factors usually termed the 'hard data'; and/or the intuitive judgement i.e. the deliberation, reasoning and acceptance of facts termed the 'soft data' contribute towards a greater influence in the decision makers' achievements and development outcomes.'

Data for the study were collected by the use of a combination of Mailed Questionnaire Survey and Repertory Grid Interviews. This chapter presents the results of the analysis of the responses of the Mailed Questionnaire and part of the Repertory Grid Interview data.

5.2 FREQUENCY ANALYSIS OF THE QUESTIONNAIRE SURVEY

The analysis of the mailed questionnaire survey responses was performed in two stages. The first stage looked at the various ways of explaining the data using the frequency distribution. A frequency distribution of the responses to each survey question was presented and summarised. Raw data were tabulated and converted to percentages for easier comparison. Thus the response rates are given in both absolute and in relative terms. For cases where missing responses were observed, a valid percentage was calculated. This was done by dividing the number of responses to a particular question by the total number of actual responses for that question (excluding the number of missing observations).

The second stage presented a correlation analysis of the primary factors used to construct the variables which were:

a) Development related factors i.e. the Completion Timing, Capital Values, Location and Site Remoteness of office and shop developments were correlated with the Development Outcomes; and

b) Decision makers' attributes i.e. the Academic and Professional Qualifications, Experience in Property Developments, Decision Making Involvement and Risk Attitudes were correlated with the decision makers' Achievements.

For this purpose the non-parametric Spearman Test for correlation and significance statistics was used to identify important factors which influence and configure the development related factors with the development outcomes and decision makers' attributes with their achievements.

The analysis framework is as shown in Fig. 5.2.1. It has to be noted that the analysis of the Repertory Grid Interviews data which were the weighting of decision making factors i.e. economic, local and project related factors and their correlationships with decision makers' achievements were examined and discussed in Chapter 6.

Before examining the tables, one point requires explanation. The practicalities of the sample number meant that the frequencies quoted (and the resultant percentages) are based on small numbers. The small sample is due to the low number of responses obtained, even though all possible means and efforts had been tried to increase the response rate. However, one consequence of the small sample size is that the confidence interval on the quoted percentages is large. For example, the standard error of a percentage of 30 based on 25 observations is approximately 9 giving a 95 percent Confidence Interval from 12 to 48. While the quoted percentages represented the best possible estimate of the responses to the questions, the particular numbers should be treated with caution and the possible variations in the figures should not be overlooked.

5.3 COMPANY BACKGROUND

To establish the nature and type of property companies sampled, questions pertaining to their development activities and nature of business were asked. The respondents were also asked to state their companies' experience in property development. These facts were important in the analysis and verifying the findings, since there are two main groups of property companies in the United Kingdom namely, the 'traders' and 'investors'. These two groups of companies obviously differ in their organization, policies and nature of business.
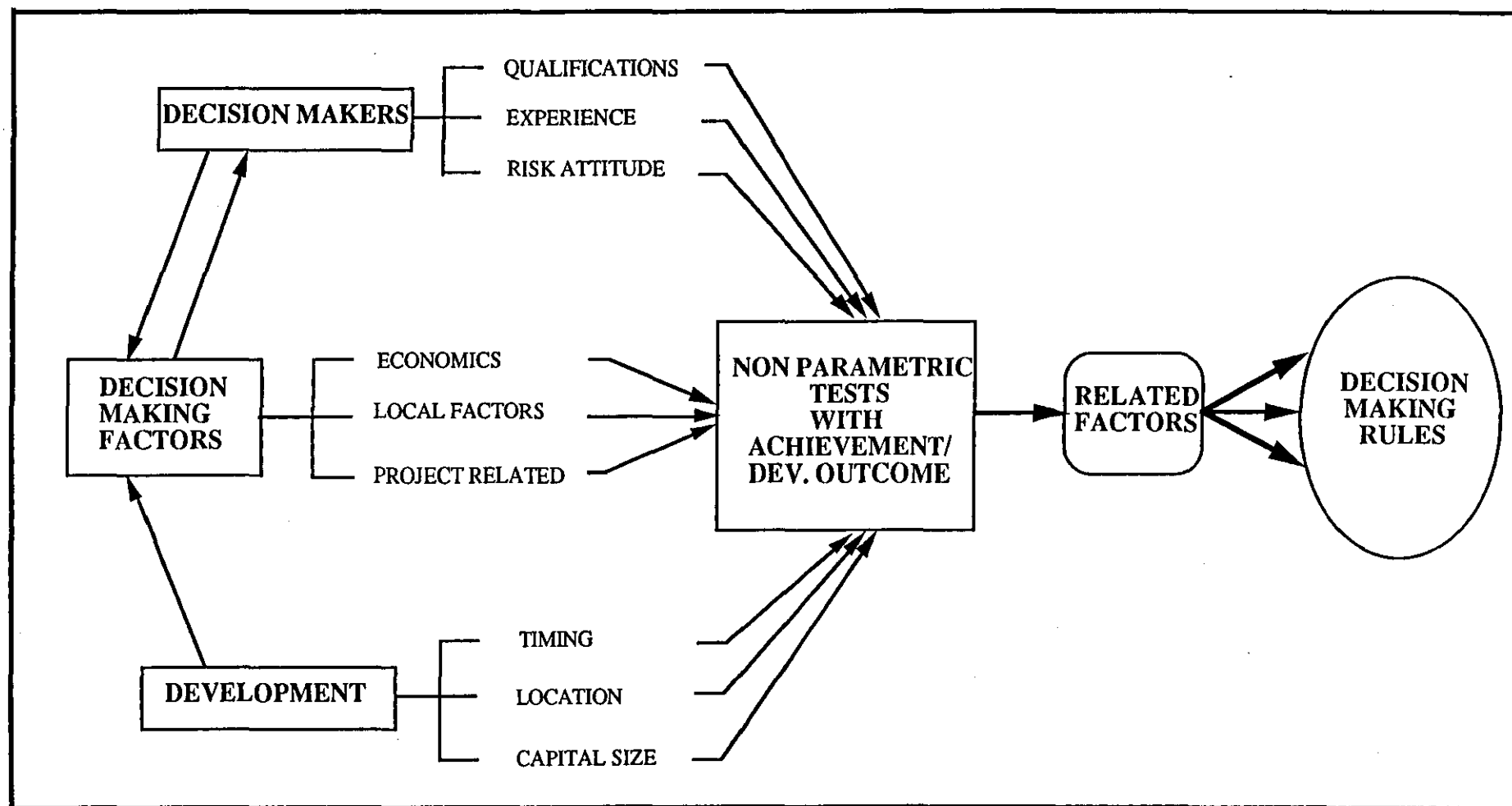
Fig. 5.2.1: Organizational framework of data analysis

5.3.1 Types of development

The first question sought information about the types of development the 41 sampled companies have carried out in the study period 1985-1990. Table 5.3.1 and the pie chart in Fig. 5.3.1 illustrate the breakdown of the types of development undertaken. It was observed that office and shop either on their own or with industrial and/or residential developments constitute the main type (95%) of the developments

Value Label	Frequency	Valid Percent	Cum. Percent
Office & shop	10	24.4	24.4
Office, shop & industrial	20	48.8	73.2
Office, shop & residential	1	2.4	75.6
Office, shop, resid. & ind.	8	19.5	95.1
Industrial	1	2.4	97.6
Ind. & resid.	1	2.4	100.0
Total:	41	100.0	

Table 5.3.1: Development undertaken 1985 - 1990
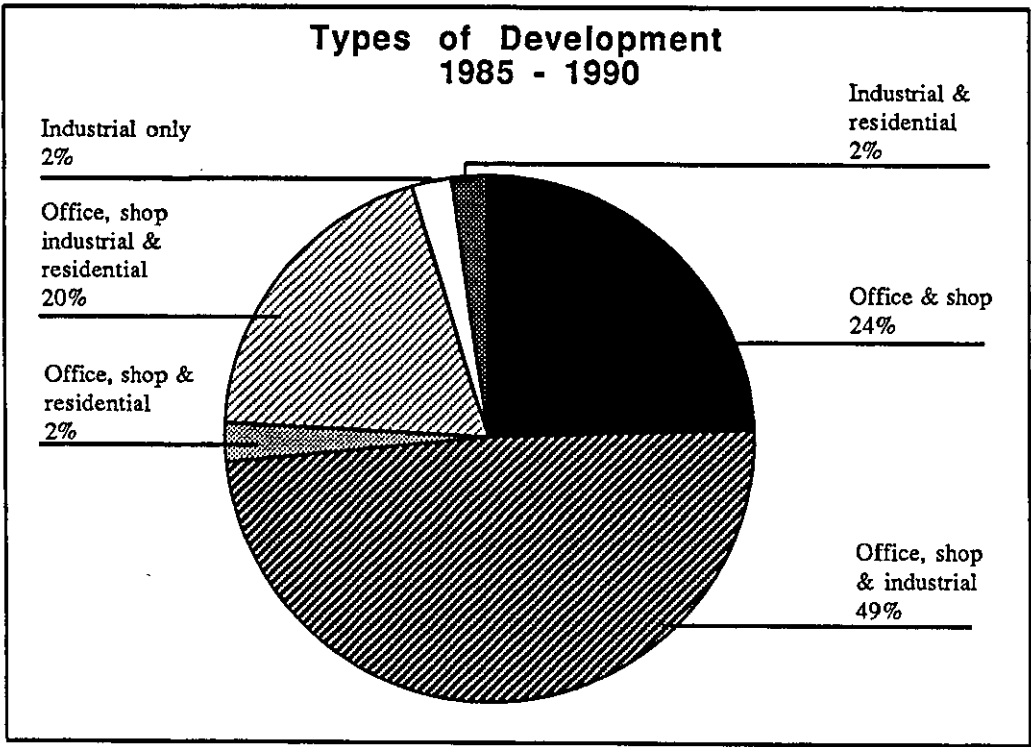
Fig. 5.3.1: Types of development undertaken - 1985-1990

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carried out by the companies sampled. This is significant as the information on decision making factors obtained from the respondents denote the concern of this research study area i.e. office and shop developments.

5.3.2 Nature of Property Companies

As indicated in Table 5.3.2, 75 percent of the companies did not retain the properties that they developed. This indicated that the majority of the companies sampled were 'traders' and not 'investors'. This implies that the analysis and findings of this research refer to the former and not the latter group of property companies.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	10	24.4	24.4
No	31	75.6	100.0
Total:	41	100.0	

Table 5.3.2: Retain development

In response to another question, to confirm the companies' trading status and performance, it was revealed that only 10 percent retained their developed properties for more than two years. In fact, over 30 percent managed to sell off their developed properties immediately upon completion, while 42 percent were able to dispose of theirs within a year. This is illustrated in Table 5.3.3.

Value Label	Frequency	Valid Percent	Cum Percent
Immediately	10	32.3	32.3
Less than 1 year	13	41.9	74.2
1 - 2 years	5	16.1	90.3
2 - 3 years	1	3.2	93.5
3 - 4 years	1	3.2	96.8
> 5 years	1	3.2	100.0
Total:	31	100.0	

Table: 5.3.3: Time to sell development

5.3.3 Development Experience

To the question enquiring of the companies' experience in property development, it was observed, as indicated in Table 5.3.4, that the majority (88%) of the companies sampled had been involved in property development for more than 5 years. The finding indicates that the majority of property companies in the United Kingdom are well established and had survived the test of time. On the other hand, it might indicate very few companies were established in the last five years due to the downturn in the property market. This is probably confirmed by the fact that over 60 percent of the companies sampled have more than 15 years experience in property development.

Value Label	Frequency	Valid Percent	Cum Percent
Less than 5 years	5	12.2	12.2
5 - 10 years	6	14.6	26.8
10 - 15 years	5	12.2	39.0
15 - 20 years	8	19.5	58.5
Over 20 years	17	41.5	100.0
Total:	41	100.0	

Table 5.3.4: Property development experience

5.3.4 Policy and Organization

a) Guide-lines for property development

Table 5.3.5 indicates that only 39 percent of the property companies sampled have written guide-lines or policies for the selection of properties for development. This is possibly due to the indefinite nature of property development which defies any standard approach in carrying out the various activities. On the other hand, it may also denote the attitude of property developers who regard the property development processes as an 'art' and therefore cannot possibly have a definite and regular approach.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	16	39.0	39.0
No	25	61.0	100.0
Total:	41	100.0	

Table 5.3.5: Development written guide-lines

b) Information gathering

Developers or decision makers need to have complete and detailed information of external and internal factors for consideration and deliberation in the decision making processes. However, only about 51 percent of the companies sampled indicated that they have their own staff to collate the information. (See Table 5.3.6).

Value Label	Frequency	Valid Percent	Cum Percent
Yes	21	51.2	51.2
No	20	48.8	100.0
Total:	41	100.0	

Table 5.3.6: Own staff to collate information

Further, as shown in Table 5.3.7, only 22 percent rely solely on reports prepared by staff members to assist the determination and selection of properties to be developed.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	9	22.0	22.0
No	32	78.0	100.0
Total:	41	100.0	

Table 5.3.7 : Solely rely on company's own report

c) Engage property consultants

Table 5.3.8 revealed that almost 90 percent of the companies sampled engaged the services of property consultants in preparing feasibility reports on the properties to be considered for development.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	36	87.8	87.8
No	5	12.2	100.0
Total:	41	100.0	

Table 5.3.8: Engage property consultants

When asked further, on the regularity of employing the property consultants, again 90 percent said their services were generally used or used occasionally. Table 5.3.9 also showed that almost 63 percent of the companies sampled affirmed that the services of the property consultants were used generally.

Value Label	Frequency	Valid Percent	Cum Percent
In general use	25	62.5	62.5
Use occasionally	11	27.5	90.0
Rarely use	1	2.5	92.5
Never use	3	7.5	100.0
Total:	40	100.0	

Table 5.3.9: Usage of property consultants services

The detailed follow-up study on the 20 property companies revealed the various consultants whose advice was requested by the companies. Architects', estate agents' and solicitors' advice was requested by all of the 20 property companies while the advice that was least asked for was from the economists. Only 8 out of the 18 companies sought the economists' advice. This is shown in Table 5.3.10. It should be interesting to examine whether there were any differences in the degree of achievements attained by the group of companies that received the economists' advice and those that did not. The results of this investigation are discussed in Section 5.7.3 (Achievements and Consultants' Advice).

CONSULTANTS	FREQ.	VALID % (YES)	N	RANK
Architects	20	100.0	20	1
Estate agents	20	100.0	20	1
Solicitors	20	100.0	20	1
Engineers	19	95.0	20	2
Quantity surveyors	18	90.0	20	3
Town planners	17	85.0	20	4
Valuers	14	82.4	17	5
Tax	14	73.7	19	6
Occupiers	12	63.2	19	7
Economists	8	44.4	18	8

Table 5.3.10: Property development consultants

Despite the involvement of several consultants in the property developments, it was found that over 80 percent did not participate in the decision making processes nor were the consultants reports' recommendations being relied upon in the final decision to undertake the developments. These facts are indicated in Tables 5.3.11 and 5.3.12. It was, however, revealed in Table 5.3.13, that 95 percent of the respondents stated that the consultants' reports were used as a form of database to assist in the decision making processes.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	3	18.8	18.8
No	13	81.2	100.0
Total:	16	100.0	

Table 5.3.11: Consultants participate in decision making

Value Label	Frequency	Valid Percent	Cum Percent
Yes	4	20.0	20.0
No	16	80.0	100.0
Total:	20	100.0	

Table 5.3.12: Final decision relying upon consultants' reports

Value Label	Frequency	Valid Percent	Cum Percent
Yes	19	95.0	95.0
No	1	5.0	100.0
Total:	20	100.0	

Table 5.3.13: Consultants' reports as database

It should also be interesting to examine whether there were any differences in the degree of achievements attained by the group of companies that had the consultants participate in their decision making processes and those that did not. The results of this investigation are discussed in Section 5.7.4 (Consultants' Participation in Decision Making).

d) Computer usage

It was revealed that many property companies did not use computers to assist in their decision making process. Table 5.3.14 indicated only about 46 percent had computer systems to support data processing. Table 5.3.15 showed an almost identical percentage (47%) of the property companies sampled claimed that computers and decision making software packages were in general use or being used only occasionally. This fact possibly indicated that over 50 percent of the property companies' decision makers still trust the traditional approach or 'back of envelope' calculations in their decision making processes.

It has to be noted that the 53 percent of the respondents who said they did not use computers in decision making as shown in Table 5.3.14 were those which rarely used or never used decision making softwares as indicated in Table 5.3.15.

Value Label	Frequency	Valid Percent	Cum Percent
Yes	19	46.3	46.3
No	22	53.7	100.0
Total:	41	100.0	

Table 5.3.14: Usage of computers in decision making

Value Label	Frequency	Valid Percent	Cum Percent
In general use	15	37.5	37.5
Use occasionally	4	10.0	47.5
Rarely use	7	17.5	65.0
Never use	14	35.0	100.0
Total:	41	100.0	

Table 5.3.15: Use decision making software

e) Investment appraisal

Table 5.3.16 showed that the 'internal rate of return' was the most widely used method for investment appraisal. Almost 92 percent of the companies sampled adopt

Value Label	Frequency	Valid Percent	Cum Percent
In general use	25	67.6	67.6
Use occasionally	9	24.3	91.9
Rarely use	3	8.1	100.0
Total:	37	100.0	

Table 5.3.16 : Use internal rate of return

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this method. However, payback period and net present value methods were also being widely use by the decision makers (*see* Tables 5.3.17 and 5.3.18).

Value Label	Frequency	Valid Percent	Cum Percent
In general use	16	51.6	51.6
Use occasionally	9	29.0	80.6
Rarely use	5	16.1	96.8
Never use	1	3.3	100.0
Total:	31	100.0	

Table 5.3.17: Use payback period

Value Label	Frequency	Valid Percent	Cum Percent
In general use	18	56.3	56.3
Use occasionally	8	25.0	81.3
Rarely use	5	15.6	96.9
Never use	1	3.1	100.0
Total:	41	100.0	

Table 5.3.18: Use net present value

f) Risk analysis

For risk analysis, the majority (about 90%) of the respondents, stated that they generally used or used occasionally the sensitivity analysis method in assessing the risks of the developments to be undertaken. This is shown in Table 5.3.19. As for the other common method of risk analysis, namely the probability analysis, only 48 percent indicated that they have used it occasionally or generally (*see* Table 5.3.20).

Value Label	Frequency	Valid Percent	Cum Percent
In general use	30	78.9	78.9
Use occasionally	4	10.5	89.5
Rarely use	1	2.6	92.1
Never use	3	7.9	100.0
Total:	38	100.0	

Table 5.3.19: Use sensitivity analysis

Value Label	Frequency	Valid Percent	Cum Percent
In general use	9	29.0	29.0
Use occasionally	6	19.4	48.4
Rarely use	7	22.6	71.0
Never use	9	29.0	100.0
Total:	31	100.0	

Table 5.3.20: Risk analysis - use probability analysis

5.4 DEVELOPMENT DETERMINANTS

The respondents were requested to respond by weighting from 'Least Important' to 'Very Important' the determinants that are normally considered in property development decision making processes. It has to be noted that the term 'most important' used in Tables 5.4.1 to 5.4 14 should be read as 'more important' as the highest weighting used in the consideration of the factors was 'very important'. The determinants were categorised into four groups namely the Economic Factors; Local Factors; Project Related Factors and Subjective Factors.

The Economic Factors include Property Demand, Return on Capital or Yield, Trends in Capital Values, Expected Capital Values of the Property, Economic Conditions, Return of Capital and Costs of Purchasing Site. Local factors are Location of the Development, Infrastructure and Facility of Surrounding Area and Size of Development. The Project related Factors include Client's Requirements, Design of the Property, Capital Availability, Design Brief Requirements, Costs of Construction and Development Period. Finally, Subjective Factors are Decision Makers' Perceptions of Market Conditions, Skills and Knowledge and consideration of Company Policies and Objectives.

5.4.1 Economic Factors

The respondents' consideration of the Economic Factors were illustrated in Tables 5.4.1 to 5.4.5. Factors which the respondents considered very important were

Value Label	Frequency	Valid Percent	Cum Percent
Least important	2	5.1	5.1
Quite important	1	2.6	7.7
Important	1	2.6	10.3
Most important	4	10.3	20.5
Very important	31	79.5	100.0
Total:	39	100.0	

Table 5.4.1: Property demand

'Property Demand' and 'Return on Capital'. As shown in Table 5.4.1, almost 90 percent of the respondents considered 'Property Demand' to be most important to very important, and about 83 percent regarded 'Return on Capital' to be most important to very important (*see* Table 5.4.2). In the consideration of other economic factors, 71 percent of the respondents regarded 'Trends in Capital Values' as being most important to very important (Table 5.4.3), and about 53 percent considered 'Expected Capital Value of the Property' to be most important to very important (Table 5.4.4).

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.5	2.5
Quite important	2	5.0	7.5
Important	4	10.0	17.5
Most important	9	22.5	40.0
Very important	24	60.0	100.0
Total:	40	100.0	

Table 5.4.2: Return on capital

Value Label	Frequency	Valid Percent	Cum Percent
Quite important	2	5.3	5.3
Important	9	23.7	28.9
Most important	17	44.7	73.7
Very important	10	26.3	100.0
Total:	38	100.0	

Table 5.4.3: Trends in capital values

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.6	2.6
Quite important	7	18.4	21.1
Important	10	26.3	47.4
Most important	7	18.4	65.8
Very important	13	34.2	100.0
Total:	38	100.0	

Table 5.4.4: Expected capital value of property

With regard to the general factor 'Economic Conditions', 22 percent of the respondents considered it to be very important as shown in Table 5.4.5.

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.8	2.8
Quite important	7	19.4	22.2
Important	6	16.7	38.9
Most important	14	38.9	77.8
Very important	8	22.2	100.0
Total:	36	100.0	

Table 5.4.5: Economic conditions

5.4.2 Local factors

In property, it is an accepted fact that location is considered to be one of the most influential factors in affecting demand and capital values. This was proven as 80 percent of the respondents considered 'Location' to be very important (*see* Table 5.4.6).

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.5	2.5
Quite important	2	5.0	7.5
Important	1	2.5	10.0
Most important	4	10.0	20.0
Very important	32	80.0	100.0
Total:	40	100.0	

Table 5.4.6: Location of development

Value Label	Frequency	Valid Percent	Cum Percent
Least important	3	7.7	7.7
Quite important	6	15.4	23.1
Important	6	15.4	38.5
Most important	14	35.9	74.4
Very important	10	25.6	100.0
Total:	39	100.0	

Table 5.4.7: Surrounding facilities

The factor normally considered in determining good location is that of the availability of infrastructures and facilities in the surrounding area. The consideration by the respondents of the importance of 'Surrounding Facilities' is illustrated in Table 5.4.7. Almost 62 percent considered the factor to be most important to very important.

5.4.3 Project related factors

Right building, right location and right timing often result in successful developments. Factors related to right building or project related factors include Clients' Requirements, Building Design, Facilities and Services in the Property, Design Brief Requirements, Construction Costs, and Development Period. Table 5.4.8 illustrates that 67 percent of the respondents said that 'Clients Requirements' were most important to very important. It has to be noted, however, that 7 (17%) of the respondents did not answer this question. This may possibly indicate that either the respondents regarded the factor to be not at all important or that the factor was not at all considered in the decision making process.

Value Label	Frequency	Valid Percent	Cum Percent
Least important	2	5.9	5.9
Quite important	3	8.8	14.7
Important	6	17.6	32.4
Most important	7	20.6	52.9
Very important	16	47.1	100.0
Total:	34	100.0	

Table 5.4.8: Clients' requirements

Consideration by the respondents of the importance of Building Design, Building Facilities and Services, Design Brief Requirements and Development Period are shown in the following Tables 5.4.9 to 5.4.12. About 85 percent and 95 percent of the

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.6	2.6
Quite important	5	12.8	15.4
Important	10	25.6	41.0
Most important	9	23.1	64.1
Very important	14	35.9	100.0
Total:	39	100.0	

Table 5.4.9: Building design

respondents considered that 'Building Design' and 'Building Facilities and Services' factors respectively were important to very important in the decision making process (*see* Tables 5.4.9 and 5.4.10). This indicated the high degree of importance the decision makers gave to these factors in their determination to ensure the successful outcome of both office and shop developments.

Value Label	Frequency	Valid Percent	Cum Percent
Least important	1	2.6	2.6
Quite important	1	2.6	5.1
Important	13	33.3	38.5
Most important	18	46.2	84.6
Very important	6	15.4	100.0
Total:	39	100.0	

Table 5.4.10: Building facilities and services

Value Label	Frequency	Valid Percent	Cum Percent
Least important	4	12.5	12.5
Quite important	5	15.6	28.1
Important	8	25.9	53.1
Most important	11	34.4	87.5
Very important	4	12.5	100.0
Total:	32	100.0	

Table 5.4.11: Design brief requirements

Table 5.4.11 shows that 72 percent of the respondents considered that the 'Design Brief Requirements' factor as important to very important in the decision making process It has to be noted, however, that 9 (22%) of the respondents did not answer this question. This may possibly indicate that either the respondents regarded the factor to be not at all important or that the factor was not at all considered in the decision making process.

The least important of the project related factors was the 'Construction Costs'. Table 5.4.12 indicates that more than 32 percent of the respondents regarded the factor to be least important.

Value Label	Frequency	Valid Percent	Cum Percent
Least important	11	32.4	32.4
Quite important	8	23.5	55.9
Important	3	8.8	64.7
Most important	8	23.5	88.2
Very important	4	11.8	100.0
Total:	34	100.0	

Table 5.4.12: Construction costs

5.4.4 Subjective factors

Table 5.4.13 shows that 83 percent of the respondents considered 'Decision Makers' Perceptions of Market Conditions' as most important to very important. It was also revealed that 'Decision Makers' Skills and Knowledge' were regarded by 79 percent of the respondents to be most important to very important (*see* Table 5.4.14). This evidence emphasises the fact that the judgemental factors were regarded by the respondents as very significant in determining the successful outcome of both office and shop developments.

Value Label	Frequency	Valid Percent	Cum Percent
Least important	2	5.6	5.6
Quite important	2	5.6	11.1
Important	2	5.6	16.7
Most important	8	22.2	38.9
Very important	22	61.1	100.0
Total:	36	100.0	

Table 5.4.13: Decision makers' perception of market conditions

Value Label	Frequency	Valid Percent	Cum Percent
Least important	2	5.9	5.9
Quite important	2	5.9	11.8
Important	3	8.8	20.6
Most important	12	35.3	55.9
Very important	15	44.1	100.0
Total:	41	100.0	

Table 5.4.14: Decision makers' skills and knowledge

5.4.5 Rank Importance of Development Determinants

The mode scores of all the decision making factors were determined and ranked as shown in Table 5.4.15. The mode and not the mean or median was taken as the basis to study the frequency of occurrence of the weighting because the main purpose of this analysis was to study the most common weighting that all the respondents had indicated for each decision making factor in the consideration of the factor's degree of influence on the outcomes of office and shop developments. Further, the mean or median would give a fraction of the weighting, which was not how the weighting was considered by the respondents. The respondents evaluated the degree of importance for each decision making factor and the weighting was subsequently given in full digit numbers of between 1 to 5.

FACTORS	N	MIN	MAX	MODE	FREQ	VALID %	RANK
Location of development (L)	40	1	5	5	32	80.0	1
Demand for the property (E)	39	1	5	5	31	79.5	2
Perceptions of mkt. conditions (S)	36	1	5	5	22	61.1	3
Return on capital (E)	40	1	5	5	24	60.0	4
Client's requirements (P)	34	1	5	5	16	47.1	5
Company's policies (S)	34	2	5	5	16	47.1	5
Skills and knowledge (S)	41	1	5	5	15	44.1	7
Building design (P)	39	1	5	5	14	35.9	8
Expected capital values (E)	38	1	5	5	13	34.2	9
Capital availability (P)	39	1	5	5	13	33.3	10
Bldg. facilities and services (P)	39	1	5	4	18	46.2	11
Trends in capital values (E)	38	2	5	4	17	44.7	12
General economic conditions (E)	36	1	5	4	14	38.9	13
Facilities of surrounding area (L)	39	1	5	4	14	35.9	14
Design brief requirements (P)	32	1	5	4	11	34.4	15
Return of capital (E)	37	1	5	4	13	31.7	16
Type of property (P)	40	1	5	4	12	30.0	17
Site identification (L)	33	1	5	3	13	39.4	18
Development period (P)	31	1	5	2	11	35.5	19
Development size (P)	38	1	5	2	10	26.3	20
Construction costs (P)	34	1	5	1	11	32.4	21
Site purchase costs (E)	34	1	5	1	11	32.4	21

L - Local   E - Economics   P - Project   S - Subjective

5.4.15: Ranked importance of decision making factors

Referring to Table 5.4.15 and considering only the external factors the following sequence of the factors was observed. The 'Right Location' factor was considered first, followed by 'Right Timing' i.e. deliberation of 'Demand' and 'Return on Capital' and finally the 'Right Building' factors i.e. consideration of 'Clients Requirements' and 'Building Design' were examined. This is perhaps the probable sequence of consideration of the decision making factors adopted by the majority of the practitioners.

It was also observed that the top ten factors, incidental all of which were weighted 'Very Important', comprised of three 'Economic Factors' i.e. Demand for Property, Return on Capital, and Expected Capital Values; three 'Project related Factors' i.e. Clients Requirements, Building Design, and Capital Availability; three 'Subjective Factors' i.e. Decision Makers' Perceptions of Market Conditions, Company's Policies, and Decision Makers' Skills and Knowledge; and one 'Local Factor' i.e. Location of the Development. This shows, in the consideration of the external factors in the decision making processes, the majority of the factors given 'Very Important' weighting by the respondents were those of 'Economic' and 'Project related Factors'. On the other hand, factors which the respondents gave the 'Least Important' weighting were 'Construction Costs' and 'Site Purchase Costs'.

5.5 DEVELOPMENT PERFORMANCE AND ACHIEVEMENTS

5.5.1 Development performance

For the period between 1985 - 1990 the 41 sampled property companies carried out a total of 309 office and shop developments between them. The respondents indicated that about 60 percent of the office and shop developments performed above the companies' expectation as shown in Table 5.5.1. In industrial developments 64 percent performed above the companies' expectation, while in residential developments 72 percent were above expectation. These results are shown in Tables 5.5 2 and 5.5.3.

Value Label	Frequency	Valid Percent	Cum Percent
Above expectation	184	59.5	59.5
Below expectation	125	40.5	100.0
Total:	309	100.0	

Table 5.5.1: Office and shop development

Value Label	Frequency	Valid Percent	Cum Percent
Above expectation	96	64.4	64.4
Below expectation	53	35.6	100.0
Total:	149	100.0	

Table 5.5.2: Industrial development

Value Label	Frequency	Valid Percent	Cum Percent
Above expectation	114	72.2	72.2
Below expectation	44	27.8	100.0
Total:	158	100.0	

Table 5.5.3: Residential development

The overall property performance is also illustrated by the bar chart as shown in Fig. 5.5.1. It has to be noted that, in the detailed follow up study of the 20 property companies, the 20 respondents gave almost identical performance figures for shop and office developments outcomes. It is shown in Table 5.5.4 that for office developments 62 percent were either highly successful and successful and 38 percent were moderately successful. For shop developments 78 percent were highly successful and successful and 22 percent were moderately successful.
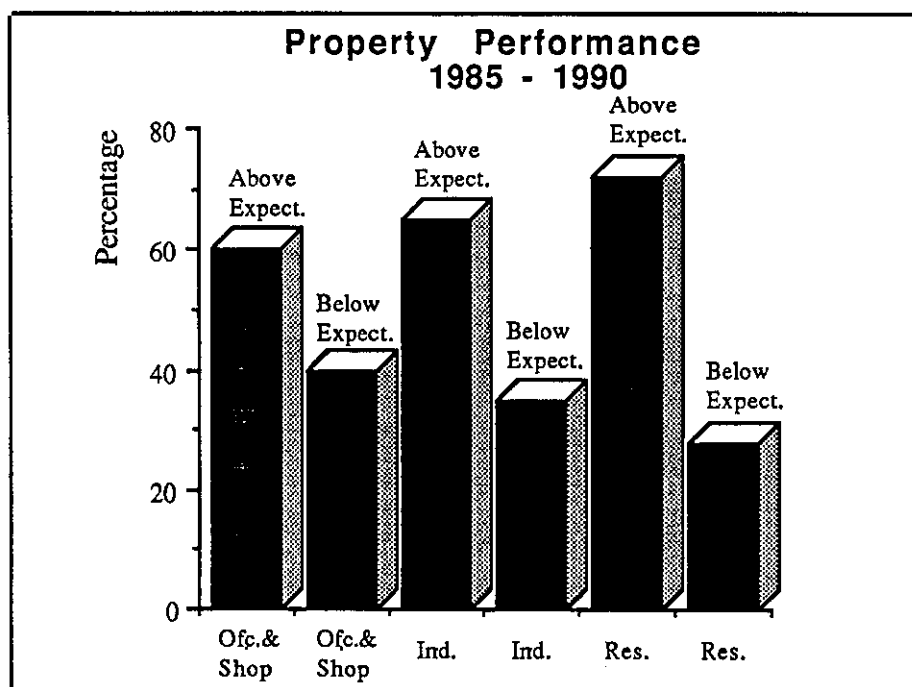
Fig. 5.5.1: Percentage property performance in UK 1985-1990

RESP	OFFICE DEVELOPMENT CAPITAL VALUE (£m.) & OUTCOME									SHOP DEVELOPMENT CAPITAL VALUE (£m.) & OUTCOME								
	£1 - 10m			£10 - 20m			Above £20m			£1 - 10m			£10 - 20m			Above 20m		
	H	S	M	H	S	M	H	S	M	H	S	M	H	S	M	H	S	M
1.	2	1	1						.	1	1	1						
2.	1	5	3							2	1							
3.		1	3							1	2	1						
4.		2	5													2	1	
5.	1	1	5										1					
6.		4	1		1		4					1		1				
7.	1		4										1					
8.	1	1		1	1	1												
9.			1		1	1			2									
10.							3					1				4		
11.	1	1						1		1	1							
12.	2						1											
13.			1									2						
14.			1								2							
15.							1	1									1	
16.	2	1																
17.		2								1	1							
18.			1					1			1							
19.	1	2	1															
20.		2	1															
Total (%)	12 (15)	23 (27)	28 (34)	1 (1)	3 (4)	2 (2)	9 (11)	3 (4)	2 (2)									
Total (%)										6 (19)	9 (28)	6 (19)	2 (6)		1 (3)	6 (19)	2 (6)	

H - Highly successful   S - Successful   M - Moderately Successful

Table 5.5.4: Property development performance

It has to be emphasised that the following analyses are concerned with the data obtained from the 20 respondents of the detailed follow-up study.

5.5.2 Developments' Performance Indicators

To ascertain the degree of the developments' performance, almost all (94.7%) of the 20 respondents in the follow-up study, indicated that they used 'Profit on Cost' as the indicator in assessing the developments' performances. Table 5.5.5 further shows that 'Actual Profit' was the second most used indicator, followed by 'Yield on Rental'. The least used indicator was the 'Payback Period'.

FACTOR	N	FREQ (YES)	VALID %	RANK
Profit on cost	19	18	94.7	1
Actual profit	17	12	70.6	2
Yield on rental income	14	7	50.0	3
Payback period	15	7	46.7	4

Table 5.5.5: Development outcome indicators

When the 20 respondents were asked further to state the percentage range of the indicator to denote 'Highly Successful', 'Successful' and 'Moderately Successful' development outcomes for office and shop developments, 95 percent of the respondents indicated the following figures for both office and shop developments:

i)   'Highly Successful' developments were those which had a return of profit on cost of above 20%

ii) 'Successful' developments were those which had a return of profit on cost between 10% to 20%

iii) 'Moderately Successful' developments were those which had a return of profit on cost below 10%

The 20 respondents' responses to the percentage range of the developments' performance indicator are illustrated in Tables 5.5.6 to 5.5.8:

Value Label	Frequency	Valid Percent	Cum Percent
Yes	19	95.0	95.0
No	1	5.0	100.0
Total:	20	100.0	

Table 5.5.6: Profit on cost > 20% as 'highly successful' indicator

Value Label	Frequency	Valid Percent	Cum Percent
Yes	19	95.0	95.0
No	1	5.0	100.0
Total:	20	100.0	

Table 5.5.7: Profit on cost 10%-20% as 'successful' indicator

Value Label	Frequency	Valid Percent	Cum Percent
Yes	19	95.0	95.0
No	1	5.9	100.0
Total:	20	100.0	

Table 5.5.8: Profit on cost <10% as 'moderately successful' indicator

The single respondent shown in Tables 5.5.6 to 5.5.8, which did not indicate 'Highly Successful' developments were those which had a return of profit on cost of above 20%, 'Successful' developments were those which had a return of profit on cost between 10% to 20% and 'Moderately Successful' developments were those which had a return of profit on cost below 10% stated instead, a return of profit on cost of above 15% for 'Highly Successful' developments, a return of profit on cost between 5% to 15% for 'Successful' developments and a return of profit on cost below 5% for 'Moderately Successful' developments.

5.5.3 Decision Makers' Achievements

To determine the decision makers' achievements in office and shop developments, two forms of ratio were considered and examined. Firstly, the average percentage of the highly successful, successful and moderately successful office and shop development outcomes attained by the 20 respondents (ascertained in Table 5.5.4) were expressed in a ratio form. The decision makers' High, Medium and Low development achievements were then determined by multiplying the ratio with the

RESP.	OFFICE DEVELOPMENT OUTCOMES				ACHIEVEMENT PERCENTAGE RATIO [27:35:38]			ACHIEVE-MENT
	Total Dev.	HS (%)	S (%)	MS (%)	HIGH	MEDIUM	LOW	
1	4	50	25	25	1350	875	950	High
2	9	11	56	33	297	1960	1254	Medium
3	4	0	25	75	0	875	2850	Low
4	7	0	28	72	0	980	2736	Low
5	7	14	14	72	378	490	2736	Low
6	10	40	50	10	1080	1750	380	Medium
7	5	20	0	80	540	0	3040	Low
8	5	40	40	20	1080	1400	760	Medium
9	5	0	20	80	0	700	3040	Low
10	3	100	0	0	2700	0	0	High
11	3	33	67	0	891	2345	0	Medium
12	3	100	0	0	2700	0	0	High
13	1	0	0	100	0	0	3800	Low
14	1	0	0	100	0	0	3800	Low
15	2	50	50	0	1350	1750	0	Medium
16	3	67	33	0	1809	1155	0	High
17	2	0	100	0	0	3500	0	Medium
18	2	0	50	50	0	1750	1900	Low
19	4	25	50	25	675	1750	900	Medium
20	3	0	67	33	0	2345	1254	Medium

HS:Highly Successful   S:Successful   MS:Moderately Successful
(Profit return >20%)   (Profit return 10%-20%)   (Profit return <10%)

Table 5.5.9 Office developments' outcomes and decision makers' achievements

percentage of the development outcomes. The highest results denoted the degree of the decision makers' achievements e.g. if the result obtained was 1350:875:950, the decision maker was categorised as a high achiever. The overall results for office and shop developments are illustrated in Tables 5.5.9 and 5.5.10 respectively.

RESP	SHOP DEVELOPMENT OUTCOMES				ACHIEVEMENT PERCENTAGE RATIO [44:34:22]			ACHIEVE-MENT
	Total Dev.	HS (%)	S (%)	MS (%)	HIGH	MEDIUM	LOW	
1.	3	34	33	33	1496	1122	726	High
2.	3	67	33	0	2948	1122	0	High
3.	4	25	50	25	1100	1700	550	Medium
4.	3	67	33	0	2948	1122	0	High
5.	1	100	0	0	4400	0	0	High
6.	2	0	0	100	0	0	2200	Low
7.	1	100	0	0	4400	0	0	High
8.	5	80	0	20	3520	0	440	High
9.	2	50	50	0	2200	1700	0	High
10.	2	0	0	100	0	0	2200	Low
11.	2	0	100	0	0	3400	0	Medium
12.	1	0	100	0	0	3400	0	Medium
13.	2	50	50	0	2200	1700	0	High
14.	1	0	100	0	0	3400	0	Medium

HS:Highly Successful   S:Successful   MS:Moderately Successful
(Profit return >20%)   (Profit return 10%-20%)   (Profit return <10%)

Table 5.5.10: Shop developments' outcomes and decision makers' achievements

Secondly, the weighting ratio of 3:2:1 for highly successful, successful and moderately successful office and shop developments was considered and examined. This weighting ratio was chosen as it was almost identical to the 'weighting' given by the respondents in classifying 'highly successful'; 'successful'; and 'moderately successful' development outcomes that is:

a) >20% profit return denotes highly successful
b) 10%-20% profit return denotes successful
c) >10% profit return denotes moderately successful

The decision makers' High, Medium and Low Development Achievements were then determined by multiplying the ratio with the percentage of the development outcomes. The highest results denoted the degree of the decision makers' achievements e.g. if the result obtained was 150:50:25, the decision maker was categorised as a high achiever. The overall results for office and shop developments are illustrated in Tables 5.5.11 and 5.5.12 respectively.

