THE MANAGEMENT OF SHORT-TERM DECISION MAKING IN PRACTICE

KHALID ZAMAN

A Master's Thesis
Submitted in partial fulfilment of the requirements
for the award of
Master of Philosophy
of
Loughborough University

April 2002

Supervisor: P Belk
Director of Research: J B Howcroft

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ABSTRACT

The main aim of this thesis is to investigate the management of working capital in practice. The three fold objectives are to:

(i) Address the issues surrounding the management of short-term assets and liabilities within the framework of working capital management, and investigate the various linkages between the key working capital variables using existing conceptual tools of finance (these links have not been tested using the empirical data as discussed below)

(ii) Identify the possible reasons why it is believed that little progress has been made in traditional short-term financial management performance measures and to review the modern methods of working capital management applied in practice.

(iii) Investigate the effect of global trading on working capital management policies This is an interesting area to explore as a natural extension to the main study.

As the study was being piloted, respondents expressed negative views regarding the objectives set out above as being too ambitious, for a study of this kind In the author's opinion, the original objectives would have made an important contribution to the existing data knowledge and further develop the theory of working capital, to fit into the overall financial framework. However, due to practical difficulties with the data collection, the objective (i) above was compromised. The linkages between the various working capital components were not tested. A key factor in collecting the required data was the timing of the study, the majority of respondents piloted, were engaged in year-end commitments and were unable to provide the required level of support. In order to attempt a review of the links between the various components of working capital, the data collection must be carried out over a period of time, and from a diverse section of the organisation. This type of data

collection can be time consuming and costly. Due to the limited time and resources available, the author was unable to proceed with the original study involving an interview approach (Appendix 1).

In order to overcome this problem, an alternative approach was considered which would give the respondents more flexibility. The original questionnaire was redrafted and mailed to the respondents. The revised instrument was deliberately set in a general style without focusing on the individual aspects of working capital. This general style data collection has however limited the authors' ability to fulfil part of the original objective of the study. The four key components were nonetheless addressed and the pattern of behaviour of managers in key financial positions monitored. The problems encountered in persuading respondents to accept the original approach has led the survey to move away from investigating the links between the main variables, to the recording of the general working capital management practices. Therefore, the main aim of the survey was revised to review the general issues surrounding the management of working capital.

The research problem has subsequently been redefined in the research methodology. The literature review has been updated to reflect any new material that may be relevant to the restated objectives. This was necessary to address the inconsistency between literature review and the research hypotheses For example, the author has made reference to Kaplan and Norton (2000), and Rafuse (1996) in trying to get a view on the practical application of working capital management techniques. Kaplan and Norton look at the Balanced Scorecard approach to managing a business, stressing the importance of non-financial performance measures to help achieve sustained growth. Rafuse argues a need to refocus efforts away from traditional techniques to purely focussing on stock reduction. These ideas will be reviewed through the research.

The Research Methodology is based on hypotheses that have been set to establish whether firms belonging to different sub-groups including size, level of overseas involvement and the degree of centralisation respond in a particular way. The details of the question structure technique are contained in Section 3.2.5.

Findings and further areas of Interest

The survey has recognised that short range financial planning is an essential part of the financial management process. The businesses of today are constantly under pressure to ensure that limited resources are used efficiently and therefore, there is a need for managers to compete for resources. It has been recognised that operational efficiencies alone are not enough to secure and enhance the wealth of an organisation. A balance is required between achieving financial and non-financial

objectives of a firm. The financial objectives can be measured using a summary equation (Figure 2.4) that has been established for all cash flow changes arising from the variation in the key working capital variables. Although the model has not been tested using empirical data, the concept of measuring the net change in cash flow and discounting the value to see if the particular balance will add value to the company has been illustrated.

The above procedure can be repeated for a number of working capital balances and a decision tree approach can be applied where different balances are matched to different economic situations An illustration of how this may be done is shown in Figure 2 4.1. The level of risk posed by the overall change in the cash flow must be considered. The size and riskiness of the cash flow change proposed by a policy needs to be carefully analysed. A particular project may, for example, create project risk as well as company wide risk, if any. The objective is thus not to minimise the use of a specific variable or indeed the whole set of working capital variables, but to maximise the return on short term investment in working capital. If the net present value of the change is zero or positive, then the particular working capital balance can be recognised as consistent with the value addition aims of the company. This clearly indicates that working capital problems can be linked to conventional ideas in finance.

The cash flow model and the decision tree analysis are a useful means of understanding the working capital framework. Traditional finance tools are useful for reviewing internally focused performance measures. However, in practice, short-term financial management decisions are not based purely on financial grounds A number of important factors are taken into account including the market place in which the company is operating, the product life cycle, competitor reactions and customer needs and requirements. For example, Mobil has adopted a world wide balanced scorecard approach setting out a number of financial and non-financial measures. The financial measures include; increase return on capital employed through better asset utilisation, and enhanced revenue through non-gasoline services. The non-financial measures include reducing customer waiting times and providing a clean environment in which customers can shop. The findings of this study further support this approach. The management of inventory is mainly determined by customer satisfaction, with stock holding costs being ranked second, indicating that financial benefits of lower stockholding costs through reduced inventory are simply not enough for a particular working capital balance

The change in the way businesses operate in the arena of the Internet will inevitably create fresh challenges for the modern financial manager. The benefits from the latest technological innovation include reduced transaction times, which can lead to the reduction in the traditional cost of debtor

and creditor management. In the face of changing market conditions and customer buying habits, firms need to assess the suitability of their traditional working capital policies to ensure they respond effectively to the challenges in the modern economy.

The data collected pertaining to the main components of working capital was categorised into exhibits and then analysed by establishing a link between the working capital policy and the sub-sample characteristics. It was felt this approach was important to identify whether a firm with a particular characteristic responds in a certain way. The findings of the study point to·

(i) The management of working capital is crucial for a firm to survive. It has been shown that variations in the key components of working capital may affect the overall company risk and cash flow, and consequently the value of the firm. Although the author was unable to obtain data to test the links between the key variables, the framework established (Figure 2.4) aids the understanding of the importance of each variable. A decision tree approach has been suggested in Figure 2.4.1, which can help assess a number of working capital balances under a varied set of assumptions. Due to the problem of data collection, these concepts were not tested using the empirical data. However, this is an area of interest and one that can benefit from further research.

(ii) A firm's attitude towards the management of working capital is influenced by the size of the firm, the level of overseas involvement and the decision making structure of the firm. The international aspect of working capital is increasing in importance as more firms are trading overseas. The benefits of diversification are feeding through to short-term decision-making It is often the case that localised units may adopt different policies to suit the particular economic environment in which they operate. A diversified structure may lead to a reduction in the operational risk faced by the firm.

(iii) The modern world of e-commerce has affected the way in which traditional working capital tools may be applied. The traditional financial tools can be used to link the key components of working capital identified above. However, the non-financial aspects of decision-making are crucial for firms of the future. The modern concepts including balanced scorecard, benchmarking and earned value analysis are proving popular in the management of short-term assets and liabilities. The most important observation made is that working capital decision-making is made with external customer foci and not just internally driven financial measures.

(iv) The decision making structure of the firm may have compartmentalised the advances in working capital, this may explain the slow progress in the area.

The above findings suggest there is room for further research to help advance the theory of working capital, particularly in the light of the modern technological advances. For example, the models suggested by the author in Figure 2.4 and 2.4.1 could be developed further and tested using empirical data under a new study.

LIST OF CONTENTS

LIST OF CONTENTS *cont'd*

CHAPTER THREE

RESEARCH METHODOLOGY

CHAPTER FOUR

FINDINGS

LIST OF CONTENTS *cont'd*

CHAPTER FIVE

GENERAL CONCLUSIONS

APPENDICES

CHAPTER 1

INTRODUCTION

1.1 The Research Objectives

Short-term financial management has traditionally been referred to as net working capital management. This is the management of current assets and current liabilities whereby the duration of these components is considered to be less than or equal to one year.

The main objective when managing working capital is the maintenance of adequate liquidity to meet obligations as they fall due. This has led to the modern term for working capital management as "liquidity management". The failure of managers to provide adequate liquid resources to finance growth objectives and to meet liabilities as they fall due has been a common cause of business failure, as have economic recessions, according to Gallinger and Healey (1987·p3). Most financial managers spend a considerable amount of time dealing with short-term issues.

The positions of management that are likely to bear responsibility for the various aspects of working capital in an organisation tend to be diverse. The data collection required to assess the various linkages between the key working capital variables is therefore more complex and requires data to be collected from a number of different functions of a business. This can be a time consuming and costly research study. A more detailed discussion will be held later in Chapter 1 to discuss how the author may have worked around these problems that necessitated a change in the project objectives.

The management of working capital in practice seems to be seen as a "whole"; rather than clearly defined individual elements, with the exception of cash. The research will explore the behaviour of financial managers towards managing working capital It is clear that the various components of working capital need to be managed, however, managers realise the need to create competitive advantage

based on operational and customer focus. The Balanced Scorecard approach, BenchMarking and Earned Value are a number of ways in which the traditional components of working capital can be balanced in an optimal manner. The aim of a successful working policy is to ensure that important non-financial performance measures are incorporated alongside the operational performance measures in an attempt to contribute to the achievement of the overall strategic objective.