RESP.	OFFICE DEVELOPMENT OUTCOMES				ACHIEVEMENT WEIGHTING RATIO [3:2:1]			ACHIEVE-MENT
	Total Dev.	HS (%)	S (%)	MS (%)	HIGH	MEDIUM	LOW	
1	4	50	25	25	150	50	25	High
2	9	11	56	33	33	112	33	Medium
3	4	0	25	75	0	50	75	Low
4	7	0	28	72	0	56	72	Low
5	7	14	14	72	42	28	72	Low
6	10	40	50	10	120	100	10	High
7	5	20	0	80	60	0	80	Low
8	5	40	40	20	120	80	20	High
9	5	0	20	80	0	40	80	Low
10	3	100	0	0	300	0	0	High
11	3	33	67	0	99	134	0	Medium
12	3	100	0	0	300	0	0	High
13	1	0	0	100	0	0	100	Low
14	1	0	0	100	0	0	100	Low
15	2	50	50	0	150	100	0	High
16	3	67	33	0	201	66	0	High
17	2	0	100	0	0	200	0	Medium
18	2	0	50	50	0	100	50	Medium
19	4	25	50	25	75	100	25	Medium
20	3	0	67	33	0	134	33	Medium

HS:Highly Successful   S:Successful   MS:Moderately Successful
(Profit return >20%)   (Profit return 10%-20%)   (Profit return <10%)

Table 5.5.11: Office developments' outcomes and decision makers' achievements

RESP	SHOP DEVELOPMENT OUTCOMES				ACHIEVEMENT WEIGHTING RATIO [3:2:1]			ACHIEVE-MENT
	Total Dev.	HS (%)	S (%)	MS (%)	HIGH	MEDIUM	LOW	
1.	3	34	33	33	102	66	33	High
2.	3	67	33	0	201	66	0	High
3.	4	25	50	25	75	100	25	Medium
4.	3	67	33	0	201	66	0	High
5.	1	100	0	0	300	0	0	High
6.	2	0	0	100	0	0	100	Low
7.	1	100	0	0	300	0	0	High
8.	5	80	0	20	240	0	20	High
9.	2	50	50	0	150	100	0	High
10.	2	0	0	100	0	0	100	Low
11.	2	0	100	0	0	200	0	Medium
12.	1	0	100	0	0	200	0	Medium
13.	2	50	50	0	150	100	0	High
14.	1	0	100	0	0	200	0	Medium

HS:Highly Successful   S:Successful   MS:Moderately Successful
(Profit return >20%)   (Profit return 10%-20%)   (Profit return <10%)

Table 5.5.12: Shop developments' outcomes and decision makers' achievements

It was observed that the 'weighting' ratio of 3:2:1 was more appropriate to measure and indicate the respondents' achievements for the following two reasons:

a) Respondents were given higher credit for better achievements.

b) In situations where respondents attained 50:50 achievements i.e. 50 percent 'highly successful' or 'successful' and 50 percent 'moderately successful' achievements or 61:39 achievements i.e. 61 percent 'highly successful' or 'successful' and 39 percent 'moderately successful' achievements, the 'weighting' ratio rightly categorised the respondents attaining such achievements not as Low Achievers. However, the 'percentage' ratio categorised such respondents as Low Achievers. It has to be noted that 61:39 ratio was examined because as indicated in Table 5.5.4, the cut-off point between 'moderately successful' and 'successful' achievements was 38 percent.

RESP.	OFFICE DEVELOPMENT OUTCOMES				ACHIEVEMENT PERCENTAGE RATIO [27:35:38]			ACHIEVE-MENT	ACHIEVEMENT WEIGHTING RATIO [3:2:1]			ACHIEVE-MENT
	Total Dev.	HS (%)	S (%)	MS (%)	HIGH	MEDIUM	LOW		HIGH	MEDIUM	LOW	
1	4	50	25	25	1350	875	950	High	150	50	25	High
2	9	11	56	33	297	1960	1254	Medium	33	112	33	Medium
3	4	0	25	75	0	875	2850	Low	0	50	75	Low
4	7	0	28	72	0	980	2736	Low	0	56	72	Low
5	7	14	14	72	378	490	2736	Low	42	28	72	Low
6	10	40	50	10	1080	1750	380	Medium	120	100	10	High
7	5	20	0	80	540	0	3040	Low	60	0	80	Low
8	5	40	40	20	1080	1400	760	Medium	120	80	20	High
9	5	0	20	80	0	700	3040	Low	0	40	80	Low
10	3	100	0	0	2700	0	0	High	300	0	0	High
11	3	33	67	0	891	2345	0	Medium	99	134	0	Medium
12	3	100	0	0	2700	0	0	High	300	0	0	High
13	1	0	0	100	0	0	3800	Low	0	0	100	Low
14	1	0	0	100	0	0	3800	Low	0	0	100	Low
15	2	50	50	0	1350	1750	0	Medium	150	100	0	High
16	3	67	33	0	1809	1155	0	High	201	66	0	High
17	2	0	100	0	0	3500	0	Medium	0	200	0	Medium
18	2	0	50	50	0	1750	1900	Low	0	100	50	Medium
19	4	25	50	25	675	1750	900	Medium	75	100	25	Medium
20	3	0	67	33	0	2345	1254	Medium	0	134	33	Medium

HS:Highly Successful   S:Successful   MS:Moderately Successful
(Profit return >20%)   (Profit return 10%-20%)   (Profit return <10%)

Table 5.5.13 Comparison of percentage and weighting ratios

These inconsistencies are revealed on examining the data for office developments shown in Tables 5.5.9 and 5.5.11. On combining the information from both these Tables and presenting them in Table 5.5.13, it was observed that respondent 18 attained 50:50 achievement i.e. 50 percent 'successful' and 50 percent 'moderately successful' achievements and using the 'percentage' ratio was categorised as Low Achiever. However on applying the 'weighting' ratio the respondent was rightly categorised as Medium Achiever. It was further observed that respondents 6, 8 and 15 attained high percentage of 'highly successful' achievements but were categorised Medium Achievers when using the 'percentage' ratio. However, on applying the 'weighting' ratio they were all appropriately categorised as 'High Achievers'.

It has to be noted that the above circumstances did not occur in shop development outcomes and the decision makers' achievements. Therefore, on examining Tables 5.5.10 and 5.5.12, no change in the achievement results was observed.

After considering the discrepancies, the 'weighting' ratio was justifiably chosen to determine and categorise the decision makers' achievements. Table 5.5.11 indicates that out of the 20 respondents' which had carried out office developments during the study period of 1985 - 1990, seven were categorised as High Achievers, six were Medium Achievers and seven were Low Achievers. Table 5.5.12 indicates that out of the 14 respondents' which had carried out shop developments during the similar study period, eight were classified as High Achievers, four were Medium Achievers and two were Low Achievers. It has to be noted that the reason why only 14 of the 20 respondents provided information on shop developments was because the other 6 respondents were not involved in any shop developments during the study period.

5.6   DEVELOPMENT OUTCOMES

5.6.1 Office development outcomes

Data obtained from the 20 respondents in the follow up study, revealed that a total of 83 office developments were carried out and completed within the study period. Table 5.6.1 shows that 27 percent were Highly Successful, 35 percent were Successful and 38 percent were Moderately Successful. Based on these figures, it could be inferred that during the study period of 1985-1990, on average less than one out of three office premises developed were highly successful.

Outcome	Frequency	Valid %	Cum. %
Highly successful	22	26.5	26.5
Successful	29	34.9	61.4
Moderately successful	32	38.6	100.0
Total:	83	100.0	

Table 5.6.1: Developments outcomes (Office)

5.6.2 Factors influencing office development outcomes

a) Completion timing

Table 5.6.2 indicates 65 percent of the office developments were completed in 1989 - 1990. This confirmed the oversupply situation of office premises in the UK which occurred during this period. This fact coupled with the downturn in the general economics' situation resulted in many moderately successful developments.

Year	Frequency	Valid %	Cum %
1986	6	7.2	7.2
1987	4	4.8	12.0
1988	19	22.9	34.9
1989	22	26.5	61.4
1990	32	38.6	100.0
Total:	83	100.0	

Table 5.6.2: Completion timing (Office)

b) Realised capital values

It was observed from the figures in Table 5.6.3 that most (71%) of the developments which the decision makers undertook were in the low capital value i.e. less than £10m. Only 18 percent of the developments were in the high capital value category of above £20m. This indicated that during the study period of 1985 - 1990 the office development market was mainly dominated by small developments.

Capital Value	Frequency	Valid %	Cum %
Less than £10m	59	71.1	71.1
£10m - £20m	9	10.8	81.9
Above £20m	15	18.1	100.0
Total:	83	100.0	

Table 5.6.3: Realised capital values (Office)

c) Location of developments

Table 5.6.4 shows that 31 percent of the office developments carried out were located in the cities, 35 percent were in the large towns and 34 percent were in the small towns. This even concentration of office developments may have indicated that there was a demand for office premises in all the urban areas in the 1985 - 1990 period.

Location	Frequency	Valid Percent	Cum Percent
City	26	31.3	31.3
Large town	29	34.9	66.3
Small town	28	33.7	100.0
Total:	83	100.0	

Table 5.6.4: Location of developments (Office)

d) Development site distance from main office

It was observed that most (90%) of the developments were sited less than 100 miles from the decision makers' offices. In fact, 43 percent were sited within the cities or towns where the offices were located. This is shown in Table 5.6.5. These results indicated that the majority of the property companies preferred to have the developments close to the decision makers' offices for administrative and monitoring purposes.

Site Distance	Frequency	Valid Percent	Cum Percent
Within city/town	36	43.4	43.4
<100 miles	39	47.0	90.4
>100 miles	8	9.6	100.0
Total:	83	100.0	

Table 5.6.5: Development site distance (Office)

5.6.3 Office Development Outcome Correlationships

To determine the relationships of Completion Timing, Capital Values, Location and Site Remoteness with the Developments' Outcomes, the non-parametric Spearman Test for correlation statistics was adopted. This is the valid

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statistical test for small sample size and most appropriate in handling ranked data. The SPSS-X was used to calculate the correlation and significant factors.

a) Completion timing with development outcome

A high negative correlation factor of -0.5490 was obtained when the Completion Timing data was correlated with Development Outcomes. This indicates that the rate of successful outcomes reduced as time progressed from 1985 to 1990, as shown in Fig 5.6.1. This relationship was most significant as the significant factor is 0.000. The result confirmed the fact that most of the office developments were moderately successful in the years 1989-1990 i.e. the beginning of the sudden downturn in the property market.

b) Capital values with development outcome

A medium positive correlation factor of 0.3942 was obtained when Capital Values were correlated with Development Outcomes. This indicates, as the capital values of the developments increased, the higher was the rate of successful outcomes. This relationship was very significant as the significant factor was 0.000 (*see* Fig. 5.6.2)

c) Location with development outcome

A low correlation factor of 0.2927 was obtained when Location was correlated with Development Outcomes, however the significant factor was high i.e. 0.007. This can be interpreted that office development outcomes were only slightly affected by the size of the towns or catchment areas within which the developments were located. This relationship is shown in Fig. 5.6.3.

d) Site distance with development outcome

A low negative correlation factor of -0.1509 was observed when Site Distances or remoteness were correlated with Development Outcomes. Further, the significant factor was also low i.e. 0.173, therefore no clear relationships between site distances and development outcomes could be established as shown in Fig. 5.6.4.
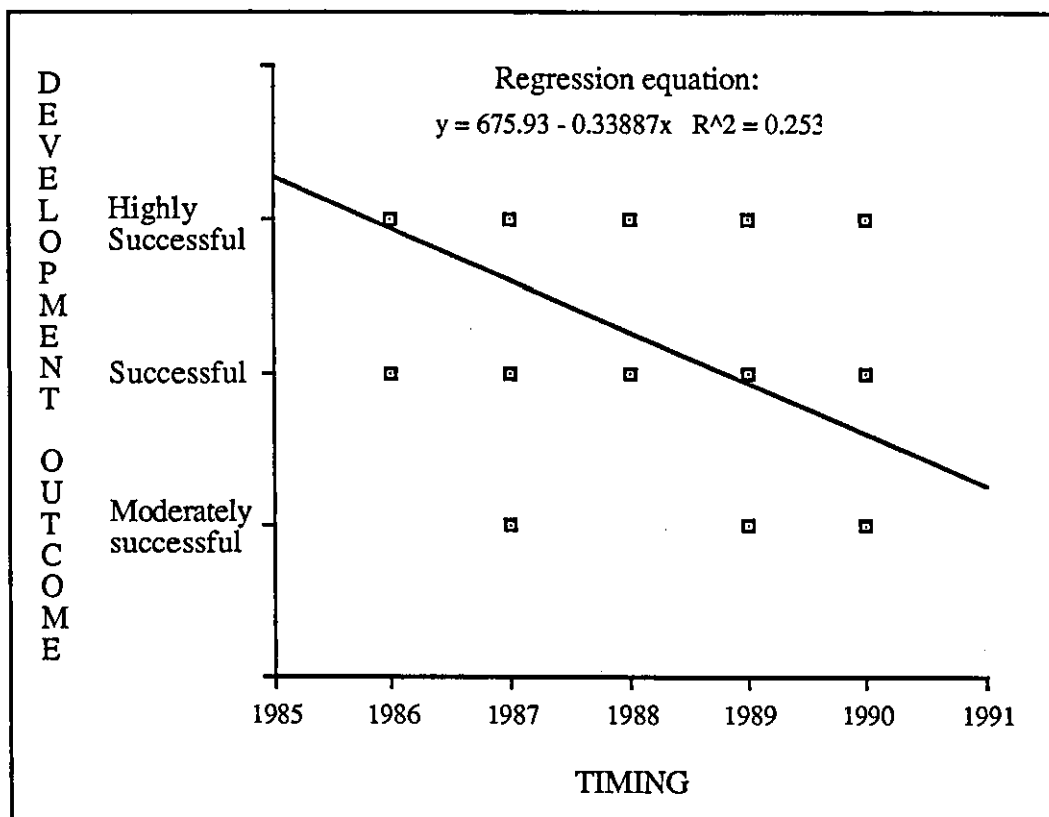
Fig. 5.6.1 Development outcome vs timing (Office)

---- SPEARMAN CORRELATION COEFFICIENTS ----

TIMING   -.5490
        N (83)
        Sig .000

        DEVCOME

(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as
      the total number of sample is 83.
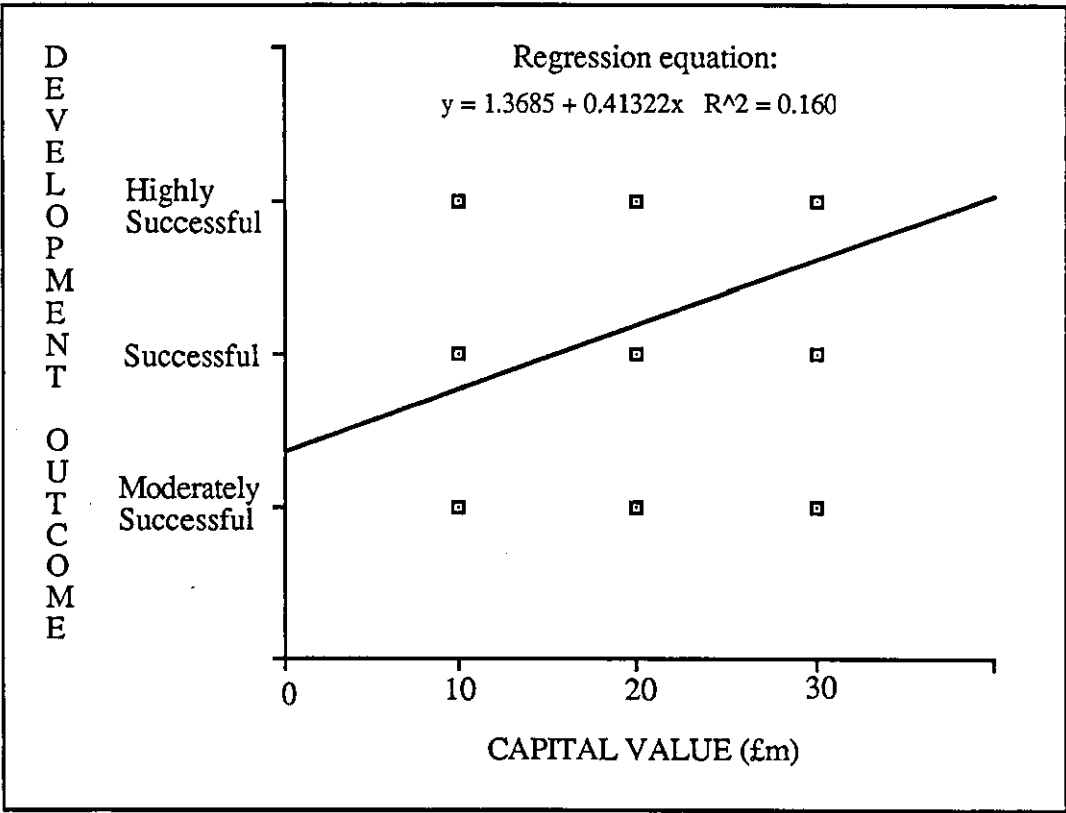
Fig. 5.6.2 Development outcome vs capital values (Office)

---- SPEARMAN CORRELATION COEFFICIENTS ----

CAPVAL   .3942

          N (83)

          Sig .000

          DEVCOME

(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as the total number of sample is 83.
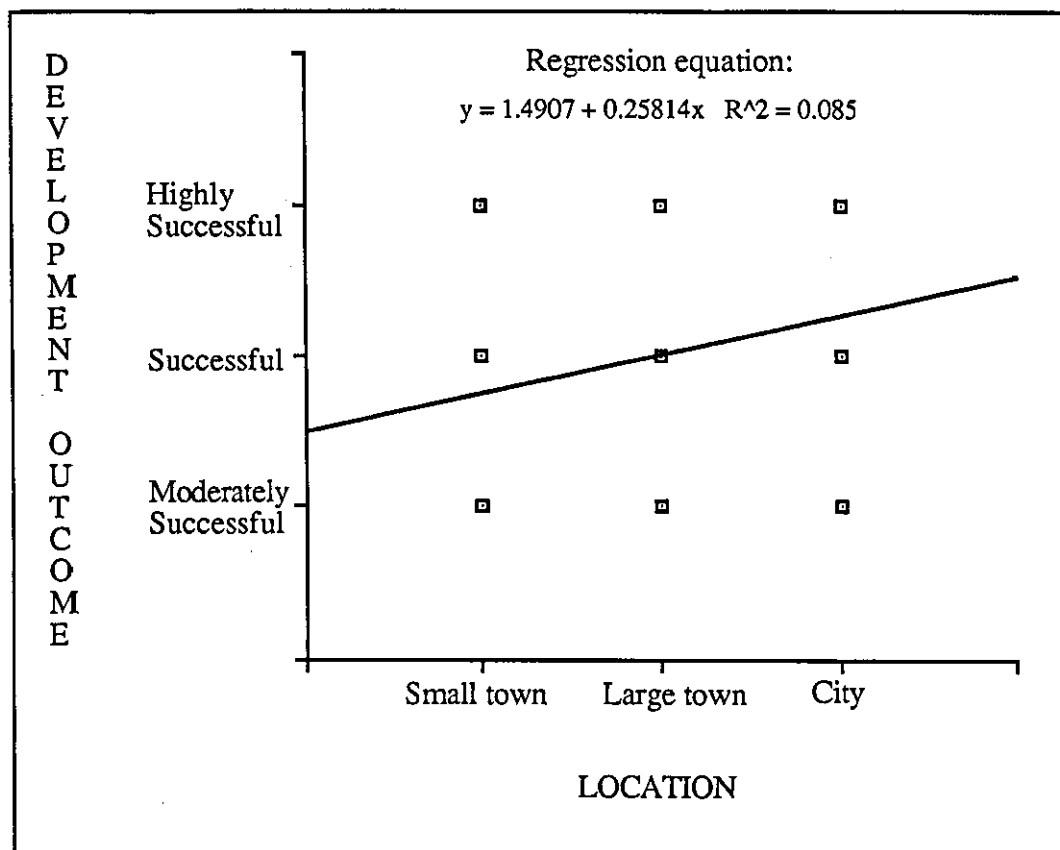
Fig. 5.6.3 Development outcome vs location (Office)

---- SPEARMAN CORRELATION COEFFICIENTS ----

LOCA   .2927
        N (83)
        Sig .007

        DEVCOME

(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as
      the total number of sample is 83.
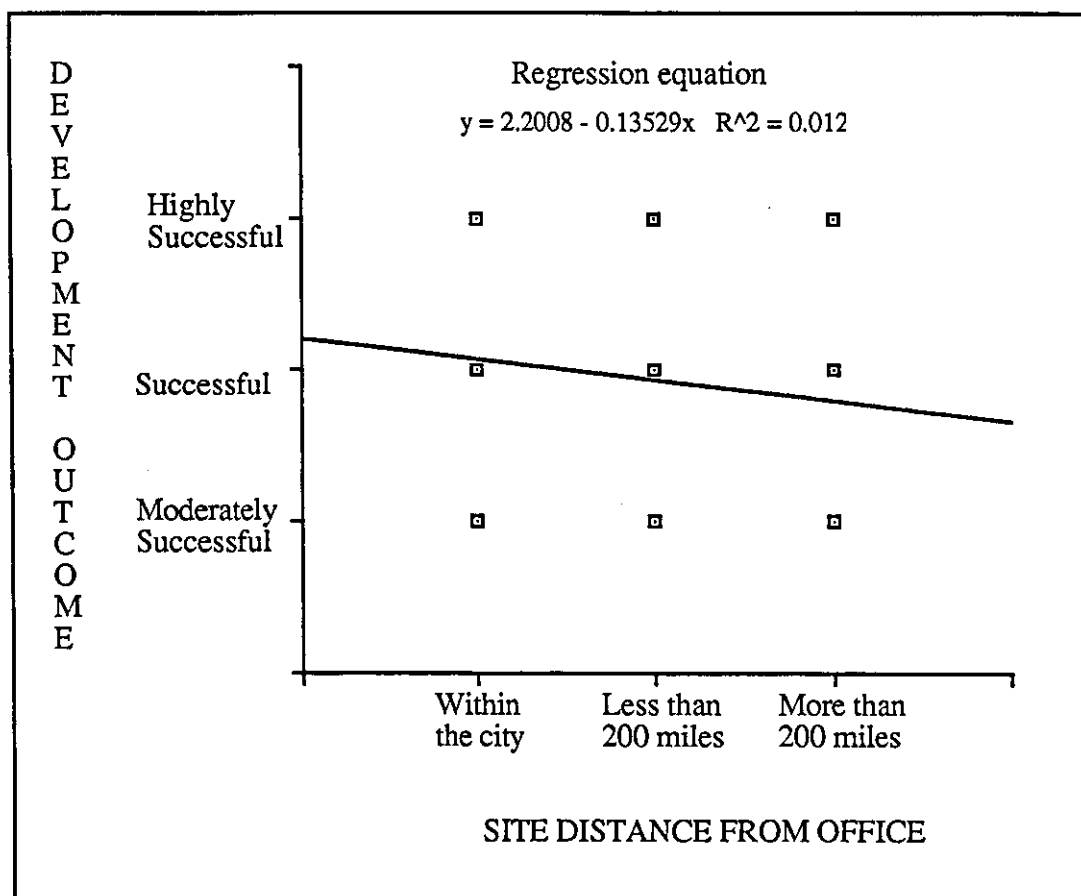
Fig. 5.6.4 Development outcome vs site distance (Office)

---- SPEARMAN CORRELATION COEFFICIENTS ----

TIMING   -.1509

      N (83)

      Sig .173

      DEVCOME

(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as
the total number of sample is 83.

5.6.4 Shop development outcome

Data obtained from the twenty respondents in the follow up study revealed that a total of 32 shop developments were carried out and completed in the study period. It should be noted that the combined Successful and Highly Successful rate was about 78 percent. This is shown in Table 5.6.6. It was also observed that the Moderately Successful shop developments were mainly in the low capital group (*see* Table 5.5.4). On further investigation, it was revealed that these Moderately Successful shop developments were single non-food retail type shop premises.

Outcome	Frequency	Valid Percent	Cum Percent
Highly successful	14	43.7	43.7
Successful	11	34.4	78.1
Moderately successful	7	21.9	100.0
Total:	32	100.0	

Table 5.6.6: Development outcomes (Shop)

5.6.5 Factors influencing shop development outcomes

a) Completion timing

Table 5.6.7 indicates a small number of shop developments were completed annually in the years 1985 - 1989. But in 1990 alone the number of completions was of the same figure as the previous four years' total. On the basis of this data, it probably indicates that there was a sudden increase in the demand for shop premises in the late 80's.

Year	Frequency	Valid Percent	Cum Percent
1986	2	6.3	6.3
1987	5	15.6	21.9
1988	7	21.9	43.8
1989	2	6.3	50.0
1990	16	50.0	100.0
Total:	32	100.0	

Table 5.6.7: Completion timing (Shop)

b) Realised capital values

75 percent of the shop developments in which the decision makers were involved were below £20 million. This is shown in Table 5.6.8. In fact, the majority (66%) of the developments were less than £10 million. This indicated that during the study period of 1985 - 1990 the shop development market was mainly dominated by small developments.

Capital Value	Frequency	Valid Percent	Cum Percent
<£10m	21	65.6	65.6
£10m - £20m	3	9.4	75.0
> £20m	8	25.0	100.0
Total:	32	100.0	

Table 5.6.8: Realised capital values (Shop)

c) Location of developments

Table 5.6.9 shows that the majority (91%) of the shop developments were located in large and small towns. This indicated that the concentration of shop developments during the study period were outside the big cities. This may probably be due to the fact that there was a lack of suitable vacant sites in the cities or the consequences of meeting the demand for shop premises to fulfil the trend of shopping outside the city centres.

Location	Frequency	Valid Percent	Cum Percent
Small town	12	37.5	37.5
Large town	17	53.1	90.6
City	3	9.4	100.0
Total:	32	100.0	

Table 5.6.9: Location of developments (Shop)

d) Site distance from main office

Table 5.6.10 shows almost 70 percent of the developments were sited in places away from the decision makers' offices, which were, as indicated in Table 5.6.9, located in the small and large towns. The possible reasons for such an occurrence were similar to that stated above.

Site Distance	Frequency	Valid Percent	Cum Percent
Within city/town	10	31.3	31.3
<100 miles	11	34.4	65.6
>100 miles	11	34.4	100.0
Total:	32	100.0	

Table 5.6.10: Development site distance (Shop)

5.6.6 Shop Development Outcome Correlationships

To determine the relationships of Completion Timing, Capital Values, Location and Site Remoteness with the Development Outcomes, the non-parametric Spearman Test for correlation statistics was adopted. This is the valid statistical test for small sample size and most appropriate in handling ranked data. The SPSS-X was used to calculate the correlation and significant factors.

a) Completion timing with development outcome

A low negative correlation factor of -0.2803 was obtained when the Completion Timing data was correlated with the Development Outcomes. Further, a low significant factor of 0.120 indicates that there were no significant relationships between Timing and Outcome of Shop Developments (*see* Fig. 5.6.5). This is interesting as Table 5.6.7 shows that more than 56 percent of the shop developments were completed in the years 1989 - 1990 and Fig. 5.6.5 indicates that the majority of these shop developments had successful outcomes even though the beginning of the property market downturn occurred in that period.

b) Capital values with development outcome

A medium positive correlation factor of 0.3177 was obtained when Capital Values were correlated with Development Outcomes. This indicates, as the capital values of the developments increased, the higher was the rate of successful outcomes (*see* Fig. 5.6.6). However, the relationship was moderately significant as the significant factor was 0.076 .

c) Location with development outcome

A high correlation factor of 0.5490 was obtained when Location was correlated with Development Outcomes. This relationship was very significant as the significant factor was very high i.e. 0.001. This can be interpreted that shop development outcomes were strongly affected by the size of the towns or catchment

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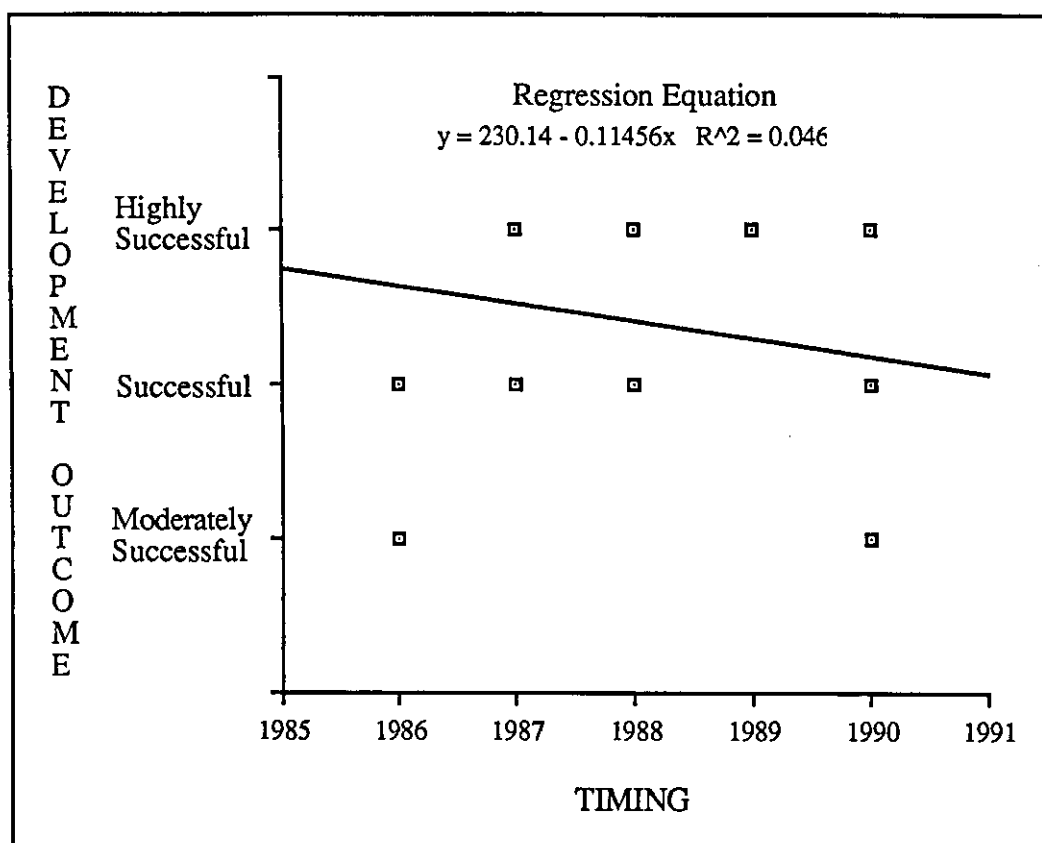
Fig. 5.6.5 Development outcome vs timing (Shop)

---- SPEARMAN CORRELATION COEFFICIENTS ----

TIMING   -.2803
      N (32)
      Sig .120

      DEVCOME

(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as the total number of sample is 32.
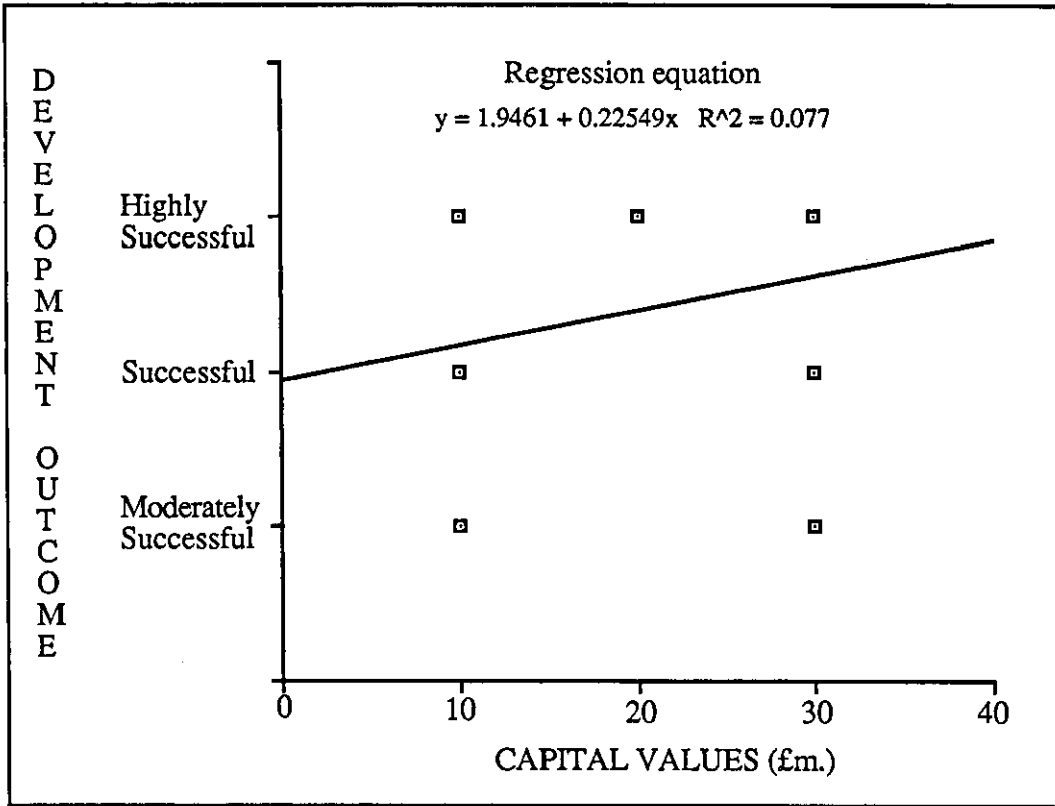
Fig. 5.6.6 Development outcome vs capital values (Shop)

---- SPEARMAN CORRELATION COEFFICIENTS ---

CAPVAL   .3177
        N (32)
        Sig .076

        DEVOME
(Coefficient / (Cases) / 2-tailed Significance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as
        the total number of sample is 32.
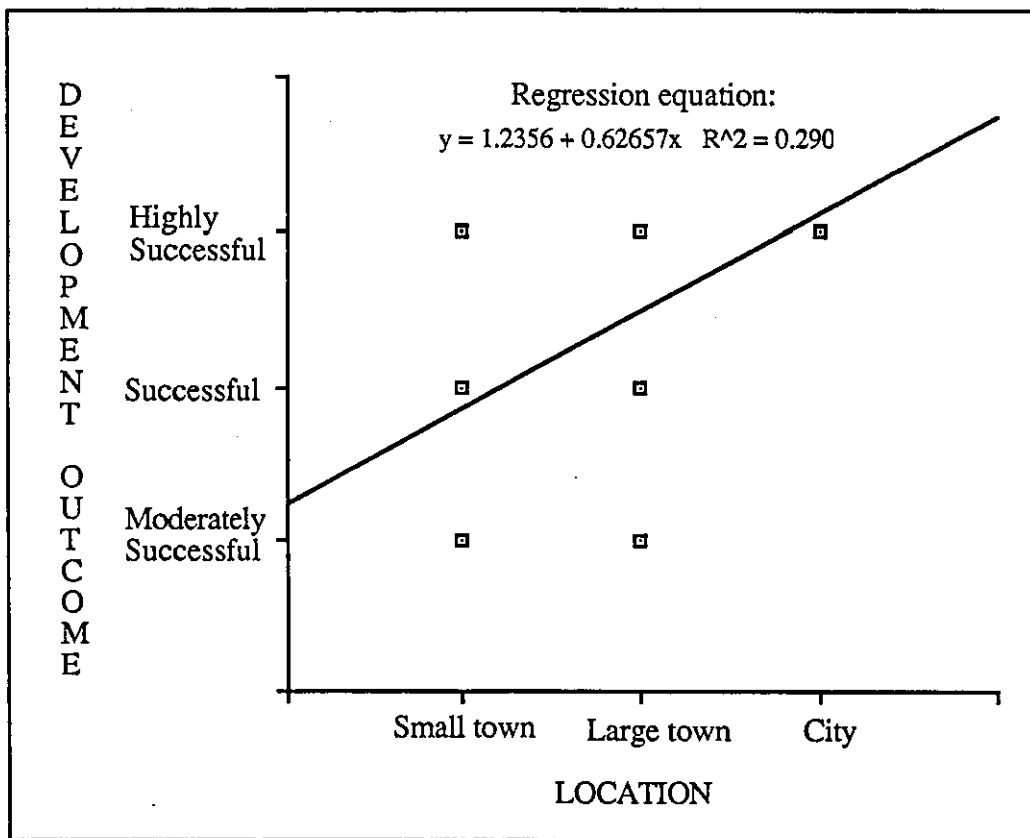
Fig. 5.6.7 Development outcome vs location (Shop)

---- SPEARMAN CORRELATION COEFFICIENTS ---

LOC   .5490

        N (32)

        Sig .001

        DEVOME

(Coefficient / (Cases) / 2-tailed Signoficance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as the total number of sample is 32.
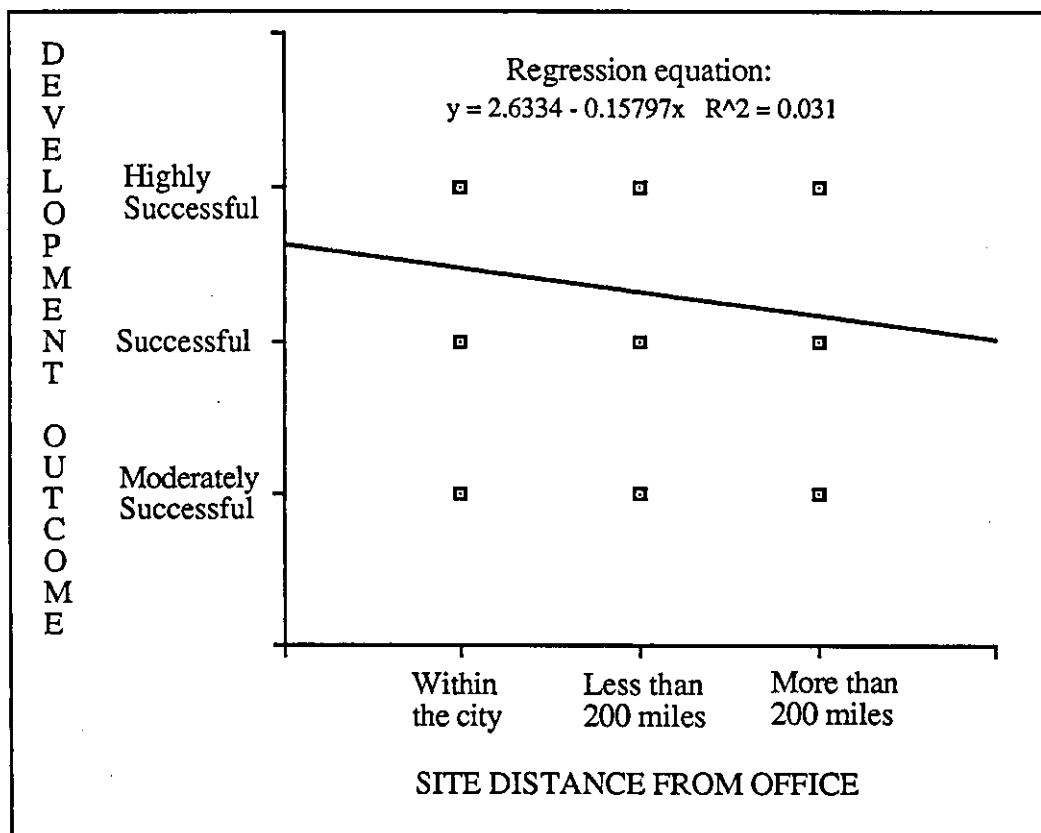
Fig. 5.6.8 Development outcome vs site distance (Shop)

---- SPEARMAN CORRELATION COEFFICIENTS ---

DIST   -.2092

      N (32)

      Sig .251

      DEVOME

(Coefficient / (Cases) / 2-tailed Signoficance)

"." is printed if a coefficient cannot be computed

NOTE: Every single point indicated on the graph represents a stack of several points as the total number of sample is 32.

areas i.e. the bigger the catchment area the higher was the rate of success. This relationship is shown in Fig. 5.6.7.

d) Site distance with development outcome

A negative correlation factor of -0.2092 was observed when Site Distances were correlated with Development Outcomes. Further, the significant factor was also low i.e. 0.251, therefore no clear relationships between site distances and development outcomes could be established (*see* Fig. 5.6.8).

5.6.7 Summary of Relationships

From Table 5.6.11, it was observed that Completion Timing had a very high significant correlation with office development outcomes compared to shop developments. This indicated office development outcomes were more sensitive to the property market downturn compared to shop development outcomes. This less sensitiveness of shop development outcomes to the sudden property market downturn was because in large shopping developments the key tenants or buyers were normally predetermined.

Therefore, the outcome of most large shop developments were found to be 'successful' at the beginning of the downturn of the property market compared to office developments because preletting/buying was not the usual strategy adopted in office development, particularly when the property market was buoyant, prior to late 1989. This fact was verified on examining that all the shop developments that were 'moderately successful' from late 1989 to 1990 were small single non-food retail type shop premises, the tenants or purchasers of which, were not normally predetermined (*see* also section 5.6.4).

Both the office and shop developments outcomes were moderately affected by the Capital Values i.e. the higher the capital values the greater were their

FACTORS	OFFICE DEVELOPMENT		SHOP DEVELOPMENT	
	CORRELATION	SIGNIFICANCE	CORRELATION	SIGNIFICANCE
Timing	High	Very high	Low	Low
Capital values	Medium	Very high	Medium	Low
Location	Low	Very high	High	Very high
Site distance	Low	Low	Low	Low

Table 5.6.11: External factors correlationships with development outcomes

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successful outcomes. However, this relationship was very significant in office developments, as indicated by the very high significant factor of 0.0000, but less significant for shop developments where the significant factor was 0.076.

Examining the Location Factor, office development outcomes had low correlation with location compared to shop development outcomes. This meant that for office development, being located in the city, large or small towns had a very small effect on the development outcomes. However, for shop developments, their outcomes were very strongly affected by location. This indicated that the success of shop developments was very strongly influenced by the size of the catchment areas i.e. being located in the large urban areas resulted in higher successful outcomes than if located in smaller urban areas.

Finally, development site distances or Remoteness from main office, due to the low correlations coupled with low significant factors, indicated that no relationships between site distances and development outcomes could be established in instances of both office and shop developments.

5.7   DECISION MAKERS AND THEIR ACHIEVEMENTS

5.7.1 Qualifications, experience and achievement

To analyse further the decision makers' achievements, which have been determined and explained in section 5.5.3, it is considered essential that personal particulars that might influence the achievement be studied. Table 5.7.1 illustrates the decision makers' educational background, academic and professional qualifications, experience and the achievements accomplished by the decision makers. It was observed that out of the 20 decision makers 9 had Degrees in Estate Management or Land Management, 2 had other degrees, 3 had Diplomas in General Surveying or Land Economics and 6 had no such qualifications. By virtue of having professional qualifications all except three of the respondents have been either awarded with ARICS or FRICS. These indicate that the 20 respondents had varied academic background but the majority (85%) of them were professionally qualified.

In terms of the respondents' length of experience in property developments, it again varied although more consistently grouped into high, medium and low experience. It was found that 6 (30%) of the respondents had 20 years or more experience, 6 (30%) had between 10 - 19 years of experience and 8 (40%) had less than 10 years of experience in property development. Almost similar results were obtained when the durations of the respondents' decision making involvement were examined. It was revealed that 5 (25%) of the respondents had more than 10 years,

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RESP	ACADEMIC QUALIFICATION	PROFESSIONAL QUALIFICATION	EXP.IN PROP. DEV. (years)	DEC. MKG INVOLV. (years)	ACHIEVEMENT	
					OFFICE DEV.	SHOP DEV.
1.	B.Sc. (Est. Mgt.)	F.R.I.C.S.	20	16	High	High
2.	C.E.M.(Est.Mgt.)	F.R.I.C.S.	25	16	Medium	High
3.	B.Sc. (Land Mgt.)	A.R.I.C.S.	5	2	Low	Medium
4.	-	A.R.I.C.S.	17	5	Low	High
5.	Dip. (Gen. Surv.)	A.R.I.C.S.	6	3	Low	High
6.	B.Sc. (Land Mgt.)	A.R.I.C.S.	5	3	High	Low
7.	Dip. (Land Econ.)	A.R.I.C.S.	6	6	Low	High
8.	-	-	20	12	High	-
9.	-	A.R.I.C.S.	6	3	Low	-
10.	-	-	20	10	High	High
11.	B.Sc. (Est. Mgt.)	F.R.I.C.S.	10	10	Medium	High
12.	Dip. (Land Econ.)	F.R.I.C.S.	11	11	High	-
13.	B.Sc. (Est. Mgt.)	A.R.I.C.S.	7	5	Low	Low
14.	B.A., M.A., Ph.D	A.R.I.C.S.	11	6	Low	Medium
15.	B.Sc. (Est. Mgt.)	A.R.I.C.S.	5	5	High	Medium
16.	B.Sc. (Est. Mgt.)	F.R.I.C.S.	30	25	High	-
17.	LLB	-	12	12	Medium	High
18.	-	F.R.I.C.S.	20	10	Medium	Medium
19.	-	F.R.I.C.S.	15	10	Medium	-
20.	B.Sc. (Est. Mgt.)	A.R.I.C.S.	5	5	Medium	-

Table 5.7.1: Decision makers' profile and achievement

7 (35%) had between 6 - 10 years and 6 (40%) had less than 5 years involvement in the decision making process. It has to be noted that normally only after gaining work experience of at least 5 years would one be considered to be included in the decision making team. This balanced distribution of the respondents in terms of their experience indicated that there is no bias in the data obtained particularly the judgement or weighting of the decision making factors by the respondents.

With regard to the various achievements attained by the respondents, as mentioned in section 5.5.3, out of the 20 respondents who had carried out office developments during the study period of 1985 - 1990, seven were categorised as High Achievers, six were Medium Achievers and seven were Low Achievers. Further, out of the 14 respondents' which had carried out shop developments during the similar study period eight were classified as High Achievers, four were Medium Achievers and two were Low Achievers. It has to be noted that the reason why only 14 of the 20 respondents were involved in shop developments was because the other 6 respondents had not undertaken any shop developments during the study period of this research.

5.7.2   Risk attitude

This research has identified two groups of decision makers, those possessing positive and negative attitudes towards risk. Positive attitude decision makers identified risk at the outset of the development, converted risk into opportunities, protected and devolved risk, did not completely avoid risky situations, sought different appropriate approaches and did not disregard risk.

	RISK FACTORS	YES	NO
•	Identify risk at outset.	20 (100%)	
•	Convert risk into opportunity.	17 (85%)	3 (15%)
•	Protect and devolve risk.	16 (80%)	4 (20%)
•	Completely avoid risky situation.	5 (25%)	15 (75%)
•	Disregard risk.		20 (100%)
•	Seek different appropriate approach.	14 (70%)	6 (30%)

Table 5.7.2: Decision makers' risk attitude

Decision makers who possessed negative attitude towards risk also identified risk at the outset, but did not convert risk into opportunity or protected and devolved risk, completely avoided risky situations, did not seek different appropriate approaches and did not disregard risk.

It was revealed that the majority of property development decision makers have a positive attitude towards risks. Table 5.7.2 illustrates this fact which explained the low percentage in the outcome of moderately successful developments. On the other hand, the occurrence of a similar low number of highly successful developments was because probably not many of the decision makers or developers were 'gamblers' or risk seekers.

5.7.3 Achievements and Consultants' Advice

a) Office development

Table 5.3.10 indicates that 44.4 percent i.e. 8 out of 18 of the respondents engaged the services of the economists amongst other property consultants. It was observed that the advice given by the economists, if taken by the property companies' decision makers, had probably not had any influence on their achievements. This is because, as shown in Table 5.7.3, about 38 percent of the decision makers had above average achievement in office development, 25 percent attained average achievement and about 38 percent had below average achievement.

Achievement	Frequency	Valid Percent	Cum Percent
High	3	37.5	37.5
Medium	2	25.0	62.5
Low	3	37.5	100.0
Total:	8	100.0	

Table 5.7.3: Engaged economic consultants [Office]

On the other hand, observing the achievement attained by the decision makers who did not engage the services of the economists, 40 percent had high achievement, 20 percent had medium achievement and 40 percent had low achievement (see Table 5.7.4). The indefinite trend observed in Tables 5.7.3 and 5.7.4 could possibly indicate that one could not measure the impact of the economists' advice on the decision makers' achievement, if it was judged on its own, as the overall decision makers' achievement were influenced by the advice of several consultants.

Achievement	Frequency	Valid Percent	Cum Percent
High	4	40.0	40.0
Medium	2	20.0	60.0
Low	4	40.0	100.0
Total:	10	100.0	

Table 5.7.4: Did not engage economic consultants [Office]

b) Shop developments

A similar analysis was carried out on shop developments. It was observed that the advice given by the economists had no significant influence in the decision makers' overall achievement. Table 5.7.5 showed that 14 percent of the decision makers who had the economists' advice had above average achievement in shop developments, 72 percent attained average achievement and 14 percent had below average achievement.

Achievement	Frequency	Valid Percent	Cum Percent
High	1	14.0	14.0
Medium	5	72.0	86.5
Low	1	14.5	100.0
Total:	7	100.0	

Table 5.7.5: Engaged economic consultants [Shop]

On the other hand, observing the achievement attained by the decision makers who did not engage the services of the economists, 86 percent had above average achievement and 14 percent had below average achievement (*see* Table 5.7.6). The high percentage of above average achievers may possibly indicate that the advice from economists was not a prerequisite to above average achievements.

Achievement	Frequency	Valid Percent	Cum Percent
High	6	86.0	86.0
Medium	0	0.0	86.0
Low	1	14.0	100.0
Total:	7	100.0	

Table 5.7.6: Did not engage economic consultants [Shop]

5.7.4 Consultants' Participation In Decision Making

Table 5.3.11 showed that only 3 out of 13 or about 20 percent of the respondents stated that consultants participated in the decision making process. A comparison in the attainment of achievement between the respondents who had consultants participate in the decision making process and those that did not, revealed that those who did not, attained better achievement (*see* Tables 5.7.7 and 5.7.8). This occurred in both office and shop developments. All the above observations could best be described by the following statement of one of the respondents, who said: 'Consultants do not give or cannot give balanced judgement of risk profile for third party'.

ACHIEVEMENT	CONSULTANTS PARTICIPATE		CONSULTANTS DID NOT PARTICIPATE	
	Frequency	Valid %	Frequency	Valid %
High	0	0	5	38.4
Medium	0	0	4	30.8
Low	3	100.0	4	30.8
Total:	3	100.0	13	100.0

Table 5.7.7: Consultants' involvement in decision making [Office]

ACHIEVEMENT	CONSULTANTS PARTICIPATE		CONSULTANTS DID NOT PARTICIPATE	
	Frequency	Valid %	Frequency	Valid %
High	1	33.3	6	66.7
Medium	2	66.7	2	22.2
Low	0	0.0	1	11.1
Total:	3	100.0	9	100.0

Table 5.7.8: Consultants' involvement in decision making [Shop]

5.8 CORRELATION OF PERSONAL ATTRIBUTES WITH ACHIEVEMENTS

5.8.1 Office Development

To determine the relationships of academic qualifications, professional qualifications, experience in property development, decision making involvement and risk attitude with the decision makers' achievement in office development, the non-parametric Spearman Test for correlation statistics was adopted. This is the valid statistical test for small sample size and most appropriate in handling ranked data. The SPSS-X was used to calculate the correlation and significant factors.

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a) Academic qualifications with achievement

The results of the statistical test obtained when the academic qualifications data was correlated with decision makers' achievement were:

   i) a low positive correlation factor of 0.2687

   ii) a low significance factor of 0.252

These indicated that there was no significant relationship between academic qualifications and achievements in office developments.

On examining the data in Table 5.8.1, this non-significant relationship can be explained. It was observed that no particular group of the decision makers dominated any classification of achievements. The high achievers were comprised of not only the degree holders but also a diploma holder and non-qualified decision makers. Similarly, low achievers were comprised of non-qualified decision makers, diploma holders and degree holders. By right one would normally not expect any degree holders to attain low achievement. However, it is indicated that 57 percent of the high achievers were degree holders.

ACHIEVEMENTS			ACADEMIC QUALIFICATIONS				RESP.
High	Medium	Low	Degree Est.Mgt.	Other degree	Diploma	No degree	
*			*				1
*			*				15
*			*				16
*			*				6
*					*		12
*						*	8
*						*	10
	*		*				20
	*		*				11
	*		*				2
	*			*			17
	*					*	19
	*					*	18
		*	*				3
		*	*				13
		*		*			14
		*			*		5
		*			*		7
		*				*	4
		*				*	9

Table 5.8.1: Achievement against academic qualifications [Office]

b) Professional qualifications with achievement

The results of the statistical test obtained when the professional qualifications data was correlated with decision makers' achievement were:

    i) a very low positive correlation factor of 0.0324

    ii) a very low significance factor of 0.892

These indicated that there were no relationships between professional qualifications and achievements in office developments. Examining the data in Table 5.8.2 indicates why there were no relationships between the factors. It was observed that no particular group of the decision makers dominated any classification of achievements but all the low achievers were ARICS holders. The high achievers were comprised of not only the FRICS holders but also ARICS holders and non-professionally qualified decision makers. Similarly, medium achievers were comprised of non-professionally qualified decision makers, ARICS holders and FRICS holders. Certainly one would not expect all the low achievers to be dominated by ARICS holders. More so, it was observed that the non-professionally qualified decision makers attained high and medium achievements. The most probable reason for the outcome could be due to the fact that the majority (71%) or 5 out of the 7 low achievers had low experience in property development while the non-professionally qualified decision makers had high experience in property development.

ACHIEVEMENTS			PROFESSIONAL QUALIFICATIONS			
High	Medium	Low	FRICS	ARICS	NO	RESP.
*			*			1
*			*			12
*			*			16
*				*		6
*				*		15
*					*	8
*					*	10
	*		*			2
	*		*			19
	*		*			18
	*			*		11
	*			*		20
	*				*	17
		*		*		4
		*		*		3
		*		*		5
		*		*		7
		*		*		9
		*		*		13
		*		*		14

Table 5.8.2: Achievement against professional qualifications [Office]

115

c) Experience with achievement

The results of the statistical test obtained when the experience in property development data was correlated with decision makers' achievement were:

   i) a low positive correlation factor of 0.2650

   ii) a low significance factor of 0.259

These indicated that there were no significant relationships between experience in property development and achievements in office developments. On examining the data in Table 5.8.3, these non-significant relationship can be explained. It was observed that no particular group of the decision makers dominated any classification of achievements. The high achievers were comprised of not only the highly experienced but also the medium experienced and low experienced decision makers. Similarly, low achievers were comprised of low experienced, medium experienced and high experienced decision makers. By right one would normally not expect any highly experienced decision maker to attain low achievement. However, it is indicated that 57 percent of the high achievers were high experience decision makers and 71 percent of he low achievers were low experience decision makers.

ACHIEVEMENTS			EXP. IN PROPERTY DEVELOPMENT			RESP.
High	Medium	Low	High	Medium	Low	
*			*			1
*			*			8
*			*			10
*			*			16
*				*		12
*					*	6
*					*	15
	*		*			2
	*		*			18
	*			*		11
	*			*		17
	*			*		19
	*				*	20
		*	*			4
		*		*		14
		*			*	3
		*			*	5
		*			*	7
		*			*	9
		*			*	13

Table 5.8.3: Achievement against experience in property development [Office]

d) Decision making involvement with achievement

The results of the statistical test obtained when the decision making involvement data was correlated with decision makers' achievement were:

i) a high positive correlation factor of 0.5191

ii) a high significance factor of 0.019

These indicated that there were significant relationships between decision making involvement and achievements in office developments. On examining the data in Table 5.8.4, it was observed that the majority (67%) of the high decision making involvement decision makers attained high achievement, 50 percent of the medium decision making involvement decision makers attained medium achievement and the majority (62.5%) of the low decision making involvement decision makers attained low achievement. Further, the high achievers were dominated by high decision making involvement decision makers and consequently, the low achievers were dominated by low decision making involvement decision making decision makers. None of the high decision making involvement decision makers attained low achievement. These obviously indicated that 'hands on experience' and 'experiential learning' had a strong positive effect on the achievement of office developments.

ACHIEVEMENTS			DECISION MAKING INVOLVEMENT			
High	Medium	Low	High	Medium	Low	RESP.
*			*			1
*			*			8
*			*			12
*			*			16
*				*		10
*					*	6
*					*	15
	*		*			2
	*		*			17
	*			*		11
	*			*		18
	*			*		19
	*				*	20
		*		*		7
		*		*		14
		*			*	3
		*			*	4
		*			*	5
		*			*	9
		*			*	13

Table 5.8.4: Achievement against decision making involvement [Office]

e) **Risk attitude with achievement**

The results of the statistical test obtained when the risk attitude data was correlated with decision makers' achievement were:

i) a very low positive correlation factor of 0.1141

ii) a very low significance factor of 0.632

These indicated that there were no strong relationships between risk attitude and achievements in office developments. Examining the data in Table 5.8.5 indicates why there were no strong relationships between the factors. It was observed that no particular group of the decision makers dominated any classification of achievements. The high achievers were comprised of positive as well as negative risk attitude decision makers. Medium achievers were also comprised of positive as well as negative risk attitude decision makers. Similarly, low achievers were comprised of positive as well as negative risk attitude decision makers. These indicate that the decision makers' achievements in office developments were not clearly influenced by their attitudes towards risk.

ACHIEVEMENTS			RISK ATTITUDE		RESP.
High	Medium	Low	Positive	Negative	
*			*		1
*			*		6
*			*		10
*			*		16
*				*	8
*				*	12
*				*	15
	*		*		2
	*		*		11
	*		*		17
	*		*		19
	*		*		20
	*			*	18
		*	*		3
		*	*		5
		*	*		7
		*	*		13
		*		*	4
		*		*	9
		*		*	14

Table 5.8.5: Achievement against risk attitude [Office]

5.8.2 Shop Development

To determine the relationships of academic qualifications, professional qualifications, experience in property development, decision making involvement and risk attitude with the decision makers' achievement in shop developments, the non-parametric Spearman Test for correlation statistics was also adopted.

a) Academic qualifications with achievement

The results of the statistical test obtained when the academic qualifications data was correlated with decision makers' achievement were:

    i) a medium negative correlation factor of -0.3509

    ii) a moderate significance factor of 0.219

These indicated that there were some significant relationships between academic qualifications and achievements in office developments. The relationships indicated by the statistical results was that the decision makers with low academic qualifications attained high achievements and conversely decision makers with high academic qualifications attained low achievements.

On examining the data in Table 5.8.6, it was observed that only among the degree holders were there high, medium and low achievers whilst the majority (71%) of the non-qualified, diploma holders and other degree holder decision makers attained high achievement and none had low achievement. These denote that in shop developments, having the academic qualifications did not always ensure the attainment of high achievements.

ACHIEVEMENTS			ACADEMIC QUALIFICATIONS				RESP.
High	Medium	Low	Degree Est.Mgt.	Other degree	Diploma	No degree	
*			*				1
*			*				2
*			*				11
*				*			17
*					*		7
*					*		5
*						*	4
*						*	10
	*		*				3
	*		*				15
	*				*		14
	*					*	18
		*	*				13
		*	*				6

Table 5.8.6: Achievement against academic qualifications [Shop]

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b) Professional qualifications with achievement

The results of the statistical test obtained when the professional qualifications data was correlated with decision makers' achievement were:

i) a very low negative correlation factor of -0.0870

ii) a very low significance factor of 0.767

These indicated that there were no relationships between professional qualifications and achievements in office developments. Examining the data in Table 5.8.7 indicates why there were no relationships between the factors. It was observed that no particular group of the decision makers dominated any classification of achievements but all the low achievers were ARICS holders. The high achievers were comprised of not only the FRICS holders but also ARICS holders and non-professionally qualified decision makers. Similarly, medium achievers were comprised of ARICS holders and FRICS holders.

Certainly one would not expect all the low achievers to be dominated by ARICS holders. More so, it was observed that the non-professionally qualified decision makers attained high achievement. The most probable reason for the outcome could be due to the fact that all of the low achievers had low experience in property development while the non-professionally qualified decision makers had high and medium experience in property development. On the basis of this observation, it can be said that professional qualifications had no strong influence on the decision makers' shop development achievements.

ACHIEVEMENTS			PROFESSIONAL QUALIFICATIONS			RESP.
High	Medium	Low	FRICS	ARICS	No	
*			*			1
*			*			2
*				*		4
*				*		5
*				*		11
*				*		7
*					*	10
*					*	17
	*		*			18
	*			*		15
	*			*		3
	*			*		14
		*		*		13
		*		*		6

Table 5.8.7: Achievement against professional qualifications [Shop]

120

c) Experience with achievement

The results of the statistical test obtained when the experience in property development data was correlated with decision makers' achievement were:

i) a high positive correlation factor of 0.4717

ii) a high significance factor of 0.089

These indicated that there were significant relationships between experience in property development and achievements in shop developments. On examining the data in Table 5.8.8, it was observed that high achievers were dominated by high experience decision makers and consequently the low achievers were dominated by the low experience decision makers.

Further, the majority (80%) of the high experience decision makers attained high achievement and it was also observed that the majority (67%) of the low experience decision makers attained low achievement. Therefore, it can be implied that experience in property development had a strong influence in determining the degree of the decision makers' achievement in shop developments.

ACHIEVEMENTS			EXPERIENCE IN PTY DEVELOPMENT			RESP.
High	Medium	Low	High	Medium	Low	
*			*			1
*			*			2
*			*			4
*			*			10
*				*		11
*				*		17
*					*	5
*					*	7
	*		*			18
	*			*		14
	*				*	3
	*				*	15
		*			*	13
		*			*	6

Table 5.8.8: Achievement against experience in property development [Shop]

121

d) Decision making involvement with achievement

The results of the statistical test obtained when the decision making involvement data was correlated with decision makers' achievement were:

i) a high positive correlation factor of 0.5403

ii) a high significance factor of 0.046

These indicated that there were significant relationships between decision making involvement and achievements in shop developments. On examining the data in Table 5.8.9, it was observed that high achievers were dominated by high and medium decision making involvement decision makers and consequently the low achievers were all low decision making involvement decision makers.

Further, all the high decision making involvement decision makers attained high achievement and it was also observed that 33 percent of the low decision making involvement decision makers attained low achievement. Therefore, it can be implied that decision making involvement or 'hands on experience' and 'experiential learning' had a strong influence in determining the degree of the decision makers' achievement in shop development.

ACHIEVEMENTS			DECISION MAKING INVOLVEMENT			RESP.
High	Medium	Low	High	Medium	Low	
*			*			1
*			*			2
*			*			17
*				*		7
*				*		10
*				*		11
*					*	4
*					*	5
	*			*		14
	*			*		18
	*				*	3
	*				*	6
		*			*	13
		*			*	15

Table 5.8.9: Achievement against decision making involvement [Shop]

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e) Risk attitude with achievement

The results of the statistical test obtained when the risk attitude data was correlated with decision makers' achievement were:

i) a low positive correlation factor of 0.2646

ii) a low significance factor of 0.361

These indicated that there were no significant relationships between risk attitude and achievements in shop developments. Examining the data in Table 5.8.10, although it was observed that the high achievers were dominated by positive risk attitude decision makers, medium achievers were comprised of positive and negative risk attitude decision makers and low achievers were also comprised of positive as well as negative risk attitude decision makers. These indicate that the decision makers' achievements in shop developments were not strongly influenced by their attitudes towards risk.

ACHIEVEMENTS			RISK ATTITUDE		RESP.
High	Medium	Low	Positive	Negative	
*			*		1
*			*		2
*			*		7
*			*		10
*			*		11
*			*		17
*			*		5
*			*		3
	*		*		6
	*			*	4
	*			*	14
	*			*	18
		*	*		13
		*		*	15

Table 5.8.10: Achievement against risk attitude [Shop]

5.8.3 Summary of Relationships

From Table 5.8.11 it is observed that achievements in office development were significantly affected only by Decision Making Involvement. Academic and Professional Qualifications as well as Experience and Risk Attitude had low or very low significant correlationships with office developments achievement. This indicated that the Personal Attributes' factors had no strong correlationships with office developments achievements. However, in shop development, beside Decision Making Involvement, Experience in Property Developments and to some extent Academic Qualifications had high significant correlations which indicated that there were strong and significant correlationships between the Personal Attributes' factors and the achievements in shop developments.

FACTORS	OFFICE DEVELOPMENT		SHOP DEVELOPMENT	
	CORRELATION	SIGNIFICANCE	CORRELATION	SIGNIFICANCE
. Academic qualifications	Low	Low	Medium	Medium
. Professional qualifications	Very low	Very low	Very low	Very low
. Experience	Low	Low	High	High
. Decision making involvement	High	High	High	High
. Risk management	Very low	Very Low	Low	Low

Table 5.8.11: Correlation of personal attributes with achievements

It is interesting to note that in examining the data in Table 5.6.11 office development outcomes were strongly influenced by 'Timing' while shop development outcomes were not affected by 'Timing'. On the other hand, from Table 5.8.11, office development achievements were affected only by 'Decision Making Involvement' whilst shop development achievements were influenced not only by 'Decision Making Involvement' but also "Experience in Property Development' and 'Academic Qualifications.

These observations suggest that the decision makers' systematic examination and analyses of 'Economic Factors' particularly those concerned with 'Completion Timing' have a greater influence on the office rather than shop development outcomes. On the other hand the intuitive judgement i.e. the deliberation, reasoning and acceptance of facts which are concerned with the decision makers' 'Experience' and

'Qualifications', affect the shop rather than the office developments' achievements. In another term the 'hard data' and economic or market factors affects office development outcomes more than shop while the 'soft data' influence shop developments' achievements more than office.

However, it has to be reiterated that market factors could override the decision makers' skill because the rise and sometimes rapid fall of the economic climate or market due to among other factors, sudden policy changes or changes in interest rates are difficult to foretell over a short period, let alone a long period of time. Property development activities can seldom be put together and carried out within a year and most take several years to complete. Therefore because of the inevitable time-lag between the inception of the project and its completion, property development is especially vulnerable to broadly based, and local, social, economic and financial changes.

5.9 ANALYSIS OF OFFICE AND SHOP DEVELOPMENT ACHIEVERS

5.9.1 Office Development

In examining the high, medium and low achievers in office developments the following situations were observed, as indicated in Table 5.9 1:
   a) High achievers:
      i) The majority (71%) i.e. 5 out of 7 had high decision making involvement and high experience in property development
      ii) 57 percent i.e. 4 out of 7 had degree in Estate Management

   b) Medium achievers:
      i) The majority (83 %) i.e. 5 out of 6 had high decision making involvement and high property development experience.
      ii) 50 percent had degree in Estate Management while the other 3 respondents had degree in other fields or were unqualified.

   c) Low achievers:
      i) Distinctly, all of the low achievers had low decision making involvement and 86 percent i.e. 6 out of 7 had low property development experience
      ii) The majority (71%) i.e. 5 out of 7 had no degree in Estate Management

The above indicators affirmed the assertion in section 5.8.3 which stated that decision makers' achievements in office development were much affected by

external factors. Therefore, from the above observation it is shown that respondents should have high experience in property development, decision making involvement and academic qualifications to enable them to comprehend the external factors and subsequently attain high achievements. On the other hand, having low experience in property development, decision making involvement and academic qualifications produced the opposite results.

RESP	ACADEMIC QUALIFICATION	EXP.IN PROP. DEV. (years)	DEC. MKG INVOLV. (years)	ACHIEVEMENT OFFICE DEV.		
				HIGH	MED	LOW
1.	B.Sc. (Est. Mgt.)	20	16	✔		
6.	B.Sc. (Land Mgt.)	5	3	✔		
8.	-	20	12	✔		
10.	-	20	10	✔		
12.	Dip. (Land Econ.)	11	11	✔		
15.	B.Sc. (Est. Mgt.)	5	5	✔		
16.	B.Sc. (Est. Mgt.)	30	25	✔		
2.	C.E.M.(Est.Mgt.)	25	16		✔	
11.	B.Sc. (Est. Mgt.)	10	10		✔	
17.	LLB	12	12		✔	
18.	-	20	10		✔	
19.	-	15	10		✔	
20.	B.Sc. (Est. Mgt.)	5	5		✔	
3.	B.Sc. (Land Mgt.)	5	2			✔
4.	-	17	5			✔
5.	Dip. (Gen. Surv.)	6	3			✔
7.	Dip. (Land Econ.)	6	6			✔
9.	-	6	3			✔
13.	B.Sc. (Est. Mgt.)	7	5			✔
14.	B.A., M.A., Ph.D	11	6			✔

Table 5.9.1: Achievers in office developments

5.9.2 Shop Development

In examining the high, medium and low achievers in shop developments the following situations were observed as indicated in Table 5.9 2:

a) High achievers:

i) About 63 percent i.e. 5 out of 8 had high decision making involvement and experience in property development

ii) Also about 63 percent had no degree in Estate Management

b) Medium achievers:

i) The majority (75%) i.e. 3 out of 4 had high decision making involvement and high property development experience.

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ii) 50 percent had degrees in Estate Management while of the other two one had another degree and the other was unqualified.

c) Low achievers:

i) Both of the low achievers had low decision making involvement and property development experience

ii) Both had a degree in Estate Management

The above indicators affirmed the assertion in section 5.8.3 which states that decision makers' achievements in shop development are much affected by the decision makers' intuitive judgement or soft data, rather than examination and analysis of external factors. Therefore, from the above observation particularly in studying the high achievers, it shows that the respondents needed some experience in property development and/or decision making involvement but did not require high academic qualifications to attain high achievements in shop developments. This indicator appeared logical as it is usually essential for one to have an appropriate academic background to examine and analyse the external factors. However, this was not the case in the shop developments.

RESP	ACADEMIC QUALIFICATION	EXP.IN PROP. DEV. (years)	DEC. MKG INVOLV. (years)	ACHIEVEMENT SHOP DEV.		
				HIGH	MED	LOW
1.	B.Sc. (Est. Mgt.)	20	16	✔		
10.	-	20	10	✔		
2.	C.E.M.(Est.Mgt.)	25	16	✔		
11.	B.Sc. (Est. Mgt.)	10	10	✔		
17.	LLB	12	12	✔		
4.	-	17	5	✔		
5.	Dip. (Gen. Surv.)	6	3	✔		
7.	Dip. (Land Econ.)	6	6	✔		
14.	B.A., M.A., Ph.D	11	6		✔	
15.	B.Sc. (Est. Mgt.)	5	5		✔	
18.	-	20	10		✔	
3.	B.Sc. (Land Mgt.)	5	2		✔	
13.	B.Sc. (Est. Mgt.)	7	5			✔
6.	B.Sc. (Land Mgt.)	5	3			✔

Table 5.9.2: Achievers in shop developments

5.9.3 Overall Achievement In Office And Shop Developments

On studying the overall achievement of the decision makers as shown in Table 5.9.3, only 2 of the respondents managed to attain high achievements in office

as well as shop developments, 1 respondent attained high achievement in office development but low in shop development, 3 respondents attained high achievement in shop development but low in office development and 1 respondent had low achievement in both office and shop developments.

On examining further these four groups of achievers namely:

    a)   Group 1 - High achievement in office and shop developments

    b)   Group 2 - High achievement in office but low in shop developments

    c)   Group 3 - High achievement in shop but low in office developments

    d)   Group 4 - Low achievement in both office and shop developments,

it was revealed that:

    i)   Group 1 achievers had high decision making involvement ;

    ii)   Group 2 achiever had low decision making involvement;

    iii)   Group 3 achievers had low decision making involvement; and

    iv)   Group 4 achiever had low decision making involvement.

These results are shown in Table 5.9.3. It has to be noted that the Decision Making Involvement factor was taken as the criterion to measure and distinguish the difference between the group of achievers because it has been established in section 5.8.3 that this factor had high correlation with the decision makers' achievement in both office and shop developments.

RESP. (GROUP)	ACADEMIC QUALIFICATIONS	DEC. MKG INVOLV. (years)	ACHIEVEMENT			
			OFFICE DEV. HIGH	OFFICE DEV. LOW	SHOP DEV. HIGH	SHOP DEV. LOW
1	B.Sc. (Est. Mgt.)	16	✓		✓	
1	-	10	✓		✓	
2	B.Sc. (Land Mgt.)	3	✓			✓
3	-	5		✓	✓	
3	Dip. (Gen. Surv.)	3		✓	✓	
3	Dip. (Land Econ.)	6		✓	✓	
4	B.Sc. (Est. Mgt.)	5		✓		✓

Table 5.9.3: Achievers' variation in office and shop developments

Table 5.9.3 indicates that high decision making involvement was necessary to attain a consistently high achievement in both office and shop developments. The long duration of the 'hands on experience' of Group 1 achievers would have enabled the decision maker to judge astutely the various factors in appropriateness with the office and shop developments requirements. The Group 2 achiever had high

achievement in office but low in shop developments since he had low decision making involvement. Due to this shortcoming he possibly could have made inaccurate judgemental assessment of factors during the decision making processes.

The results attained by the Group 3 achievers further proved the earlier assertion that high achievements in shop developments were the result of good intuitive judgement rather than the examination and analysis of external factors. Therefore, it indicated distinctly that low achievers of both shop and office developments (Group 4) were due to their low decision making involvement.

Further, it was observed from Table 5.9.3 that the Group 2 achiever had low decision making involvement but possessed the degree in Land Management. Having the degree in Land Management probably had enabled him to evaluate and make good judgement of the external factors, despite his low experience, thereby facilitating the attainment of the high achievement in office development. The necessity to possess high academic qualification to enable a thorough analysis and assessment of the external factors and subsequently attaining high achievement in office development was confirmed on examining the achievements attained by the respondents in Group 3. It was observed that all the respondents in Group 3 had no degree and all attained low achievements in office development but high achievement in shop developments.

Thus, it can safely be said that it is essential to have high academic qualifications, specifically the degree in Estate or Land Management, which will enable the decision makers to examine and analyse the external factors and subsequently attaining high achievement in office development. On the other hand possessing high academic qualifications is not a prerequisite to the attainment of high achievements in shop developments as they were influenced by intuitive judgement. In summary, high educational background is required to enable a thorough examination and analysis of the hard data but not essential for the handling of the soft data.

5.10   SUMMARY OF FINDINGS

1. Almost all (90%) of the respondents stated that they engaged the services of property consultants to give advice on the feasibility of the development to be undertaken. However, 80 percent of the consultants did not participate in the decision making process. It was revealed that the consultants' reports were used as a form of database to assist in the decision making process.

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2. Many property companies did not use computers to assist in their decision making processes. Only about 46 percent had computer systems to support data processing. This fact possibly indicates that over 50 percent of the property companies' decision makers still trust the traditional approach of calculation in their decision making process.

3. In the consideration of external decision making factors this study has found that the respondents first considered the 'right location' factor, followed by 'right timing' i.e. deliberation of 'demand' and 'return of capital' and finally the 'right building' factors were examined. This is perhaps the probable sequence of consideration of the decision making factors adopted by the majority of the practitioners.

4. Completion timing had a very high significance correlation with office development outcomes compared to shop developments. This indicated office development outcomes were more sensitive to the property market downturn compared to shop development outcomes.

5. This lower sensitivity of shop development outcomes to the sudden property market downturn which commenced in late 1989 was probably because the key tenants or buyers of the large shopping developments were predetermined. Therefore, the outcome of most large shop developments were found to be 'successful' at the beginning of the downturn of the property market compared to office developments because preletting/buying was not the usual strategy adopted in office development, particularly when the property market is buoyant, which was the case prior to late 1989.

6. Office development outcomes were strongly affected by capital values i.e. the higher the capital values the greater were their successful outcomes. Shop development outcomes on the other hand had no significant relationship.

7. Office development outcomes were clearly not affected by location. This meant that for office development, being located in the city, or large or small towns had a very low effect on the outcomes. However, for shop developments, their outcomes were heavily affected by the location. This indicated that the success of shop developments was strongly influenced by

the size of the catchment areas i.e. being located in the city had higher successful outcomes than if located in small or large towns.

8. Site distances or remoteness from main office had no significant relationship with both office and shop development outcomes.

9. Decision makers' attributes, namely their academic qualifications, experience and risk attitude, influenced the achievements in shop development more than office development.

10. Decision makers' systematic examination and analysis of 'Economic Factors', particularly those concerned with 'Completion Timing', have a greater influence on the office rather than shop development outcomes. On the other hand the intuitive judgement i.e. the deliberation, reasoning and acceptance of facts which are concerned with the decision makers' 'Experience' and 'Qualifications', affect the shop rather than the office developments' achievements. In another term the 'hard data' affects office development outcomes more than shop while the 'soft data' influence shop developments' achievements more than office.

11. Decision makers were inconsistent in their decision making outcomes' achievements. The variations were generally due to the difference in decision making involvements. Specifically, the office development achievements were affected by the variations in the consideration of the 'hard data' whilst the shop developments were influenced by the variations in the intuitive judgement of facts i.e. the 'soft data'.

CHAPTER 6

ANALYSIS OF THE REPERTORY GRID

6.1   INTRODUCTION

This chapter presents the results of the analysis of the Repertory Grid data and their relationships with decision makers' achievements. In this analysis the information, which was obtained from a smaller sub-sample of twenty (20) respondents, will be examined in both quantitative and qualitative terms, to identify important factors which affected decision makers' achievements in office and shop developments.

6.2   ANALYSIS OF THE OVERALL REPERTORY GRID DATA

A follow up study was conducted on a smaller sub-sample of twenty decision makers who responded to the second questionnaire. The decision makers were interviewed twice during the months of October 1992 to May 1993. The purpose of the interviews was to elicit information regarding decision making factors which influenced the development outcomes. The first interview was to obtain the factors i.e. constructs which the decision makers perceived to have influenced the success or otherwise of the office and shop developments in which they have been involved in the decision making process. A list of the constructs which excluded repetitions was obtained.

In the second interview, all the twenty respondents were given similar list of constructs and were asked to give the weighting each construct had in influencing the 'successful' and 'moderately successful' office and shop developments. The respondents confirmed that they had full knowledge of the developments and were involved during the decision making process. The weighting score was from one to five, with five the highest and one the least influence for successful developments i.e. the positive pole; but for unsuccessful developments i.e. the negative pole the weighting score is the opposite, with one the highest and five the least influence. This method complies with the Repertory Grid technique for constructs weighting.

6.2.1 Frequency Analysis of Constructs

A total of 140 constructs were elicited from the respondents in the first interview. The list of the constructs is shown in Appendix D. On examining the elicited constructs, it was observed that many respondents produced similar constructs. A comprehensive list of the constructs excluding repetitions came up to

twenty-seven (27). The list of the constructs excluding repetitions is shown in Appendix E. As the elicitation of the constructs in the first interview were free response and in the second interview no further construct was able to be elicited from the respondents, it could safely be said that the list of twenty-seven (27) constructs obtained is the complete list of all factors the property development decision makers normally considered in practice.

6.2.2 Office Developments

a) Successful developments

All the 20 respondents had carried out office property development during the study period 1985-1990. The mode weighting of each construct for successful office developments are shown in Table 6.2.1. All the 20 respondents also gave very high weighting for Right Timing as shown in Table 6.2.2. This clearly indicates Right Timing was the most influential factor in the successful outcome office development. This indicator confirms the earlier assertion in sections 5.6.3 and 5.6.7.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	5	20	100.0	100.0
	Total	20	100.0	

Table 6.2.2: Right timing weighting

Other constructs which the majority of the respondents gave very high weighting to included Fall in Yield; Right Market Conditions; Growth of Rental Values; Easily Let or Sold; Good Location; High Demand; Good Economic Conditions; and Good Funding Terms. Table 6.2.3 showed that 90 percent of the respondents gave very high weighting for Fall in Yield.

Value Label	Value	Frequency	Valid Percent	Cum Percent
Medium	3	1	5.0	5.0
High	4	1	5.0	10.0
Very high	5	18	90.0	100.0
	Total:	20	100.0	

Table 6.2.3: Fall in yield weighting

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NO.	FACTOR	MODE	PERCENT	MAX	MIN	N
1.	Right timing	5	100	5	5	20
2.	Fall in yield	5	90	5	3	20
3.	Right market conditions	5	80	5	4	20
4.	Growth of rental values	5	75	5	2	20
5.	Easily let/sold	5	70	5	3	20
6.	Good location	5	60	5	3	20
7.	High demand	5	60	5	3	20
8.	Good economic conditions	5	50	5	2	20
9.	Good funding terms	5	50	5	1	20
10.	Tenants satisfied	4	75	4	3	20
11.	Good building design	4	60	5	3	20
12.	Good surrounding facilities	4	55	5	2	20
13.	Building cost under control	4	50	5	1	20
14.	Within budget	4	45	5	1	20
15.	Right development size	4	45	5	2	19
16.	Low land purchase	4	45	4	1	20
17.	Opportunities taken	4	40	5	2	20
18.	Good building specification	3	65	4	1	20
19.	Completion on time	3	60	4	1	20
20.	New development	3	40	5	1	20
21.	Short construction period	2	70	4	2	20
22.	Good co-op from stat. auth	2	60	4	1	20
23.	Design and built	2	60	5	1	19
24.	Low building cost	2	50	4	1	20
25.	Initial dev. team selection	2	45	5	1	19
26.	Clear vacant site	1	74	3	1	19
27.	High quality landscape	1	63	5	1	19

Table 6.2.1: Mode weighting of factors influencing successful office development

For Right Market Conditions 80 percent of the respondents indicated that it had very high influence on the successful outcome of the office developments (see Table 6.2.4). For Growth of Rental Values 75 percent gave very high weighting (see Table 6.2.5), while for Easily Let or Sold factor 70 percent gave very high weighting (see Table 6.2.6).

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
High	4	4	20.0	20.0
Very high	5	16	80.0	100.0
	Total:	20	100.0	

Table 6.2.4: Right market conditions weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Low	2	1	5.0	5.0
Medium	3	4	20.0	25.0
Very high	5	15	75.0	100.0
	Total:	20	100.0	

Table 6.2.5: Growth of rental values weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	1	5.0	5.0
High	4	5	25.0	30.0
Very high	5	14	70.0	100.0
	Total:	20	100.0	

Table 6.2.6: Easily let/sell weighting

Good Location and High Demand factors produced similar responses i.e. in both the factors 60 percent of the respondents gave very high weighting (*see* Tables 6.2.7 and 6.2.8) and for Good Economic Conditions 50 percent indicated very high weighting (*see* Table 6.2 9).