Many complex policies develop over time as organisations grow. For example, a company's credit policy may be part of its overall marketing package. This can create considerable tension between the marketing department, anxious to increase profitable sales, and the credit control department, trying to reduce debtors to their lowest level. This may help explain the variety of approaches used to manage short-term financial resources. It is therefore vital for management to understand the implications of their local policies and how these impact on the organisation as a whole, in terms of liquidity and profitability. The author has attempted to investigate relationships between the main components of working capital and this will be discussed throughout the research.

One view according to Gallinger & Healey (1987) is that financial literature has ignored liquidity management in the valuation process. Working capital has been considered to be generally unimportant to any of the firms' objectives, particularly to the objective of value maximisation. The rationale behind this is based on the difference between current assets and fixed assets. The current assets are considered to be relatively liquid and are closely related to each other. Short-term assets are constantly changing into other assets. For example, cash can change its form to inventory, upon sales of the stock the asset becomes a receivable and then cash within a short period of time. The time in which each component of working capital is transformed has become shorter as e-commerce has developed. For example, many organisations allow customers to access the company account and order goods/services and make payments immediately on-line. This advancement in technology is a major challenge facing financial managers. The impact of technological innovation on working capital techniques will be discussed through the research.

In contrast, fixed assets have a longer time span, limited marketability and are therefore considered to be more important. However, the author will demonstrate that traditional finance tools may be applied to working capital management. It is important for firms to optimise the amount of cash tied up in working capital. The objective would be to conserve or add to the value of the firm This can be attempted by investigating the value change caused by the proposed balance between the key working capital variables. A working capital sensitivity analysis can be investigated under different economic conditions. A decision tree approach can be adopted to help match different working policies to different economic scenarios (see 2 4.1). This model will be developed through the thesis.

Gallinger and Healey (1987) state "The irrelevance of liquidity management to value maximisation is short sighted since short-term assets and liabilities have a direct influence on the firm's value." This may be a main contributing factor to the fact that academic textbooks of today give a broader coverage of short-term financial management. However, interest in this area has developed along fragmented lines. This will further complicate the identification of the linkages between the various components of working capital. For example, there is literature on credit policy and accounts receivable management, but few attempts have been made to integrate credit policy and accounts and inventory management decisions, according to Hill & Sartoris (1984).

In the case of inventory versus receivables, the selling of inventory by the use of increased credit reduces stock holding costs and generates other cash flow changes. An illustration of how traditional finance tools can be used to manage working capital can be seen in Figure 2 4. For example, the cash flow changes in inventory holding costs, in sales revenue and in receivable costs caused by the balance between the two key working capital variables could be identified. In a similar way, this process can be repeated for all working capital variables. However, due to complexities in data collection and time constraints the author was not able to illustrate the process in practice. An example of how this process may have worked given the data was collected will be reviewed in Chapter 2. A complete review of the working capital components and the cash flow changes resulting from the change in the key variables requires collecting data over a

period of time, say for example, during different economic conditions including inflation and exchange rate risk.

During the early stages of the research, the author realised the complexities in proceeding with the original objective of investigating the linkages between the various components of working capital. The level of data required, the diversity of decision-making, and the time frames involved proved a task beyond the scope of this study. The author has now decided to focus on how working capital is managed in practice. The main focus is therefore turned to managing working capital as a whole.

There are many textbooks that are solely devoted to working capital management. For example, Beranek (1966) presents a series of linear programming models for optimising one or more of the working capital accounts, the practical application of these models being limited due to the nature and uncertainty of variables. Srinivasan (1999) covers a more recent review on cash and working capital management.

A recent article by Rafuse (1996) argues that attempts to improve working capital by delaying payments to creditors is counter-productive to individuals and the economy as a whole. It is claimed that altering the debtor and creditor levels will rarely produce a net benefit. The article suggests that by altering stock levels, the real cash flow benefits are achieved This will be discussed in more detail when reviewing the individual components of working capital in Chapter 2.

Knight (1972) believes that financial problems involve multiple objectives that are dependent on financial and non-financial relationships that define the problem. Gallinger and Healey recognise that short-term financial management is essential for the overall management of scarce resources. Hill (1984) recognises the paucity of research into factors affecting the management of short-term decision making. It is apparent that there is a clear need to understand the interrelationships between the various components of working capital. The understanding of these factors is important to help cash managers appreciate the role they play in collecting and disbursing cash as part of a larger management process. For example, a decision made to extend credit in order to increase sales will affect cash tied up in

inventory, reduce stock holding costs and increase account receivables and the risk associated with default of the debt.

Smith (1980) surveyed the working capital management practices of US firms The survey looks at working capital as an individual balance sheet item and as a total part of the firm's financial resources An interesting finding was revealed by Hill's (1984) survey on credit policy. This indicated that the efforts of credit managers to increase significantly their collection efforts have gone unnoticed by payables managers. This suggests that unless short-term financial management policies are communicated efficiently, the opportunity to benefit from them may be lost. This is further supported by Maness (1993) who states that efficient working capital cycles result in shorter cash conversion periods and reduced value lost.

The brief review of literature so far has focused on the management of individual components of working capital. The problems are mainly set in the domestic environment. Many large companies are structured in a way such that a head office normally makes certain decisions centrally such as foreign currency management. In the main, foreign currency is generated and absorbed by local operating units through movement in the working capital cycle. It is clearly necessary for the local units to communicate the working capital progress and understand the importance of local operational decisions that affect the business as a whole. The complications of foreign exchange risk, political risk and other relevant risks will be introduced It is clear that companies that operate in the International environment must look at ways to introduce global solutions to the short-term financial problems.

The literature review also revealed that the management of cash is seen as a separate area. Many textbooks that have been referred to throughout this survey have dedicated a complete section to cash management. For example, many companies report weekly cash flow forecasts to head office. However, the overall working capital reports are issued monthly or even quarterly. This is certainly the case in long-term contracting businesses The nature of long-term contracts makes the reporting requirement of working capital less frequent than that of a company for example in the retail sector where organisations are primarily cash rich. There is a constant need for change in working capital components due to changes in

fashion, customer choice and buying patterns. The reporting requirement will vary from industry to industry. For further reading please refer to Maness & Zietlow (1993) and Emery (1991).

As cash is the lifeblood of the organisation, its importance has flagged this area of management as top priority in the short-term. Academics perceive that the management of debtors, stock and creditors has not received quite the level of attention they deserve. Nevertheless, all aspects of working capital compete for a firm's limited resources. The management of inventory, receivables and payables is important and these are key management tools. However, cash management seems to be seen as more glamorous than other key components of working capital. With technological advances in warehouse management, electronic payments and receipts reducing processing time, the automation of these components may have contributed to the segregation of cash from working capital. Whatever the reason, the main objectives of the survey are to:

(i) Address the issues surrounding the management of short-term assets and liabilities within the framework of working capital management, by attempting to investigate the various linkages between the key variables using the traditional financial tools.

(ii) Identify the possible reasons why it is believed that little progress has been made in short-term financial management. The challenges faced by firms in the world of e-commerce and how this will affect the management of working capital will be considered along with the modern techniques applied in practice.

(iii) Investigate the international effect on working capital management policies by extending the existing conceptual framework to cope with the additional risks and challenges faced in this environment.

In satisfying the above objectives the author hopes to add valuable data to the existing knowledge in the area of short-term financial management. The management realisation of the need to create competitive advantage has been influenced by a number of factors including;

(a) Higher real interest rates have forced a closer examination of the performance of current assets. All assets and liabilities have to compete for a firm's limited resources. The treasury function will want to invest surplus cash into profit earning assets. On the other hand, operational managers may want to offer customer discounts to attract greater sales and so there may be conflict between departments within the business.

(b) The need for operational efficiency. The management of the various components of working capital will help identify operations that add little value to the business. A value-added approach can be applied to the various processes. Any processes that do not add value should be questioned.

(c) The development in computer technology and e-commerce has allowed the cost-effective management of information. For example, inventory management costs have declined due to advanced computer warehouse management systems. Many firms have created e-commerce sites where customers can place transactions that are automatically processed. The computerised integrated business solutions can help businesses in order processing, buying, warehouse management, logistics and accounts. The integration of key processes can help run a business more efficiently.

(d) Changes in the regulatory environment have encouraged firms to behave in an ethical manner. Following on, the customer is demanding a service second to none. Regulatory bodies such as consumer protection bodies and readily available information provide the customer with the freedom and protection.

In a recent article by Kaplan and Norton (2000) the inventors of the balanced scorecard, the authors looked at how an organisation transformed its approach to customers and how this can boost cash flow using a strategic approach. This modern approach will be discussed in more detail in Chapter 2. A firm's cash flow cycle indicates that short-term assets are intimately interrelated; decisions made in one area can impact other areas. Cash management is inter-linked with

receivables and inventory management in that it shares common goals with these functions For example, the application of the balanced scorecard approach will affect the management of working capital. The company will set financial objectives and customer objectives giving customer choice and value for money, achieved through productivity and growth. These relationships will be explained in more detail in the following chapter.