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	2	10.0	10.0
High	4	6	30.0	40.0
Very high	5	12	60.0	100.0
	Total:	20	100.0	

Table 6.2.7: Good location weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	2	10.0	10.0
High	4	6	30.0	40.0
Very high	5	12	60.0	100.0
	Total:	20	100.0	

Table 6.2.8: High demand weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Low	2	1	5.0	5.0
High	4	9	45.0	10.0
Very high	5	10	50.0	100.0
	Total:	20	100.0	

Table 6.2.9: Good economic conditions weighting

From Table 6.2.1 it was observed that the factors to which the respondents gave high weighting include Tenants Satisfied; Good Building Design; Good Surrounding Facilities; Building Cost Under Control; Within Budget; Right Development Size; Low Land Purchase and Opportunities Taken. Medium weighting was given for Good Building Specification; Completion On Time; and New Development.

Table 6.2.1 also indicated that Short Construction Period; Good Cooperation from Statutory Authorities; Design and Build; Low Building Cost; and Initial Development Team Selection were considered to have low weighting. For High Quality Landscape, 63 percent of the respondents gave very low weighting as shown in Table 6.2.10 and 74 percent indicated that Clear Vacant Site had very low influence in the successful outcome of office developments (see Table 6.2.11).

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	12	63.2	63.2
Low	2	1	5.2	68.4
Medium	3	4	21.1	89.5
Very high	5	2	10.5	100.0
	Total:	19	100.0	

Table 6.2.10: High quality landscape weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	14	73.7	73.7
Medium	3	5	26.3	100.0
	Total:	19	100.0	

Table 6.2.11: Clear vacant site weighting

b) Moderately successful office developments

The mode weightings for each construct influencing the moderately successful outcome of office developments are shown in Table 6.2.12. All the 20 respondents gave very high weighting for Wrong Timing as shown in Table 6.2.13. This clearly indicated that, for office development, Wrong Timing was the most influential factor in the moderately successful outcome of office developments. This indicator confirms the earlier assertion in sections 5.6.3 and 5.6.7.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	20	100.0	100.0
	Total	20	100.0	

Table 6.2.13: Wrong timing weighting

NO	FACTOR	MODE	PERCENT	MAX	MIN	N
1.	Wrong timing	1	100	1	1	20
2.	Low demand	1	95	2	1	20
3.	Rise in yield	1	90	4	1	20
4.	Bad market conditions	1	85	3	1	20
5.	Drop in rental values	1	85	4	1	20
6.	Difficult to let/sell	1	70	3	1	20
7.	Poor economic conditions	1	60	3	1	20
8.	Poor quality landscape	1	55	3	1	20
9.	Uncleared site	1	50	4	1	20
10.	Outside budget	2	75	3	1	20
11.	Tenants not satisfied	2	60	4	1	20
12.	Contract design	2	50	4	1	20
13.	Poor co-op from stat.auth.	2	50	3	1	20
14.	Opportunities not taken	2	50	4	1	20
15.	Delayed completion	2	45	4	1	20
16.	High building cost	2	45	4	1	20
17.	Bldg. cost beyond control	2	45	3	1	20
18.	Wrong development size	2	30	5	1	20
19.	High land purchase	3	60	4	1	20
20.	Ad-hoc team selection	3	55	3	1	20
21.	Poor building design	3	55	4	1	20
22.	Low specification building	3	55	5	1	20
23.	Redevelopment	3	50	5	1	20
24.	Long construction period	3	50	4	1	20
25.	Bad funding terms	3	40	5	1	20
26.	Poor surrounding facilities	4	40	4	1	20
27.	Poor location	4	50	4	1	20

Table 6.2.12: Mode weighting of factors influencing moderately successful office developments

Other constructs to which the majority of the respondents gave very high weighting included Low Demand; Rise in Yield; Bad Market Conditions; Drop In Rental Values; Difficult to Let or Sell; Poor Economic Conditions; Poor Quality Landscape; and Uncleared Site. Table 6.2.14 shows that 95 percent of the respondents gave very high weighting for Low Demand. In Table 6.2.15, 90 percent of the respondents indicated Rise In Yield had very high influence on the moderately successful outcome of the office developments.

Value Label	Value	Frequency	Valid Percent	Cum Percent
High	2	1	5.0	5.0
Very high	1	19	95.0	100.0
	Total:	20	100.0	

Table 6.2.14: Low demand weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Low	4	1	5.0	5.0
High	2	1	5.0	10.0
Very high	1	18	90.0	100.0
	Total:	20	100.0	

Table 6.2.15: Rise in yield weighting

Wrong Market Conditions and Drop In Rental Values factors produced similar responses i.e. for both the factors 85 percent of the respondents gave very high weighting of influence (see Tables 6.2.16 and 6.2.17). For Difficult To Let or Sell 70 percent gave very high weighting of influence (see Table 6.2.18) and for Poor Economic Conditions 60 percent indicated very high weighting of influence (see Table 6.2.19).

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	1	5.0	5.0
High	2	2	10.0	15.0
Very high	1	17	85.0	100.0
	Total:	20	100.0	

Table 6.2.16: Wrong market conditions weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Low	4	1	5.0	5.0
High	2	2	10.0	15.0
Very high	1	17	85.0	100.0
	Total:	20	100.0	

Table 6.2.17: Drop in rental value weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	1	5.0	5.0
High	2	5	25.0	30.0
Very high	1	14	70.0	100.0
	Total:	20	100.0	

Table 6.2.18: Difficult to let or sell weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Medium	3	1	5.0	5.0
High	2	7	35.0	40.0
Very high	1	12	60.0	100.0
	Total:	20	100.0	

Table 6.2.19: Poor economic conditions weighting

From Table 6.2.12 it was observed that the factors to which on average the respondents gave high weighting of influence included Outside Budget; Tenants Not Satisfied; Contract Design; Poor Cooperation From Statutory Authorities; Opportunities Not Taken; Delayed Completion; High Building Cost; Building Cost Beyond Control; and Wrong Development Size.

Factors which were considered to have medium weighting of influence were High Cost of Land Purchase; Ad-hoc Development Team Selection; Poor Building Design; Low Specification Building; Redevelopment; Long Construction Period; and Bad Funding Terms.

The factors that were considered to have the lowest influence in the unsuccessful outcome of office developments were Poor Surrounding Facilities and Poor Location. Table 6.2.20 showed that 70 percent of the respondents considered Poor Location as having medium to low weighting of influence in the moderately successful outcome of office developments.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Low	4	10	50.0	50.0
Medium	3	4	20.0	70.0
High	2	4	20.0	90.0
Very high	1	2	10.0	100.0
	Total:	20	100.0	

Table 6.2.20: Poor location weighting

6.2.3 Shop Development

a) Successful developments

Out of the 20 respondents interviewed, 14 had carried out shop development during the study period 1985-1990. The mode weighting of each construct for successful shop developments is shown in Table 6.2.21. Almost 86 percent of the respondents that have undertaken shop developments gave a very high weighting for Good Location as shown in Table 6 2.22. The other 14 percent i.e. the remaining two of the respondents, gave high weighting. This clearly indicated that location was the most influential factor in the successful outcome of shop development. This indicator confirms the earlier assertions in sections 5.6.6 and 5.6.7.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
High	4	2	14.3	14.3
Very high	5	12	85.7	100.0
	Total	14	100.0	

Table 6.2.22: Good location weighting

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NO	FACTOR	MODE	PERCENT	MAX	MIN	N
1.	Good location	5	86	5	4	14
2.	High demand	5	79	5	4	14
3.	Easily let/sell	5	71	5	4	14
4.	Right market conditions	5	71	5	1	14
5.	Growth in rental values	5	64	5	1	14
6.	Right timing	5	50	5	4	14
7.	Good funding terms	5	43	5	3	14
8.	Good building design	4	79	4	3	14
9.	Tenants satisfied	4	71	5	3	14
10.	Good surr. facilities	4	64	4	2	14
11.	Fall in yield	4	64	4	3	14
12.	Bldg. cost under control	4	57	5	3	14
13.	Opportunities taken	4	43	5	2	14
14.	Good economic conditions	4	50	5	1	14
15.	Low land purchase	4	50	4	2	14
16.	Right development size	4	43	5	2	14
17.	Good spec. building	3	64	4	2	14
18.	New development	3	64	3	1	14
19.	Completion on time	3	57	4	1	14
20.	Within budget	3	43	5	2	14
21.	Good co-op from stat.auth	2	71	4	1	14
22.	Short construction period	2	64	5	2	14
23.	Low building cost	2	64	4	2	14
24.	Design and built	2	64	3	1	14
25.	Initial team selection	2	46	3	1	13
26.	Clear vacant site	1	64	3	1	14
27.	High quality landscape	1	69	3	1	13

Table 6.2.21: Mode weighting of factors influencing successful shop development

Other constructs to which the majority of the respondents gave very high weighting includes High Demand; Easily Let or Sold; Right Market Conditions; Growth In Rental Values; Right Timing; and Good Funding Terms. Table 6.2.23 showed that 79 percent of the respondents gave a very high weighting for High Demand. Easily Let or Sold and Right Market Conditions factors produced similar response i.e. 71 percent of the respondents gave very high weighting for each of the factors (see Tables 6.2.24 and 6.2.25).

Value Label	Value	Frequency	Valid Percent	Cum Percent
High	4	3	21.4	21.4
Very high	5	11	78.6	100.0
	Total:	14	100.0	

Table 6.2.23: High demand weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
High	4	4	28.6	28.6
Very high	5	10	71.4	100.0
	Total:	14	100.0	

Table 6.2.24: Easily let or sell weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	1	7.1	7.1
High	4	3	21.4	28.6
Very high	5	10	71.4	71.4
	Total:	14	100.0	

Table 6.2.25: Right market conditions weighting

For Growth of Rental Values 64 percent gave very high weighting (*see* Table 6.2.26) but for Right Timing 50 percent indicated a very high weighting of influence (*see* Table 6.2 27) while the other 50 percent gave a high weighting.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	1	7.1	7.1
Medium	3	2	14.3	21.4
High	4	2	12.3	35.7
Very high	5	9	64.3	100.0
	Total:	14	100.0	

Table 6.2.26: Growth of rental value weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
High	4	7	50.0	50.0
Very high	5	7	50.0	100.0
	Total:	14	100.0	

Table 6.2.27: Right timing weighting

From Table 6.2.21, it was observed that, the factors to which on average the respondents gave high weighting included Good Building Design; Tenants Satisfied; Good Surrounding Facilities; Fall In Yield; Building Cost Under Control; Opportunities Taken; Good Economic Conditions; Low Land Purchase; and Right Development Size.

Good Specification Building; New Development; Completion On Time; and Within Budget were considered by the respondents to have medium weighting. Factors which had low weighting included Good Cooperation From Statutory Authorities; Short Construction Period; Low Building Cost; Design and Build; and Initial Team Selection; while Clear Vacant Site and High Quality Landscape were considered to have the least influence in the successful outcome of shop developments.

Table 6.2.28 shows that 64 percent of the respondents gave Clear Vacant Site very low weighting and in Table 6.2 29, 69 percent indicated very low weighting for High Quality Landscape in influencing the successful outcome of shop developments.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	9	64.3	64.3
Low	2	1	7.1	71.4
Medium	3	4	28.6	100.0
	Total:	14	100.0	

Table 6.2.28: Clear vacant site weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very low	1	9	69.2	69.2
Low	2	2	15.4	84.6
Medium	3	2	15.4	100.0
	Total:	14	100.0	

Table 6.2.29: High quality landscape weighting

b) Moderately successful shop developments

The mode of the respondents' weighting for each of the constructs for moderately successful shop developments is shown in Table 6.2.30. About 93 percent of the respondents gave very high weighting for Wrong Location as shown in Table 6.2.31. This clearly indicated that, for shop developments, Wrong Location was the most influential factor in the moderately successful outcome of shop developments. This indicator confirms the earlier assertion in sections 5.6.6 and 5.6.7.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	13	92.9	92.9
High	2	1	7.1	7.1
	Total	14	100.0	

Table 6.2.31: Poor location weighting

NO.	FACTOR	MODE	PERCENT	MAX	MIN	N
1.	Poor location	1	93	2	1	14
2.	Low demand	1	86	2	1	14
3.	Poor market conditions	1	86	2	1	14
4.	Rise in yield	1	86	4	1	14
5.	Drop in rental values	1	79	2	1	14
6.	Difficult to let/sell	1	57	2	1	14
7.	Poor economic conditions	1	57	3	1	14
8.	Poor quality landscape	1	50	3	1	14
9.	Wrong timing	2	86	3	1	14
10.	Tenants not satisfied	2	64	4	1	14
11.	Outside budget	2	64	3	1	14
12.	Poor co-op from stat.auth	2	57	3	1	14
13.	Opportunities not taken	2	50	4	1	14
14.	Contract design	2	43	4	1	14
15.	Bldg. cost beyond control	2	43	3	1	14
16.	High building cost	2	43	4	1	14
17.	Poor surrounding facilities	2	36	2	1	14
18.	Low specification building	3	71	5	1	14
19.	High land purchase	3	64	4	1	14
20.	Poor building design	3	64	4	2	14
21.	Redevelopment	3	57	4	1	14
22.	Long construction period	3	50	3	1	14
23.	Ad-hoc dev.team selection	3	50	3	1	14
24.	Uncleared site	3	50	4	1	14
25.	Delayed completion	3	43	4	1	14
26.	Unfavourable fund. terms	3	36	5	1	14
27.	Wrong development size	3	29	5	1	14

Table 6.2.30: Mode weighting of factors influencing moderately successful shop developments.

Other constructs to which the majority of the respondents gave very high weighting included Low Demand; Wrong Market Conditions; Rise in Yield; Drop in Rental Values; Difficult to Let or Sell; Poor Economic Conditions; and Low Quality Landscape. Tables 6.2.32, 6.2.33 and 6.2.34 indicate that 86 percent of the respondents gave very high weighting for Low Demand; Wrong Market Conditions; and Rise in Yield.

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	12	85.7	95.7
High	2	2	14.3	100.0
	Total:	14	100.0	

Table 6.3.32: Low demand weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	12	85.7	85.7
High	2	2	14.3	100.0
	Total:	14	100.0	

Table 6.2.33: Wrong market conditions weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	12	85.7	85.7
High	2	1	7.1	92.9
Low	4	1	7.1	100.0
	Total:	14	100.0	

Table 6.2.34: Rise in yield weighting

About 79 percent of the respondents gave very high weighting for Drop in Rental Values (see Table 6.2.35). Difficult to Let or Sell and Poor Economic Conditions factors produced similar responses i.e. for both the factors 57 percent of the respondents gave very high weighting of influence (see Tables 6.2.36 and 6.2.37).

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	11	78.6	78.6
High	2	3	21.4	100.0
	Total:	14	100.0	

Table 6.2.35: Drop in rental values weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	8	57.1	57.1
High	2	6	42.9	100.0
	Total:	14	100.0	

Table 6.2.36: Difficult to let or sell weighting

Value Label	Weighting	Frequency	Valid Percent	Cum Percent
Very high	1	8	57.1	57.1
High	2	5	35.7	92.9
Medium	3	1	7.1	100.0
	Total:	14	100.0	

Table 6.2.37: Poor economic conditions weighting

From Table 6.2.30 it is also observed that the factors, which on average the respondents gave high weighting of influence, include Wrong Timing; Tenants Not Satisfied; Outside Budget; Poor Cooperation From Statutory Authorities; Opportunities Not Taken; Contract Design; Building Cost Beyond Control; High Building Cost; and Poor Surrounding Facilities.

Factors which were considered to have medium weighting of influence were Low Specification Building; High Cost of Land Purchase; Poor Building Design; Redevelopment, Long Construction Period; Ad-hoc Development Team Selection; Uncleared Site; Delayed Completion; Unfavourable Funding Terms; and Wrong Development Size. It has to be noted that the respondents did not indicate any factors which had low or very low weighting of influence in the moderately successful outcome of shop developments.

6.2.4 Factors weighting comparison

a) Successful outcome

On classifying the constructs into Economic Factors, Local Factors and Project Related Factors a more meaningful comparison between office and shop developments' successful outcomes was observed. This is shown in Table 6.2.38. In the Economic Factors, the main differences are in the consideration of Right Timing, Fall in Yield and Good Economic Condition factors. As has been stated earlier in sections 5.6.3, 5.6.6 and 5.6.7, Right Timing was considered to have lesser influence in the successful outcome of shop developments compared to offices. Table 6.2.38 also shows that Fall in Yield and Good Economic Condition factors were considered more influential to the office development outcomes, since the respondents gave very high weighting for these factors in office developments but only high weighting in shop developments. Thus due to these facts, the influence of Economic Factors were of moderately less significant in the successful outcome of shop developments.

In the consideration of Local Factors, the respondents gave equal weighting for Good Location and Good Surrounding Facilities in their influences towards the successful outcome of office and shop developments. However, in the consideration of Right Development Size, the respondents indicated that the factor was slightly more influential in the successful outcome of office than shop development. This probably indicates the respondents' 'fear' of the fact that the problems of excess floorspace are more acute for office than shop developments.

For Project Related Factors, generally the respondents indicated similar weightings of the factors for both office and shop developments. Only very minor differences in weighting occur for Good Funding Terms, Building Cost Under Control and New Development factors.

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| FACTORS | SUCCESSFUL DEVELOPMENT | | | | | | | | | |
| | Office | | | | | Shop | | | | |
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Right timing					✓				✓	
2. High demand					✓					✓
3. Easily let/sold					✓					✓
4. Low land purchase			✓					✓		
5. Growth of rental values					✓					✓
6. Fall in yield					✓				✓	
7. Good econ.conditions					✓				✓	
8. Right market conditions					✓					✓
LOCAL										
9. Good Location					✓					✓
10. Good surr.facility				✓					✓	
11. Right development size				✓				✓		
12. Opportunities taken				✓				✓		
PROJECT										
13. Good building design				✓					✓	
14. High specification bldg.		✓						✓		
15. Tenants satisfied				✓					✓	
16. Good funding terms					✓				✓	
17. Design and build	✓						✓			
18. Within budget				✓				✓		
19. Bldg.cost under control				✓					✓	
20. Completion on time			✓					✓		
21. Short const.period		✓					✓			
22. Initial team selection		✓					✓			
23. Good co-op fr.stat.auth		✓					✓			
24. New development		✓						✓		
25. Low building cost		✓					✓			
26. High quality landscape	✓					✓				
27. Clear vacant site	✓					✓				
Total:	2	6	3	7	9	2	5	7	8	5

Table 6.2.38: Successful office and shop weighting comparison

FACTORS	MODERATELY SUCCESSFUL DEV.									
	Office					Shops				
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Wrong timing	✓						✓			
2. Low demand	✓					✓				
3. Difficult to let/sell	✓					✓				
4. High cost of land purchase			✓					✓		
5. Drop in rental values	✓					✓				
6. Rise in yield	✓					✓				
7. Poor economic conditions	✓					✓				
8. Wrong market conditions	✓					✓				
LOCAL										
9. Poor location			✓			✓				
10. Poor surrounding facility			✓			✓				
11. Wrong development size		✓					✓			
12. Opportunities not taken		✓					✓			
PROJECT										
13. Poor building design			✓					✓		
14. Low specification bldg.			✓					✓		
15. Tenants not satisfied		✓					✓			
16. Bad funding terms			✓					✓		
17. Contract design		✓					✓			
18. Outside budget		✓					✓			
19. Bldg. cost beyond control		✓					✓			
20. Delayed completion		✓						✓		
21. Long construction period			✓					✓		
22. Ad-hoc team selection			✓					✓		
23. Poor co-op fr. stat.autho.		✓					✓			
24. Redevelopment			✓					✓		
25. High building cost		✓						✓		
26. Poor quality landscape	✓					✓				
27. Uncleared site		✓						✓		
Total:	8	10	9			9	8	10		

Table 6.2.39: Moderately successful developments weighting comparison

b) Moderately successful outcome

Referring to Table 6.2.39, in the consideration of the Economic Factors, the only difference was the consideration of the Wrong Timing factor, which again indicated its higher influence in the office developments' moderately successful outcomes compared with shops. The Project Related Factors were also evenly weighted in their influence for both office and shop outcomes.

An obvious difference was the consideration of the Local Factors, namely Poor Location and Poor Surrounding Facilities. In the moderately successful outcome of office developments both of the factors were considered to have only medium influence but for shop development they were considered to have very high influence. This clearly confirms the fact that Local Factors, specifically Good Location, were more influential than Economic Factors in the outcome of shop development.

6.3 DECISION MAKERS' CONSTRUCTS AND ACHIEVEMENT

In the effort to ascertain the relationships between the decision makers' achievement and their perception of the degree of importance of the decision making factors, several approaches have been identified and examined. Decision makers' personal attributes have been correlated with their achievement and the results explained in section 5.8.3. In section 6.2, the frequency, in terms of the mode and percentages of all the decision makers' weighting of the decision factors, were established and the trends described. In the subsequent section the correlations between decision makers' achievements and the weighting of every construct were examined. This is followed by examining relationships between construct weighting and the decision makers grouped by their achievements and finally, the relationships between constructs weighting and the decision makers grouped by their attributes were then investigated.

6.4 CORRELATIONS OF CONSTRUCTS' WEIGHTING AND ACHIEVEMENT OF ALL DECISION MAKERS

6.4.1 Office development

To determine the relationships of decision makers' achievements with their perceptions of the importance of the various decision making factors, indicated by the weighting given to each factor, the non-parametric Spearman Test for

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correlation statistics was adopted. This is the valid statistical test for small sample size and most appropriate in handling ranked data. The SPSS-X was used to calculate the correlation and significance factors. It was observed that there was no significant correlation between each construct weighting and the achievement in successful office developments.

Table 6.4.1 indicates low or very low correlation at low or very low significance when achievements were correlated with the constructs weighting of successful office developments. The exceptions were the High Demand and Within Budget factors where medium correlation at medium significance was observed. These results possibly indicate that the constructs' weightings were too inconsistent with the achievements, resulting in the inability to establish some distinct statistical relationships between them. In simple words it may be deduced that, whether the decision makers attained high, medium or low achievements, the total weightings given to all the factors were probably quite similar. This circumstance is further reinforced when a much lower correlation at lower significance was obtained on correlating achievement with weighting of the constructs for unsuccessful office development. This is shown in Table 6.4.2.

FACTORS	SPEARMAN CORRELATION COEFFICIENT			
	CORRELATION		SIGNIFICANCE	
ECONOMIC				
1. Right timing	-		-	
2. High demand	Medium	- 0.4207	Medium	0.065
3. Easily let/sold	Very low	0.0786	Very low	0.742
4. Low land purchase	Low	0.2919	Low	0.212
5. Growth of rental values	Low	- 0.2757	Low	0.239
6. Fall in yield	Low	- 0.3722	Low	0.106
7. Good econ.conditions	Low	0.3664	Low	0.112
8. Right market conditions	Nil	0.0000	Nil	1.000
LOCAL				
9. Good location	Low	- 0.1893	Low	0.424
10. Good surr. facility	Low	0.1711	Low	0.471
11. Right development size	Low	0.3327	Low	0.164
12. Opportunities taken	Very low	0.0614	Very low	0.830
PROJECT				
13. Good building design	Low	- 0.1406	Low	0.554
14. High specification bldg.	Very low	-0.0115	Very low	0.962
15. Tenants satisfied	Low	0.2582	Low	0.272
16. Good funding terms	Very low	0.0736	Very low	0.758
17. Design and build	Low	0.1800	Low	0.448
18. Within budget	Medium	0.5534	Medium	0.011
19. Bldg. cost under control	Low	- 0.1381	Low	0.562
20. Completion on time	Low	0.1321	Low	0.579
21. Short const.period	Low	0.1741	Low	0.463
22. Initial team selection	Low	0.3277	Low	0.171
23. Good co-op fr.stat.auth	Low	0.4182	Low	0.067
24. New development	Very low	0.0108	Very low	0.964
25. Low building cost	Low	0.2300	Low	0.329
26. High quality landscape	Low	0.2923	Low	0.225
27. Clear vacant site	Low	0.3044	Low	0.205

Table 6.4.1: Achievements vs constructs weightings [Office - successful]

FACTORS	SPEARMAN CORRELATION COEFFICIENT			
	CORRELATION		SIGNIFICANCE	
ECONOMIC				
1. Wrong timing	-	-	-	-
2. Low demand	Low	0.2565	Low	0.275
3. Difficult to let/sell	Very low	- 0.0786	Very low	0.742
4. High land purchase	Very low	0.0824	Very low	0.730
5. Drop in rental values	Very low	0.0234	Very low	0.922
6. Rise in yield	Very low	- 0.0186	Very low	0.938
7. Poor econ. conditions	Low	- 0.3206	Low	0.168
8. Bad market conditions	Low	0.1717	Low	0.469
LOCAL				
9. Poor location	Low	- 0.3345	Low	0.149
10. Poor surrounding facilities	Very low	0.0675	Very low	0.777
11. Wrong development size	Low	0.1043	Low	0.489
12. Opportunities not taken	Very low	- 0.0744	Very low	0.755
PROJECT				
13. Poor building design	Low	- 0.1822	Low	0.442
14. Low specification building	Low	0.1275	Low	0.592
15. Tenants not satisfied	Very low	- 0.0880	Very low	0.712
16. Bad funding terms	Low	0.1283	Low	0.590
17. Contract design	Low	- 0.1518	Low	0.523
18. Outside budget	Low	- 0.1150	Low	0.629
19. Bldg. cost beyond control	Very low	0.0547	Very low	0.819
20. Delayed completion	Low	0.1634	Low	0.491
21. Long construction period	Very low	0.0584	Very low	0.807
22. Ad-hoc dev. team selectn	Low	0.1961	Low	0.407
23. Poor co-op from stat.auth	Low	- 0.2021	Low	0.393
24. Redevelopment	Very low	- 0.0372	Very low	0.876
25. High building cost	Very low	0.0463	Very low	0.846
26. Low quality landscape	Low	- 0.3066	Low	0.189
27. Uncleared site	Low	- 0.1531	Low	0.519

Table 6.4.2: Achievements vs constructs weighting [Office- moderately successful]

FACTORS	SPEARMAN CORRELATION COEFFICIENT			
	CORRELATION		SIGNIFICANCE	
ECONOMIC				
1. Right timing	Low	0.1587	Low	0.588
2. High demand	Very low	- 0.0242	Very low	0.935
3. Easily let/sold	Very low	0.0438	Very low	0.882
4. Low land purchase	Low	0.4058	Low	0.150
5. Growth of rental values	Low	- 0.2757	Low	0.239
6. Fall in yield	Low	- 0.2926	Low	0.310
7. Good econ.conditions	Low	- 0.2270	Low	0.435
8. Right market conditions	Very low	- 0.0242	Very low	0.935
LOCAL				
9. Good location	Low	0.4535	Low	0.882
10. Good surrounding facility	Low	0.1863	Low	0.524
11. Right development size	Very low	0.0562	Very low	0.849
12. Opportunities taken	Low	0.3277	Low	0.253
PROJECT				
13. Good building design	Low	0.2417	Low	0.405
14. High specification bldg.	Low	0.1213	Low	0.679
15. Tenants satisfied	Very low	- 0.0388	Very low	0.895
16. Good funding terms	Low	- 0.2136	Low	0.463
17. Design and build	Low	0.1630	Low	0.578
18. Within budget	Very low	0.0481	Very low	0.870
19. Bldg. cost under control	Low	- 0.3488	Low	0.222
20. Completion on time	Low	0.2169	Low	0.456
21. Short construction period	Low	0.3149	Low	0.273
22. Initial team selection	Low	0.4512	Low	0.122
23. Good co-op fr. stat.autho.	Low	0.4461	Low	0.110
24. New development	Low	- 0.0815	Low	0.782
25. Low building cost	Low	- 0.0563	Low	0.848
26. High quality landscape	Low	0.2524	Low	0.405
27. Clear vacant site	Low	0.5214	Low	0.056

Table 6.4.3: Achievements vs constructs weighting [Shop - successful]

FACTORS	SPEARMAN CORRELATION COEFFICIENT			
	CORRELATION		SIGNIFICANCE	
ECONOMIC				
1. Wrong timing	Low	0.3162	Low	0.271
2. Low demand	Low	- 0.1708	Low	0.559
3. Difficult to let/sell	Low	0.2415	Low	0.405
4. High land purchase	Low	- 0.3119	Low	0.278
5. Drop in rental values	Low	0.4369	Low	0.118
6. Rise in yield	Very low	- 0.0243	Very low	0.934
7. Poor econ. conditions	Very low	- 0.0591	Very low	0.841
8. Bad market conditions	Low	0.3416	Low	0.232
LOCAL				
9. Poor location	Low	0.2320	Low	0.425
10. Poor surrounding facilities	Low	- 0.2340	Low	0.421
11. Wrong development size	Low	- 0.2440	Low	0.401
12. Opportunities not taken	Low	- 0.2890	Low	0.316
PROJECT				
13. Poor building design	Low	- 0.2017	Low	0.489
14. Low specification building	Very low	0.0000	Very low	1.000
15. Tenants not satisfied	Low	0.1932	Low	0.406
16. Bad funding terms	Low	- 0.4352	Low	0.120
17. Contract design	Low	- 0.1409	Low	0.631
18. Outside budget	Low	0.1403	Low	0.632
19. Bldg. cost beyond control	Low	0.3812	Low	0.179
20. Delayed completion	Low	0.2095	Low	0.472
21. Long construction period	Low	-.0.1657	Low	0.517
22. Ad-hoc dev.team selection	Low	0.1575	Low	0.591
23. Poor co-op fr.stat. autho.	Very low	0.0760	Very low	0.796
24. Redevelopment	Low	- 0.1570	Low	0.592
25. High building cost	Low	0.1020	Low	0.489
26. Low quality landscape	Very low	0.0201	Very low	0.948
27. Uncleared site	Low	- 0.1492	Low	0.611

Table 6.4.4: Achievements vs constructs weighting [Shop - moderately successful]

6.4.2 Shop developments

Correlating constructs' weighting with achievements for shop developments produced results similar to those observed for office development. These are shown in Tables 6.4.3 and 6.4.4, which indicated that there were no significant relationships between achievement and constructs weighting in both instances of successful and moderately successful shop developments.

6.4.3 Correlation of grouped constructs' weighting with achievements

These relationships of no significant were also observed when the constructs were grouped into Economic Factors; Local Factors; and Project Related Factors and each group's aggregate weighting score was correlated with achievements. The correlation results were shown in Table 6.4.5 and 6.4.6. It has to be noted that the degree of correlationships was very much lower and less significant in the unsuccessful developments for both office and shop developments.

FACTORS	SPEARMAN CORRELATION COEFFICIENT							
	OFFICE				SHOP			
	Correlation		Significance		Correlation		Significance	
Economic	Very low	- 0 0394	Very low	0.869	Low	- 0.2727	Low	0.345
Local	Low	0.2387	Low	0.311	Low	0.3222	Low	0.261
Project	Low	0.2241	Low	0.342	Low	0.3840	Low	0.175

Table 6.4.5: Achievements vs grouped constructs weighting
[Successful office & shop]

FACTORS	SPEARMAN CORRELATION COEFFICIENT							
	OFFICE				SHOP			
	Correlation		Significance		Correlation		Significance	
Economic	Very low	0.0469	Very low	0.844	Low	0.1242	Low	0.672
Local	Very low	- 0.0294	Very low	0.902	Low	- 0.3305	Low	0.248
Project	Very low	- 0.0488	Very low	0.838	Very low	0.0901	Very low	0.759

Table 6.4.6: Achievements vs grouped constructs weighting
[Moderately successful office & shop]

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6.5 CONSTRUCTS' WEIGHTING OF DECISION MAKERS GROUPED BY ACHIEVEMENTS

A further analysis to identify relationships between achievement and the constructs' weighting is to examine the mode weighting of the constructs indicated by the decision makers grouped according to their achievements. As explained in section 5.5.2, the decision makers were grouped into high, medium and low achievers. Each group can be broken down further according to the following criteria:

    i) having different academic qualifications;

    ii) having different professional qualification;

    iii) having high, medium and low experience in property development;

    iv) having high, medium and low decision making involvement; and

    v) showing positive and negative attitudes towards risk.

The following analysis only considers' constructs weightings of successful office and shop developments because Table 6.4.6 shows that the relationships between constructs' weighting and achievements for moderately successful office and shop developments were too insignificant to justify further investigation.

6.5.1 Above average achievers' constructs weighting

a) Office development

Table 6.5.1 shows the mode weighting of the constructs stated by the high achievers possessing various academic qualifications in the consideration of the successful outcomes of office developments. In the evaluation of Economic Factors, the degree holders gave the highest weighting score, followed by the diploma holders and the unqualified respondents the lowest. In the weighting of Local Factors, all the decision makers gave almost similar weighting. It was observed that there was a significant difference in the weightings of Project Factors given by the unqualified respondents. However, the respondents gave an almost similar overall total score.

A quite identical pattern was observed in the mode weighting of constructs indicated by high achievers with and without professional qualifications as shown in Table 6.5.2. In the evaluation of Economic Factors, the respondents without professional qualification gave the lowest weighting score. In the weighting of

Local Factors, all the decision makers gave almost similar weighting. It was observed that there was a significant difference in the weightings of Project Factors given by the non-professionally qualified respondents. However, all the respondents gave a similar overall total score.

The mode weighting of constructs indicated by above average achievers with various years of experience in property development is shown in Table 6.5.3. Generally, all the respondents gave similar aggregate weighting for the Economic, Local and Project Related factors. Obviously, all respondents irrespective of having high, medium and low experience, produced a similar total weighting for all the constructs.

Generally, it was observed that the high achievers came up with a similar total weighting score for all the constructs regardless of the varied years of their decision making involvement, as indicated in Table 6.5.4, or having positive or negative attitude towards risk as shown in Table 6.5.5.

FACTORS	ACADEMIC QUALIFICATIONS		
	DEGREE (4)	DIPLOMA (1)	NO DEGREE (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	5	5	3
3. Easily let/sold	5	5	3
4. Low land purchase	3	4	3
5. Growth of rental values	5	2	3
6. Fall in yield	5	5	3
7. Good econ.conditions	5	5	5
8. Right market conditions	5 (38)	4 (35)	4 (29)
LOCAL			
9. Good location	5	4	4
10. Good surr.facility	4	4	4
11. Right development size	4	4	4
12. Opportunities taken	3 (16)	4 (16)	3 (15)
PROJECT			
13. Good building design	3	3	5
14. High specification bldg.	3	3	4
15. Tenants satisfied	5	3	5
16. Good funding terms	5	3	3
17. Design and build	2	2	2
18. Within budget	4	5	4
19. Bldg.cost under control	3	4	3
20. Completion on time	3	3	4
21. Short const.period	2	3	4
22. Initial team selection	2	3	3
23. Good co-op fr.stat.auth	2	3	3
24. New development	2	2	3
25. Low building cost	2	2	3
26. High quality landscape	1	2	2
27. Clear vacant site	1 (40)	1 (43)	1 (49)
Total:	94	93	93

Table 6.5.1: Academic qualifications & high achievers' mode weighting [Office]

	PROF. QUALIFICATIONS		
FACTORS	FRICS (3)	ARICS (2)	NIL (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	5	4	3
3. Easily let/sold	5	5	3
4. Low land purchase	4	4	3
5. Growth of rental values	5	5	3
6. Fall in yield	5	5	3
7. Good econ.conditions	5	5	4
8. Right market conditions	5 (39)	5 (38)	4 (28)
LOCAL			
9. Good location	3	5	3
10. Good surr.facility	2	4	4
11. Right development size	4	4	4
12. Opportunities taken	4 (13)	2 (15)	3 (14)
PROJECT			
13. Good building design	3	3	4
14. High spec. bldg.	3	3	4
15. Tenants satisfied	3	4	4
16. Good funding terms	5	5	3
17. Design and build	2	2	2
18. Within budget	4	4	4
19. Bldg.cost under control	4	3	4
20. Completion on time	3	3	4
21. Short const.period	2	2	4
22. Initial team selection	2	2	3
23. Good co-op fr.stat.auth	2	2	3
24. New development	2	2	3
25. Low building cost	2	4	3
26. High quality landscape	1	1	5
27. Clear vacant site	3 (41)	1 (41)	3 (53)
Total:	93	94	95

Table 6.5.2: Professional qualifications & high achievers' mode weighting [Office]

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FACTORS	EXPERIENCE IN PTY. DEV.		
	HIGH (4)	MEDIUM (1)	LOW (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	5	5	4
3. Easily let/sold	5	5	5
4. Low land purchase	1	4	4
5. Growth of rental values	5	3	5
6. Fall in yield	5	5	5
7. Good econ.conditions	4	5	5
8. Right market conditions	5 (35)	5 (37)	5 (38)
LOCAL			
9. Good location	4	4	4
10. Good surr.facility	4	4	4
11. Right development size	4	2	4
12. Opportunities taken	2 (14)	3 (13)	2 (14)
PROJECT			
13. Good building design	5	5	4
14. High specification bldg.	3	3	3
15. Tenants satisfied	4	5	4
16. Good funding terms	5	4	4
17. Design and build	2	2	2
18. Within budget	4	4	4
19. Bldg.cost under control	4	3	3
20. Completion on time	4	3	3
21. Short const.period	2	2	2
22. Initial team selection	2	2	3
23. Good co-op fr.stat.auth	2	2	2
24. New development	3	3	2
25. Low building cost	1	2	4
26. High quality landscape	1	1	1
27. Clear vacant site	2 (44)	1 (42)	1 (42)
Total:	93	92	94

Table 6.5.3: Experience in property develoment & high achievers' mode weighting [Office]

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FACTORS	DEC. MKG. INVOLVEMENT.		
	HIGH (4)	MEDIUM (1)	LOW (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	5	5	3
3. Easily let/sold	5	5	5
4. Low land purchase	4	3	3
5. Growth of rental values	5	3	5
6. Fall in yield	5	5	5
7. Good econ.conditions	5	5	5
8. Right market conditions	5 (39)	5 (36)	5 (36)
LOCAL			
9. Good location	3	5	5
10. Good surr.facility	2	4	4
11. Right development size	4	2	4
12. Opportunities taken	4 (13)	3 (14)	4 (17)
PROJECT			
13. Good building design	3	3	4
14. High spec. bldg.	3	3	3
15. Tenants satisfied	4	4	4
16. Good funding terms	5	5	5
17. Design and build	2	2	2
18. Within budget	4	4	4
19. Bldg.cost under control	4	3	3
20. Completion on time	3	3	2
21. Short const.period	2	2	2
22. Initial team selection	2	3	2
23. Good co-op fr.stat.auth	2	3	2
24. New development	2	3	2
25. Low building cost	2	3	4
26. High quality landscape	1	1	1
27. Clear vacant site	3 (42)	1 (43)	1 (41)
Total:	94	93	94

Table 6.5.4: Decision making involvement & high achievers' mode weighting [Office]

FACTORS	RISK ATTITUDE	
	POSITIVE (5)	NEGATIVE (2)
ECONOMICS		
1. Right timing	5	5
2. High demand	5	4
3. Easily let/sold	5	5
4. Low land purchase	4	4
5. Growth of rental values	5	5
6. Fall in yield	5	5
7. Good econ.conditions	5	4
8. Right market conditions	5 (39)	5 (37)
LOCAL		
9. Good location	5	4
10. Good surrounding facility	4	4
11. Right development size	4	4
12. Opportunities taken	3 (16)	4 (16)
PROJECT		
13. Good building design	3	3
14. High specification bldg.	3	3
15. Tenants satisfied	4	4
16. Good funding terms	5	5
17. Design and build	2	1
18. Within budget	4	4
19. Bldg. cost under control	3	3
20. Completion on time	2	3
21. Short construction period	2	2
22. Initial tean selection	2	3
23. Good co-op fr. stat.autho.	2	2
24. New development	2	2
25. Low building cost	2	4
26. High quality landscape	1	1
27. Clear vacant site	3 (38)	1 (41)
Total:	93	94

Table 6.5.5: Risk attitude & high achievers' mode weighting [Office]

b) Shop developments

Table 6.5.6 shows the mode weighting of the constructs produced by the respondents in their consideration of the successful outcome of shop developments. These respondents were high achievers who had varied academic qualifications. It was observed that they produced an almost identical weighting score for the economic, local and project related factors. Therefore, all the respondents regardless of holders of degrees in Estate Management, other degrees and diplomas as well as the unqualified produced an almost similar total weighting scores for all the constructs.

Generally, it was observed that the high achievers in successful shop developments came up with an almost similar total weighting score for all the constructs regardless of their professional qualifications (see Table 6.5.7); the varied years of their experience in property development (see Table 6.5.8) or decision making involvement, as indicated in Table 6.5.9; or having positive or negative attitude towards risk as shown in Table 6.5.10.