1.1.1 Research Identification

Identifying the research was a very lengthy and difficult decision and one where the author's ideas were constantly being challenged. The author's initial proposal constituted a case study approach to the data collection, as the pilot study in Chapter 3 will reveal. This instrument was deliberately left open ended, as this would have allowed the author to capture the relevant data regarding the practical application of working capital. The pilot study revealed the instrument as being too ambitious as it covered many areas of working capital, and was regarded as too general. In order to proceed with the research, it was decided to concentrate on the core issues of working capital, which are receivables, payables, inventory and cash.

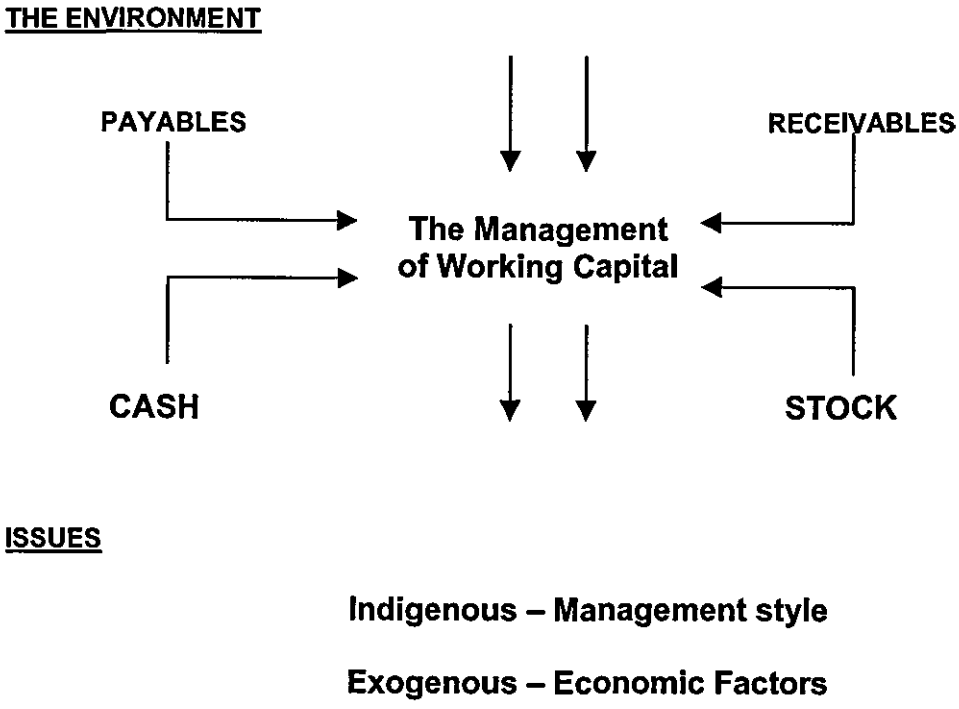
As a result of concentrating the study on core aspects of working capital, some relevant data regarding, for example, international aspects of working capital management, the use of swaps and forward contracts has not been addressed in the level of detail that was originally planned. These financial instruments are available in financial markets and can be used to reduce the risk posed by the international environment. Nevertheless, these issues are interrelated as they influence the level of risk a firm carries when managing working capital. For example a firm trading overseas using dollars will be required to identify, measure and hedge against any currency risk by either buying currency forward in the event of a deficit or selling when there is surplus to requirement. This is an example of the sort of limitations of the data resulting from the change in the data collection instrument

Under the circumstances, the main focus of the study will be to look at the overall management of working capital. A framework will be established within which the above issues will be investigated.

The revised research investigations will be addressed within the framework outlined in Figure 1.1. This framework will be developed throughout the research, which will look at ways in which working capital is managed in practice for companies that vary in size, the degree of centralisation and the level of overseas involvement. The main survey will be investigated under the four headings: receivables, payables, inventory and cash. Other issues, both internal and external to the firm, which may affect the management of the main components, will be identified.

Figure 1.1

The interrelationships in Working Capital



1.2 The Need for Research

I have briefly outlined that academic literature is replete with theoretical discussions and models pertaining to long-term value enhancing decisions,

unfortunately the same cannot be said about shorter-range decision making which is referred to as liquidity management. As mentioned earlier, finance literature has largely ignored liquidity management in the valuation of a firm. The possible reasons for this will be explored in Chapter 4. It is hoped that this survey will further strengthen the case that a short sighted view of the irrelevance of liquidity management can be detrimental to an organisation as short-term assets and liabilities have a direct influence on the firm's value. For example, competitive advantage can be created through operational and customer foci. The operational efficiency will be achieved through improved management of the working capital components. The traditional performance evaluation systems are internally focussed, and the modern techniques require externally focused measures with the application of non-financial systems. The balanced scorecard is a way of using the traditional finance tools in a balance together with non-financial measuring systems to improve shareholder wealth by providing a framework in which strategy can be translated into action.

As mentioned earlier, the various components of working capital must compete for the firms limited resources The short-term assets investment decisions can be evaluated using traditional tools by measuring cash flow and risk associated with a different combination of working capital policy. By altering the key variables of Inventory or receivables, the cash flow and risk associated with different combinations of working capital policies can be measured. The key variables such as inventory and receivables can be used to see how reducing inventory and stock holding costs by offering discounts or by selling on credit generates cash flow changes In a similar way, the change in cash flow caused by increased sales, receivables costs and inventory holding costs caused by the change in the two key variables can be identified. A summary equation can be established for all cash flow changes arising from the balance between the key variables. This is one way of establishing the key links between the working capital variables using traditional tools. The cash flow changes can be discounted to find the real value change caused by the proposed working capital policy.

As the research methodology in Chapter 3 indicates, due to various constraints it was not possible to apply this concept. The data required in order to identify any interrelationships between the key working capital variables required collecting

from different sections of the business. As discussed earlier, the decision making for the various aspects of working capital rests in the hands of a number of senior managers across different functions of an organisation. The time and cost constraints, combined with the low level of support from companies involved in the survey, forced the author to re-define the research objectives. The initial objectives were clearly regarded as too ambitious for a study of this nature.

The objective of this analysis and of managing working capital is to conserve or add to the company value. The aim is not to minimise the use of a specific variable or of the whole set of working capital variables. When the value of short-term assets and liabilities is varied, this in turn affects the future profitability and risk of the firm. This link can be better understood by identifying the interrelationships that will be discussed in Chapter 2. Here the author wishes to acknowledge that there exists such interdependence between short-term decisions made by financial managers and the value of a firm

The working capital of a firm may vary when a firm plans capital investments, particularly during periods of economic growth. The proposed projects may require additional investments in inventory and receivables and cash flow changes associated with these investments. Emery (1991) states "short-term financial management decision making should be integrated into the overall capital investment decision making process" (p815).

The literature review in Chapter 2 will reveal that there have been various attempts to explain the linkages between the key working capital variables. The existing conceptual tools do offer ways of linking the key variables in some kind of optimum balance as discussed earlier. A more detailed review of the summary equation for all cash flow changes resulting from the changes in the key variables will be discussed in Chapter 2.

Smith (1974) suggests eight approaches to working capital management ranging from simple aggregate guidelines to probability models and portfolio theories that take into account both risk and interrelationships amongst variables.

Knight (1972) applies reverse stock models to inventory, receivables and cash; the article acknowledges that financial problems involve multiple objectives and are dependent on the complex financial and non-financial relationships that define the problem. It is proposed by Smith (1974) that closer ties between the academic world and the practitioners will provide the motivation for parallel and simultaneous assaults on both short and long-range financial problems of the organisation.

The analysis of academic literature and journal articles reveals that advances have been made in certain areas of short-term finance and to a lesser extent in others. There have been many valuable theoretical and operational contributions on managing cash, managing receivables, credit selection and inventory control from several contributors including Hill & Sartoris (1984), Tully (1994) and Smith (1973). A detailed review of their work is carried out in Chapter 2. Several authors have linked credit and inventory management; valuable observations emerge from the preceding set of articles which clearly focus on specific segments of working capital management. The author recognises the need to look at working capital management in an overall organisational context as well as by individual components. The importance of integrating the working capital processes into the long range financial planning processes has also been recognised, for example, by Emery (1991).

1.3 Scope Of the Study

The scope of the study is depicted by the framework in Figure 1.1 (which looks at the overall management of working capital). The author will begin by setting out issues relating to the domestic management of working capital. The existing financial management theory will be reviewed to explore the relationships between the key variables. The research will look at how working capital is managed in practice and how it differs by companies belonging to different sub-groups; size, level of centralisation and the level of overseas involvement This work will lay down the foundation for further research in this area. To this end, the study will review literature relevant to the main aspects of working capital management. Reference will be made to work carried out both in the UK and US; this was necessary, as there is, in comparison, less coverage in the UK. The study sample consists of both manufacturing and retailing firms with diverse products and a

considerable amount of turnover from overseas markets. This variation in the sample is consistent with the research hypotheses.

The author acknowledges that there is a gap between practical and academic prescriptions of working capital management. Management practices may vary from one sector to another. For example, in long term contracting businesses such as defence where a typical contract can be for 10 years or more, working capital management may focus more on cash flow rather than stock, debtors or creditors. However, in a retail organisation cash flow will be important, but so will creditors and stock as retailers turn around stock very quickly. For example, a manufacturer in defence and a retailer in the same industry will work with similar challenges, more likely to be long term contract based. Although the Ministry of Defence is moving towards modern procurement and making effective use of suppliers, working capital policies appear to be more relaxed. Many management practices may be unique to a firm due to the organisational structure, products, markets and customers. In the data analysis, the survey will highlight any common trends within or between the manufacturing and retail sector of the economy.