	FACTORS	ACADEMIC QUALIFICATIONS			
		DEGREE (3)	OTHER (1)	DIPLOMA (2)	NO DEGREE (2)
	ECONOMICS				
1.	Right timing	5	5	4	4
2.	High demand	4	5	5	5
3.	Easily let/sold	5	4	5	5
4.	Low land purchase	4	3	4	3
5.	Growth of rental values	5	5	5	5
6.	Fall in yield	4	4	4	4
7.	Good econ.conditions	5	4	4	5
8.	Right market conditions	5 (37)	5 (35)	5 (36)	4 (35)
	LOCAL				
9.	Good location	5	5	5	5
10.	Good surr.facility	4	4	4	4
11.	Right development size	4	4	2	3
12.	Opportunities taken	3 (16	4 (17)	4 (15)	3 (15)
	PROJECT				
13.	Good building design	4	4	4	4
14.	High specification bldg.	3	3	4	2
15.	Tenants satisfied	4	4	4	3
16.	Good funding terms	4	4	5	4
17.	Design and build	2	2	2	1
18.	Within budget	5	4	4	4
19.	Bldg.cost under control	3	4	4	4
20.	Completion on time	4	3	4	4
21.	Short const.period	2	2	2	3
22.	Initial team selection	3	2	3	3
23.	Good co-op fr.stat.auth	2	3	2	3
24.	New development	3	3	3	3
25.	Low building cost	2	3	2	2
26.	High quality landscape	1	1	1	2
27.	Clear vacant site	1 (43)	1 (43)	1 (45)	2 (44)
	Total:	96	95	96	94

Table 6.5.6: Academic qualifications & high achievers' mode weighting [Shop]

FACTORS	PROFESSIONAL QUALIFICATIONS		
	FRICS (2)	ARICS (4)	NIL (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	5	5	5
3. Easily let/sold	5	5	5
4. Low land purchase	4	4	4
5. Growth of rental values	4	5	5
6. Fall in yield	4	4	5
7. Good econ.conditions	5	5	4
8. Right market conditions	5 (37)	5 (38)	5 (38)
LOCAL			
9. Good location	5	5	5
10. Good surr.facility	4	4	4
11. Right development size	4	2	4
12. Opportunities taken	3 (16)	4 (15)	4 (17)
PROJECT			
13. Good building design	4	4	4
14. High spec. bldg.	4	4	3
15. Tenants satisfied	4	4	4
16. Good funding terms	4	5	4
17. Design and build	2	2	1
18. Within budget	2	3	3
19. Bldg.cost under control	4	4	4
20. Completion on time	4	3	3
21. Short const.period	2	2	2
22. Initial team selection	3	3	2
23. Good co-op fr.stat.auth	3	2	3
24. New development	3	2	3
25. Low building cost	2	2	3
26. High quality landscape	1	1	1
27. Clear vacant site	1 (43)	1 (42)	1 (41)
Total:	96	95	96

Table 6.5.7: Professional qualifications & high achievers' mode weighting [Shop]

	FACTORS	EXPERIENCE IN PROPERTY DEV.		
		HIGH (4)	MEDIUM (2)	LOW (2)
	ECONOMICS			
1.	Right timing	5	5	4
2.	High demand	5	5	5
3.	Easily let/sold	5	5	5
4.	Low land purchase	4	4	4
5.	Growth of rental values	4	5	5
6.	Fall in yield	4	4	4
7.	Good econ.conditions	5	5	4
8.	Right market conditions	5 (37)	5 (38)	5 (36)
	LOCAL			
9.	Good location	5	5	5
10.	Good surr.facility	4	4	4
11.	Right development size	4	4	2
12.	Opportunities taken	3 (16)	4 (17)	4 (15)
	PROJECT			
13.	Good building design	4	4	4
14.	High spec. bldg.	2	3	4
15.	Tenants satisfied	3	4	4
16.	Good funding terms	4	4	5
17.	Design and build	2	2	2
18.	Within budget	4	4	4
19.	Bldg.cost under control	4	4	4
20.	Completion on time	4	3	4
21.	Short const.period	2	2	2
22.	Initial team selection	3	2	3
23.	Good co-op fr.stat.auth	3	2	2
24.	New development	3	3	3
25.	Low building cost	2	3	2
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (42)	1 (42)	1 (45)
	Total:	95	97	96

Table 6.5.8: Experience in property develoment & high achievers' weighting [Shop]

FACTORS	DECISION MAKING INVOLVEMENT.		
	HIGH (3)	MEDIUM (3)	LOW (2)
ECONOMICS			
1. Right timing	5	4	5
2. High demand	5	5	5
3. Easily let/sold	5	5	5
4. Low land purchase	4	4	4
5. Growth of rental values	5	4	5
6. Fall in yield	4	4	3
7. Good econ.conditions	5	5	5
8. Right market conditions	5 (38)	5 (36)	5 (37)
LOCAL			
9. Good location	5	5	5
10. Good surr.facility	4	4	5
11. Right development size	4	4	4
12. Opportunities taken	4 (17)	3 (16)	4 (18)
PROJECT			
13. Good building design	4	4	4
14. High spec. bldg.	3	2	2
15. Tenants satisfied	4	4	4
16. Good funding terms	4	4	5
17. Design and build	2	2	2
18. Within budget	3	4	3
19. Bldg.cost under control	4	4	4
20. Completion on time	3	4	3
21. Short const.period	2	2	2
22. Initial team selection	3	3	3
23. Good co-op fr.stat.auth	2	2	2
24. New development	3	3	2
25. Low building cost	2	2	2
26. High quality landscape	1	1	1
27. Clear vacant site	1 (41)	1 (42)	1 (40)
Total:	96	94	95

Table 6.5.9: Decision making involvement & high achievers' weighting [Shop]

	FACTORS	RISK ATTITUDE	
		POSITIVE (8)	NEGATIVE
	ECONOMICS		
1.	Right timing	5	-
2.	High demand	5	-
3.	Easily let/sold	5	-
4.	Low land purchase	4	-
5.	Growth of rental values	5	-
6.	Fall in yield	4	-
7.	Good econ.conditions	4	-
8.	Right market conditions	5 (37)	-
	LOCAL		
9.	Good location	5	-
10.	Good surrounding facility	4	-
11.	Right development size	4	-
12.	Opportunities taken	4 (17)	-
	PROJECT		
13.	Good building design	4	-
14.	High specification bldg.	4	-
15.	Tenants satisfied	4	-
16.	Good funding terms	4	-
17.	Design and build	2	-
18.	Within budget	3	-
19.	Bldg. cost under control	4	-
20.	Completion on time	3	-
21.	Short construction period	2	-
22.	Initial tean selection	3	-
23.	Good co-op fr. stat.autho.	2	-
24.	New development	3	-
25.	Low building cost	2	-
26.	High quality landscape	1	-
27.	Clear vacant site	1 (42)	-
	Total:	96	-

Table 6.5.10: Risk attitude & high achievers' mode weighting [Shop]

6.5.2 Medium achievers' constructs weighting

a) Office development

Table 6.5.11 shows the mode weighting of the constructs indicated by the respondents in their consideration of the successful outcome of office developments. The respondents were medium achievers possessing various academic qualifications. Generally, all the medium achievers gave almost similar weighting scores for the economic, local and project related factors. Therefore, holders of the degree in Estate Management and diploma as well as the unqualified respondent produced a similar total weighting for all the constructs.

It was also observed that the medium achievers in successful office developments came up with an almost identical total weighting score for all the constructs regardless of their professional qualifications (see Table 6.5.12); the varied years of their experience in property development (see Table 6.5.13) or decision making involvement, as indicated in Table 6.5.14; or whether having positive or negative attitude towards risk, as shown in Table 6.5.15.

FACTORS	ACADEMIC QUALIFICATIONS		
	DEGREE (3)	DIPLOMA (1)	NO DEGREE (2)
ECONOMICS			
1. Right timing	5	5	5
2. High demand	4	5	4
3. Easily let/sold	5	4	5
4. Low land purchase	4	3	4
5. Growth of rental values	5	5	3
6. Fall in yield	5	5	5
7. Good econ.conditions	5	4	5
8. Right market conditions	5 (38)	5 (36)	5 (36)
LOCAL			
9. Good location	4	5	5
10. Good surr.facility	4	2	4
11. Right development size	4	4	2
12. Opportunities taken	3 (15)	2 (13)	3 (14)
PROJECT			
13. Good building design	4	4	3
14. High spec. bldg.	3	3	3
15. Tenants satisfied	3	4	4
16. Good funding terms	3	4	5
17. Design and build	1	1	2
18. Within budget	3	3	4
19. Bldg.cost under control	3	2	3
20. Completion on time	3	3	3
21. Short const.period	2	2	2
22. Initial team selection	3	2	2
23. Good co-op fr.stat.auth	2	2	2
24. New development	2	3	2
25. Low building cost	2	3	2
26. High quality landscape	1	1	1
27. Clear vacant site	1 (36)	1 (38)	1 (39)
Total:	89	87	89

Table 6.5.11: Academic qualifications & medium achievers' mode weighting [Office]

	FACTORS	PROFESSIONAL QUALIFICATIONS		
		FRICS (4)	ARICS (1)	NIL (1)
	ECONOMICS			
1.	Right timing	5	5	5
2.	High demand	4	4	4
3.	Easily let/sold	5	4	4
4.	Low land purchase	4	4	3
5.	Growth of rental values	3	5	5
6.	Fall in yield	5	5	5
7.	Good econ.conditions	5	4	4
8.	Right market conditions	5 (36)	5 (36)	5 (35)
	LOCAL			
9.	Good location	4	4	4
10.	Good surr.facility	4	4	2
11.	Right development size	2	4	4
12.	Opportunities taken	3 (13)	3 (15)	4 (14)
	PROJECT			
13.	Good building design	3	4	4
14.	High spec. bldg.	3	3	3
15.	Tenants satisfied	4	3	4
16.	Good funding terms	3	3	4
17.	Design and build	2	1	1
18.	Within budget	4	3	3
19.	Bldg.cost under control	3	3	4
20.	Completion on time	3	3	3
21.	Short const.period	2	2	2
22.	Initial team selection	2	3	2
23.	Good co-op fr.stat.auth	2	2	2
24.	New development	2	2	3
25.	Low building cost	2	3	3
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (37)	1 (37)	1 (40)
	Total:	86	88	89

Table 6.5.12: Professional qualifications & medium achievers' mode weighting
[Office]

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	FACTORS	EXPERIENCE IN PROPERTY DEVELOPMENT		
		HIGH (1)	MEDIUM (3)	LOW (2)
	ECONOMICS			
1.	Right timing	5	5	5
2.	High demand	4	4	5
3.	Easily let/sold	5	5	5
4.	Low land purchase	4	4	4
5.	Growth of rental values	4	4	5
6.	Fall in yield	5	5	4
7.	Good econ.conditions	5	4	4
8.	Right market conditions	5 (37)	5 (36)	4 (36)
	LOCAL			
9.	Good location	4	5	5
10.	Good surr.facility	4	4	4
11.	Right development size	3	4	4
12.	Opportunities taken	3 (14)	3 (16)	3 (16)
	PROJECT			
13.	Good building design	4	4	4
14.	High spec. bldg.	3	3	3
15.	Tenants satisfied	3	3	3
16.	Good funding terms	3	4	3
17.	Design and build	1	1	1
18.	Within budget	3	3	3
19.	Bldg.cost under control	3	3	3
20.	Completion on time	3	3	3
21.	Short const.period	2	2	2
22.	Initial team selection	3	2	3
23.	Good co-op fr.stat.auth	2	2	2
24.	New development	2	2	2
25.	Low building cost	2	2	3
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (36)	1 (36)	1 (37)
	Total:	87	88	89

Table 6.5.13: Experience in property develoment & medium achievers' mode weighting [Office]

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	FACTORS	DECISION MAKING INVOLVEMENT.		
		HIGH (2)	MEDIUM (3)	LOW (1)
	ECONOMICS			
1.	Right timing	5	5	5
2.	High demand	4	4	5
3.	Easily let/sold	4	5	5
4.	Low land purchase	3	4	4
5.	Growth of rental values	5	3	5
6.	Fall in yield	5	5	4
7.	Good econ.conditions	4	5	4
8.	Right market conditions	5 (35)	5 (36)	5 (36)
	LOCAL			
9.	Good location	4	5	5
10.	Good surr.facility	2	4	4
11.	Right development size	4	2	4
12.	Opportunities taken	4 (14)	3 (14)	3 (16)
	PROJECT			
13.	Good building design	4	3	4
14.	High specification bldg.	3	3	3
15.	Tenants satisfied	4	4	3
16.	Good funding terms	3	5	3
17.	Design and build	1	2	1
18.	Within budget	3	4	3
19.	Bldg cost under control	4	3	3
20.	Completion on time	3	3	3
21.	Short const.period	2	2	2
22.	Initial team selection	2	2	3
23.	Good co-op fr.stat.auth	2	2	2
24.	New development	3	2	2
25.	Low building cost	2	2	3
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (38)	1 (39)	1 (37)
	Total:	87	89	89

Table 6.5.14: Decision making involvement & medium achievers' mode weighting [Office]

FACTORS	RISK ATTITUDE	
	POSITIVE (6)	NEGATIVE
ECONOMICS		
1. Right timing	5	-
2. High demand	4	-
3. Easily let/sold	5	-
4. Low land purchase	4	-
5. Growth of rental values	5	-
6. Fall in yield	5	-
7. Good econ.conditions	4	-
8. Right market conditions	5 (37)	-
LOCAL		
9. Good location	5	-
10. Good surr.facility	4	-
11. Right development size	4	-
12. Opportunities taken	3 (16)	-
PROJECT		
13. Good building design	4	-
14. High specification bldg.	3	-
15. Tenants satisfied	4	-
16. Good funding terms	3	-
17. Design and build	1	-
18. Within budget	3	-
19. Bldg. cost under control	3	-
20. Completion on time	3	-
21. Short construction period	2	-
22. Initial tean selection	2	-
23. Good co-op fr. stat.auth	2	-
24. New development	2	-
25. Low building cost	2	-
26. High quality landscape	1	-
27. Clear vacant site	1 (36)	-
Total:	89	-

Table 6.5.15: Risk attitude & medium achievers' mode weighting [Office]

b) Shop developments

Table 6.5.16 shows the mode weighting of the constructs indicated by the respondents in their consideration of the successful outcome of shop developments. The respondents were medium achievers with various academic qualifications. It was observed that all the respondents gave almost identical weighting scores for the economic, local and project related factors. Therefore, holders of the degree in Estate Management and diploma as well as the unqualified respondent produced an almost similar total weighting for all the constructs.

It was also observed that the medium achievers in successful shop developments came up with an almost identical total weighting score for all the constructs regardless of their professional qualifications (see Table 6.5.17); the varied years of their experience in property development (see Table 6.5.18) or decision making involvement, as indicated in Table 6.5.19; or whether having positive or negative attitude towards risk, as shown in Table 6.5.20.

	FACTORS	ACADEMIC QUALIFICATIONS		
		DEGREE (2)	DIPLOMA (1)	NO DEGREE (1)
	ECONOMICS			
1.	Right timing	5	4	4
2.	High demand	5	5	5
3.	Easily let/sold	5	4	4
4.	Low land purchase	4	2	4
5.	Growth of rental values	5	5	5
6.	Fall in yield	4	4	4
7.	Good econ.conditions	5	5	4
8.	Right market conditions	5 (38)	5 (34)	5 (35)
	LOCAL			
9.	Good location	5	4	5
10.	Good surr.facility	4	4	4
11.	Right development size	4	3	2
12.	Opportunities taken	3 (16)	3 (14)	4 (15)
	PROJECT			
13.	Good building design	4	4	4
14.	High spec.bldg.	3	3	3
15.	Tenants satisfied	3	4	4
16.	Good funding terms	4	5	5
17.	Design and build	1	2	1
18.	Within budget	4	3	4
19.	Bldg.cost under control	3	4	4
20.	Completion on time	3	2	3
21.	Short const.period	2	3	2
22.	Initial team selection	1	2	1
23.	Good co-op fr.stat.auth	1	2	1
24.	New development	3	2	3
25.	Low building cost	2	2	2
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (36)	1 (40)	1 (39)
	Total:	90	88	89

Table 6.5.16: Academic qualifications & medium achievers' mode weighting [Shop]

FACTORS	PROFESSIONAL QUALIFICATIONS	
	FRICS (1)	ARICS (3)
ECONOMIC		
1. Right timing	4	4
2. High demand	5	5
3. Easily let/sold	4	5
4. Low land purchase	4	4
5. Growth of rental values	5	5
6. Fall in yield	4	4
7. Good econ.conditions	4	5
8. Right market conditions	5 (35)	
LOCAL		
9. Good location	5	4
10. Good surr.facility	4	4
11. Right development size	2	4
12. Opportunities taken	4 (15)	3 (15)
PROJECT		
13. Good building design	4	4
14. High specificatn bldg.	3	3
15. Tenants satisfied	4	4
16. Good funding terms	5	4
17. Design and build	1	2
18. Within budget	4	3
19. Bldg.cost under control	4	3
20. Completion on time	3	3
21. Short const.period	2	1
22. Initial team selection	1	2
23. Good co-op fr.stat.auth	1	1
24. New development	3	3
25. Low building cost	2	2
26. High quality landscape	1	1
27. Clear vacant site	1 (39)	1 (37)
Total:	89	89

Table 6.5.17: Professional qualifications & medium achievers' mode weighting [Shop]

FACTORS	EXP. IN PROPERTY. DEV.		
	HIGH (1)	MEDIUM (1)	LOW (2)
ECONOMICS			
1. Right timing	4	4	5
2. High demand	5	5	5
3. Easily let/sold	4	4	5
4. Low land purchase	4	2	4
5. Growth of rental values	5	5	5
6. Fall in yield	4	4	4
7. Good econ.conditions	4	5	5
8. Right market conditions	5 (35)	5 (34)	5 (38)
LOCAL			
9. Good location	5	4	5
10. Good surr.facility	4	4	4
11. Right development size	2	3	4
12. Opportunities taken	4 (15)	3 (14)	4 (16)
PROJECT			
13. Good building design	4	4	4
14. High specification bldg.	3	3	3
15. Tenants satisfied	4	4	3
16. Good funding terms	5	5	4
17. Design and build	1	2	1
18. Within budget	4	3	4
19. Bldg.cost under control	4	4	3
20. Completion on time	3	2	3
21. Short const.period	2	3	2
22. Initial team selection	1	2	1
23. Good co-op fr.stat.auth	1	2	1
24. New development	3	2	3
25. Low building cost	2	2	2
26. High quality landscape	1	1	1
27. Clear vacant site	1 (39)	1 (40)	1 (36)
Total:	89	88	90

Table 6.5.18: Experience in property develoment & medium achievers' mode weighting [Shop]

FACTORS	HIGH	DECISION MAKING INVOLVEMENT	
		MEDIUM (2)	LOW (2)
ECONOMICS			
1. Right timing	-	5	4
2. High demand	-	5	5
3. Easily let/sold	-	5	5
4. Low land purchase	-	4	3
5. Growth of rental values	-	5	5
6. Fall in yield	-	4	4
7. Good econ.conditions	-	5	5
8. Right market conditions	-	5 (38)	5 (36)
LOCAL			
9. Good location	-	5	5
10. Good surr. facility	-	4	4
11. Right development size	-	4	4
12. Opportunities taken	-	3 (16)	3 (16)
PROJECT			
13. Good building design	-	4	4
14. High specification bldg.	-	3	3
15. Tenants satisfied	-	3	3
16. Good funding terms	-	4	3
17. Design and build	-	1	2
18. Within budget	-	4	3
19. Bldg.cost under control	-	3	3
20. Completion on time	-	3	3
21. Short const. period	-	2	2
22. Initial team selection	-	1	2
23. Good co-op fr.stat.auth	-	1	2
24. New development	-	3	3
25. Low building cost	-	2	2
26. High quality landscape	-	1	1
27. Clear vacant site	-	1 (36)	1 (37)
Total:	-	90	89

Table 6.5.19: Decision making involvement & medium achievers' mode weighting [Shop]

FACTORS	RISK ATTITUDE	
	POSITIVE (1)	NEGATIVE (3)
ECONOMICS		
1. Right timing	4	4
2. High demand	5	5
3. Easily let/sold	5	4
4. Low land purchase	4	3
5. Growth of rental values	5	5
6. Fall in yield	4	4
7. Good econ.conditions	5	4
8. Right market conditions	5 (37)	5 (34)
LOCAL		
9. Good location	5	4
10. Good surrounding facility	4	4
11. Right development size	4	2
12. Opportunities taken	3 (16)	3 (13)
PROJECT		
13. Good building design	3	4
14. High specification bldg.	3	3
15. Tenants satisfied	3	4
16. Good funding terms	4	5
17. Design and build	2	2
18. Within budget	4	3
19. Bldg. cost under control	3	4
20. Completion on time	4	3
21. Short construction period	1	2
22. Initial tean selection	1	2
23. Good co-op fr. stat.autho.	2	2
24. New development	3	3
25. Low building cost	2	2
26. High quality landscape	1	1
27. Clear vacant site	1 (37)	1 (41)
Total:	90	88

Table 6.5.20: Risk attitude & medium achievers' mode weighting [Shop]

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6.5.3 Below average achievers constructs' weighting

a) Office development

Table 6.5.21 shows the mode weighting of the constructs indicated by the respondents in their consideration of the successful outcome of office developments. The respondents were low achievers possessing various academic qualifications or had no qualifications. All the respondents gave almost identical weighting scores for the economic, local and project related factors. Therefore, holders of the degree in Estate Management, other degree and diploma as well as the unqualified respondent produced an almost similar total weighting for all the constructs.

It was also observed that these low achievers came up with an almost identical total weighting scores for all the constructs, regardless of their professional qualifications (see Table 6.5.22); the varied years of their experience in property development (see Table 6.5.23) or decision making involvement, as indicated in Table 6.5.24; or whether having positive or negative attitude towards risk, as shown in Table 6.5.25.

FACTORS	ACADEMIC QUALIFICATIONS			
	DEGREE (2)	OTHER (1)	DIPLOMA (2)	NO DEGREE (2)
ECONOMICS				
1. Right timing	5	5	5	5
2. High demand	5	5	5	3
3. Easily let/sold	5	4	4	5
4. Low land purchase	3	2	2	3
5. Growth of rental values	5	5	5	3
6. Fall in yield	5	5	5	5
7. Good econ.conditions	4	4	4	4
8. Right market conditions	4 (36)	5 (35)	5 (35)	5 (33)
LOCAL				
9. Good location	4	4	4	4
10. Good surr. facility	2	4	4	2
11. Right development size	2	2	2	2
12. Opportunities taken	3 (11)	2 (12)	2 (12)	4 (12)
PROJECT				
13. Good building design	3	4	4	4
14. High specification bldg.	3	3	4	4
15. Tenants satisfied	4	4	4	4
16. Good funding terms	3	5	4	3
17. Design and build	2	1	1	2
18. Within budget	3	3	3	3
19. Bldg. cost under control	3	4	4	4
20. Completion on time	3	1	1	3
21. Short const. period	2	3	3	2
22. Initial team selection	2	1	1	2
23. Good co-op fr.stat.auth	2	1	1	2
24. New development	3	2	2	2
25. Low building cost	2	2	2	2
26. High quality landscape	1	1	1	1
27. Clear vacant site	1 (37)	1 (36)	1 (36)	1 (39)
Total:	84	83	83	84

Table 6.5.21: Academic qualifications & low achievers' mode weighting [Office]

	PROFESSIONAL QUALIFICATION	
FACTORS	FRICS (1)	ARICS (6)
ECONOMICS		
1. Right timing	5	5
2. High demand	5	5
3. Easily let/sold	4	5
4. Low land purchase	2	3
5. Growth of rental values	5	5
6. Fall in yield	5	5
7. Good econ.conditions	4	4
8. Right market conditions	5 (35)	5 (37)
LOCAL		
9. Good location	4	4
10. Good surr. facility	2	4
11. Right development size	2	2
12. Opportunities taken	4 (12)	2 (12)
PROJECT		
13. Good building design	4	4
14. High specificatn bldg.	3	3
15. Tenants satisfied	4	4
16. Good funding terms	4	4
17. Design and build	2	2
18. Within budget	2	2
19. Bldg.cost under control	4	4
20. Completion on time	3	3
21. Short const.period	1	2
22. Initial team selection	1	1
23. Good co-op fr.stat.auth	2	2
24. New development	2	1
25. Low building cost	2	1
26. High quality landscape	1	1
27. Clear vacant site	1 (36)	1 (35)
Total:	83	84

Table 6.5.22: Professional qualifications & low achievers' mode weighting [Office]

	FACTORS	EXPERIENCE IN PROPERTY DEVELOPMENT		
		HIGH (1)	MEDIUM (1)	LOW (5)
	ECONOMICS			
1.	Right timing	5	5	5
2.	High demand	5	5	5
3.	Easily let/sold	4	4	5
4.	Low land purchase	2	2	2
5.	Growth of rental values	5	5	5
6.	Fall in yield	5	5	5
7.	Good econ.conditions	4	4	4
8.	Right market conditions	5 (34)	5 (35)	5 (37)
	LOCAL			
9.	Good location	4	4	4
10.	Good surr.facility	4	4	2
11.	Right development size	2	2	2
12.	Opportunities taken	4 (14)	2 (12)	3 (11)
	PROJECT			
13.	Good building design	3	4	4
14.	High specification bldg.	2	4	3
15.	Tenants satisfied	3	4	4
16.	Good funding terms	5	4	3
17.	Design and build	2	1	2
18.	Within budget	3	3	3
19.	Bldg.cost under control	4	4	4
20.	Completion on time	3	1	3
21.	Short const.period	2	3	2
22.	Initial team selection	2	1	1
23.	Good co-op fr.stat.auth	2	1	1
24.	New development	1	2	3
25.	Low building cost	2	2	1
26.	High quality landscape	1	1	1
27.	Clear vacant site	1 (36)	1 (36)	1 (36)
	Total:	84	83	84

Table 6.5.23: Experience in property development & low achievers' mode weighting [Office]

FACTORS	DECISION MAKING INVOLVEMENT		
	HIGH	MEDIUM (2)	LOW (5)
ECONOMICS			
1. Right timing	-	5	5
2. High demand	-	5	5
3. Easily let/sold	-	4	5
4. Low land purchase	-	4	3
5. Growth of rental values	-	5	5
6. Fall in yield	-	5	5
7. Good econ.conditions	-	4	4
8. Right market conditions	-	5 (37)	5 (37)
LOCAL			
9. Good location	-	3	4
10. Good surr. facility	-	3	4
11. Right development size	-	2	2
12. Opportunities taken	-	3 (11)	3 (13)
PROJECT			
13. Good building design	-	4	4
14. High specification bldg.	-	3	3
15. Tenants satisfied	-	4	4
16. Good funding terms	-	4	3
17. Design and build	-	2	1
18. Within budget	-	4	3
19. Bldg.cost under control	-	4	4
20. Completion on time	-	1	2
21. Short const.period	-	2	1
22. Initial team selection	-	1	2
23. Good co-op fr.stat.auth	-	2	1
24. New development	-	1	2
25. Low building cost	-	2	2
26. High quality landscape	-	1	1
27. Clear vacant site	-	1 (36)	1 (34)
Total:	-	84	84

Table 6.5.24: Decision making involvement & low achievers' mode weighting [Office]

FACTORS	RISK ATTITUDE	
	POSITIVE (3)	NEGATIVE (4)
ECONOMICS		
1. Right timing	5	5
2. High demand	5	5
3. Easily let/sold	5	4
4. Low land purchase	3	2
5. Growth of rental values	5	5
6. Fall in yield	5	5
7. Good econ.conditions	4	4
8. Right market conditions	5 (37)	5 (35)
LOCAL		
9. Good location	4	4
10. Good surrounding facility	4	4
11. Right development size	1	2
12. Opportunities taken	3 (12)	2 (12)
PROJECT		
13. Good building design	4	4
14. High specification bldg.	3	3
15. Tenants satisfied	4	4
16. Good funding terms	3	4
17. Design and build	1	1
18. Within budget	3	3
19. Bldg. cost under control	4	4
20. Completion on time	3	2
21. Short construction period	1	2
22. Initial tean selection	1	1
23. Good co-op fr. stat.autho.	1	2
24. New development	3	2
25. Low building cost	2	2
26. High quality landscape	1	1
27. Clear vacant site	1 (35)	1 (36)
Total:	84	83

Table 6.5.25: Risk attitude & low achievers' mode weighting [Office]

b) Shop developments

Table 6.5.26 shows the mode weighting of the constructs produced by low achievers in their consideration of the successful shop developments. These two respondents had the degree in Estate Management, produced a score of 33 for economic factors, 14 for local factors and 38 for project related factors. The aggegate total of the weighting was 85.

Generally, it was observed that the below average achievers in successful shop developments came up with an almost identical total weighting score for all the constructs regardless of being accredited with ARICS (see Table 6.5.27); low experience in property development (see Table 6.5.28) or low decision making involvement, as indicated in Table 6.5.29; or finally whether having positive or negative attitude towards risk as shown in Table 6.5.30.

| | FACTORS | ACADEMIC QUALIFICATION | |
		DEGREE (2)	OTHER
	ECONOMICS		
1.	Right timing	4	-
2.	High demand	4	-
3.	Easily let/sold	5	-
4.	Low land purchase	3	-
5.	Growth of rental values	5	-
6.	Fall in yield	4	-
7.	Good econ.conditions	4	-
8.	Right market conditions	4 (33)	-
	LOCAL		
9.	Good location	5	-
10.	Good surr.facility	4	-
11.	Right development size	2	-
12.	Opportunities taken	3 (14)	-
	PROJECT		
13.	Good building design	3	-
14.	High specificatn. bldg.	3	-
15.	Tenants satisfied	4	-
16.	Good funding terms	4	-
17.	Design and build	2	-
18.	Within budget	3	-
19.	Bldg.cost under control	3	-
20.	Completion on time	3	-
21.	Short const.period	1	-
22.	Initial team selection	3	-
23.	Good co-op fr.stat.auth	2	-
24.	New development	3	-
25.	Low building cost	2	-
26.	High quality landscape	1	-
27.	Clear vacant site	1 (38)	-
	Total:	85	-

Table 6.5.26: Academic qualifications & low achiever's weighting [Shop]

FACTORS	PROFESSIONAL QUALIFICATION	
	ARICS (2)	OTHER
ECONOMICS		-
1. Right timing	4	
2. High demand	4	-
3. Easily let/sold	5	-
4. Low land purchase	3	-
5. Growth of rental values	5	-
6. Fall in yield	4	-
7. Good econ.conditions	4	-
8. Right market conditions	4 (33)	-
LOCAL		
9. Good location	5	-
10. Good surr. facility	4	-
11. Right development size	2	-
12. Opportunities taken	3 (14)	-
PROJECT		
13. Good building design	3	-
14. High spec.bldg.	3	-
15. Tenants satisfied	4	-
16. Good funding terms	4	-
17. Design and build	2	-
18. Within budget	3	-
19. Bldg.cost under control	3	-
20. Completion on time	3	-
21. Short const.period	1	-
22. Initial team selection	3	-
23. Good co-op fr.stat.auth	2	-
24. New development	3	-
25. Low building cost	2	-
26. High quality landscape	1	-
27. Clear vacant site	1 (38)	-
Total:	85	-

Table 6.5.27: Prof. qualifications & low achievers's weighting [Shop]

FACTORS	EXPERIENCE IN PROPERTY DEVELOPMENT		
	HIGH	MEDIUM	LOW (2)
ECONOMICS			
1. Right timing	-	-	4
2. High demand	-	-	4
3. Easily let/sold	-	-	5
4. Low land purchase	-	-	3
5. Growth of rental values	-	-	5
6. Fall in yield	-	-	4
7. Good econ.conditions	-	-	4
8. Right market conditions	-	-	4 (33)
LOCAL			
9. Good location	-	-	5
10. Good surr. facility	-	-	4
11. Right development size	-	-	2
12. Opportunities taken	-	-	3 (14)
PROJECT			
13. Good building design	-	-	3
14. High specification bldg.	-	-	3
15. Tenants satisfied	-	-	4
16. Good funding terms	-	-	4
17. Design and build	-	-	2
18. Within budget	-	-	3
19. Bldg.cost under control	-	-	3
20. Completion on time	-	-	3
21. Short constr. period	-	-	1
22. Initial team selection	-	-	3
23. Good co-op fr.stat.auth	-	-	2
24. New development	-	-	3
25. Low building cost	-	-	2
26. High quality landscape	-	-	1
27. Clear vacant site	-	-	1 (38)
Total:	-	-	85

Table 6.5.27: Experience in property development & low achiever's weighting [Shop]

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FACTORS	DECISION MAKING INVOLVEMENT		
	HIGH	MEDIUM	LOW (2)
ECONOMICS			
1. Right timing	-	-	4
2. High demand	-	-	4
3. Easily let/sold	-	-	5
4. Low land purchase	-	-	3
5. Growth of rental values	-	-	5
6. Fall in yield	-	-	4
7. Good econ.conditions	-	-	4
8. Right market conditions	-	-	4 (33)
LOCAL			
9. Good location	-	-	5
10. Good surr.facility	-	-	4
11. Right development size	-	-	2
12. Opportunities taken	-	-	3 (14)
PROJECT			
13. Good building design	-	-	3
14. High specification bldg.	-	-	3
15. Tenants satisfied	-	-	4
16. Good funding terms	-	-	4
17. Design and build	-	-	2
18. Within budget	-	-	3
19. Bldg.cost under control	-	-	3
20. Completion on time	-	-	3
21. Short constr.period	-	-	1
22. Initial team selection	-	-	3
23. Good co-op fr stat.auth	-	-	2
24. New development	-	-	3
25. Low building cost	-	-	2
26. High quality landscape	-	-	1
27. Clear vacant site	-	-	1 (38)
Total:	-	-	85

Table 6.5.29: Decision making involvement & low achiever's weighting [Shop]

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		RISK ATTITUDE	
	FACTORS	POSITIVE (1)	NEGATIVE (1)
	ECONOMICS		
1.	Right timing	4	5
2.	High demand	5	4
3.	Easily let/sold	5	5
4.	Low land purchase	3	3
5.	Growth of rental values	5	5
6.	Fall in yield	4	4
7.	Good econ.conditions	4	4
8.	Right market conditions	4 (34)	5 (35)
	LOCAL		
9.	Good location	5	5
10.	Good surrounding facility	4	4
11.	Right development size	2	3
12.	Opportunities taken	3 (14)	3 (15)
	PROJECT		
13.	Good building design	3	4
14.	High specification bldg.	3	3
15.	Tenants satisfied	4	4
16.	Good funding terms	4	4
17.	Design and build	2	1
18.	Within budget	3	4
19.	Bldg. cost under control	2	3
20.	Completion on time	3	3
21.	Short construction period	2	1
22.	Initial tean selection	2	2
23.	Good co-op fr. stat.autho.	2	1
24.	New development	3	2
25.	Low building cost	2	2
26.	High quality landscape	1	1
27.	Clear vacant site	1 (37)	1 (36)
	Total:	85	86

Table 6.5.30: Risk attitude & low achievers mode weighting [Shop]

6.5.4 Comparison of grouped decision makers constructs' weighting total score

Table 6.6.31 shows that decision makers having similar degrees of achievements produced identical constructs' weighting total score regardless of their varied academic or professional qualifications; experience in property development; decision making involvement ; and or risk attitude. This occurred in both office and shop developments. In office development the total weighting score indicated by the high achievers was in the range of 92 to 95; medium achievers total weighting score was between 86 to 89 and low achievers total weighting score was between 83 to 84. While for shop development the total weighting score indicated by high achievers was

DECISION MAKERS ATTRIBUTES	TOTAL WEIGHTING MODE SCORE					
	OFFICE			SHOP		
	High (7)	Medium (6)	Low (7)	High (8)	Medium (4)	Low (2)
ACADEMIC QUALIFICATION						
1. Degree in Est. Mgt.	94 (4)	89 (3)	84 (2)	96 (3)	90 (2)	85 (2)
2. Other degree	-	87 (1)	83 (1)	95 (1)	-	-
3. Diploma	93 (1)	-	84 (2)	96 (2)	88 (1)	-
4. Nil	93 (2)	89 (2)	84 (2)	94 (2)	89 (1)	-
PROFESSIONAL QUALIFICATION						
1. FRICS	93 (3)	86 (4)	-	96 (2)	89 (1)	-
2. ARICS	94 (2)	88 (1)	84 (7)	95 (4)	89 (3)	85 (2)
3. Nil	95 (2)	89 (1)	-	96 (2)		
EXPERIENCE IN PROPERTY DEVELOPMENT						
1. High	93 (4)	87 (1)	84 (1)	95 (4)	89 (1)	-
2. Medium	92 (1)	88 (3)	83 (1)	97 (2)	88 (1)	-
3. Low	94 (2)	89 (2)	84 (5)	96 (2)	90 (2)	85 (2)
DECISION MAKING INVOLVEMENT						
1. High	94 (4)	87 (2)	-	96 (3)	-	-
2. Medium	93 (1)	89 (3)	84 (2)	94 (3)	90 (2)	-
3. Low	94 (2)	89 (1)	84 (5)	95 (2)	89 (2)	85 (2)
RISK ATTITUDE						
1. Positive	93 (5)	89 (6)	84 (3)	96 (8)	90 (1)	85 (1)
2. Negative	94 (2)	-	83 (4)	-	88 (3)	86 (1)

Table 6.5.31: Comparison of grouped decision makers constructs weighting total score

in the range of 94 to 96; medium achievers total weighting score was between 88 to 90 and low achievers total weighting score was between 85 and 86.

Referring to Table 6.5.31, the figure in brackets denotes the number of decision makers. It has to be noted that the constructs total weighting score descended as the decision makers achievement rate decreased. This probably was due to the decision makers giving high degree of importance to a lesser number of factors which then resulted in the lowering of the achievement rate. This possibility is to be examined in the following section.

6.6 CONSTRUCTS' WEIGHTING OF DECISION MAKERS GROUPED BY THEIR ATTRIBUTES

It was noted in the preceding section that the constructs' total weighting scores were, firstly, almost identical among the same category of achievers and, secondly, reducing as the rate of achievement declined. Analysing the constructs' weighting of respondents who have different achievement rates i.e. high, medium and low but possessing similar attributes e.g holding degrees in Estate Management, would probably reveal some trend which may explain these circumstances. The following sections will examine and explain the results of this analysis.

6.6.1 Office development

Table 6.6.1 shows the mode weighting of the constructs given by the Estate Management degree holders in their consideration of successful office developments. The respondents were comprised of 4 high achievers, 3 medium and 2 low achievers. Comparing the number of constructs the decision makers gave very high and very low weighting, it was observed that the high achievers gave very high weighting to 10 constructs; the medium achievers 6 constructs and the low achievers 5 constructs. On the other hand, the high achievers did not give very low weighting to any of the factors but the medium achievers gave very low weighting to 3 constructs and the low achievers gave a similar weighting to 2 constructs.

The mode weighting of the constructs given by the other degree holders attaining medium and low achievements for successsful office development are shown in Table 6.6.2. It was observed that the medium achiever gave very high

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weighting to 6 constructs; and the low achievers 5 constructs. On the other hand, the medium achiever gave very low weighting to 3 constructs but the low achiever gave very low weighting to 6 constructs.

It was generally observed that, as the achievement rate declined, the number of constructs given very high weighting were reduced and correspondingly the number of factors given low weighting increased. This seemed to occur in examining the various achievements of respondents with diploma qualifications, as shown in Table 6.6.3; having no academic qualifications (see Table 6.6.4); accredited with FRICS (Table 6.6.5); accredited with ARICS (Table 6.6.7); having no professional qualifications (Table 6.6.7); having high, medium, and low experience in property development (Tables 6.6.8, 6.6.9 and 6.6.10 respectively); having high, medium, and low decision making involvement (Tables 6.6.11, 6.6.12 and 6.6.13 respectively); and having positive and negative risk attitudes towards risk (Table 6.6.14 and Table 6.6.15 respectively). It was also noticed that the variation in the number of constructs given high weighting occurred mostly within the economic factors group.

FACTORS	EST. MGT. DEGREE HOLDERS														
	High (4)					Medium (3)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔					✔						✔
2. High demand				✔				✔							✔
3. Easily let/sold				✔					✔						✔
4. Low land purchase				✔				✔					✔		
5. Growth of rental values		✔							✔						✔
6. Fall in yield				✔					✔						✔
7. Good econ. conditions				✔					✔					✔	
8. Right market conditions				✔					✔					✔	
LOCAL															
9. Good location				✔				✔						✔	
10. Good surr. facility			✔					✔				✔			
11. Right development size			✔					✔				✔			
12. Opportunities taken			✔					✔					✔		
PROJECT															
13. Good building design			✔						✔				✔		
14. High specification bldg.			✔					✔					✔		
15. Tenants satisfied				✔				✔						✔	
16. Good funding terms				✔				✔					✔		
17. Design and build		✔				✔							✔		
18. Within budget				✔				✔					✔		
19. Bldg.cost under control			✔					✔					✔		
20. Completion on time			✔					✔					✔		
21. Short const. period		✔					✔						✔		
22. Initial team selection		✔						✔					✔		
23. Good co-op fr.stat.auth		✔					✔						✔		
24. New development		✔					✔							✔	
25. Low building cost		✔					✔						✔		
26. High quality landscape		✔				✔						✔			
27. Clear vacant site		✔				✔						✔			
Total:	-	8	6	3	10	3	4	8	6	6	2	7	9	4	5

Table 6.6.1: Estate/Land Management.degree holders constructs' weighting [Office]

FACTORS	OTHER DEGREE HOLDERS									
	Medium (1)					Low (1)				
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Right timing				✔						✔
2. High demand				✔						✔
3. Easily let/sold			✔						✔	
4. Low land purchase		✔					✔			
5. Growth of rental values				✔						✔
6. Fall in yield				✔						✔
7. Good econ. conditions			✔						✔	
8. Right market conditions				✔						✔
LOCAL										
9. Good location				✔					✔	
10. Good surr. facility	✔								✔	
11. Right development size			✔				✔			
12. Opportunities taken		✔					✔			
PROJECT										
13. Good building design			✔						✔	
14. High specification bldg.		✔							✔	
15. Tenants satisfied			✔						✔	
16. Good funding terms			✔						✔	
17. Design and build	✔					✔				
18. Within budget			✔					✔		
19. Bldg.cost under control		✔							✔	
20. Completion on time			✔			✔				
21. Short cons. period		✔						✔		
22. Initial team selection		✔				✔				
23. Good co-op fr.stat.auth		✔				✔				
24. New development			✔				✔			
25. Low building cost			✔				✔			
26. High quality landscape	✔					✔				
27. Clear vacant site	✔					✔				
Total:	3	6	6	6	6	6	5	2	9	5

Table 6.6.2: Other degree holders constructs' weighting [Office]

FACTORS	DIPLOMA HOLDERS									
	High (1)					Low (2)				
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Right timing					✔					✔
2. High demand					✔			✔		
3. Easily let/sold					✔					✔
4. Low land purchase				✔				✔		
5. Growth of rental values		✔						✔		
6. Fall in yield				✔						✔
7. Good econ. conditions				✔					✔	
8. Right market conditions			✔							✔
LOCAL										
9. Good location			✔						✔	
10. Good surr. facility			✔				✔			
11. Right development size			✔				✔			
12. Opportunities taken			✔						✔	
PROJECT										
13. Good building design			✔						✔	
14. High specification bldg.			✔						✔	
15. Tenants satisfied			✔						✔	
16. Good funding terms			✔					✔		
17. Design and build		✔					✔			
18. Within budget				✔				✔		
19. Bldg.cost under control			✔						✔	
20. Completion on time			✔					✔		
21. Short const.period			✔				✔			
22. Initial team selection			✔				✔			
23. Good co-op fr.stat.auth			✔				✔			
24. New development		✔					✔			
25. Low building cost		✔					✔			
26. High quality landscape		✔				✔				
27. Clear vacant site	✔					✔				
Total:	1	5	8	7	6	2	8	6	7	4

Table 6.6.3: Diploma holders constructs' weighting for office development

FACTORS	NON-DEGREE HOLDERS														
	High (2)					Medium (2)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✓				✓						✓
2. High demand		✓							✓						✓
3. Easily let/sold		✓							✓					✓	
4. Low land purchase		✓							✓			✓			
5. Growth of rental values		✓						✓							✓
6. Fall in yield		✓							✓						✓
7. Good econ. conditions				✓					✓					✓	
8. Right market conditions			✓						✓						✓
LOCAL															
9. Good location			✓						✓						✓
10. Good surr. facility			✓						✓					✓	
11. Right development size			✓				✓					✓			
12. Opportunities taken			✓					✓				✓			
PROJECT															
13. Good building design				✓				✓						✓	
14. High specification bldg.			✓					✓					✓		
15. Tenants satisfied				✓					✓					✓	
16. Good funding terms			✓						✓						✓
17. Design and build	✓						✓					✓			
18. Within budget			✓						✓			✓			
19. Bldg cost under control			✓					✓						✓	
20. Completion on time			✓					✓						✓	
21. Short const. period			✓				✓					✓			
22. Initial team selection		✓					✓				✓				
23. Good co-op fr.stat.auth		✓					✓				✓				
24. New development		✓					✓				✓				
25. Low building cost		✓					✓					✓			
26. High quality landscape	✓					✓					✓				
27. Clear vacant site	✓					✓					✓				
Total:	1	2	12	8	4	2	7	6	5	7	5	7	2	6	7

Table 6.6.4: Non-degree holders constructs' weighting [Office]

RESPONDENTS WITH FRICS

FACTORS	High (3)					Medium (3)					Low (1)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔					✔					✔
2. High demand					✔				✔						✔
3. Easily let/sold					✔					✔					✔
4. Low land purchase				✔					✔				✔		
5. Growth of rental values					✔			✔							✔
6. Fall in yield					✔					✔					✔
7. Good econ.conditions					✔					✔				✔	
8. Right market conditions					✔					✔					✔
LOCAL															
9. Good location			✔						✔					✔	
10. Good surr.facility		✔							✔					✔	
11. Right development size				✔				✔					✔		
12. Opportunities taken				✔				✔					✔		
PROJECT															
13. Good building design			✔					✔						✔	
14. High specification bldg.			✔					✔					✔		
15. Tenants satisfied			✔						✔					✔	
16. Good funding terms					✔			✔						✔	
17. Design and build		✔					✔					✔			
18. Within budget				✔					✔			✔			
19. Bldg.cost under control				✔				✔						✔	
20. Completion on time			✔					✔					✔		
21. Short constr. period		✔					✔					✔			
22. Initial team selection		✔					✔				✔				
23. Good co-op fr.stat.auth		✔					✔					✔			
24. New development		✔					✔				✔				
25. Low building cost		✔					✔				✔				
26. High quality landscape	✔					✔					✔				
27. Clear vacant site		✔				✔					✔				
Total:	1	7	6	5	8	2	7	7	6	5	4	8	2	8	5

Table 6.6.5: Respondents with FRICS construct weighting [Office]

FACTORS	High (2)					Medium (1)					Low (7)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						✔
2. High demand			✔					✔							✔
3. Easily let/sold				✔				✔							✔
4. Low land purchase			✔					✔					✔		
5. Growth of rental values				✔					✔						✔
6. Fall in yield			✔						✔						✔
7. Good econ. conditions			✔					✔						✔	
8. Right market conditions			✔						✔				✔		
LOCAL															
9. Good location				✔				✔						✔	
10. Good surr.facility			✔					✔				✔			
11. Right development size			✔					✔				✔			
12. Opportunities taken		✔					✔					✔			
PROJECT															
13. Good building design			✔					✔					✔		
14. High specification bldg.			✔				✔						✔		
15. Tenants satisfied				✔				✔						✔	
16. Good funding terms					✔			✔					✔		
17. Design and build		✔				✔						✔			
18. Within budget				✔				✔					✔		
19. Bldg.cost under control			✔					✔					✔		
20. Completion on time			✔					✔					✔		
21. Short const. period		✔					✔					✔			
22. Initial team selection		✔					✔					✔			
23. Good co-op fr.stat.auth		✔					✔					✔			
24. New development		✔					✔						✔		
25. Low building cost				✔				✔				✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	6	4	7	8	3	3	9	8	4	2	7	9	4	5

Table 6.6.6: Respondents with ARICS constructs' weighting [Office]

| FACTORS | NO PROFESSIONAL QUALIFICATION | | | | | | | | | | | | | | |
| | High (2) | | | | | Medium (1) | | | | | Low | | | | |
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔					✔					
2. High demand		✔							✔						
3. Easily let/sold		✔							✔						
4. Low land purchase		✔						✔							
5. Growth of rental values		✔								✔					
6. Fall in yield		✔								✔					
7. Good econ. conditions			✔						✔						
8. Right market conditions			✔							✔					
LOCAL															
9. Good location		✔							✔						
10. Good surr. facility			✔				✔								
11. Right development size			✔						✔						
12. Opportunities taken		✔							✔						
PROJECT															
13. Good building design			✔						✔						
14. High specification bldg.			✔					✔							
15. Tenants satisfied			✔						✔						
16. Good funding terms		✔							✔						
17. Design and build	✔					✔									
18. Within budget			✔					✔							
19. Bldg cost under control			✔						✔						
20. Completion on time			✔					✔							
21. Short const. period			✔				✔								
22. Initial team selection		✔					✔								
23. Good co-op fr.stat.auth		✔					✔								
24. New development		✔						✔							
25. Low building cost		✔						✔							
26. High quality landscape				✔		✔									
27. Clear vacant site		✔				✔									
Total:	-	1	13	11	2	3	4	6	10	4	-	-	-	-	-

Table 6.6.7: Respondents with no professional qualification constructs weighting [Office]

FACTORS	HIGH EXPERIENCE IN PTY DEV.														
	High (3)					Medium (1)					Low (1)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						✔
2. High demand					✔			✔							✔
3. Easily let/sold					✔				✔					✔	
4. Low land purchase	✔							✔				✔			
5. Growth of rental values					✔			✔							✔
6. Fall in yield					✔				✔						✔
7. Good econ. conditions			✔						✔				✔		
8. Right market conditions		✔							✔			✔			
LOCAL															
9. Good location		✔						✔					✔		
10. Good surr. facility		✔						✔					✔		
11. Right development size		✔						✔				✔			
12. Opportunities taken	✔							✔					✔		
PROJECT															
13. Good building design				✔					✔				✔		
14. High specification bldg.		✔						✔				✔			
15. Tenants satisfied			✔					✔						✔	
16. Good funding terms				✔				✔							✔
17. Design and build	✔					✔						✔			
18. Within budget			✔					✔						✔	
19. Bldg.cost under control			✔					✔						✔	
20. Completion on time			✔					✔						✔	
21. Short const. period	✔						✔				✔				
22. Initial team selection	✔							✔			✔				
23. Good co-op fr.stat.auth	✔						✔				✔				
24. New development		✔					✔				✔				
25. Low building cost	✔						✔				✔				
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	3	6	2	8	8	3	4	9	6	5	3	8	4	7	5

Table 6.6.8: High experience respondents constructs weighting [Office]

| FACTORS | MEDIUM EXPERIENCE IN PTY. DEV. | | | | | | | | | | | | | | |
| | High (1) | | | | | Medium (3) | | | | | Low (2) | | | | |
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						✔
2. High demand					✔		✔								✔
3. Easily let/sold					✔				✔					✔	
4. Low land purchase			✔					✔				✔			
5. Growth of rental values		✔						✔							✔
6. Fall in yield				✔					✔						✔
7. Good econ. conditions			✔					✔						✔	
8. Right market conditions			✔						✔						✔
LOCAL															
9. Good location			✔						✔					✔	
10. Good surr. facility			✔					✔						✔	
11. Right development size		✔						✔				✔			
12. Opportunities taken			✔					✔				✔			
PROJECT															
13. Good building design				✔					✔					✔	
14. High specification bldg.			✔					✔						✔	
15. Tenants satisfied				✔				✔						✔	
16. Good funding terms				✔					✔					✔	
17. Design and build		✔				✔					✔				
18. Within budget				✔				✔					✔		
19. Bldg.cost under control			✔					✔						✔	
20. Completion on time			✔					✔			✔				
21. Short const. period		✔					✔						✔		
22. Initial team selection		✔					✔				✔				
23. Good co-op fr.stat.auth		✔					✔				✔				
24. New development			✔					✔				✔			
25. Low building cost		✔						✔				✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	6	6	5	8	3	5	6	8	5	6	5	2	9	5

Table 6.6.9: Medium experience respondents constructs weighting [Office]

FACTORS	LOW EXPERIENCE IN PTY. DEV.														
	High (2)					Medium (2)					Low (5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔					✔					✔
2. High demand					✔					✔					✔
3. Easily let/sold					✔					✔					✔
4. Low land purchase	✔							✔					✔		
5. Growth of rental values					✔					✔					✔
6. Fall in yield					✔			✔							✔
7. Good econ. conditions				✔				✔						✔	
8. Right market conditions				✔				✔							✔
LOCAL															
9. Good location				✔						✔				✔	
10. Good surr. facility				✔					✔			✔			
11. Right development size				✔					✔			✔			
12. Opportunities taken	✔						✔					✔			
PROJECT															
13. Good building design					✔				✔					✔	
14. High specification bldg.			✔					✔						✔	
15. Tenants satisfied				✔				✔							✔
16. Good funding terms					✔			✔						✔	
17. Design and build		✔				✔						✔			
18. Within budget				✔				✔						✔	
19. Bldg.cost under control				✔				✔							✔
20. Completion on time				✔				✔						✔	
21. Short const. period		✔					✔					✔			
22. Initial team selection		✔						✔			✔				
23. Good co-op fr.stat.auth		✔						✔			✔				
24. New development			✔					✔						✔	
25. Low building cost	✔							✔			✔				
26. High quality landscape	✔						✔				✔				
27. Clear vacant site		✔					✔				✔				
Total:	3	6	2	8	8	3	3	9	7	5	5	4	7	5	6

Table 6.6.10: Low experience respondents constructs weighting [Office]

FACTORS	HIGH DECISION MAKING INVOLVEMENT														
	High (4)					Medium (1)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔					✔					
2. High demand					✔				✔						
3. Easily let/sold					✔				✔						
4. Low land purchase			✔					✔							
5. Growth of rental values					✔					✔					
6. Fall in yield					✔					✔					
7. Good econ.conditions					✔				✔						
8. Right market conditions					✔					✔					
LOCAL															
9. Good location			✔						✔						
10. Good surr.facility		✔					✔								
11. Right development size				✔					✔						
12. Opportunities taken				✔					✔						
PROJECT															
13. Good building design			✔						✔						
14. High specification bldg.			✔					✔							
15. Tenants satisfied				✔					✔						
16. Good funding terms					✔			✔							
17. Design and build		✔				✔									
18. Within budget				✔				✔							
19. Bldg.cost under control				✔					✔						
20. Completion on time			✔					✔							
21. Short const.period		✔					✔								
22. Initial team selection		✔					✔								
23. Good co-op fr.stat.auth		✔					✔								
24. New development		✔						✔							
25. Low building cost		✔					✔								
26. High quality landscape	✔					✔									
27. Clear vacant site				✔		✔									
Total:	1	7	5	6	8	3	5	6	9	4					

Table 6.6.11: High decision making involvement respondents construct weighting [Office]

FACTORS	MEDIUM DECISION MAKING INVOLVEMENT														
	High (1)					Medium (3)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔					✔						✔
2. High demand				✔				✔							✔
3. Easily let/sold				✔						✔				✔	
4. Low land purchase		✔						✔						✔	
5. Growth of rental values		✔						✔							✔
6. Fall in yield			✔							✔					✔
7. Good econ. conditions			✔							✔				✔	
8. Right market conditions			✔							✔					✔
LOCAL															
9. Good location				✔						✔			✔		
10. Good surr.facility			✔						✔				✔		
11. Right development size		✔						✔					✔		
12. Opportunities taken			✔					✔					✔		
PROJECT															
13. Good building design			✔					✔						✔	
14. High specification bldg.			✔					✔					✔		
15. Tenants satisfied				✔					✔						✔
16. Good funding terms					✔					✔					✔
17. Design and build		✔					✔						✔		
18. Within budget				✔					✔						✔
19. Bldg.cost under control			✔					✔							✔
20. Completion on time			✔					✔			✔				
21. Short constr. period		✔					✔						✔		
22. Initial team selection			✔				✔				✔				
23. Good co-op fr.stat.auth			✔				✔						✔		
24. New development			✔				✔				✔				
25. Low building cost			✔				✔						✔		
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	3	11	3	8	2	7	6	5	7	5	5	4	8	5

Table 6.6.12: Medium decision making involvement & constructs weighting [Office]

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FACTORS	LOW DECISION MAKING INVOLVEMENT														
	High (2)					Medium (1)					Low (5)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						✔
2. High demand		✔							✔						✔
3. Easily let/sold			✔						✔						✔
4. Low land purchase		✔						✔					✔		
5. Growth of rental values			✔						✔						✔
6. Fall in yield			✔					✔							✔
7. Good econ. conditions			✔					✔						✔	
8. Right market conditions			✔					✔							✔
LOCAL															
9. Good location			✔						✔					✔	
10. Good surr.facility		✔						✔						✔	
11. Right development size		✔						✔				✔			
12. Opportunities taken			✔					✔					✔		
PROJECT															
13. Good building design			✔					✔						✔	
14. High specification bldg.		✔					✔						✔		
15. Tenants satisfied			✔				✔							✔	
16. Good funding terms				✔			✔						✔		
17. Design and build	✔					✔					✔				
18. Within budget			✔				✔						✔		
19. Bldg.cost under control		✔					✔							✔	
20. Completion on time	✔						✔					✔			
21. Short const. period	✔						✔				✔				
22. Initial team selection	✔						✔				✔				
23. Good co-op fr.stat.auth	✔						✔				✔				
24. New development	✔						✔					✔			
25. Low building cost			✔					✔				✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	6	4	7	8	3	3	9	7	5	5	5	5	6	6

Table 6.6.13: Low decision making involvement respondents constructs' weighting [Office]

FACTORS	POSITIVE RISK ATTITUDE														
	High (5)					Medium (6)					Low (3)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔					✔						✔
2. High demand				✔				✔							✔
3. Easily let/sold				✔					✔						✔
4. Low land purchase			✔					✔					✔		
5. Growth of rental values				✔					✔						✔
6. Fall in yield				✔					✔						✔
7. Good econ.conditions				✔				✔						✔	
8. Right market conditions				✔					✔						✔
LOCAL															
9. Good location				✔					✔					✔	
10. Good surr. facility			✔					✔						✔	
11. Right development size			✔					✔				✔			
12. Opportunities taken		✔					✔					✔			
PROJECT															
13. Good building design			✔					✔						✔	
14. High specification bldg.			✔						✔				✔		
15. Tenants satisfied				✔					✔						✔
16. Good funding terms					✔			✔					✔		
17. Design and build		✔				✔						✔			
18. Within budget				✔				✔					✔		
19. Bldg.cost under control			✔					✔						✔	
20. Completion on time		✔						✔					✔		
21. Short const. period		✔					✔				✔				
22. Initial team selection		✔					✔				✔				
23. Good co-op fr.stat.auth		✔					✔				✔				
24. New development		✔					✔						✔		
25. Low building cost		✔					✔					✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	7	4	5	9	3	5	6	7	6	7	1	7	6	6

Table 6.3.14: Positive risk attitude respondents constructs' weighting [Office]

FACTORS	NEGATIVE RISK ATTITUDE														
	High (2)					Medium					Low (4)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✓										✓
2. High demand			✓												✓
3. Easily let/sold				✓										✓	
4. Low land purchase			✓									✓			
5. Growth of rental values				✓											✓
6. Fall in yield				✓											✓
7. Good econ. conditions			✓											✓	
8. Right market conditions				✓											✓
LOCAL															
9. Good location			✓											✓	
10. Good surr. facility			✓											✓	
11. Right development size			✓									✓			
12. Opportunities taken			✓									✓			
PROJECT															
13. Good building design			✓											✓	
14. High specification bldg.			✓										✓		
15. Tenants satisfied				✓										✓	
16. Good funding terms					✓									✓	
17. Design and build	✓										✓				
18. Within budget				✓									✓		
19. Bldg.cost under control			✓											✓	
20. Completion on time			✓									✓			
21. Short constr. period		✓										✓			
22. Initial team selection			✓								✓				
23. Good co-op fr.stat.auth		✓										✓			
24. New development		✓										✓			
25. Low building cost				✓								✓			
26. High quality landscape	✓										✓				
27. Clear vacant site	✓										✓				
Total:	3	3	5	10	6						4	8	2	8	4

Table 6.6.15: Negative risk attitude respondents constructs weighting [Office]

6.6.2 Shop development

Table 6.6.16 shows the mode weighting of the constructs given by the Estate Management degree holders attaining high, medium and low achievements for successful shop developments. Comparing the number of constructs the decision makers gave very high or very low weighting, it was observed that the high achievers gave very high weighting to 7 constructs; the medium achievers 7 constructs and the low achievers 3 constructs. On the other hand, the high achievers gave very low weighting to two of the constructs, the medium achievers gave very low weighting to five constructs and the low achievers did so to 3 constructs.

Only one respondent had another degree qualification and attained high achievement. His weighting of the constructs is shown in Table 6.6.17. The mode weighting of the constructs given by the diploma holders attaining high and medium achievements for successsful shop development are shown Table 6.6.18. It was observed that the high achievers gave very high weighting to 6 constructs; and the medium achiever 5 constructs. On the other hand, all the respective respondents gave very low weighting to identical constructs.

It was however generally observed that similar circumstances of reduction in the number of constructs given very high weighting coupled with increasing number of factors given low weighting as the achievement declined, occurred in examining respondents having no academic qualifications (see Table 6.6.19); accredited with FRICS (Table 6.6.20); accredited with ARICS (Table 6.6.21); having high, medium, and low experience in property development (Tables 6.6.23, 6.6.24 and 6.6.25 respectively); having medium, and low decision making involvement (Tables 6.6.27,and 6.6.28 respectively); and having positive and negative risk attitudes (Table 6.6.29 and Table 6.6.30 respectively). It was also noticed that the variation in the number of constructs given high weighting occurred mostly within the economic factors group.

FACTORS	ESTATE.MANAGEMENT DEGREE HOLDERS														
	High (3)					Medium (2)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔						✔			✔		
2. High demand			✔							✔			✔		
3. Easily let/sold				✔						✔					✔
4. Low land purchase			✔						✔				✔		
5. Growth of rental values				✔						✔					✔
6. Fall in yield			✔						✔					✔	
7. Good econ. conditions				✔						✔				✔	
8. Right market conditions				✔						✔			✔		
LOCAL															
9. Good location				✔						✔					✔
10. Good surr. facility			✔						✔					✔	
11. Right development size			✔						✔				✔		
12. Opportunities taken			✔					✔					✔		
PROJECT															
13. Good building design				✔						✔				✔	
14. High specification bldg.			✔						✔					✔	
15. Tenants satisfied				✔					✔						✔
16. Good funding terms				✔						✔					✔
17. Design and build		✔					✔						✔		
18. Within budget					✔					✔				✔	
19. Bldg.cost under control			✔						✔					✔	
20. Completion on time				✔					✔					✔	
21. Short const. period		✔						✔				✔			
22. Initial team selection			✔				✔							✔	
23. Good co-op fr.stat.auth			✔				✔						✔		
24. New development				✔					✔					✔	
25. Low building cost			✔					✔					✔		
26. High quality landscape	✔						✔					✔			
27. Clear vacant site	✔						✔				✔				
Total:	2	4	5	9	7	5	2	6	7	7	3	4	9	8	3

Table 6.6.16: Estate/Land Management degree holders' constructs weighting [Shop]

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| FACTORS | OTHER DEGREE HOLDERS | | | | | | | | | |
| | High (1) | | | | | Low | | | | |
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Right timing					✔					
2. High demand					✔					
3. Easily let/sold				✔						
4. Low land purchase			✔							
5. Growth of rental values					✔					
6. Fall in yield				✔						
7. Good econ. conditions				✔						
8. Right market conditions					✔					
LOCAL										
9. Good location					✔					
10. Good surr. facility				✔						
11. Right development size				✔						
12. Opportunities taken				✔						
PROJECT										
13. Good building design				✔						
14. High specification bldg.			✔							
15. Tenants satisfied				✔						
16. Good funding terms				✔						
17. Design and build		✔								
18. Within budget				✔						
19. Bldg.cost under control				✔						
20. Completion on time			✔							
21. Short const. period		✔								
22. Initial team selection		✔								
23. Good co-op fr.stat.auth			✔							
24. New development			✔							
25. Low building cost			✔							
26. High quality landscape	✔									
27. Clear vacant site	✔									
Total:	2	3	6	11	5					

Table 6.6.17: Other degree holders' construct weighting [Shop]

FACTORS	DIPLOMA HOLDERS									
	High (2)					Medium (1)				
	1	2	3	4	5	1	2	3	4	5
ECONOMIC										
1. Right timing				✔					✔	
2. High demand					✔					✔
3. Easily let/sold					✔				✔	
4. Low land purchase				✔			✔			
5. Growth of rental values					✔					✔
6. Fall in yield				✔					✔	
7. Good econ. conditions				✔						✔
8. Right market conditions					✔					✔
LOCAL										
9. Good location					✔				✔	
10. Good surr. facility				✔					✔	
11. Right development size		✔						✔		
12. Opportunities taken					✔			✔		
PROJECT										
13. Good building design				✔					✔	
14. High specification bldg.				✔				✔		
15. Tenants satisfied				✔					✔	
16. Good funding terms					✔					✔
17. Design and build		✔					✔			
18. Within budget				✔				✔		
19. Bldg.cost under control				✔					✔	
20. Completion on time				✔			✔			
21. Short constr. period		✔						✔		
22. Initial team selection			✔				✔			
23. Good co-op fr.stat.auth		✔					✔			
24. New development			✔				✔			
25. Low building cost		✔					✔			
26. High quality landscape	✔					✔				
27. Clear vacant site	✔					✔				
Total:	2	5	2	12	6	2	7	5	8	5

Table 6.6.18: Diploma holders' construct weighting [Shop]

FACTORS	NON-DEGREE HOLDERS														
	High (2)					Medium (1)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔					✔						
2. High demand					✔					✔					
3. Easily let/sold					✔			✔							
4. Low land purchase			✔					✔							
5. Growth of rental values					✔					✔					
6. Fall in yield			✔						✔						
7. Good econ. conditions				✔					✔						
8. Right market conditions			✔							✔					
LOCAL															
9. Good location					✔					✔					
10. Good surr. facility			✔						✔						
11. Right development size			✔				✔								
12. Opportunities taken				✔					✔						
PROJECT															
13. Good building design				✔					✔						
14. High specification bldg.		✔						✔							
15. Tenants satisfied				✔					✔						
16. Good funding terms					✔					✔					
17. Design and build	✔					✔									
18. Within budget				✔					✔						
19. Bldg.cost under control				✔					✔						
20. Completion on time				✔					✔						
21. Short const. period			✔				✔								
22. Initial team selection			✔				✔								
23. Good co-op fr.stat.auth			✔			✔									
24. New development				✔					✔						
25. Low building cost		✔				✔									
26. High quality landscape		✔				✔									
27. Clear vacant site		✔				✔									
Total:	1	4	8	9	5	5	3	3	11	5					

Table 6.6.19: Non-degree holders' construct weighting [Shop]

FACTORS	High (2)					Medium (1)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						
2. High demand				✔						✔					
3. Easily let/sold				✔					✔						
4. Low land purchase			✔						✔						
5. Growth of rental values			✔							✔					
6. Fall in yield			✔						✔						
7. Good econ. conditions				✔					✔						
8. Right market conditions				✔						✔					
LOCAL															
9. Good location				✔						✔					
10. Good surr.facility			✔						✔						
11. Right development size			✔				✔								
12. Opportunities taken		✔							✔						
PROJECT															
13. Good building design				✔					✔						
14. High specification bldg.				✔				✔							
15. Tenants satisfied				✔					✔						
16. Good funding terms				✔						✔					
17. Design and build		✔				✔									
18. Within budget		✔							✔						
19. Bldg.cost under control				✔					✔						
20. Completion on time				✔				✔							
21. Short constr. period		✔					✔								
22. Initial team selection			✔			✔									
23. Good co-op fr.stat.auth			✔			✔									
24. New development			✔					✔							
25. Low building cost		✔					✔								
26. High quality landscape	✔					✔									
27. Clear vacant site	✔					✔									
Total:	2	4	4	11	6	5	3	3	11	5					

Table 6.6.20: Respondents with FRICS constructs weighting [Shop]

FACTORS	RESPONDENTS WITH ARICS														
	High (4)					Medium (3)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔				✔						✔	
2. High demand				✔					✔					✔	
3. Easily let/sold				✔					✔						✔
4. Low land purchase			✔					✔					✔		
5. Growth of rental values				✔					✔						✔
6. Fall in yield			✔					✔						✔	
7. Good econ. conditions				✔					✔					✔	
8. Right market conditions				✔					✔					✔	
LOCAL															
9. Good location				✔				✔							✔
10. Good surr. facility			✔					✔						✔	
11. Right development size		✔						✔				✔			
12. Opportunities taken			✔					✔					✔		
PROJECT															
13. Good building design			✔					✔					✔		
14. High specification bldg.			✔				✔						✔		
15. Tenants satisfied			✔					✔						✔	
16. Good funding terms				✔				✔						✔	
17. Design and build		✔					✔					✔			
18. Within budget		✔						✔					✔		
19. Bldg. cost under control			✔					✔					✔		
20. Completion on time		✔						✔					✔		
21. Short constr. period	✔					✔					✔				
22. Initial team selection			✔				✔						✔		
23. Good co-op fr.stat.auth	✔					✔						✔			
24. New development	✔							✔					✔		
25. Low building cost			✔				✔					✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	6	3	8	8	4	3	6	9	5	3	4	9	8	3

Table 6.6.21: Respondents with ARICS constructs weighting [Shop]

FACTORS	NO PROFESSIONAL QUALIFICATION														
	High (2)					Medium					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔										
2. High demand					✔										
3. Easily let/sold					✔										
4. Low land purchase				✔											
5. Growth of rental values					✔										
6. Fall in yield					✔										
7. Good econ. conditions				✔											
8. Right market conditions					✔										
LOCAL															
9. Good location					✔										
10. Good surr. facility				✔											
11. Right development size				✔											
12. Opportunities taken				✔											
PROJECT															
13. Good building design				✔											
14. High specification bldg.			✔												
15. Tenants satisfied				✔											
16. Good funding terms				✔											
17. Design and build	✔														
18. Within budget			✔												
19. Bldg.cost under control				✔											
20. Completion on time			✔												
21. Short constr. period		✔													
22. Initial team selection		✔													
23. Good co-op fr.stat.auth			✔												
24. New development			✔												
25. Low building cost			✔												
26. High quality landscape	✔														
27. Clear vacant site	✔														
Total:	3	2	6	9	7										

Table 6.6.22: Respondents with no professional qualification constructs weighting [Shop]

FACTORS	HIGH EXP. IN PROPERTY DEV.														
	High (4)					Medium (1)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔				✔						
2. High demand					✔					✔					
3. Easily let/sold					✔				✔						
4. Low land purchase				✔					✔						
5. Growth of rental values				✔						✔					
6. Fall in yield				✔					✔						
7. Good econ. conditions					✔				✔						
8. Right market conditions					✔					✔					
LOCAL															
9. Good location					✔					✔					
10. Good surr. facility				✔					✔						
11. Right development size				✔				✔							
12. Opportunities taken				✔					✔						
PROJECT															
13. Good building design					✔					✔					
14. High specification bldg.			✔						✔						
15. Tenants satisfied				✔						✔					
16. Good funding terms					✔					✔					
17. Design and build			✔				✔								
18. Within budget					✔					✔					
19. Bldg.cost under control					✔					✔					
20. Completion on time					✔				✔						
21. Short const. period			✔					✔							
22. Initial team selection				✔			✔								
23. Good co-op fr.stat.auth				✔			✔								
24. New development				✔					✔						
25. Low building cost			✔					✔							
26. High quality landscape		✔					✔								
27. Clear vacant site		✔					✔								
Total:	2	4	5	10	6	5	3	3	11	5					

Table 6.6.23: High experience respondents constructs weighting [Shop]

FACTORS	MEDIUM EXP. IN PROPERTY. DEV.														
	High (2)					Medium (1)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔					✔						
2. High demand				✔						✔					
3. Easily let/sold				✔					✔						
4. Low land purchase			✔				✔								
5. Growth of rental values				✔						✔					
6. Fall in yield			✔						✔						
7. Good econ. conditions				✔						✔					
8. Right market conditions				✔						✔					
LOCAL															
9. Good location				✔					✔						
10. Good surr. facility			✔						✔						
11. Right development size			✔					✔							
12. Opportunities taken			✔					✔							
PROJECT															
13. Good building design				✔					✔						
14. High specification bldg.			✔					✔							
15. Tenants satisfied				✔					✔						
16. Good funding terms				✔						✔					
17. Design and build		✔					✔								
18. Within budget				✔				✔							
19. Bldg.cost under control				✔					✔						
20. Completion on time			✔				✔								
21. Short constr. period		✔						✔							
22. Initial team selection		✔					✔								
23. Good co-op fr.stat.auth		✔					✔								
24. New development			✔				✔								
25. Low building cost			✔				✔								
26. High quality landscape	✔					✔									
27. Clear vacant site	✔					✔									
Total:	2	4	4	10	7	2	7	5	8	5					

Table 6.6.24: Medium experience respondents' constructs weighting [Shop]

FACTORS	LOW EXP. IN PROPERTY. DEV. High (2)					Medium (2)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing			✓						✓					✓	
2. High demand				✓					✓					✓	
3. Easily let/sold				✓					✓						✓
4. Low land purchase			✓					✓					✓		
5. Growth of rental values				✓					✓						✓
6. Fall in yield			✓					✓						✓	
7. Good econ. conditions			✓						✓					✓	
8. Right market conditions				✓					✓					✓	
LOCAL															
9. Good location				✓					✓						✓
10. Good surr. facility			✓					✓						✓	
11. Right development size		✓						✓				✓			
12. Opportunities taken				✓				✓					✓		
PROJECT															
13. Good building design			✓						✓					✓	
14. High specification bldg.			✓					✓						✓	
15. Tenants satisfied			✓					✓							✓
16. Good funding terms				✓					✓						✓
17. Design and build		✓				✓							✓		
18. Within budget			✓						✓					✓	
19. Bldg.cost under control			✓					✓						✓	
20. Completion on time			✓					✓						✓	
21. Short constr. period		✓					✓				✓				
22. Initial team selection			✓			✓								✓	
23. Good co-op fr.stat.auth		✓				✓							✓		
24. New development			✓					✓						✓	
25. Low building cost		✓						✓					✓		
26. High quality landscape	✓					✓					✓				
27. Clear vacant site	✓					✓					✓				
Total:	2	5	2	12	6	5	2	6	7	7	3	4	9	8	3

Table 6.6.25: Low experience respondents' constructs weighting [Shop]

FACTORS	HIGH DECISION MAKING INVOLVEMENT														
	High (3)					Medium					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing					✔										
2. High demand					✔										
3. Easily let/sold					✔										
4. Low land purchase				✔											
5. Growth of rental values					✔										
6. Fall in yield				✔											
7. Good econ.conditions					✔										
8. Right market conditions					✔										
LOCAL															
9. Good location					✔										
10. Good surr. facility				✔											
11. Right development size				✔											
12. Opportunities taken				✔											
PROJECT															
13. Good building design				✔											
14. High specification bldg.			✔												
15. Tenants satisfied				✔											
16. Good funding terms				✔											
17. Design and build		✔													
18. Within budget			✔												
19. Bldg.cost under control				✔											
20. Completion on time			✔												
21. Short constr. period		✔													
22. Initial team selection			✔												
23. Good co-op fr.stat.auth		✔													
24. New development			✔												
25. Low building cost		✔													
26. High quality landscape	✔														
27. Clear vacant site	✔														
Total:	2	4	5	9	7										

Table 6.6.26: High decision making involvement respondents' constructs weighting [Shop]

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FACTORS	MEDIUM DECISION MAKING INVOLVEMENT														
	High (3)					Medium (2)					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔						✔					
2. High demand					✔					✔					
3. Easily let/sold					✔					✔					
4. Low land purchase			✔						✔						
5. Growth of rental values			✔							✔					
6. Fall in yield			✔						✔						
7. Good econ. conditions				✔						✔					
8. Right market conditions				✔						✔					
LOCAL															
9. Good location				✔						✔					
10. Good surr. facility			✔						✔						
11. Right development size			✔						✔						
12. Opportunities taken		✔						✔							
PROJECT															
13. Good building design				✔					✔						
14. High specification bldg.		✔						✔							
15. Tenants satisfied			✔					✔							
16. Good funding terms			✔						✔						
17. Design and build		✔					✔								
18. Within budget			✔						✔						
19. Bldg.cost under control			✔					✔							
20. Completion on time			✔					✔							
21. Short constr. period		✔					✔								
22. Initial team selection			✔			✔									
23. Good co-op fr.stat.auth		✔				✔									
24. New development			✔					✔							
25. Low building cost		✔					✔								
26. High quality landscape	✔					✔									
27. Clear vacant site	✔					✔									
Total:	2	5	3	12	5	5	2	6	7	7					

Table 6.6.27: Medium decision making involvement respondents constructs weighting [Shop]

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FACTORS	LOW DECISION MAKING INVOLVEMENT														
	High (2)					Medium (2)					Low (2)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔				✔					✔		
2. High demand				✔					✔				✔		
3. Easily let/sold				✔					✔						✔
4. Low land purchase			✔					✔					✔		
5. Growth of rental values				✔					✔						✔
6. Fall in yield		✔						✔						✔	
7. Good econ. conditions				✔					✔					✔	
8. Right market conditions				✔					✔					✔	
LOCAL															
9. Good location				✔					✔						✔
10. Good surr. facility				✔				✔						✔	
11. Right development size			✔					✔				✔			
12. Opportunities taken				✔			✔						✔		
PROJECT															
13. Good building design			✔						✔				✔		
14. High specification bldg.		✔						✔					✔		
15. Tenants satisfied			✔					✔						✔	
16. Good funding terms				✔				✔						✔	
17. Design and build		✔					✔					✔			
18. Within budget			✔					✔					✔		
19. Bldg.cost under control			✔					✔					✔		
20. Completion on time			✔					✔					✔		
21. Short constr. period		✔					✔				✔				
22. Initial team selection			✔				✔						✔		
23. Good co-op fr.stat.auth		✔					✔					✔			
24. New development		✔						✔					✔		
25. Low building cost		✔					✔					✔			
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	6	4	6	9	2	5	9	5	6	3	4	9	8	3

Table 6.6.28: Low decision making involvement respondents constructs weighting
[Shop]

FACTORS	POSITIVE RISK ATTITUDE														
	High (8)					Medium (1)					Low (1)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing				✔				✔						✔	
2. High demand				✔					✔						✔
3. Easily let/sold				✔					✔						✔
4. Low land purchase			✔					✔					✔		
5. Growth of rental values				✔					✔						✔
6. Fall in yield			✔					✔						✔	
7. Good econ. conditions			✔						✔					✔	
8. Right market conditions			✔						✔					✔	
LOCAL															
9. Good location				✔					✔						✔
10. Good surr. facility		✔						✔						✔	
11. Right development size		✔						✔				✔			
12. Opportunities taken		✔					✔					✔			
PROJECT															
13. Good building design		✔					✔						✔		
14. High specification bldg.		✔					✔						✔		
15. Tenants satisfied		✔					✔							✔	
16. Good funding terms		✔							✔					✔	
17. Design and build	✔						✔				✔				
18. Within budget		✔							✔			✔			
19. Bldg.cost under control			✔					✔			✔				
20. Completion on time		✔							✔				✔		
21. Short const.period	✔					✔					✔				
22. Initial team selection		✔				✔					✔				
23. Good co-op fr.stat.auth	✔							✔			✔				
24. New development		✔						✔					✔		
25. Low building cost	✔						✔				✔				
26. High quality landscape	✔					✔					✔				
27. Clear vacant site	✔					✔					✔				
Total:	2	4	4	11	6	4	3	6	8	6	2	7	7	7	4

Table 6.6.29: Positive risk attitude respondents constructs weighting [Shop]

FACTORS	NEGATIVE RISK ATTITUDE														
	High					Medium (3)					Low (1)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ECONOMIC															
1. Right timing									✔						✔
2. High demand										✔				✔	
3. Easily let/sold									✔						✔
4. Low land purchase								✔					✔		
5. Growth of rental values										✔					✔
6. Fall in yield									✔					✔	
7. Good econ. conditions								✔						✔	
8. Right market conditions										✔					✔
LOCAL															
9. Good location									✔						✔
10. Good surr. facility								✔						✔	
11. Right development size							✔						✔		
12. Opportunities taken								✔					✔		
PROJECT															
13. Good building design									✔					✔	
14. High specification bldg.							✔					✔			
15. Tenants satisfied								✔						✔	
16. Good funding terms										✔				✔	
17. Design and build							✔				✔				
18. Within budget									✔					✔	
19. Bldg.cost under control									✔			✔			
20. Completion on time								✔					✔		
21. Short constr. period							✔				✔				
22. Initial team selection							✔					✔			
23. Good co-op fr.stat.auth							✔				✔				
24. New development									✔				✔		
25. Low building cost							✔						✔		
26. High quality landscape						✔					✔				
27. Clear vacant site						✔					✔				
Total:						2	6	6	9	4	5	3	6	8	5

Table 6.6.30: Negative risk attitude respondents constructs weighting [Shop]

DECISION MAKERS ATTRIBUTES	OFFICE DEVELOPMENT															SHOP DEVELOPMENT														
	High					Medium					Low					High					Medium					Low				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
ACADEMIC																														
1. Est. Mgt. degree	-	8	6	3	10	3	4	8	6	6	2	7	9	4	5	2	4	5	9	7	5	2	6	7	7	3	4	9	8	3
2. Other degree	3	6	6	6	6						6	5	2	9	5	2	3	6	11	5										
3. Diploma	1	5	8	7	6	2	8	6	7	4						2	5	2	12	6	2	7	5	8	5					
4. Non-degree	1	2	12	8	4	2	7	6	5	7	5	7	2	6	7	1	4	8	9	5	5	3	3	11	5					
PROFESSIONAL																														
1. FRICS	1	7	6	5	8	2	7	7	6	5	5	6	3	7	6	2	4	4	11	6	5	3	3	11	5					
2. ARICS	2	6	4	7	8	3	3	9	8	4	2	7	9	4	5	2	6	3	8	8	4	3	6	9	5	3	4	9	8	3
3. No	-	1	13	11	2	3	4	6	10	4						3	2	6	9	7										
EXPERIENCE																														
1. High	3	6	2	8	8	3	4	9	6	5	3	8	4	7	5	2	4	5	10	6	5	3	3	11	5					
2. Medium	2	6	6	5	8	3	5	6	8	5	6	5	2	9	5	2	4	4	10	7	2	7	5	8	5					
3. Low	3	6	2	8	8	3	3	9	7	5	5	4	7	5	6	2	5	2	12	6	5	2	6	7	7	3	4	9	8	3
DEC. MKG. INVOLVEMENT																														
1. High	1	7	5	6	8	3	5	6	9	4						2	4	5	9	7										
2. Medium	2	3	11	3	8	2	7	6	5	7	5	5	4	8	5	2	5	3	12	5	5	2	6	7	7					
3. Low	2	6	4	7	8	3	3	9	7	5	5	5	5	6	6	2	6	4	6	9	2	5	9	5	6	3	4	9	8	3
RISK ATTITUDE																														
1. Positive	2	7	4	5	9	3	5	6	7	6	7	1	7	6	6	2	4	4	11	6	4	3	6	8	6	2	7	7	7	4
2. Negative	3	3	5	10	6						4	8	2	8	4						2	6	6	9	4	5	3	6	8	5

Table 6.6.31: Decision makers' attributes, constructs' weighting and achievements

6.6.3 Summary of constructs weighting of decision makers grouped by attributes

The pattern of constructs weighting given by the decision makers having similar attributes but different achievements are summarised in Table 6.6.31. Besides the already noted trend of the reducing number of factors given the high weighting together with increasing factors given the low weighting as the achievement rate decreased; it was also observed that low achievements in shop developments were noticeably lesser in number compared to the office developments. It was in fact 50 percent less. This difference may be due to the different factors influencing the outcome of office and shop developments as explained in section 5.8.3. Shop developments were influenced more by the decision makers' intuitive judgement or the soft data than examination and analysis of the external factors or the hard data. Therefore, the data shown in Table 6.6.31 indicated the positive effect the soft data had on the achievement rate of the shop compared to the office developments.