The data collected using the revised questionnaire (Appendix II on page 152) has been statistically tested using the "population mean" test. This statistical technique was regarded as appropriate since the sample size was small. The statistical tests were carried out to identify any interdependence between the responses based on sub-samples, needed to identify any pattern in the behaviour of the respondent. These sub-samples include the size of the firm, level of overseas involvement and the number of years in operation. As the sample size is not very large, clear relationships between management practices will not be too apparent. In order to interpret the collected data in a meaningful way, it was important to carry out a detailed review of the individual firms that make up the sample of companies used in the survey. Further information about the respondents can be found in Appendix IV.

1.4 Approach to the Study

The overall outline of the study can be seen in Figure 1 2 below. Chapter 2 reviews and evaluates the relevant literature in the decision-making of working capital management. The various components of working capital management are examined; where possible, these are supported by references. Further, complications posed by trading in the international environment are also added. The implications of operating in the international market on working capital policy are discussed and again, where possible, supported by references. The main aim of this Chapter is to demonstrate the need to understand the opportunities available and threats facing the financial managers of today. The short-term decision making process requires operational efficiency and customer foci as mentioned earlier. The modern management techniques such as the balanced scorecard by Kaplan and Norton, Benchmarking and Earned Value Analysis will be reviewed alongside the traditional financial tools. The author has identified the need for managers to take a global view when managing the key components of working capital. It is unlikely that the author will be able to address all objectives set out on page 6 in detail due to the limited resources and time constraints. However, possible areas for further research will be identified.

Chapter 3 describes the research methodology and identifies the various steps taken in order to achieve the objectives set out in Chapter 2. The complications faced by the author in attempting to pursue the original objectives will be addressed in more detail. The research methodology will give an account of how the revised research objectives were arrived at and how they will be achieved. The research hypotheses are stated at the outset before looking at the research questions in more detail. The actual survey design and the nature of the survey limitations will then follow.

Chapter 4 analyses the research findings. The survey responses are first categorised into exhibits. Each exhibit represents a corresponding research question. Interrelationships between and among components are identified and tested by categorising responses into sub-samples of size, overseas involvement

and centralisation of decision making. The statistical package used to analyse the responses to the survey calculates a Z value statistic that can be used to test statistically one sub-sample against another. A technique known as the Student t-test is also carried out where the significance of a result is uncertain. Further information on the analysis will be given in Chapter 4.

Chapter 5 presents the major conclusions and implications of the study. Additional comments will be made and suggestions for further research will be identified.

Figure 1.2

The outline of the Thesis

CHAPTER TWO	Review and evaluate literature on short-term financial management including modern management tools
CHAPTER THREE	Research methodology
CHAPTER FOUR	Survey findings and data analysis
CHAPTER FIVE	Conclusions / Recommendations

1.5 Final Comments

Chapter 1 has introduced the main body of the thesis. An introduction to liquidity management and a brief review of the limited literature was given. A framework (Figure 1.1) was established within which the research objectives will be investigated. The need for further research in the area has been highlighted. This Chapter has also introduced the reader to the scope and the approach of the study, what the survey is trying to achieve and the approach that will be taken.

There is sufficient evidence in this section to support the view that short-term financial management influences the value of the firm. A number of techniques are available to manage working capital in an effective manner such that short-term decisions can be integrated into the overall strategic aim of the business. There are many challenges facing financial managers when making operational

decisions It is important to understand two key points, how does managing working capital affect the overall strategic aims of the organisation and the value of the firm, and how can we manage short-term decisions using the existing financial tools to enhance the value of the firm? To successfully achieve the aim of wealth maximisation, the importance of communication between operational and strategic managers has been acknowledged. The effectiveness of this communication is vital as the time factor from which one can benefit is shorter, compared to longer-range financial decisions.

E-commerce has changed the way in which businesses make short-term decisions. The time factor which we refer to has been removed in some cases as customers shop on the Internet, make immediate payments and the concept of virtual warehousing affect the cash flow resulting from the virtual Internet business. The effects of this innovation will be discussed detail in Chapter 2. It appears from the limited literature review that the research coverage of the accounts payable, receivables and inventory management has lagged behind that of cash management. The objective of managing working capital would be to conserve or to add to the company value The method of measuring the effect of a cash flow change on the value of the company will be illustrated in section 2.4. An appreciation of the cash flow changes caused by variations in key working capital variables is important for managers. If the net discounted cash flow change resulting from the variation of the working capital variables is positive, the decision is considered to be consistent with the wealth maximisation objective of shareholders.

Chapter 2 will examine each of the key working capital variables and the relevant literature will be reviewed. The effect on the management of working capital as a whole will be discussed in the light of international trading

CHAPTER TWO

THEORY REVIEW AND EVALUATION

2.1 Introduction to Corporate Finance

The objective of this chapter is to examine short range decision making theory associated with working capital management as an integral part of corporate finance, and to review how the existing conceptual tools of finance offer a way of linking the key working capital variables. Firstly, in this section, overall corporate finance theory will be reviewed, and the position of working capital management within the overall corporate framework will be established. The research will then look at the various specific components of working capital and how these variables link in some optimum balance. The chapter will conclude by looking at the practical ways in which financial managers view the management of working capital using modern techniques.

2.1.1 Corporate Finance

The finance discipline has matured to a point where there exists a sound body of theory that represents the collective understanding of finance. Many textbooks and journal articles develop this theory, e g. Emery & Finnerty (1991), state "After covering the basic principles of finance, the applications are designed to illustrate how theory is useful and immediately applicable to the real world." Emery goes on to state "The theory of finance is not complete, we know of no theory that is." Due to the theory being incomplete, this opportunity has allowed the author to take a look at the short-term issues in finance with a view to adding knowledge to this area of research.

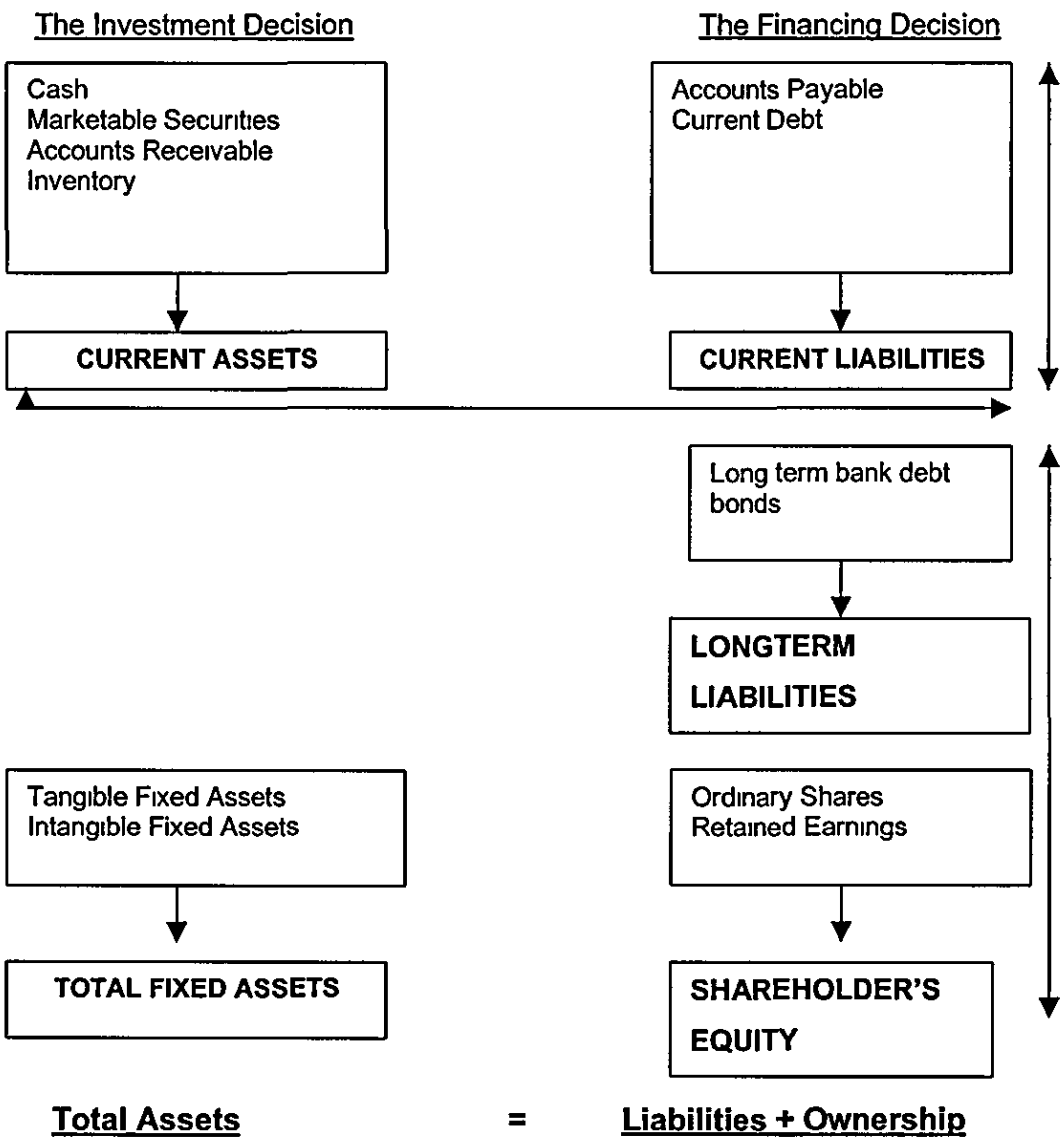
Corporate finance deals with the operation of a corporation from that firm's viewpoint. In broad terms, corporate finance can be broken down into two sides of the balance sheet. The asset side involves what is called the investment decision because it is concerned with decisions affecting the assets in which the firm should invest. The liabilities and owner's equity side involves what is called the financing

decision, which is concerned with obtaining the funds from investors so that the firm can obtain the assets in which it has decided to invest.

Financial markets deal with the firm's financing decision from a different viewpoint, that of a third party. The viewpoint is that of an independent observer of the transaction. Businesses of today are large and complex organisations. The accounting model of the firm in Figure 2.1 1 is embodied in the balance sheet view of the firm.

Figure 2.1.1

Accounting Model of the Firm



The subject matter of this research is short-term investment and financing decisions as indicated by the top part of Figure 2.1.1. However, Emery & Finnerty (1991) identify a number of first principles for understanding financial transactions and making financial decisions. These consist of a set of tenets that are generally recognised and form the basis for financial theory and for decision making in finance. These include.-

- *The principle of self-interested behaviour,* this principle assumes that, as a group, people act in an economically rational way.

- *The principle of risk aversion,* when all else is equal, people prefer higher return and lower risk.

- *The principle of diversification,* by dividing one's investment among multiple companies the entire investment is less likely to be lost; the diversification is beneficial.

- *The principle of two-sided transactions,* each transaction has at least two sides; for every sale there is a purchase, for each buyer there is a seller.

- *The principle of incremental benefits,* financial decisions are based on incremental benefits The value of choosing a particular alternative is determined by whatever changes the alternative will make in the future outcome-changes from what the outcome would have been if the alternative had not been selected.

- *The signalling principle,* here actions convey information.

- *The principle of capital market efficiency,* assumes the capital markets are efficient. Market prices of financial products that are traded regularly in the capital markets reflect all available information and adjust fully and quickly to "New" information.

- *The principle of risk-return trade off,* assumes there is a trade off between risk and return. If people prefer higher returns and lower risk (the principle of risk

aversion), and they act in their own interest (the principle of self-interested behaviour), then competition will force people to make a trade off between the return and the risk of their investment.

- *The principle of valuable ideas,* assumes extraordinary returns are achievable with new ideas.

- *The options principle,* an option is defined as the right without an obligation to do something The owner (the buyer of the option), can require the writer (the seller of the option), to make the transaction specified in the option contract, but the writer cannot require the owner to do anything.

- *The behavioural principle,* when all else fails look at others for guidance. In a sense, the behavioural principle is simply an application of the signalling principle.

- *The time value of money principle,* money has a time value Simply stated, the time value of money is how much it costs to "Rent" money.

Much of financial theory is built with the above mentioned principles in mind. It is generally recognised that the goal of a firm is to maximise shareholder wealth, and this is a direct application of the principle of "self-interested behaviour". The author has discussed that variations in the key working capital variables may cause changes in the cash flow of the company and affect the size and riskiness of the overall company cash flows. The effective management of working capital requires the decision-maker to assess the full implications of the changes in the key working capital variables. For example, by offering credit terms to increase sales involves generating cash flow from reducing stock levels and lower stock holding costs At the same time, accounts receivables will absorb more cash, there may be risks of debt recovery although debt factoring can be used to reduce the risk, but there is a cost.

In practice, working capital is normally affected by decisions made in other parts of the organisation. For example, the marketing department is running a promotion to increase sales orders that ultimately lead to an increase in sales value and higher

profit margins. The bottom line profit depends on how efficiently and effectively the working capital is managed The financial manager must carry out a sensitivity analysis of how these changes alter the size and riskiness of the company's overall cash flow. The resultant cash flow changes will be investigated later in this chapter. Ultimately, the shareholder wealth will be maximised if short-term financial management influences the value of the firm. Before embarking on a discussion on the position of working capital within corporate finance, the author will address the various views of the firm.

According to Emery & Finnerty (1991) "The business enterprise is a dynamic system Its capital budgeting, capital structure, liquidity, financing, liabilities management and dividend policy continually interact." However, Cornell & Shapiro (1987) view the firm as a contractual coalition that includes both investor and non-investor stakeholders: "Stakeholders other than investors and management play an important role in financial policy and constitute a vital link between corporate strategy and finance." This suggests that working capital management is part of an overall system. The management of liquidity and liabilities is central to a firm achieving its long-term financial plan. Financial planning involves analysing the interactions among capital investment, capital structure, liquidity, liabilities management, financing and dividend policy. It is therefore important for a firm to consider explicitly the interactions among the various policy decisions.

Furthermore a relationship between working capital management and business failure has been established. Petty & Scott (1980) investigated the changes in corporate liquidity positions during two different periods of economic fluctuations, an upturn and downturn in the economy. According to Altman (1968), a close relationship between inept working capital management and business failure has been empirically verified. Petty & Scott (1980) examined liquidity responses across different groupings of corporations. The objective was to determine whether different liquidity changes induced by economic fluctuations were dissimilar among firms that can be categorised as belonging to different classes. One of the implications of this study was directly relevant to this research. borrowing firms and lending firms need to be acutely aware of the nature of the industry in which the given firm operates.

Economic fluctuations do not affect corporate liquidity in a homogeneous manner. As mentioned earlier, when evaluating the cash flow changes caused by changing the balance between the key working capital variables, a decision tree approach can be adopted in which different working capital balances are matched to different economic situations. This would allow an assessment of the flexibility of a particular policy. The cash flow model will be developed further in section 2.3 3 where a decision tree will be used to illustrate how the different working capital scenarios can be explained. In doing so, the sensitivity to economic changes can be heeded in the appropriate processes of working capital management, for example, credit granting (credit seeking). Under times of economic recession, cash flow management is vital A firm must be extremely careful when granting credit as companies do go into liquidation in poor economic conditions. The credit selection procedures need to be very stringent. It is inevitable that working capital policies will vary according to different economic conditions.

The following section will now discuss short-term decision making as an integral part of corporate finance.

2.1.2 Working Capital as an integral part of Corporate Finance

Anon (1993) identifies four key skills associated with managerial success: People, marketing, strategic and financial skills. Anon (1993) states "In financial management all problems are approached from two disciplines. Financial theory teaches that all decisions should be made on cash flow and risk. Secondly, accounting theory teaches that all decisions should be based on accounting profit, return on investment, etc."

As a starting point, Grossman & Stiglitz (1977) point to two strands of analysis for the firm's behaviour: One is literature trying to extend the conventional maxims of profit maximisation, the other is the literature in which objectives such as satisficing, sales maximisation and the manager's utility function are maximised. The second group criticise the first as being unrealistic. In this context, the firm's value is referred to as output minus the value of all inputs Furthermore, Sartoris & Hill (1983) identified the need for a consistent valuation framework. "In addition to the compartmentalised nature of much of the work in the working capital area,

many approaches focus on accounting variables rather than cash flows The net present value concept is needed, incorporating the interaction between the various working capital elements." The cash flow timeline crosses many organisational borders, such as cash management, credit management, inventory management, and payables management. The net present value concept is generally applied to longer-term decision making The author has illustrated in Section 2.3.4 that the net present value concept may be applied to working capital decisions.

The compartmentalised nature of the work in the area of working capital management may explain the view that short-term financial management has been neglected. Working capital management crosses many organisational borders. For example, the production managers want steady production, sales staff would like products that they can sell, and treasury would like to see minimal resources tied up in working capital. Under these circumstances, particularly under short-term decision making, the satisficing theory of the firm seems to be more appropriate than profit maximisation as the correct balance between the various decision-makers is sought.

As mentioned earlier, the key decision areas in financial management can be broken down into investment decisions and financing decisions. Anon (1993) proposes investment decisions relate to projects, working capital management and mergers and acquisitions. Working capital management is therefore a central issue in financial management and can prove to be costly if under estimated.

Another view of the firm is given by Barnard (1968), who argues that a corporation owes its continued existence to the consent of many number of factions including the customer, the stockholder, the banker, the supplier, the worker, and the voter. In other words, an organisation can only exist if it satisfies all parties involved.

Banfield (1968) explored the power or influence of the executive and concluded it is difficult to determine the ability of a manager to elicit co-operation, power or influence. Whether management seek power for their own sake, to fulfil a social responsibility to the community or out of practical recognition of the vital need for continued co-operation from the faction on which the corporation depends is difficult to determine. The corporation has a financial relationship with each of the

factions on which its continued existence depends. For example, the customer wants a high quality product at a competitive price The worker wants decent working conditions and the highest possible wage, and the concerns of the stockholders, bankers and suppliers are also financial.