6.7 SUMMARY OF FINDINGS

1. It was verified that economic factors, in particular, right timing, fall in yield and good economic conditions had slightly less influence in the successful development outcomes of the shop rather than the office developments.

2. In the consideration of local factors, the respondents gave equal weighting for good location and good surrounding facilities in those factors influencing the successful outcome of office and shop developments. However, in the consideration of right development size, the respondents indicated that the factor was more influential in the successful outcome of office than shop development. This probably indicated the respondents' 'fear' of the fact that the problem of excess floorspace was more acute in office than shop developments.

3. For project related factors, generally the respondents indicated similar weighting of the factors for both office and shop developments. Only very minor differences in weighting occurred for good funding terms, building cost under control and new development factors.

4. No significant correlations between each construct weighting and the achievement in the successful or unsuccessful office and shop developments were found. This indicated that regardless of whether the decision maker

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attained above average, average or below average achievements, the aggregate weighting scores of all the factors given by each group of achievers were quite close to each other.

5. Decision makers having similar achievement produced identical constructs weighting total score regardless of their varied academic or professional qualifications; experience in property development; decision making involvement ; and/or risk attitude. This occurred in both office and shop developments.

In office development the total weighting score indicated by above average achievers was in the range of 92 to 95; average achievers' total weighting score was between 86 to 89 and below average achievers' total weighting score was between 83 to 84. While for shop development the total weighting score indicated by above average achievers was in the range of 94 to 96; average achievers total weighting score was between 88 to 90 and below average achievers total weighting score was between 85 to 86.

It has to be noted that the constructs' total weighting score descended slightly as the decision makers achievement rate decreased. This trend occurred in both the office and shop developments.

6. The achievement rate decreased because the decision makers, regardless of their attributes, reduced the number of factors they gave the high weighting and at the same instance increased the factors they gave the low weighting. This obviously resulted in a slight decline in the total weighting score.

7. To obtain high achievement rate in both the office and shop developments, the decision makers have to give high weighting to more economic factors.

8 Soft data or the personal attributes had a positive effect on the achievement rate of the shop compared to the office developments.

CHAPTER 7

IMPROVING DECISION MAKING

7.1 INTRODUCTION

The preceding chapters have revealed that the decision makers were inconsistent in their decision making outcomes achievements. Very few have managed to attain constantly high achievements in all the property developments that they were involved in. As such there should be room for improving the decision makers' achievements by reducing the judgemental errors in the consideration of the decision making factors. One method that has been suggested by Bazerman (1990)[1] is by using linear models based on expert judgement or subsequently the Knowledge Based System.

The purpose of this chapter is to address this issue as well as providing a useful theoretical discussion towards the practical implementation of the Knowledge Based System in the property development decision making environment. The basic features and development of the Knowledge Based System are presented. The potential application areas and the main merits for using Knowledge Based Systems in property development decision making are also outlined. Special attention is given to knowledge acquisition, knowledge representation and the phases in the development of the Knowledge Based System.

7.2 DECISION MAKING IMPROVEMENT STRATEGIES

Decision makers aspire to make good decisions although "the capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behaviour in the real world ..." (Simon, 1957)[2] which results in judgemental errors and inconsistencies in their decision making outcomes. As evidenced in Chapters 5 and 6, decision makers varied in their achievements. It was observed that there were decision makers who attained 'high achievement' in office developments but had 'low achievement' in shop developments. Further, it was also observed that the decision makers having similar attributes, for example, the same academic and professional qualifications, were very inconsistent in their achievements.

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As such there should be plenty of room to improve one's judgement. As briefly discussed in section 3.5, there are a number of correcting strategies that help to adjust decision makers' intuition towards rationality in making decisions which should reduce the judgemental errors. Bazerman (1990)[1] suggested four strategies for making better decisions namely:

     i)   acquiring experience and expertise

    ii)   debiasing judgement

   iii)   using linear models based on expert judgement or the Knowledge Based System

   iv)   adjusting intuitive predictions

It is not the intention of this thesis to study in detail the methods of acquiring experience and expertise; debiasing judgement; and adjusting intuitive predictions towards the improvement of decision making. The main reason is that they are not within the research objectives and subsequently the data collected are not able to substantiate any detailed examination of these corrective measures of judgement.

On the other hand, as the data for this research were elicited from the property development 'experts', it should definitely be appropriate to examine the 'use of linear models based on expert judgement or the Knowledge Based System' method of improving decision making. However, as a large dataset is considered mandatory for the development of the linear model, it is therefore imperative, considering the amount of data that was obtained, these research objectives and limitations, that the Knowledge Based System is the most relevant to be examined.

7.3   OVERVIEW OF KNOWLEDGE BASED SYSTEM

7.3.1 Basic concepts

Knowledge based systems (KBS) are computer based systems that use knowledge and reasoning techniques to solve problems that would normally require human expertise. The knowledge obtained normally from experts is entered into the system in a coded form, which is then used by the system's inferencing and reasoning processes to offer advice on request. Thus, KBS comprises expert knowledge and the ability to manipulate that knowledge in order to infer conclusions about a particular problem domain. It allows the knowledge and experience of one or more experts to be acquired. This knowledge can then be used by anyone who considers it useful for examining their problem. However, the

purpose of KBS is not to replace the experts, but to make their knowledge more widely available and permanently stored on computer. In addition to the ability to tackle problems which cannot be solved using conventional programs, KBS have other unique attributes. The internal structure of KBS makes the generation of explanation text a straightforward task and the same structure enables the knowledge base to be easily updated and modified.

7.3.2 Characteristic features of knowledge based systems

Knowledge based systems are different from conventional programs in many respects. Amongst others are:

i. KBS contain practical knowledge which can be facts and heuristics obtained from at least one human expert and should perform at an expert's level of competence within a specialised area. Conventional programs do not try to emulate human experts.

ii. The knowledge is coded and kept separate from the rest of the program in a part called the 'knowledge base'. This permits easy refinement of the knowledge without recompilation of the control part of the program, which is often known as the 'inference engine'. This arrangement also enables the KBS to be more easily updated, and thus improved, at a later date. It also means that the control and interface mechanisms of some systems can be used with different knowledge bases. Systems of this type are usually called shells.

With conventional programs, knowledge about the problem and control information would be intermixed, making improvement and later development more complicated.

iii. Knowledge is represented with the use of symbols using techniques such as the production rules. This natural form of representation means that the knowledge base is easy to examine and modify. Conventional programs can only manipulate numerical or string data, not symbols.

iv. KBS attempt to generate the best possible answer by exploring many solution paths. They do this using heuristics searching techniques. Conventional programs are executed according to a predefined algorithm and have only one solution path.

v. KBS are able to offer explanations or justifications on demand. Since expert systems are typically interactive, they are capable of explaining how or why information is needed and how particular conclusions are reached. This can be provided in the middle or at the end of consultations. Information of this

type is provided to boost the user's confidence in the system and is not generally provided with conventional programs.

vi. KBS are able to handle incomplete information. When an expert system fails to find a fact from the knowledge base that is needed to derive a conclusion, it first asks the user for the information. If the information cannot be supplied then the system will try another line of reasoning. Obviously if too much information is missing, the system will be unable to solve the problem. Conventional programs would crash immediately if the data needed were unavailable.

Considering these features, it can be said that the objectives, methodology and the data that have been assembled in this research were adequately fulfilling the requirements of the KBS. However, it needs to be mentioned at the outset that several more stages need to be examined in detail before the prototype 'Property Development - Judgement and Decision Making KBS' could be established.

Some of the 'knowledge' i.e. facts on the decision making processes had been acquired from the 'experts' i.e. the decision makers, using the Repertory Grid Interviews technique. Basic concepts of the heuristics adopted by the decision makers in their decision making processes have been revealed, as discussed in Chapter 7, although as already mentioned, refinements have to be made before it could be coded into the 'knowledge base'. Knowledge representation, which is the examination and application of techniques such as production rules or others to organise and represent the knowledge obtained into the knowledge base, need therefore be examined in detail.

7.4 COMPONENTS OF KNOWLEDGE BASED SYSTEM

Conceptually the knowledge based system has four basic components namely:

i. the 'knowledge base', which contains a representation of the knowledge that is required;

ii. the 'inference mechanism', the means by which this knowledge is handled;

iii. the 'input/output interface', which enables the user to supply facts and data, and enables the system to ask questions or supply advice and explanation; and

iv. the 'database', which stores user's answers to questions or facts obtained from external sources.

The KBS basic components are shown diagrammatically in Fig. 7.1.
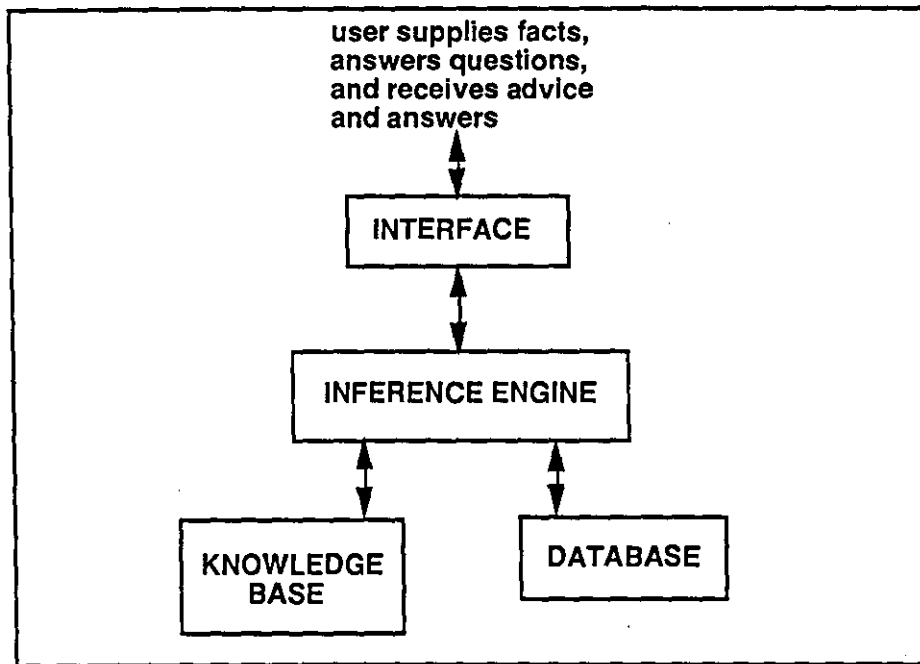
Fig. 7.1 Knowledge based system components

I) Knowledge Base

A knowledge base is the part of the program that contains the knowledge associated with a specific domain. The knowledge may comprise of facts about objects, together with information about the relationships between them and a set of rules for solving problems in a given domain. The latter is derived from the heuristics, which comprise judgements, intuition and experience, obtained from the expert or experts. The expert's or experts' knowledge is normally entered into the knowledge base after having identified and considered the most appropriate representation techniques to convert the knowledge into a suitable form.

II) User Interface

The user interface is the section of the program which enables the user to communicate with the knowledge base system. It controls the dialogue with the user in a form consistent with the user's understanding of the task being dealt with. This may be an explanation module which provides the user with the information about questions asked and decisions made by the inference engine.

III) Inference Engine

The inference engine is responsible for manipulating the domain knowledge encoded in the system's knowledge base together with information provided by the

system user during the consultation and information from external devices such as databases. It does this by using decision making strategies to generate inferences from the facts and the heuristics held in the knowledge base and/or information obtained from the user (Lachman, 1989)[3]. It works out the logical consequences of rules and controls the operation of the knowledge base. It will often have to infer conclusions from incomplete and imprecise data. In most knowledge based systems, it will include a capability for explaining the reasoning in the knowledge base. It combines facts from the database with rules in the knowledge base to produce expert level advice. This advice can be presented to a user or to another computer programme.

In a rule based expert system, the inference engine selects which rules to fire at the appropriate time during the user's consultation in order to infer conclusions. Various search strategy approaches are available for controlling the manipulation of the knowledge. These approaches are known as inference mechanisms and are generally dependent upon the representation scheme being deployed.

The inference mechanisms search the knowledge base for a solution by looking for patterns that match a desired goal or data. There are two main strategies by which rules can be inferred by the inference mechanisms. In general, rule based systems adopt a mixture of global and local inference mechanisms. The global mechanisms are domain independent procedures encoded within the inference engine, whilst the local mechanisms correspond to the expert's heuristic knowledge and are used to focus the attention of global mechanisms down more promising search paths.

Control strategies, or also called reasoning strategies, are used to decide what operators to apply at each stage of the search. The most common control strategies used in expert systems are forward chaining, backward chaining, or bi-directional. Forward chaining strategies start with the data and work forward to find a solution. In rule based systems, the facts are matched with the antecedent, or the 'IF', part of the rules. If a match occurs the rule is fired and the consequent, or the 'THEN', part of the rules becomes the new fact. Chaining continues with user interaction, where necessary, until the solution is found. Backward chaining works in the opposite direction. In this case the process starts by identifying possible solutions. It then searches the knowledge base for relevant facts or requests information from users to either verify or disprove them in turn. In rule-based systems using backward chaining, facts are matched with the consequent part of the

rules. Forward chaining and backward chaining strategies are also known as data-driven and goal-directed searching techniques, respectively, for obvious reasons. Bi-directional strategies use a combination of both forward and backward chaining to try to arrive at a solution more quickly.

Additional reasoning techniques are often incorporated into the inference engine to deal with uncertainty and anomalies between the facts and relationships in the knowledge base. The commonly used techniques are namely: Bayesian probabilities, the use of certainty factors, degrees of belief and measures based on fuzzy logic. All attempt to give the user some idea of the confidence he can place on the advice given. Another technique, which is becoming more popular, is blackboarding. This is often used when the knowledge required to solve the problem is segmented into several independent knowledge base and/or databases. The blackboard acts as a global knowledge base, receiving and storing problem-solving knowledge from any of the independent sources. It is not the intention of this section to discuss in detail this subject matter but further information on these can be found in (Hayes-Roth (1984)[4]; Keller (1987)[5]; Graham (1990)[6]; and Harmon and Sawyer (1990)[7].

Iv) Database

The database is the section of the program that keeps track of the problem by storing data such as the user's answers to questions, facts obtained from external sources, intermediate results of reasoning and any conclusions reached so far (Barrett and Beerel, 1988)[8]. It is really just a working store and is wiped clean after each session.

7.5   KNOWLEDGE ACQUISITION AND REPRESENTATION

7.5.1 Knowledge acquisition

One of the most difficult tasks facing expert system developers is 'knowledge acquisition' (Sowizral, 1985)[9]. Knowledge acquisition can be defined as the process which involves eliciting, analysing and interpreting the knowledge which a human expert uses when solving a particular problem, and then transforming this knowledge into a suitable machine representation' (Kidd, 1987)[10]. Knowledge acquisition can be extremely slow and difficult as well as costly, and suitably earns the reputation of being the main bottle-neck in the development of an expert system (Morris, 1989)[11]. The main techniques used in knowledge acquisition are:

a) interviewing,

b) protocol analysis,

c) observation, and

d) multidimensional techniques.

These techniques are discussed briefly below.

a) Interviewing

Interviewing is by far the most common method of knowledge acquisition (O'Neill and Morris, 1989)[12]. Interviews are particularly useful for acquiring basic knowledge about the problem domain such as concepts, general rules and control strategies. Apart from the first meeting with the expert, which is likely to be unstructured since the primary objective is to establish rapport, interviews should be focused with specific aims and objectives in mind. In focused or structured interviews, the interviewer or better known in this context as the knowledge engineer, controls the direction of the interview by asking questions about selected topics. A number of questioning strategies have been developed which include:

i Distinction of goals

Experts are asked what evidence is necessary to distinguish between one goal or conclusion and another.

ii Reclassification

Experts are asked to work backwards from goals by elaborating on the actions or decisions on which they are supported.

iii Critical incident

This involves the expert being asked to recall particularly memorable cases.

iv Forward scenario

In this the expert describes in detail how he would solve hypothetical problems posed by the interviewer.

b) Protocol Analysis

Protocol analysis is a technique which attempts to record and analyse an expert's step by step information processing and decision making behaviour. It basically involves asking the expert to think aloud while solving a problem. All the verbalizations, which are tape recorded, are then transcribed into protocols and analysed for meaningful relationships. In some cases, where video tape has been used, a skilful knowledge engineer can also take into account body language and eye movement when analysing the importance of such relationships.

Protocol analysis has been used successfully in a number of domains but it does have its shortcomings. Its major drawback is that it is extremely time consuming particularly in the transcription phase. Further, experts can also think faster than they talk, therefore any analysis is best followed up with other techniques such as interviewing.

c) Observation

Observation is almost similar to protocol analysis except that experts are not required to think aloud. Recordings consist of natural dialogue and, if video images have been taken, the expert in action. Some researchers have found it to be more effective than protocol analysis (Cookson, Holman and Thompson, 1985)[13], but this still has the same shortcomings i.e. lengthy, time consuming, transcriptions containing repetitions, contradictions and often inaudible muttering. However, observing an expert at work can be a useful familiarisation exercise at the beginning of a project. Rarely, if ever, can the technique be used alone.

d) Multidimensional Techniques

The purpose of these techniques is to elicit structural criteria which are used by the expert to organise his concepts, and thus to form a representational map of the domain, which is often difficult to put into words (Gammack, 1987)(14). One of the techniques is the repertory grid which involves the experts comparing concepts or called elements in the technique, to identify any differences between them. Details of this technique are explained in section 4.2.2. The other technique often used is card sorting. With card sorting, experts are asked to sort cards, each bearing the name of one concept, into groups according to any criteria they choose. This is repeated until the expert runs out of criteria. When analysed, the knowledge engineer should be able to formulate a conceptual map of the domain.

7.5.2   Knowledge Representation

Knowledge representation is concerned with how knowledge is organized and represented in the knowledge base. There are several methodologies available but the most common methods used in expert systems are:

    i. production rules
    ii. semantic networks
    iii. frames
    iv. hybrid of the above

By far the most popular method is production rules. This is particularly true in the case of microcomputer systems where, up until recently, lack of power has prevented the use of more complex and demanding representation techniques. The dependence on production rules is likely to change, however, as microcomputers become more powerful (Morris, 1989)[15]. The following is a brief description of the representation methodologies.

a) Production rules

Production rules are used to represent relationships in terms of conditional statements. The basic conditional statement is of the form If - Then:

IF (condition)
THEN (action or conclusion)

which reads 'IF the condition is true THEN either the action should be taken or a conclusion has been reached. The condition part of the rule, (before the THEN part), is also referred to as the antecedent, premise or left-hand-side (LHS). Similarly, the action pat of the rule, (the THEN part) is also referred to as the consequent, conclusion, or right-hand-side (RHS).

There are several advantages to rule-based systems:

1. Rules are easy to express and to understand.
2. The system is modular in design, in that rules can be added, deleted or changed without affecting the others.
3. Rules can represent procedural as well as descriptive knowledge.
4. Small rule-based systems are generally quick to develop.

The two main disadvantages of rule-based systems are:

1. They impose a very rigid structure, which makes it difficult to follow the flow of reasoning and to identify hierarchical levels within the problem area.
2. They are generally inefficient in execution because they are unable to make use of the more sophisticated reasoning strategies.

b) Semantic nets

A semantic net, or semantic network, is a general structure used for representing descriptive knowledge. It is a graphical representation of the concepts and relationships existing in a particular domain. Concepts, objects or events are

represented by nodes, and the relationships between them are represented by the links which span the nodes. The links are more commonly referred to as the arcs and have an arrow at one end to show the direction of the relationships.

Many different types of relationships can be expressed in a semantic net. One concept may be linked to several other concepts, and two concepts may have several relationships. The relationships between objects may also be used to create inheritance hierarchies in the network. In these cases objects can inherit properties from other objects.

The main value of a semantic net is to provide the knowledge engineer with a structural representation of a complex set of relationships. It is of little direct use to computers since they cannot handle diagrams. However, once in the computer, it may be possible to obtain a network form again, depending on the type of machine and availability of graphics software.

The advantages of semantic nets are:

1. They provide a powerful representation of relationships between objects.
2. They are flexible - nodes and arcs can be easily added, deleted or modified.
3. They provide inheritance facilities which enable assertions to be made about relationship between two objects, even when no arc exists between the two nodes.

The disadvantages of semantic nets include:

1. Procedural knowledge cannot be represented, therefore they invariably have to be used with some other representation method, usually production rules.
2. It is difficult to distinguish between an individual inheritance and a class of inheritance.

c) Frames

Frames were devised by Minsky (1975)[16] as a way of representing both descriptive and procedural knowledge. Each frame represents an idea or object and contains data associated with it. The data, sometimes referred to as attributes, are held in 'slots' within each frame. Slots, which can be abstractly regarded as 'fields' in database terminology, may contain a variety of information such as default values, rules, value options, certainty values or pointers to other frames.

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The pointers give rise to inheritance capabilities. Frames can be linked together in this way to form a hierarchy, or even several interlinked hierarchies. The reasoning process for frame representation involves trying to 'fill in the slots' and selecting the most likely frames that will result in a conclusion.

The main advantages of frame representation are:

1. It is efficient, since the structure facilitates economical inferencing.
2. The knowledge base is concise.
3. Hierarchical relationships can be represented.

The disadvantages are:

1. The knowledge must be capable of being represented in 'chunks' to fit the frame format.
2. Few expert system tools for microcomputers provide frame facilities.

d) Hybrids

Hybrid representation schemes attempt to incorporate the best features of all the methods. Typically the knowledge is represented by frames and production rules. Expert system environments usually have hybrid representation schemes.

Each of the above methods have advantages and disadvantages and these have to be weighed up during the selection phase. Undoubtedly, the main consideration should be whether the knowledge representation scheme is capable of emulating the real world application. Some knowledge is best expressed by a diagram or a drawing, whereas other knowledge may be better represented using general descriptive techniques. Either way, knowledge base system development will be much faster if the knowledge representation method selected matches the expert's viewpoint.

7.6   EXPERT SYSTEM TOOLS

Three distinct types of software tools are available to aid knowledge based system development. These are:

    i. Artificial Intelligence programming languages
    ii. Expert system shells
    iii. Knowledge engineering environments

a) Artificial Intelligence Programming Languages

Artificial Intelligence (AI) programming languages differ from conventional programming languages such as BASIC, FORTRAN, C and COBOL in that they have facilities for symbol handling and dealing with dynamic data structures. The two most common AI languages are LISP and PROLOG. LISP is a complicated language developed in 1958 by John McCarthy. PROLOG, which stands for PROgramming in LOGic, was invented by Alain Colmerauer and colleagues in France in about 1970.

PROLOG is more compact i.e. uses much less memory, than LISP and it can be more easily moved from one machine to another. Supporters of PROLOG claim that it is easier to learn and use than LISP. On the other hand, supporters of LISP maintain that it is hard to write efficient programs in PROLOG because of the lack of supporting tools and utilities.

Currently, two other AI languages that are becoming more popular are OPS-S and POPLOG. OPS-S is a rule based programming language which includes a complex forward-chaining inference engine, whereas POPLOG is a language which combines the features of both LISP and PROLOG.

b) Expert System Shells

Since learning AI languages can take months, many KBS developers prefer to use expert system shells. These are 'off the shelf' expert systems without a knowledge base. Once purchasers insert the knowledge of their choice, the shell responds as a complete expert system. Shells provide as a minimum:

- facilities for constructing the knowledge base
  (an English-like language far easier to learn than the AI languages, an editor, display and browsing facilities, rule validator and a debugging component)
- an inference engine
- an interface
- a database

Some also provide graphic facilities, spelling checkers and interfaces to traditional software tools such as word processing, spreadsheets and communication programs designed for use on personal computers.

Shells have been widely and successfully used in industry in the UK (O'Neill and Morris, 1989)[12], their main advantage being that systems can be built quickly. Sometimes shells are use only to develop early prototypes to test out ideas. In other cases they form part of the delivery program. Their popularity is in part due to their simplicity. Most of the commercial shells rely on the use of production rules to represent knowledge. A few do, however, also offer features such as frames. The inferencing techniques used vary from shell to shell; some offer forward chaining, others backward chaining and a few can do either. The most popular shells in the UK are CRYSTAL and LEONARDO.

CRYSTAL is a rule-based expert system which also provides interfaces to other software e.g. Lotus 1-2-3 and Symphony 2. It is mainly menu-driven and is said to be easy to use. LEORNARDO is a shell that provides both a rule-based and a frame-based knowledge representation scheme. It supports forward and backward chaining and a default mechanism which employs both. Also provided are the asset of productivity toolkits i.e. graphics, screen designer, interfaces to other software including Lotus, dBases and statistics and mathematics libraries. An extended version of LEONARDO also includes facilities for the management of uncertainty using Bayesian or certainty factor models.

c) Knowledge Engineering Environments

Environments, also known as toolkits or hybrid tools, are much more sophisticated than expert system shells. Environments use object-orientated programming techniques. Such techniques require elements of each problem under investigation to be classified as objects which can then contains facts, if - then rules to other objects. Using this approach, systems containing several thousands rule can be built.

Environments are not for beginners, as a thorough knowledge of LISP is usually required. One of the main advantages of environments is that they facilitate the development of complex, graphically orientated user interfaces. Two of the best known environments are KEE and Knowledge Craft.

KEE, which stands for Knowledge Engineering Environment, was developed by Intellicorp in the USA. It is an object-orientated environment which provides knowledge-representation tools, various reasoning strategies, and graphical interface facilities for both users and developers. Frames, called units, form the basis for the knowledge representation. Slots within the units contain the actual data, and facets associated with each slot describe the inheritance, value

class, and any developer-defined attributes. Rules and procedures are also supported. Inference is carried out through inheritance, forward chaining, backward chaining, or a mixture of these three methods. KEE has been used for the development of a number of successful systems particularly in the area of manufacturing (Morris and Reed, 1989)[17]. KEE users need to be experienced LISP programmers.

Knowledge Craft is a product of the Carnegie Group, Pittsburgh, Pennsylvania. It provides an integrated set of tools for the knowledge representation, reasoning and interfacing with end-users. It consists of "a set of integrated tools, including a schema-based representation language called CRL, functions for manipulating CRL knowledge bases, special purpose languages for implementing reasoning and inferencing strategies, and a number of workbenches and interface tools to assist in the development of user applications" (Morris and Reed, 1989)[17].

7.7   DEVELOPMENT OF KNOWLEDGE BASED SYSTEMS

Prototyping approach has been accepted as the norm in the development of knowledge based systems. The prototyping approach is discussed by Luger and Stubblefield (1989)[18] as a process in which "expert systems are built by progressive approximations, with the program's mistakes leading to corrections or additions to the knowledge base". Not all researchers agree with this type of approach; Bader et al., (1989)[19], for example said that "development to date has been unstructured and sympathetically called incremental development or prototyping". They argue for a more structured approach, which is gaining ground amongst developers. They believe that whilst the nature of expert systems work does require a degree of informality and flexibility of approach, this can be achieved in a structured and coherent manner. The advantages of structured development approach are:

a) They enable boundaries to be set, and prevent systems from collapsing under the weight of a mass of confused information.

b) They enforce documentation. A great deal of experimental work may be lost if not written down.

c) Documentation ensures that input from experts, users etc., can be formally recorded and used either in system development or for other valuable purposes.

d) Mistakes and errors are more easily identified and can be repaired as the system develops.

e) Maintenance and extension of the system at a later date is easier if a structured and documented methodology has been followed.

Several development methodologies have been described in the literature, many of which have been reviewed and analysed by Guida and Tasso (1989)[20]. All the expert systems methodologies reported are divided into distinct phases and the one described below explaining the development methodology of a knowledge based system, which is based on a method advocated by Plant (1991)[21] is no exception:

- Phase 1 - Initial specification
- Phase 2 - Knowledge acquisition
- Phase 3 - Knowledge analysis and representation
- Phase 4 - Implementation
- Phase 5 - Validation, verification and maintenance

This development methodology is further illustrated by the flow chart as shown in Fig. 7.2.

a) Phase 1 - Initial specification

The development commences with an initial specification, which acts as an informal software requirements document. This gives a broad outline of the systems parameters and boundaries to be used by the knowledge engineer as the basis of both the knowledge acquisition phase and the creation of the user model. Further, this baseline document will also be useful in the post-development stages, for instance, in maintenance.

b) Phase 2 - Knowledge acquisition

The creation of a knowledge based system is not by definition possible without knowledge, and it is the extraction, gathering, and articulation of that knowledge by the knowledge engineer from the domain expert in a particular area of interest which is termed knowledge acquisition. This is different to knowledge analysis, in which the knowledge engineer considers the content and inter-relationship of the information provided by the domain expert gathered during the acquisition phase.

However, the two are not discrete in their purposes. If, for example, an interview takes place as a means of acquisition, the acquisition will involve a certain amount of analysis on the part of the knowledge engineer for the interview to be
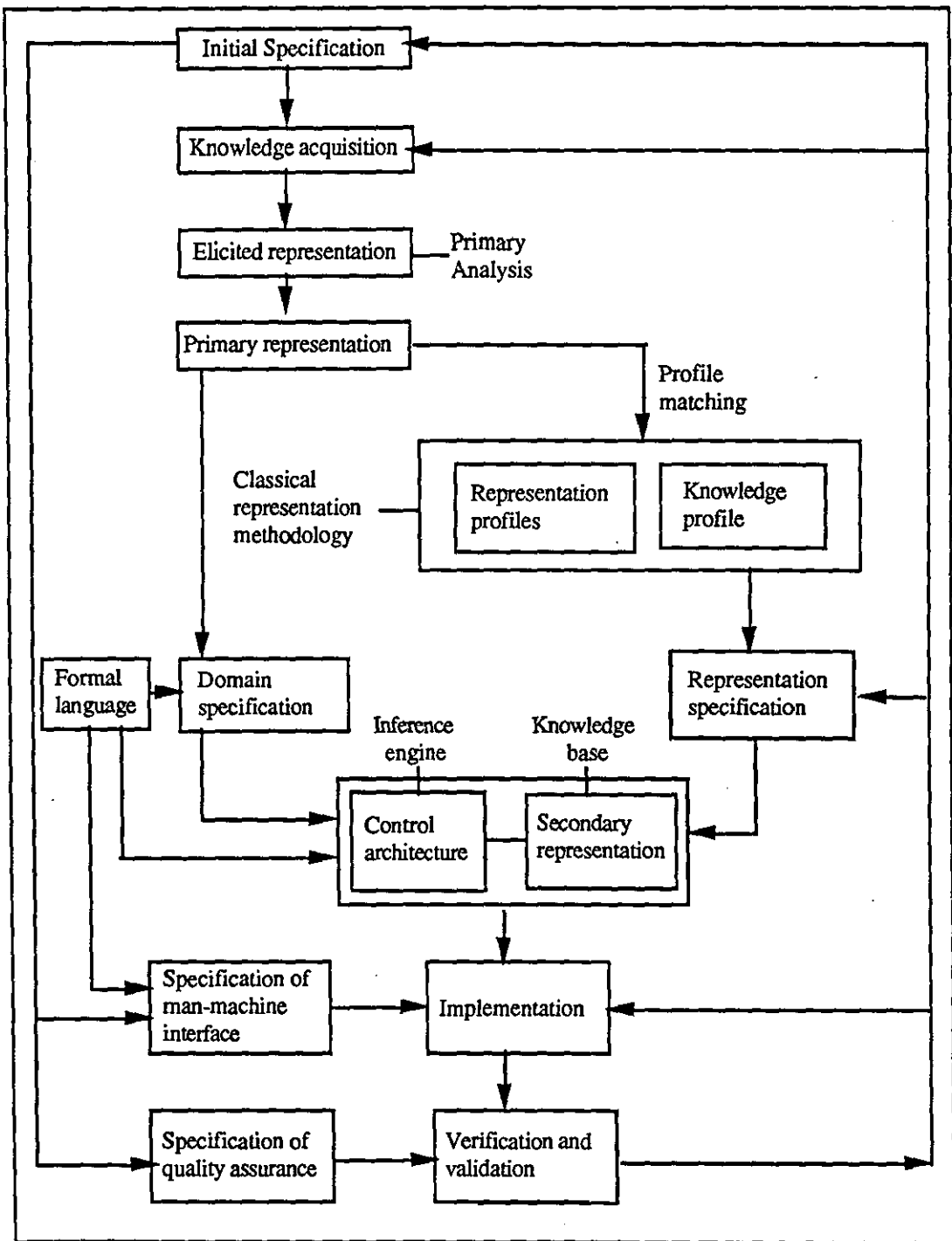
Fig. 7.2: Knowledge based system development methodology
(Adapted from Plant, 1991)

discursive and continuous and to have a dialogue rather than be a set of disjointed questions and answers. It has to be mentioned that other techniques of knowledge acquisition have been explained in section 7.5.1.

This knowledge acquisition phase should result in a textual form of elicited representation, from which a refinement process can proceed. This also allows a permanent record of the knowledge to be kept in the form in which it was acquired from the domain expert. Knowledge engineers can then assess if the refined knowledge used in the knowledge base is semantically equivalent to its original form. Further, if the system has to be maintained, then this document is available.

c) Phase 3 - Knowledge analysis and representation

Knowledge analysis is the process of breaking down the knowledge acquired during the knowledge acquisition phase into its composite parts and examining the relationship between the parts. The aim of this phase is to produce a representation of the elicited knowledge that is rigourous enough to allow several demanding analyses to take place on it. One of these ultimately produces a formal specification of the domain and another acts as the basis for the selection of the high-level classical representation such as production rules, frames, semantic networks etc.

To find the most suitable form of representation, several considerations have to be taken into account. First, the underlying needs of the system, in terms of data and knowledge types, have to be assessed. This assessment is based on the degree of presence of the five underlying knowledge types found to some extent in all systems namely: factual, heuristic, control, procedural, and conceptual. The second step is then to assess which of the representations e.g. rules, frames, etc., has a structure that best accommodates the knowledge types and control needs of the knowledge to be represented.

Having performed the matching process, the knowledge engineer can assess the results and thereby produce a formal syntax and a denotational semantics for the representation that has been suggested in the matching process.

d) Phase 4 - Implementation

The domain and representation specifications are used as a basis of the knowledge based implementation. The interface issues are resolved by referring to the man-machine interface specification. The implementation phase of the system is

said to be the most straightforward of all the stages, due to the high degree of structuring and refinement that has been performed on the domain knowledge (Plant, 1991)[21].

e) Phase 5 - Validation, verification and maintenance

This phase is concerned with testing and maintaining the knowledge based system. Active research is being carried out in the area of validation and verification for the knowledge based system. It has been found that the process of validation is difficult (O'Leary (1987)[22], Constantine and Ulvila (1990)[23]). It has been suggested that a useful approach that the knowledge engineer could adopt is a testing strategy that has a wide coverage, to locate as many sources of software failure as possible (Plant, 1991)[21].

With the structured development methodology, the knowledge engineer could easily maintain and refine the system as he/she has a complete and unambiguous record of all stages in the development processes. Finally, important criteria in assessing whether the knowledge based system is successful include:
- correctness of conclusions
- user-friendliness of the interface
- quality of advice and applications
- speed of responses
- user acceptance
- cost/benefits

7.8 KNOWLEDGE BASED SYSTEM DEVELOPMENT IN THIS STUDY

One of the contributions of this research is to lay the groundwork towards the establishment of the 'Property Development - Judgement And Decision Making Knowledge Based System'. The preceding sections have explained and indicated the various phases in the development of the knowledge based system. It is therefore possible, not only to identify the level in the development of the proposed knowledge based system this study has reached but also indicate the steps that will need to be undertaken towards the completion and application of the system.

7.8.1 Knowledge acquisition

This research indicated that it is possible to acquire the knowledge which the respondents, hereafter referred to as the 'experts', have used to attain the various achievements in the office and shop developments. As explained in section 4.4.2, the technique adopted

to acquire the knowledge from the experts was the Repertory Grid Interview technique. This is one of the recommended methods to acquire the expert's or experts' knowledge, as explained in section 7.5.1. Further, the knowledge was acquired from 20 experts which should refined the procedures and helped make the system more consistent.

The knowledge that was obtained from the experts were the weightings of the various constructs i.e the decision making factors. These weightings indicated the degree of the constructs' importance in the decision making processes as perceived by the experts. The number of constructs that were exhaustively obtained from the respondents was 27.

7.8.2 Knowledge analysis and representation

The facts that were revealed after analysing the knowledge obtained from the experts included:

i) The experts having similar achievements produced identical constructs weighting total score regardless of their varied academic or professional qualifications; experience in property development; decision making involvement ; and/or risk attitude. This occurred in both office and shop developments.

ii) For office developments the total weighting score indicated by high achievers was in the range of 92 and 95; medium achievers' total weighting score was between 86 and 89 and low achievers' total weighting score was between 83 and 84.

iii) For shop developments the total weighting score indicated by high achievers was in the range of 94 and 96; medium achievers' total weighting score was between 88 and 90 and low achievers' total weighting score was between 85 and 86.

It has been noted that the constructs' total weighting score descended slightly as the decision makers' achievement rate decreased. This trend occurred in both the office and shop developments.

iv) The achievement rate decreased because the decision makers, regardless of their attributes, generally reduced the number of constructs they gave high weighting and at the same instance increased the constructs they gave low

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weighting. This obviously resulted in the slight decline in the total weighting score.

v) To obtain high achievement rate in both the office and shop developments, the decision makers have to give high weighting to more economic factors.

The subsequent stage towards the development of the 'Property Development - Judgement and Decision Making' knowledge based system is to transform these facts or knowledge into a suitable machine representation form through the use of an appropriate technique. As mentioned previously, to find the most suitable form of representation, two main considerations have to be taken into account.

i) First, the underlying needs of the system, in terms of data and knowledge types, have to be assessed. This assessment is based on the degree of presence of the five underlying knowledge types found to some extent in all systems namely: factual, heuristic, control, procedural, and conceptual.

ii) The second step is then to assess which of the representations e.g. rules, frames, etc., has a structure that best accommodates the knowledge types and control needs of the knowledge to be represented.

Having performed the matching process, the knowledge engineer can assess the results and thereby produce a formal syntax and denotational semantics for the representation that has been suggested in the matching process.

One representation form that would probably be appropriate to the knowledge obtained in this study is rules production, since they can present relationships between constructs and achievements within the conditional statements of If-Then. An example of the statement could be:

"IF the total weighting score is between 92-95,

THEN it indicates high achievement in office development".

However, not only the syntax and denotational semantics should be in the appropriate form of rules production, other forms of representation have to be examined before the most suitable one can rightly be adopted.

Having finalised the knowledge representation phase then the following stages of the development would be the implementation, validation, verification and finally maintenance of the system. However, before going further than knowledge representation, or even before that, the developer needs to select the expert system tools.

7.8.3 Expert System Tools

Barrett and Beerel (1988)[8] have suggested the following motto be adopted when selecting an expert system tool: "Use a shell if you can, an environment where you should, and an AI language when you must".

Shells are the most cost-effective choice where applications can be developed by such tools. If finance is not a problem and an extensive expert system is required, then environments can provide the best support. AI languages can be used, if they must, for specialised developments where only limited funds are available. However, a large investment in time should be expected when programming from scratch.

Considerations when buying expert system tools include:

i. Hardware requirements.

   Can the tool run on existing computers or will special hardware be required?

ii. Software requirements.

   Does the tool require additional software to run?

iii. Power and capacity.

   Many expert system shells have imposed limits on the number of rules they can accommodate. Therefore, it is important to check this and the response time for large systems.

iv. Interface capabilities.

   User friendly interfaces are a must for both the developer and the eventual users of the system. Facilities to look for include editing flexibility and ease of use, consistency and appropriate use of menus and pop-up windows, adequate message and prompt facilities, graphics capabilities, user-friendly help and how and why facilities.

v. Knowledge representation methods.

   Shells use a variety of different methods: rules, semantic networks, frames, etc. all with or without uncertainty facilities. Some representation methods suit some types of knowledge better than others. Consequently, this aspect will need to be addressed thoroughly before a tool is selected.

iv. Inference and control methods.

   A number of inference and control methods exist. Again the preferred method depends on the application. Tools supporting forward chaining are generally better for applications involving forecasting and prediction, whereas for diagnosis-type applications, tools offering backward chaining are to be preferred.

There is no doubt that the selection of an expert system tool is a major task. The wrong selection can jeopardise the successful outcome of the KBS development project.

7.9   SKELETAL KNOWLEDGE BASED SYSTEM

The motivation for initiating the 'Property Development - Judgement Analysis and Decision Making' knowledge based system is rooted in the unique capabilities of such systems. As stated earlier, the knowledge based systems are capable of performing symbolic manipulation as opposed to numerical computation. Knowledge based systems can explain meaning and relevance of terms and symbols to the users in a highly interactive and user friendly environment. Moreover, changing the input and re-running the system can be done easily in a knowledge based system. This feature also enables the user to monitor the nature and extent of variation in the output due to changes in the input. All these features would help simplify the complicated property development decision making processes.

The 'Property Development - Judgement Analysis and Decision Making' knowledge based system which can be called JUDGEX (Judgement Expert) could be developed on the basis of the findings of the Repertory Grid Interviews. Detailed studies will have to be carried out to determine how the knowledge is to be organised and represented in the knowledge base. However, a suggested knowledge representation of JUDGEX knowledge based system is shown by the flow chart in Fig. 7.3.

Referring to Fig. 7.3 the knowledge base of JUDGEX has two parts. One deals with the office or shop development decision and the other with the further decision adjustment and/or consistency check decision. The first part may be composed of a series of IF-THEN rules designed and arranged on the basis of the factors identified in the Repertory Grid Interviews. If either office or shop development is suggested, the external programme that contains the datasets and the database management are invoked. The final results indicating the user's 'decision making attainment' will be displayed. The second part of the system allows the decision maker to check for consistency and/or make further decision adjustment.

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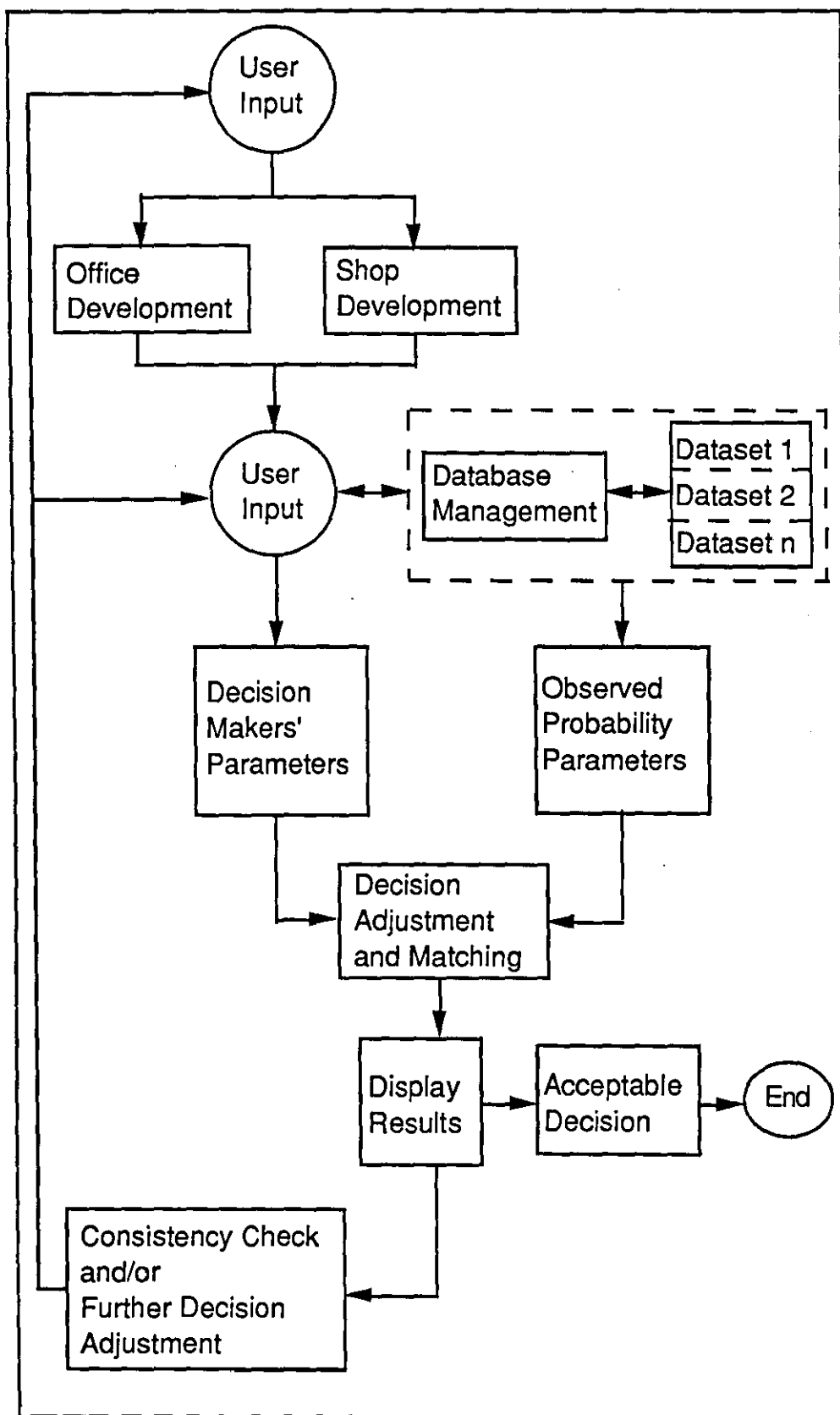
Fig. 7.3 Flow chart of Knowledge Representation in JUDGEX

At any stage, the JUDGEX knowledge based system should be able to respond to the "why" question by the user. Whenever the user is asked to input a value he or she has the option to respond by typing WHY or QUIT. If WHY is selected, the system will display the rule or rules wherein the variable will be used. Thus the user will get a feel for the relevance of the variable in question and can check the validity of the rules. After the text is displayed, the user will be asked the original question again. QUIT tells JUDGEX to save the data input up to that point.

When the system displays its final results, it should also be able to allow the user to inquire how the results were obtained. As a consequence of this inquiry, rules will be displayed and the user can see the list of known data and check for any inconsistency or alternatively amend the input to make further decision adjustments. The user, therefore, should be able to change any input data at this point and rerun the system. This feature will allow the JUDGEX user to check the effect and validity of the subjective input.

7.10 SUMMARY

The motivation for building a knowledge based system must lie in the benefits obtained. This is particularly true in the commercial sectors when the return from an expert system development would be expected to exceed the costs incurred. Expertise can be pooled when more than one expert contributes to the system development. This pooling exercise can assist in the refinement of procedures and help to make the system more consistent. Further, expert systems can provide a standardised approach to problem solving. Finally, the development of an expert system offers the expert an opportunity to critically assess and improve his or her problem-solving behaviour and therefore their decision making state of attainment. On the other hand the performance of non-experts can be improved over a period of time and may eventually even reach expert status.

CHAPTER 8

SUMMARY, CONCLUSION AND RECOMMENDATIONS

8.1   INTRODUCTION

The general purpose of this study was to establish the relationships between the decision makers' judgement of the decision making factors and the development outcomes and consequently identifying the most appropriate method that could possibly assist in the attainment of consistent decision making outcomes. Specifically, the research aimed to answer four fundamental questions:

(i)   What relationships do timing, location and capital size have with the development outcomes?

(ii) To what extent do the decision makers' education, training, experience and risk attitude correlate with their achievements?

(ii) How do the decision makers' perceptions of the decision making factors affect their achievements?

(iv) To what extent does the examination and analysis of external factors usually termed the 'hard data' and/or the intuitive judgement i.e. deliberation, reasoning and acceptance of facts i.e. the 'soft data' contribute towards a greater influence in the decision makers' achievements and/or development outcomes?

Data were collected from a sample of property companies within the United Kingdom. Two methods of data collection, namely the Questionnaire Survey and the Repertory Grid Interviews, were used. The analyses of the Questionnaire Survey data were performed using the Statistical Package for the Social Sciences (SPSS-X). Three analyses were carried out on the Repertory Grid data namely: the frequency count analyses, the content analysis and cluster analysis.

8.2   SUMMARY RELATING THE SUPPOSITIONS OF THE STUDY

Three research suppositions were forwarded in this investigation. This summary presents the findings determined from the data gathered from the property companies sampled.

Supposition 1 states:

The respondents' degree of success in their achievements of office and shop developments would be more strongly influenced by the 'soft data' or the intuitive judgement i.e. the deliberation, reasoning and acceptance of facts, rather than the 'hard data', i.e. the examination and systematic analysis of external factors.

The evidence, as discussed in section 5.8.3, has shown partial support for this supposition. It was observed that office development outcomes were influenced by the hard data whilst the shop developments were influenced by the soft data. It has been indicated that the decision makers' systematic examination and analyses of 'Economic Factors' or the market conditions, particularly those concerned with 'Timing' have a greater influence on the office rather than shop development outcomes. On the other hand, the intuitive judgement, i.e. the deliberation, reasoning and acceptance of facts that are concerned with the decision makers' 'Experience' and 'Qualifications', affect the shop rather than the office developments' outcomes.

However, office development outcomes were clearly not affected by 'Location'. This meant that for office developments, being located in the city, or large or small towns had a very low effect on the outcomes. On the other hand, the outcomes of shop developments were heavily influenced by the 'Location'. It has been indicated that the successes of shop developments were strongly influenced by the size of the catchment areas, i.e. being located in the city had higher successful outcomes than if located in small or large towns.

Thus, it seems obvious that the rule for property development, "To be successful it must be built with the 'right timing', 'right location' and 'right building' ", still applies but it must be stressed that for office developments greater emphasis must be given to 'Right Timing' and for shop developments to 'Right Location'.

Thus with regard to the soft data, this research has shown that it affects the degree of success of shop developments but not of office developments. Therefore, there is an inherent difference in the decision making processes for shop and office developments.

Supposition 2 states:

The respondents with certain personal attributes, i.e. those possessing academic and professional qualifications, high experience and positive attitudes towards risk

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would attain a higher degree of success in their achievements in office and shop developments than those having the opposite characteristics.

The evidence, as discussed in section 5.9, has shown no support for this supposition. It has been indicated that the decision makers were inconsistent in their decision making achievements. There were decision makers having similar attributes, for example, the same academic and professional qualifications, but were very inconsistent in their achievements. Further, it was also observed that decision makers who attained 'high achievement' in office developments had 'low achievement' in shop developments. Specifically, the decision makers' achievements in the office developments were affected by the variation in consideration of the 'hard data' whilst their achievements in the shop developments were more influenced by the variation in the intuitive judgement of facts, i.e. the 'soft data'.

It has been indicated that high decision making involvement was necessary to attain a consistently high achievement in both office and shop developments. The long duration of the 'hands on experience' enabled the decision makers to judge astutely the various factors in appropriateness with the office and shop developments' requirements. Assertions in section 5.9.3 further proved that high achievements in shop developments were the results of good intuitive judgement rather than the examination and analysis of external factors.

This research has therefore revealed that having academic and/or professional qualifications and positive risk attitude do not assure a consistently high achievement in office and shop developments. But experience in particular 'hands on experience' invariably produces a higher degree of success in office and shop developments.

Supposition 3

Adopting the concept of satisficing behaviour, the respondents with better personal attributes i.e. those possessing academic and professional qualifications, high experience and positive attitudes towards risk would, in their consideration of decision making factors, focus their attention on the key factors and maximise the consideration of and weighting on these factors and attain a high degree of success. On the other hand, those having the opposite characteristics would consider more factors in attempting to attain a similar degree of success, thereby

losing sight of the relative importance of key factors resulting in a lesser number of factors given very high weighting.

The evidence gathered was partly in support of this supposition. It was indicated that high achievers gave very high weighting to marginally more factors than medium and low achievers but the attributes of the high achievers varied. As stated in section 5.9 and reiterated in the discussion on Supposition 2, there were decision makers who had similar attributes, e.g. the same academic and professional qualifications, but were very inconsistent in their achievements.

Thus, this study has revealed that decision makers having similar degrees of achievement produced identical constructs weighting total score regardless of their varied academic or professional qualifications; experience in property development; decision making involvement; and/or risk attitude. High achievers in office developments produced almost identical constructs weighting total scores between them. Similarly, the groups of medium and low achievers produced almost similar constructs weighting total scores within their group. These circumstances also occurred in shop developments.

It has to be noted that the constructs total weighting scores descended slightly as the decision makers' achievement rate decreased. These circumstances occurred in the shop and office developments. It was discovered, though not very conclusively, that as the achievement rate decreased the decision makers, irrespective of their attributes, reduced the number of factors which they gave a high weighting. These obviously resulted in the slight decline in the total weighting score. This indicates that the high achievers possibly focused their attention on the key factors and maximised the consideration and weighting on these factors and attained the higher degree of success. On the other hand, the low achievers consider more factors in attempting to attain a similar degree of success, thereby losing sight of the relative importance of key factors resulting in a lesser number of factors given very high weighting. These facts fulfilled Simon's idea of satisficing.

This research has therefore revealed that high achievements in office and shop developments are attained through not only considering all the decision making factors but focussing the attention on key factors and consequently giving high weighting to these factors. The ability to correctly identify and focus on these key factors is unrelated to personal attributes.

8.3   SUMMARY OF THE RESULTS

This summary of findings revolves around the four research questions of the study. The research questions are: "What relationships do timing, location and capital size have with the development outcomes?"; "To what extent does the decision makers' education, training, experience and risk attitude correlate with their achievements?"; "How do the decision makers' perceptions of the decision making factors affect their achievements?" and "To what extent do the examination and analysis of external factors usually termed the 'hard data' and/or the intuitive judgement i.e. deliberation, reasoning and acceptance of facts, i.e. the 'soft data' contribute towards a greater influence in the decision makers' achievements and/or development outcomes?"

Mentioning only the more significant findings, the following general comments can be made:

8.3.1 Factors affecting development outcomes

The purpose of the first question was to determine the relationships of the various external factors with development outcomes. The results of the analyses showed that the relationships vary between office and shop developments. On examining the 'Timing' factor, it was found that office development outcomes were more sensitive to the property market downturn than shop developments. This lower sensitivity of shop development outcomes to the sudden property market downturn was probably because the key tenants or buyers of the large shopping developments were predetermined.

Therefore, the outcomes of most large shop developments were found to be 'successful' at the beginning of the downturn of the property market compared to office developments because preletting or buying was not the usual strategy adopted in office development, particularly when the property market is buoyant. However, the shop developments' 'advantage' would possibly be only for a short time because as the property market slump continued, the lack of demand would probably be felt by all types of properties.

As for other external factors, evidence has shown that office development outcomes were strongly affected by Capital Values, i.e. the higher the capital values the greater were their successful outcomes. Shop development outcomes on the other hand had no such significant relationship. The Site Distances or

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Remoteness of the development sites from the main office, had no significant relationship with both office and shop development outcomes.

However, office development outcomes were clearly not affected by Location. This indicated that, for office developments, being located in the city or large or small towns had a very low effect on the outcomes. However, for shop developments, their outcomes were heavily influenced by the location. This indicated that the successes of shop developments were strongly influenced by the size of the catchment areas, i.e. being located in the city ensured higher successful outcomes than if located in small or large towns.

Thus, the study indicates that the external factors affect the outcomes of both office and shop developments but decision makers need to be aware of giving higher emphasis on the appropriate factors for different types of development. In principle, the rule of thumb of 'right timing', 'right location' and 'right building' to ensure the attainment of successful property developments, generally still applies but it must be stressed that for office developments emphasis must be given for 'Right Timing' and for shop developments 'Right Location'.

8.3.2 Factors affecting decision makers' achievements

The main purpose of the second question is to examine and comprehend the relationships between the decision makers personal attributes and their achievements. In other words, this is to question whether high achievements could only be attained by a particular group of individuals with some definite characteristics. Evidence gathered in this study indicates that achievements in office developments were significantly affected only by the Decision Making Involvement. Academic and Professional Qualifications as well as Experience and Risk Attitude had low or very low significance relationships with office developments' achievement. This indicated that the Personal Attributes' factors had no strong correlationships with office developments' achievements. However, in shop developments, besides Decision Making Involvement, Experience in Property Developments and to some extent Academic Qualifications had high significance correlations, which indicated that there were strong and significant relationships between the Personal Attributes' factors and the achievements in shop developments.

It is noteworthy that office development outcomes were strongly influenced by 'Timing' while shop development outcomes were not affected by 'Timing'. On the other hand, office development achievements were affected only by 'Decision

Making Involvement' whilst shop development achievements were influenced not only by 'Decision Making Involvement' but also 'Experience in Property Development' and 'Academic Qualifications'. These observations suggest that the intuitive judgement, i.e. the deliberation, reasoning and acceptance of facts that are concerned with the decision makers' 'Experience' and 'Qualifications', affect the shop rather than the office developments' achievements.

This study therefore reveals that personal attributes or 'internal' characteristics affect the achievements in shop developments rather than offices. This implies that different expertise is needed to undertake office and shop developments. Shops' development requires a more personal approach as it is oriented towards a smaller and to a certain extent 'specialised clients', particularly in the effort to 'capture' the key tenants. On the other hand, office developments are less specialised as it is for a wider and more mixed market and very often office premises are not occupied by major tenants or, more rarely, are the major tenants being predetermined before the development. These then are the reasons why achievements in shop developments are affected more by personal attributes and the offices by external factors, but with the exception of the 'Timing' (offices) and 'Location' (shops) factors.

8.3.3 Hard data and soft data influences

It has been indicated that the decision makers' systematic examination and analysis of 'Economic Factors', particularly those concerned with 'Completion Timing', have a greater influence on the office rather than shop development outcomes. On the other hand the intuitive judgement, i.e. the deliberation, reasoning and acceptance of facts that are concerned with the decision makers' 'Experience' and 'Qualifications', affect the shop rather than the office developments' achievements. In another term the 'hard data' affects office development outcomes more than shop while the 'soft data' influence shop developments' outcomes more than office. These facts strengthen the earlier assertion that shop developments require a more personal approach while office developments need a more quantitative examination of factors as the developments are for a wider and mixed market, that were influenced more by 'Timing'.

8.4   LIMITATIONS OF RESEARCH

As this research investigates the relationships between the decision makers' judgement of the decision making factors and the development outcomes of office

and shop developments it was considered appropriate to consider only the decision makers or the developers point of view. As such it has not dealt with in detail clients' need and clients' brief with respect to the development of office and shop premises.

In defining successful developments this research has adopted the measurement obtained from the respondents who considered the degree of success only from the financial point of view. It has to be noted that this is a narrow view and other parameters could be considered, giving a broader definition of success.

8.5   RECOMMENDATIONS FOR FURTHER RESEARCH & CONCLUSION

This research has only managed to lay the groundwork towards the establishment of the 'Property Development - Judgement and Decision Making' knowledge based system. This research has found that the decision makers were not consistent in their achievements. Several methods have been suggested to improve decision making but the knowledge based system should be capable of assisting this. Therefore, further detailed research is required to establish the KBS.

As no other similar research has been undertaken previously, a similar study but on a larger scale should be conducted so that the results of this study can be further validated.

In conclusion, the investigation has achieved the purpose for which it was designed. The findings can be useful as indicators to better understand the relationships between the decision makers and their achievements in property development, particularly that of office and shop premises.

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JUDGEMENT ANALYSIS AND DECISION MAKING IN PROPERTY DEVELOPMENT

QUESTIONNAIRE 1

MEGAT MOHD. GHAZALI

LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY
FEBRUARY 1992

1. THE COMPANY

The following questions concerning your company are asked in order that we may classify the nature and type of your property development investment.

1.1 During the years 1985-1990 what types of property development have your company carried out?

           (Please tick the appropriate box/boxes).   1 - 3

     (i) residential   4 - 7

     (ii) commercial (shops and/or offices)

     (iii) industrial

     (iv) other (please specify)

       ....

1.2 For the period 1985-1990 what is the total number of commercial, residential, industrial and/or other developments that your company had carried out ?   8 - 11

        (Please state the total number in the boxes)

     (i) residential

     (ii) commercial (shops and/or offices)

     (iii) industrial

     (iv) other (please specify)

       ....

1.3 For each type of property development carried out since 1985, how many at the time of their completion, have given financial return or profit above your **company's initial estimation?**   12-15

        (Please state the number in the boxes)

     (i) residential

     (ii) commercial (sops and/or offices)

     (iii) industrial

     (iv) other (please specify)

       ....

1.3   For each type of property development carried out since 1985, how many
       at the time of their completion, have given financial return or **profit below**
       your company's initial estimation?

       (Please state the number in the boxes)

       (i) residential

       (ii) commercial (sops and/or offices)

       (iii) industrial

       (iv) other (please specify)

       ....

1.5   Of the total number of property developments carried out by your company
       in the period 1985 - 1990, what was the breakdown for each type of
       development in accordance to their capital size?

	Below 2	2 - 4	4 - 6	6 - 8	over £8
			(in £millions)		
commercial	☐	☐	☐	☐	☐
residential	☐	☐	☐	☐	☐
industrial	☐	☐	☐	☐	☐
other	☐	☐	☐	☐	☐

1.6   Does your company normally retain in its portfolio the whole of the developed
       property?

              YES   NO
              ☐   ☐

              If the answer is YES go to question 1.10.

1.7   Does your company normally retain in its portfolio part of the developed
       property for investment purposes?

              YES   NO
              ☐   ☐

1.8   How long after completion of the development does your company normally   46-51
       takes to sell off the whole of the property?

       Immediately Less than   1 - 2   2 - 3   3 - 4   over 5
                      1 year   yrs.   yrs.   yrs.   yrs.
       ☐   ☐   ☐   ☐   ☐   ☐

1.9   If your company retained in its portfolio part of the developed property,   52-57
       how long after completion of the development does your company
       normally takes to sell off that part of the property?

       Immediately Less than   1 - 2   2 - 3   3 - 4   over 5
                      1 year   yrs.   yrs.   yrs.   yrs.
       ☐   ☐   ☐   ☐   ☐   ☐

1.10   How many years experience has your company had in property development
       development?   58

       Less than 5   5-10   10-15   15-20   over 20
       yrs.   yrs.   yrs.   yrs.   yrs.
       ☐   ☐   ☐   ☐   ☐

2. POLICY AND ORGANIZATIONS

This section deals with general questions about your company policy and organization.

(Please tick the appropriate answer to the questions)

		YES	**NO**	
2.1	Does your company have a written policy or guide-lines for the selection of properties for development investment ?	☐	☐	59
2.2	Do you have staff members specifically designated to collate information on all factors related to the properties to be selected for development?	☐	☐	60
2.3	Does your company have any computer system to support data processing with regards to selection of properties for development investment ?	☐	☐	61
2.4	Does your company solely rely on reports prepared by staff members to assist the determination and selection of properties to be developed ?	☐	☐	62
2.5	Does your company engaged the services of property consultants in preparing feasibility reports on the properties to be considered for development?	☐	☐	63

3. INVESTMENT DETERMINANTS

Please indicate by weighting (not ranking) from 1 - 5 the importance of the following determinants in your consideration and selection of properties for development for the period 1985-1990.

Note - 5 is the most important down to 1, the least important.

FINANCIAL FACTORS

3.1	*Capital availability*	☐	64
3.2	*Return of capital*	☐	65
3.3	*Return on capital*	☐	66
3.4	*Financial/borrowing cost for site acquisition*	☐	67
3.5	*Financial/borrowing cost for construction*	☐	68
3.6	*Other (please specify)*		
	....	☐	69
	....	☐	70

SITE AND DEVELOPMENT FACTORS

3.7	*Location of development*	☐	71
3.8	*Type of property to be developed*	☐	72
3.9	*Site identification*	☐	73
3.10	*Infrastructures and facilities of surrounding area*	☐	74
3.11	*Development period*	☐	75
3.12	*Size of development*	☐	76
3.13	*Other (please specify)*		
	....	☐	77
	....	☐	78

ECONOMIC AND MARKET FACTORS

3.14	*Demand for the property on completion*	☐	79
3.15	*General economic conditions*	☐	80
3.16	*Expected capital value of the property on completion*	☐	81
3.17	*Trends in capital and rental values*	☐	82

3.13 Other (please specify)

☐   83

....

☐   84

....

BUILDING CHARACTERISTICS

3.20 Design of property to be developed   ☐   85

3.21 Facilities and services in the property to be developed   ☐   86

3.22 Clients' requirements   ☐   87

3.23 Other (please specify)

☐   88

....

☐   89

....

POLICY AND REGULATIONS

3.24 Company's policies, objectives and strategies   ☐   90

3.25 Design brief requirements i.e. legal, professional etc.   ☐   91

3.26 Other (please specify)

☐   92

....

☐   93

....

DECISION MAKER

3.27 Perception of property market conditions   ☐   94

3.28 Decision makers' skills and knowledge.   ☐   95

3.29 Other (please specify)

☐   96

....

☐   97

....

4. DECISION MAKING

Questions in this section are to determine the methods used by your company to assist decision making in the selection of properties for development.

		In Gen. Use	Used Occas.	Rarely Used	Never Used	
4.1	Individual decision making based upon experience and intuition	☐	☐	☐	☐	98
4.2	Group decision making based upon informal discussion and using experience and intuition	☐	☐	☐	☐	99
4.3	The use of computers and decision making software packages	☐	☐	☐	☐	100
4.4	The use of property consultants	☐	☐	☐	☐	101

4.5 Investment appraisal techniques used;

	In Gen. Use	Used Occas.	Rarely Used	Never Used	
i. payback period	☐	☐	☐	☐	102
ii. internal rate of return	☐	☐	☐	☐	103
iii. net present value	☐	☐	☐	☐	104
iv. other (please specify)	☐	☐	☐	☐	105

....

4.6 Method used for analysing the riskiness of development investment;

	In Gen. Use	Used Occas.	Rarely Used	Never Used	
i. probability analysis	☐	☐	☐	☐	106
ii. sensitivity analysis	☐	☐	☐	☐	
iii. none	☐	☐	☐	☐	109
iv. other (please specify)	☐	☐	☐	☐	

....

THANK YOU FOR YOUR PARTICIPATION

JUDGEMENT ANALYSIS AND DECISION MAKING IN PROPERTY DEVELOPMENT

QUESTIONNAIRE 2

MEGAT MOHD. GHAZALI

LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY

MAY 1992

PROPERTY DEVELOPMENT PERFORMANCE

1 a. For the period 1985 - 1990, would your company's involvement in the following type of property development be considered regular or spasmodic?

(Please circle the appropriate number)

Property Types	Regular	Spasmodic
(i) shops as defined in Class A1 of the Town and Country Planning (Use Classes) Order 1987.	1	2
(ii) offices as defined in Class A 2 and B1 of the Town and Country Planning (Use Classes) Order 1987.	1	2
(iii) mixed development of shops and offices	1	2

b. Please state other types of mixed development with shops that your company had carried out in the period 1985-1990:

(i) regularly

....

(ii) spasmodically

....

2 a. Were the following indicators used in assessing the investment outcome i.e. whether successful or unsuccessful, of the property developments that your company carried out for the period 1985 - 1990?

(Please circle the appropriate number)

Indicators	Yes	No
(i) Actual profit	1	2
(ii) Profit on cost	1	2
(iii) Yield on rental income	1	2
(iv) Rental cover or payback period	1	2

2 b. Please state other indicators that your company uses to assess the investment outcome of the property developed.

....

....

c. What percentage or range of the indicators used would your company classify **shop developments** that were carried out for the period 1985-1990 highly successful, successful and moderately successful?

Indicators   *Percentage / Range*

	Highly Successful	*Successful*	*Moderately Successful*
Actual profit	☐ % to ☐	☐ % to ☐	☐ % to ☐
Profit on cost	☐ % to ☐	☐ % to ☐	☐ % to ☐
Yield on rental	☐ % to ☐	☐ % to ☐	☐ % to ☐
Rental cover or payback period	☐ years	☐ years	☐ years

d. What percentage or range of the indicators used would your company classify **office developments** that were carried out for the period 1985-1990 highly successful, successful and moderately successful?

Indicators   *Percentage / Range*

	Highly Successful	*Successful*	*Moderately Successful*
Actual profit	☐ % to ☐	☐ % to ☐	☐ % to ☐
Profit on cost	☐ % to ☐	☐ % to ☐	☐ % to ☐
Yield on rental	☐ % to ☐	☐ % to ☐	☐ % to ☐
Rental cover or payback period	☐ years	☐ years	☐ years

2 e. What percentage or range of the indicators used would your company classify **mixed developments of shops and offices** that were carried out for the period 1985- 1990 highly successful, successful and moderately successful?

Indicators   *Percentage / Range*

	Highly Successful	**Successful**	**Moderately Successful**
Actual profit	☐ % to ☐	☐ % to ☐	☐ % to ☐
Profit on cost	☐ % to ☐	☐ % to ☐	☐ % to ☐
Yield on rental	☐ % to ☐	☐ % to ☐	☐ % to ☐
Rental cover or payback period	☐ years	☐ years	☐ years

f. What percentage or range of the indicators used would your company classify **mixed developments of shops and other uses** that were carried out for the period 1985- 1990 highly successful, successful and moderately successful?

Indicators   *Percentage / Range*

	Highly Successful	**Successful**	**Moderately Successful**
Actual profit	☐ % to ☐	☐ % to ☐	☐ % to ☐
Profit on cost	☐ % to ☐	☐ % to ☐	☐ % to ☐
Yield on rental	☐ % to ☐	☐ % to ☐	☐ % to ☐
Rental cover or payback period	☐ years	☐ years	☐ years

3 a. In determining the outcome of investment for mixed development did your company assess:

(Please circle the appropriate number)

	Yes	**No**
(i) the whole development together	1	2
(ii) each type separately	1	2

b. In either case how was the performance of the development determined?

....

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4 a (i) Referring to the period 1985-1990 and in the format below please state the date of inception and completion as well as location of each **office development** that your company has carried out.

(ii) what was the capital size of each development?

(iii) please tick which of the developments your company considers to have been highly successful, successful or moderately successful.

Location	Date of Inception mth. yr.	Date of Completion mth. yr.	Capital Size nearest (£ million)	Highly Successful	Successful	Unsuccessful

4b.(i) Referring to the period 1985-1990 and in the format below please state the date of inception and completion as well as location of each **shop development** that your company has carried out.

(ii) what was the capital size of each development?

(iii) please tick which of the developments your company considers to have been highly successful, successful or moderately successful.

Location	Date of Inception mth. yr.	Date of Completion mth. yr.	Capital Size nearest (£ million)	Highly Successful	Successful	Unsuccessful

5 a. With reference to the **highly successful developments** stated in the answer to Question 4 above, please indicate by weighting (not ranking) from 1 to 10 the degree of influence the following factors had towards the highly successful outcome of the developments undertaken by your company.

Note - 10 has the highest degree of influence down to 1 the least influence.

(i)   *Location of development*   □□

(i i)   *Decision makers' skills and experience*   □□

(i i i) *General economic conditions*   □□

(i v)   *Facilities of surrounding areas*   □□

(v)   *Financial cost of development*   □□

(v i)   *Types of properties developed*   □□

(v i i) *Company's organization, policies and strategies.*   □□

(i i x) *Decision makers' perception of property market conditions.*   □□

(i x)   *External design of properties developed*   □□

(x)   *Clients requirements*   □□

(x i)   *Marketing and advertising programme and strategies.*   □□

5 b. With reference to the **successful developments** stated in the answer to Question 4 above, please indicate by weighting (not ranking) from 1 to 10 the degree of influence the following factors had towards the successful outcome of the developments undertaken by your company.

Note - 10 has the highest degree of influence down to 1 the least influence.

(i) Location of development ☐

(i i) Decision makers' skills and experience ☐

(i i i) General economic conditions ☐

(i v) Facilities of surrounding areas ☐

(v) Financial cost of development ☐

(v i) Types of properties developed ☐

(v i i) Company's organization, policies and strategies. ☐

(i i x) Decision makers' perception of property market conditions. ☐

(i x) External design of properties developed ☐

(x) Clients requirements ☐

(x i) Marketing and advertising programme and strategies. ☐

5 c. With reference to the **moderately successful developments** stated in the answer to Question 4 above, please indicate by weighting (not ranking) from 1 to 10 the degree of influence the following factors had towards the unsuccessful outcome of the developments undertaken by your company.

Note - 10 has the highest degree of influence down to 1 the least influence.

(i)   Location of development

(i i)   Decision makers' skills and experience

(i i i)   General economic conditions

(i v)   Facilities of surrounding areas

(v)   Financial cost of development

(v i)   Types of properties developed

(v i i)   Company's organization, policies and strategies.

(i i x)   Decision makers' perception of property market conditions.

(i x)   External design of properties developed

(x)   Clients requirements

(x i)   Marketing and advertising programme and strategies.

MANAGEMENT INFORMATION & DECISION SUPPORT SYSTEM

1 . Please state the computer systems and software your company uses in the following decision making stages of property development investment;

      (i) storage, retrieval and analysis of information
      (ii) investment appraisal?
      (iii) risk analysis?
      (iv) other decision support mechanisms?

Decision Making Stages	*System and Software Used*
(i) storage, retrieval and analysis of information	....
(ii) investment appraisal	....
(iii) risk analysis	....
(iv) other decision support mechanisms	....

2 a. What types of information pertaining to property development investment does your company gather, store and analyse in the computer system?

    ....

    ....

b. Where does your company obtain the above information?

    ....

3 a. From your judgement, to what extent does your company rely on the following processes in the final decision to carry out or not any of the shop, office or mixed developments.

Note - 5 is the highest reliance down to 1, the least.

(Please circle the relevant numbers)

(i) comparative analysis of all
external information obtained.   1   2   3   4   5

(ii) judgemental factors   1   2   3   4   5

(iii) internal factors
(For definition see Qtn. 3c)   1   2   3   4   5

b. Please state the key judgemental factors normally adopted by your company in the final decision whether to undertake the shop or office or mixed development projects.

....

....

....

c. Which of the following internal factors do your company consider in the decision making process?

(Please circle the appropriate number)

	Yes	No
(i) organizational policies	1	2
(ii) personnel's experience	1	2
(iii) personnel's seniority	1	2

d. Please state other internal factors adopted by your company in the decision making process.

....

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4 a. Did your company engage any consultants in the process of developing the shop, office or mixed developments for the period 1985-1990?

(*Please circle the appropriate number*)

Yes	No
1	2

If NO, why?

....

b. From which of the following consultants' did your company seek advice in the process of developing the shop, office and mixed properties for the period 1985-1990?

(*Please circle the appropriate number)*

		Yes	No
(i)	Planning consultants	1	2
(i i)	Economic consultants	1	2
(i i i)	Estate agents	1	2
(i v)	Valuers	1	2
(v)	Tax and accountancy consultants	1	2
(v i)	Architects/Building surveyors	1	2
(v i i)	Quantity surveyors	1	2
(i i x)	Engineers	1	2
(i x)	Occupiers	1	2

c. Please state other consultants from which your company has sought advice in the process of developing the shop, office and mixed properties.

....

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5. If your company relies on consultants' reports to assist in the decision making process:

(i) does your company rely on the recommendations of the consultants in the final decision to undertake the development?

	Yes	No
	1	2

If NO, why?

....

....

(ii) what was the specialist advice they gave?

....

....

(iii) was the advice significant in making the project successful?

	Yes	No
	1	2

If NO, why?

....

6 a. Did your company use the consultants' reports as a form of database to assist in the decision making process?

	Yes	No
	1	2

If NO,

b. Did the consultants participate in your company's decision making process?

	Yes	No
	1	2

7. Was it cheaper to use consultants rather than in-house professionally qualified staff?

	Yes	No
	1	2

8. Will your company seek the advice of the same consultants again?

	Yes	No
	1	2

If NO, why?

....

....

....

THANK YOU FOR YOUR PARTICIPATION

INTERVIEW SCHEDULE

(i) **Personal Attributes**

1 Position.

....

2. Period of experience in property development.

....years

3. Duration with present company.

....years

4. Involvement in decision making:

   i) As member of decision making team.   .... years

   ii) Main decision maker/s.   .... years

5. Type and number of developments that have been carried out in the years 1985-1990, in which you were involved in the decision making process.

   Shops (   )   Offices   (   )   Mixed (   )

6 Academic qualification/s.

   i) ....   (19 ....)

   ii) ....   (19 ....)

7. Professional qualification/s and/or related courses attended).

   i) ....   (19 ....)

   ii) ....   (19 ....)

   iii) ....   (19 ....)

(ii) Attitudes Towards Risk

1. In addressing any investment decision, do you give the identification of inherent risk a high priority at the outset and generally quantify the nature of any risk or risks inherent in the situation?

<div align="center">

YES   NO

</div>

2. Having identified a probable risk, would you:

   (a) seek to find a method to turn the risk into an opportunity and/or profit

<div align="center">

YES   NO

</div>

   (b) seek a means of protecting, covering or devolving that risk

<div align="center">

YES   NO

</div>

   (c) completely avoid the risky situation, even though it means relinquishing a business opportunity

<div align="center">

YES   NO

</div>

   (d) disregard risk and rely on established business practices and procedures to carry you through to a successful outcome in the proposed development

<div align="center">

YES   NO

</div>

   (e) seek a quite different approach to the situation, as appropriate to the needs of the development

<div align="center">

YES   NO

</div>

   (f) if so, please describe.

   ....

   ....

   ....

(Information on the card used to elicit the constructs)

DEVELOPMENT DETAILS

LOCATION: ....

INCEPTION: .... */19* ....   *COMPLETION:* .... */19*
....

CAPITAL SIZE : £ .... *(nearest million)*

REPERTORY GRID DATA (PROPERTY MANAGER/DIRECTOR)													
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	
C1													C1
C2													C2
C3													C3
C4													C4
C5													C5
C6													C6
C7													C7
C8													C8
C9													C9
C10													C10
C11													C11
C12													C12
C13													C13
C14													C14
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	
Dev. Outcome Category													

H: Highly Successful   S: Successful   M: Moderately Successful

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List of Constructs Elicited from the Decision Makers

Good location

Good timing

Good site value

Good cost control during construction

Appealing to occupier

Satisfy tenant demand

Finance right

Buying land at right price

Good design (external appearance and internal layout)

Right size of development

Good specifications building

Good location

Easily let

Right timing

Good demand

Good location

Good tenant demand

High specification building

Built to design

Low building cost

Growth of rental values

Improvement in investment yield

Occupier demand

Well designed building

Good location

Good funding terms

Short development period

High occupier interest

Good external environment

Good occupier and investment demand

Controlled cost budgeting

Design and build

Frozen design

Good economic conditions

Completed on time

Good demand

Design and built

Initial team selection

Good timing

Right timing

Good demand

Good tenant demand

High capital values

Right yield

Right market conditions

Right location

Easily let or sell

Pre-sale or pre-let

Good timing

Good location

Low capital involvement

Good economic conditions

Known occupier demand

New development

Construction or design problems

Good location

Good building design

Economic building cost

Right development size

Short construction period

Improvement market conditions

Low land cost

Good cooperation from statutory bodies

Initial selection of high quality professional team

Good funding and banking facilities

Let and sold quickly

Availability of money

Good demand

Limited supply

Strong economy

Easily let

Good demand

Frozen design

Good location

Good surrounding facilities

Good design

Good control of building contract

Attention to quality finish

Lack of supply

Manage to attract tenants

Building cost under control

Capital value go up

Good specification building

Good timing

Good quality building

Good location

High demand

Building appeal to a wide range of demand

Less expensive building

Attract quality tenants

Good location

Right timing

Good economy

Low land cost

Easily pre-let or pre-sell

Good location

Good design building

Reasonable site size

Good location

Close to catchment area

Good surrounding facilities

Good value for money

Rising demand

Low land price

Right timing

Good tenant demand

Good cooperation from statutory authorities

Good surrounding facilities

Clear vacant site

Attract quality tenants

Sells easily

Rising occupier demand

High site value

Opportunities taken

Good location

Good purchase timing

Good surrounding facilities

Completion on time

Within budget

Good cooperation from statutory authorities

Good demand

Tenants happy with provisions

Low building price

Easily let

Good design

Right timing

Low land purchase

High quality landscape

Prudent acquisition

Good specifications building

Rise in tenant demand

Fall in yield

Good location

Pre-let or pre-sell

Good funding terms

Good timing

Prime location

Able to secure tenants

Good acquisition

Good demand

List of Constructs Excluding Repetitions

Right timing
High demand
Easily let/sold
Good location
Good building design
Tenants satisfied
Low land purchase
Good funding terms
Design and built
Good specification building
High quality landscape
New development
Initial team selection
Low building cost
Completion on time
Good co-operation from statutory bodies
Building cost under control
Opportunities taken
Good surrounding facilities
Good economics
Clear vacant site
Right market conditions
Growth of rental values
Within budget
Short construction period
Fall in yield
Right development size