In most cases the financial claims of several factions must be met with cash, and they must be met when they fall due or else the various factions lose confidence in the corporation and withdraw their support. The financial objective of the organisation is to conserve, and when possible enhance, the corporation's power to distribute cash. This objective crosses the boundary of short-term financial management. This confirms the earlier comments that working capital management is a company-wide concept.

In the past it has been recognised that there are difficulties in trying to develop a theory of working capital Dauten (1955) admitted " there are difficulties involved in formulating a theory of business finance but he did not altogether rule out the possibility that a theory could be developed For example, a study of the working capital policies of corporations over a period of time will not necessarily provide the data for developing a theory of working capital. However, each figure is in a real sense unique· since business cycles do not repeat themselves in any determinable pattern this makes generalisation difficult and unreliable." The paper concluded that it is possible to develop a theory of working capital that will serve as a basis for working capital policies.

By definition, working capital management is seen as the management of short-term assets and liabilities such as to optimise the level of cash invested in the various elements of working capital. The nature and inter-relationships of working capital will be briefly introduced by the operating cycle of the firm.

Figure 2.1 is a simplified diagram of the operating cycle of a firm. As a brief background, the firm invests cash in raw materials or bought in components which take the form of inventory: inventory may be purchased using trade credit and a payable is then created: however, inventory is increased thus showing an increase in short-term assets. Further cash is expended and further trade credit is obtained to enable the production of finished goods. The finished goods are then sold on

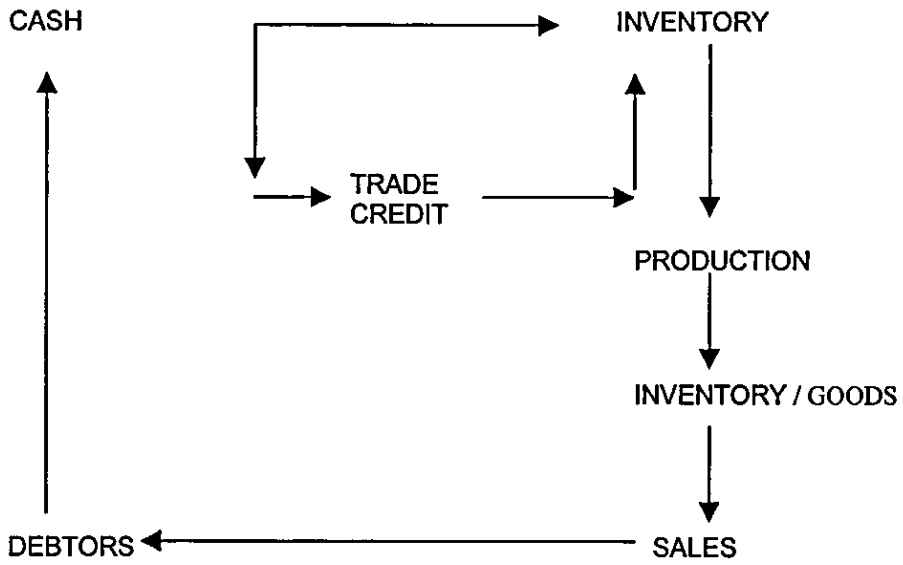
credit, which increase the debtor balance: debtors will then upon maturity of the credit line repay the firm. The cash balance will rise and the firm will be in a position to settle creditors. This is a very simplified account of how funds flow in a typical organisation. The cyclical nature of the cash flows has given rise to the term 'circulating capital'. It is this flow of funds that is caused by the change in the key working capital variables which may alter the overall risk and cash flow of the organisation.

Smith (1973) believes that efficient working capital cycles result in shorter cash conversion periods and less value lost. In most organisations short-term assets are constantly being transformed into other assets. The total time taken from when the cash changes into another state and when cash is received is known as the cash conversion period. The quicker each component of working capital is converted into an inter-related state and to cash, the less value is lost. With the modern technological advances this process of transforming one asset into another is a lot quicker.

The modern e-commerce organisations have revolutionised the way in which customers shop. The Internet has provided a very quick and efficient way of processing orders and receiving payments. These developments provide fresh challenges to financial managers, as the traditional methods of managing working capital may no longer be adequate. The factors affecting a firm's ability to manage these short-term assets and liabilities in the light of the latest modern technology will be considered in the following section.

Figure 2.1

Operating Cycle of a Typical Firm



The next section will give a general background and include various explanations of liquidity management. Section 2.3 will then look at each element of working capital and attempt to highlight the inter-relationships between the key working capital variables. The bilateral changes between these variables will be investigated in terms of cash flow changes and the value of the firm. Initially, discussions will be set in the domestic environment. Section 2.4 will then introduce further elements of international trading. Any resultant impact on short-term policy making will be analysed.

2.2 General Background

The background to the research aims to focus on the main issues surrounding the management of working capital. Having looked at working capital as an integral part of corporate finance, the author will now develop the framework in Figure 1.1.

Knight (1972 p33) acknowledges the complex simultaneous inter-relationships involved between the working capital variables and states "financial problems involve multiple objectives that are dependent on the complex financial and non

financial relationships that define the problem". These multiple objectives are further complicated when firms deal in the international environment One of the three objectives of the research is to find out to what extent firms take these complications into account when managing receivables, payables and inventory. However, as mentioned in Chapter One, cash management is looked at as a global area of management because cash moves around the organisation. When an organisation has global operations, cash will move across borders; therefore, in order to manage this accurately, one needs to understand fully the environment and implications of the management of this asset.

Another important issue is the relevance of research. The relevance of academic research to practical problems confronting managers has been a source of concern for academic leaders and industry. "The research attention required by financial managers of UK small firms in the area of liquidity of cash holdings and accounts receivable / payable policies is relatively greater than their US counterparts" (Herbert, 1995). However, it is interesting to note that there is little research carried out in the UK, the majority of the findings being from the US.

It is also observed that "The research importance of working capital management by financial executives of small firms is not shared by their counterparts in large firms Perhaps this is partially because large firms may have developed over a period of time working capital management policies" Herbert (1995) These findings are very important as they direct available resources to the research areas that are regarded as important. Many large firms do not share the same level of importance of working capital management with their smaller counterparts. However, the research is very important given that current assets constitute a large portion of a firm's total assets.

Gallinger and Healy (1987) emphasise that the objective of liquidity management is a supportive one: "To provide for the adequate availability and safe-keeping of corporate funds under varied economic conditions in order to help achieve the desired corporate goal of shareholder wealth maximisation" (p4) The importance of managing liquid assets is not only required at times of recession, but at all times. However during a recession period it is advocated that one needs to administer these assets and liabilities more rigorously in order to survive the swing in the

economy. The neglect of short-term financial management in the past can be explained by Sartoris & Hill (1983): "Part of the reason for the neglect could be attributed to the academic focus on market efficiency. Given perfectly efficient capital and product markets, there was little room for short-term decisions to make any difference." However, in reality markets are not perfectly efficient, see Fama (1970)

Evidence suggests that many businesses may have failed as a result of inefficiencies in working capital management. Smith (1973) states "We can probably attribute a large number of business failures in recent years to an inability of financial managers to plan and control properly current assets and current liabilities of their respective firms." Smith predicted improved methods would be forthcoming. In the usual way, competition will intensify the need for better resource allocation. Improvements in data base and computer capability will add to the potential for better methods and guidelines. In reality, this revolution is here, as mentioned earlier, vast improvements in computer technology are changing the way in which businesses operate. For example, with the customer being able to order on-line and pay immediately, the processing times have been vastly reduced. The firm can process orders as they are received The need to manage large outstanding receivables and stock holding costs will be reduced. The business systems of successful companies are fully integrated; financial systems process orders and can communicate with productions systems.

From another angle, the management of receivables, payables and inventory is a consequence of strategic decisions made within the organisation. For example, a firm may invest in new plant and machinery in order to keep ahead of competitors in terms of product quality and cost; this decision will affect all elements of working capital. For example, production levels may rise, sales may be stimulated through greater market penetration and the debtor balances may rise. Short-term assets and liabilities are created as a result of longer-term decision making. These tend to be by-products of decisions made in the past (Figure 2.2). These areas merit much attention as there are possible gains to be made from their effective management particularly using the modern technology in order to create competitive advantage

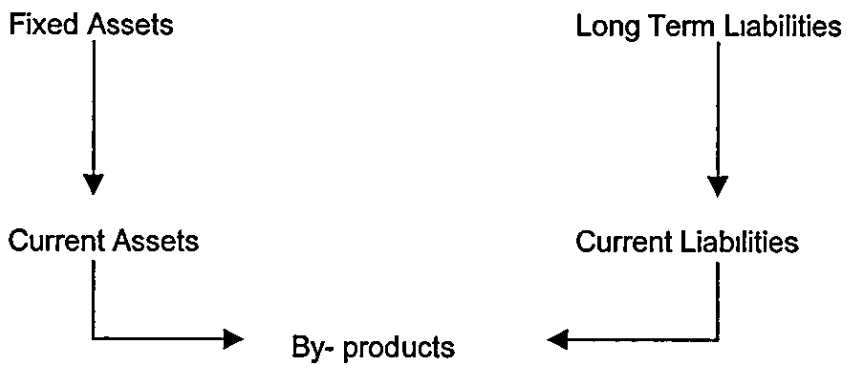
As illustrated above, the use of modern technology can reduce processing times, lower overheads as processes are computerised, for example, on-line ordering and customer account information reduces the need for administrative overheads. With smart procurement and advance warehouse processes, the stock holding costs can be reduced. With lower costs, and improved customer satisfaction, firms that adopt these processes can create competitive advantage.

Many authors including Gallinger & Healey (1987) recognise that short range planning is an essential part of the overall management of scarce resources of an organisation. The author believes this area of management is complex and dynamic. In order to implement successfully an effective system, one needs to identify, measure and control the various variables of liquidity management. The scope of the present study covers the main components of working capital that are common cause for management concern in major UK firms. In order to control the financial progress and position of an organisation it is necessary to have realistic measures of the flow of funds throughout all of its activities; it is only then that the production and distribution objectives of an organisation are met

Having introduced the background to this survey, the author will now begin to look at the key elements of working capital as outlined in Figure 1.1. The traditional tools of finance will be applied to develop Figure 1.1. The added complications of international trading will be introduced in the latter part of this section. Further comments will be made on the literature review and the knowledge gained from this review.

Figure 2.2

Working Capital as a By-product



2.3 The Components of Working Capital

There are four main components of working capital and these four components play a vital role in any business. These are depicted in Figure 2.1. The importance of managing these components of working capital has been identified; evidence also suggests that the research in three of the four components, receivables, payables and inventory may have lagged behind cash management. It may be that traditional approaches to managing these short-term assets and liabilities may prove to be less relevant today. It was therefore decided to investigate the three components individually and to highlight any inter-relationships between these components. In the process, the available literature in the area will be reviewed. The initial discussions will be based on domestic working capital management. Section 2.4 will then introduce the international scene and look at any policy implications this may have on short-term decision making.

2.3.1 Receivables Management

A receivable is created by selling to a customer on credit, as opposed to cash. Firms often extend credit to customers, which again delays the conversion of stock into cash. When a firm decides to sell goods on credit, the organisation is effectively choosing to hold accounts receivable as an asset instead of inventory in the balance sheet. There is a trade-off that exists between holding inventory or holding accounts receivable of a firm. This trade-off can have a measurable impact on both profitability and cash flow of a firm. A firm may decide not to sell on credit;

consequently sales may be foregone and as a result the firm will hold inventory in the balance sheet. However, should the firm decide to offer credit and a sale is made, the firm will hold receivables in the balance sheet instead of inventory.

Smith (1973) identifies two approaches to financial decision-making: the financial statement approach and the valuation approach.

The financial statement approach looks at the balance sheet and evaluates what the effect of a proposed course of action would be on the company's liquidity and profitability. The various ratios include the current ratio, acid test ratio, inventory turnover ratio, average collection period ratio, etc. These are calculated and analysed. The firm can then establish how pronounced the financial effects may be and the level of risk being carried. The shortcomings of this approach have been identified. The approach implicitly defines the project's riskiness as its effect on the company's liquidity; the project risk analysis should encompass the variability of the project cash flows and the effect of the proposal on the company's existing cash flow distribution.

The valuation approach proposes the analyst take into account both the time value of money and the riskiness of the cash flows. The principles behind this approach rest on calculating the net present value of each alternative and selecting the alternative with the highest net present value. These two models are designed for long-term decisions and the prevailing academic literature does not explain how these models may be used for short-term decision making.

The net present value concept can be applied to short-term decision-making. The cash flow changes in inventory holding costs, sales revenue and receivables costs caused by changes in the bilateral balance between the key variables can be identified. The main aim of managing receivables is not to minimise the assets, but to conserve or add value to the company. The illustration below shows the link between the two variables.

The financial effect of selling on Credit

Effect: Increase in receivables / increased sales
Reduction in Stock
Lower stock holding costs

Impact: Cash flow of company
Value of company

Inventory	V.s	Receivables
* Lower holding costs		* Higher sales / affects profitability
* Opportunity cost of investment		* Better cash flow
* Low stock costs		* Costs of credit/discounts/bad debts

THE CHANGE IN WORKING CAPITAL BALANCE CREATES CASH FLOW CHANGES

Change in cash flow	TO	Change in cash flow	+ / -
Change in value of company	TO	Change in value to the company	+ / -
Risk of change to cash flow	TO	Risk of change to cash flow	+/-
		NET Change in Cash flow	+ / -

By selling on credit, there is a reduction in stock levels and the receivables balance rises. The inventory versus receivables above shows that there are cash flow changes as a result of this balance. The cash flow changes on both sides can be identified and matched against each other as shown above. For example, the change in cash flow created by lower stock holding costs can be compared to the cash flow effect of higher sales and so on. The resultant net change in the cash flow can be used as a benchmark for decision making. The Net change in cash flows can be discounted back to the present time. A positive net change will be consistent with the value maximisation concept. This will be later confirmed, see

Smith (1973). The option with the highest positive net change will give the firm the maximum value based on purely financial grounds.

The non-financial considerations, which will be addressed later, also need to be taken into account when evaluating the short-term asset investment. A modern approach known as the balanced scorecard can be used to help identify the non-financial considerations. This approach by Kaplan and Norton was applied to an American refining company. The steps in the approach are to identify a number of financial and non-financial measures to achieve For example product differentiation, growth, cost reductions and leadership and customer satisfaction

The non-financial considerations proposed by Kaplan and Norton place a new dimension on the recent article "Working capital management: an urgent need to refocus" by Rafuse (1996). It is proposed that a change to traditional working capital policies is essential in order to produce real benefits rather than transferring benefits from one organisation to another The stock reduction aims of Rafuse may prove challenging when applying the balanced scorecard approach. This discussion will be revisited when developing the working capital model in section 2.3.3.

Turning back to the literature review, it appears that the theoretical coverage of short-range decision making has failed to convince practitioners of the value this can add to the organisation by enforcing sound short-term financial management policies. Management attitudes towards the data collection in this study and the response rate seem to confirm this view. Many textbooks and journal articles look at this area of management in an isolated context. Studies tend to look at the individual components of working capital. This may be necessary in order to show a full understanding of each area of management; however, when concentrating on one particular aspect of financial management, other inter-related areas may receive little attention.

The potential gain from managing the bilateral balance between the two key variables (inventory and accounts receivable) is illustrated by McConnel & Scott (1984), who state "There are market imperfections that might impact the trade credit decision and allow an opportunity for the ingenious design of credit policy to

affect the value of a firm." This confirms the view of Hill & Sartoris (1983) that the academic focus on market efficiency may have contributed to the past neglect of short-term decision making. Accounts receivable are allowed to fluctuate in response to deviation in demand and this represents the formation of a sales queue rather than a product or customer queue. This method is believed to insulate the operations from shocks produced by variations in demand that permits more flexibility in the conduct of operations, as the capacity to respond to fluctuations is provided elsewhere.

Another motive for extending credit is believed to be a financial one, according to Emery (1984). When the financial market is imperfect, the firm must maintain a liquid reserve to meet its requirements for cash. An alternative lending opportunity is available to the firm that offers credit; such a firm may circumvent the financial markets and lend a portion of its liquid reserves directly to borrowers who are its customers. The liquid reserve is still available to meet liquidity needs even though the receivables created as a result of operations may be factored before maturity.

The management of accounts receivable is important to many sectors of the economy. In recent years, the health service has looked at ways of improving their operations. For example, the sale of accounts receivable by hospitals and other health care providers and the securing of these receivables has been the subject of considerable recent discussion. "The working capital needs of hospitals often can be significant, and those needs have been increasing in recent years" states Kinkaid (1993). When exploring alternative sources of working capital, it is appropriate to examine the assets that can be used to generate funds, although sales of receivables by hospitals can raise a variety of issues as discussed by healthcare providers for funding their working capital requirements. For further reading see "Selling accounts receivables to fund working capital" by Kinkaid (1993). The two largest asset groups of most hospitals are their accounts receivable and their property, land and equipment. The conversion of property, plant and equipment to finance working capital can be accomplished in many ways including re-financing at lower interest rates, negotiating a sale-leaseback or borrowing against the collateral of these facilities.

In contrast, accounts receivable is eventually converted into cash which can be used for working capital. The real issue is whether that conversion can be accelerated and seeking more efficiency from the existing accounts receivable team is one way. However, as mentioned earlier the article "an urgent need to refocus" by Rafuse (1996) clearly views that the bulk of effort devoted towards the managing of debtors and creditors throughout the economy is wasted and these administrative processes add no value. In practice, firms actively manage debtor and creditor levels in order to control cash. For example, Rafuse points to processes such as delaying payments to smaller suppliers in order to fund working capital requirements and placing strict payment terms on customers. It is argued that by delaying payments to a smaller supplier, the firm delaying payments will gain and the supplier will be disadvantaged. This will lead to no real gain to the society. However, on the basis of self-interested behaviour, it assumed that the firms will act in an economically rational way, and each firm will try to individually benefit from any such opportunities.

There are however two ways to gain immediate cash from accounts receivable; borrowing against collateral of the receivables or selling the receivables themselves. When accounts receivable are used as collateral for borrowing, this will not improve the balance sheet since it will add debt to the business, whereas the sale of those receivables substitutes cash into the business for the receivables sold. The issue of the lender imposing restrictive covenants against receivables when borrowing is a very important consideration. Such covenants may limit the organisation's ability to incur additional debt or limit the financial flexibility of the borrower. The purchaser of accounts receivable, on the other hand, generally has no need to place stringent requirements on the seller that would reduce the hospitals other financing option. The sale of accounts receivables at a discount is known as factoring. This is an effective and quick method of gaining immediate cash from accounts receivable and allows reliable cash flow forecasting.

It is important to balance the cost of debt factoring against the cost of resources devoted to increasing the debt collection activity. Some firms may choose to outsource the debt collection by selling the debt immediately to the debt factoring agency. This practice was once confined to the textile industry but it has now become an established practice in other industries This shows the importance of

working capital management in both the public and the private sector where funds are limited.

The cash requirements of many firms may vary seasonally. Robichek (1965) proposes "The cash requirements of many firms follow a seasonal pattern. These firms may obtain short-term cash to cover their seasonal needs from a variety of sources, e.g. lines of credit, delaying accounts payable, pledging, or factoring receivables." This again confirms the inter-relationship between receivables, payables and cash. The optimum manner of meeting short-term needs is difficult to determine due to the constraints relating to alternative sources of cash.

A simultaneous inventory and receivable management model was identified by Beranek (1966). This gives attention to the inter-relationship of inventory and receivables, and makes apparent the relationship of working capital policy to sales revenue and variable profits. Knight (1972) regards the significance of this model to be a demonstration that independent receivables and inventory models will produce sub-optimal results. The area of simultaneity as indicated by Knight must be extended to all elements (eg. revenue, costs and risk factors in domestic and international environments). This simultaneous model concept can be repeated for all variables and the overall balance between cash, inventory, receivables and payables established. A summary equation can be established for all working capital variables. The incremental cash flow changes can be discounted to find the value change caused by the proposed working capital balance. This concept is demonstrated in Figure 2.4.

Another contribution comes from Maness (1993). Maness believes that a firm is a cash flow system, and looks at how the different working capital accounts depicted on the balance sheet create a disparity between cash flow and the value of the firm. It has been identified that the expansion of working capital asset accounts absorbs resources whereas the expansion of working capital liability accounts release resources. The inter-dependence of the various accounts is acknowledged and the relationships are depicted on a cash flow time line. However, there is general agreement on the idea that the critical aspects of managing the operations of a firm are profitability, the value of the firm and liquidity

It has previously been mentioned that working capital is a by-product of longer-term decision making It is also important to appreciate when managing working capital that a firm is an operation in a given environment in which there are both constraints and opportunities; it is important to evaluate these constraints and to ensure that management solutions are in harmony with the prevailing environment. Gallinger & Healy (1987) believe that before investing in accounts receivable firms need to consider several inter-related aspects; these aspects include investing costs, losses from bad debts should they arise, the impact of credit terms on sales and the impact on profitability. Hill (1992) believes "Whilst credit programmes spurred sales, solving inventory problems, consequently the programme ate into the profitability of a company." This indicates the clear need to understand the relationship between granting credit and profitability. A firm may stimulate sales and solve the inventory problem; however, the profitability of the company may be sacrificed unless the firm strictly administers credit. The inefficient working capital procedures will lead to losses being incurred and the value of the firm being eroded.

In most firms, general credit managers administer credit policy. In many large firms, credit functions may be administered by a separate financial subsidiary. For example, the head office may decide on credit policy as they have a better view of the company cash flow. The important credit decision variables include collection expenses of the seller, penalty rates for overdue accounts and the loss of money value when accounts are sold to a factoring agency.

Firms face many constraints that limit their ability to influence credit policy too rigidly. Some of these constraints include industry standards, inertia inherent in traditional credit terms, working capital constraints, and legal constraints. Whatever the reason for creating receivables, one must understand the relationship this has with the various aspects of working capital and the business as a whole. McConnell & Scott (1980) support the view that the ingenious design of credit policy will affect the value of the firm. The management of receivables is very important to many sectors of the economy. Hill (1992) proposes that the relationship between granting credit i.e. creating receivables and profitability needs to be clearly understood. The firm may attempt to maximise profits by stimulating

sales, and solve the inventory problem; unless credit is strictly administered, the profitability may be sacrificed.

As mentioned earlier, the modern methods of shopping will require working capital policies to be flexible to meet customer requirements. The challenges faced by managers in the world of e-commerce can give substantial benefits to firms. For example, many companies have created on-line shopping sites that allow customers to access the site and purchase goods and services and make payments or access account details. This virtual world of trading has reduced the time taken to process orders, with the possibility of immediate payment by credit card, and the cash generated can be used to earn value for the business. With this change in buying patterns, the level of business resources tied up in credit control departments will be reduced. Similar benefits can be gained from automation of payment systems for suppliers.

The greatly improved transaction systems have been achieved in many industries across the world. For example, retailers like Sainsbury's are amongst those that use the latest technology to service its customers via Internet shopping These retailers are strategically positioned to provide the existing customer base a vast range of non-core services such as insurance and personal finance. Many of these buyer-seller relationships involve:

- long-term supply contracts;
- regular, small volume call-offs and deliveries based on electronic data interchange (EDI) and minimised order instability.
- programmed supplier payments at set, short-term intervals using digital transmission arrangements

Several of the major UK retailers have made significant progress along these lines for example, Boots, Great Universal Stores, Tesco and Sainsbury. The subsequent cost reduction and reduced replenishment costs have lead to improved lead-times and enhanced customer service. The potential reduction in the traditional cost of the debtor and creditor is apparent The use of modern technology and forward thinking finance managers will eliminate unneeded or duplicate process steps.

The following section will now look at payables management.

2.3.2 Payables Management

Buying goods or services on credit creates trade payables and this is the cheapest form of financing available to a business. The payables created need to be managed over the time period to which they relate. With reference to Figure 1.1 trade creditors represent the largest single item of cash flow in most small and large firms. Accounts payable have become a major source of finance in all sectors of the economy since the Second World War. The sources referred to in the review of payables are limited as there is little work done in the area. It is very important to draw a clear distinction between poor payers and those that utilise the accounts payable management programme, as good management of accounts payable can bring positive cash flow into the business at a low cost

Accounts payable is considered a "spontaneous financial source" according to Smith (1973). They are generated by the normal day-to–day running of the firm. For example, when a firm orders raw materials or supplies are bought (services), if these purchases are made on credit, a source of financing is created. When the final product is sold the firm gains a resource that will generate cash in the near future which will allow the spontaneous liability (accounts payable) to be paid off.

There has been considerable research into the traditional realm of cash management, in particular the collection, disbursement and concentration of cash. The payables policy and credit policy are represented in a larger segment of cash inflow and outflow timelines. As stated by Hill & Sartoris (1984· p56), "Unfortunately, there has been a paucity of research into factors affecting these important segments. An understanding of such is important to help cash managers appreciate the role they play in collecting and disbursing cash as part of a larger management process." Their survey measured attitudes, policies and practices of corporations in the area of a credit policy and payables. A survey carried out prior to this by Hill & Sartoris (1971) was designed to see if higher interest rates and the accompanying recession had caused fundamental changes in credit policy trends

In a further survey carried out by Hill & Sartoris (1984) it was revealed that credit collection efforts seem to have increased and credit policy seems to be managed with aggression. The survey showed that the best efforts of credit managers to increase significantly their collections have gone unnoticed by payables managers. Evidence found in both the 1971 and 1984 surveys suggests that credit policy terms were stable and cash discounts were declining. However, some differences in industries sampled could account for some of the discrepancies between credit and payables management. These findings point to the need for better communication of short-term policies as the effectiveness of credit managers increasing their collections may not have been communicated to the parties involved.

It is also important to evaluate trade credit and sellers with a great deal of scrutiny because this is effectively another source of credit. Sellers as a common practice extend credit and at the same time may allow a discount for earlier payments. For example, many Utility companies now offer a discount if customers switch to paying by direct debit. A direct debit payment is an automated process that will collect payment from the customer at the same time a bill is issued.

There are many considerations that need to be taken into account when formulating a payables policy. It is necessary to determine whether the firm should pay under the existing terms or whether it is in the interest of the firm to settle debt at a different point in time. A firm may be able to negotiate better terms or may exercise bargaining through power. For example, Marks & Spencer (M&S) ties suppliers by sourcing key suppliers that exist solely for the company. In this situation, the supplier is forced to provide better terms and conditions and an outstanding service to the customer.

Theoretical procedures dictate that one should net costs and revenues of the sources and the uses of funds and costs should be employed to the point of cost and revenue indifference. A net present value approach will now be applied, which will try to establish that the cash reserves can be identified and matched against each other to show the net change resulting from the change in the balance between the variables.

Increase in Payables

Benefit: Using external funds releases cash for use in other areas of business

Cost: Loss of discounts, supplier goodwill

Increase Stock

Stock is purchased on credit which has created the payable, together with stock holding costs, and other associated costs.

Cash Reserves

Relatively high compared to purchasing by cash. Interest can be earned on this cash balance.

When a firm places an order on credit, and the goods are received for example on a standard thirty days credit period, an accounts payable is created and an asset is created as stock. As the asset has not been paid for, the firm is effectively using third party funds to finance the business. This creates positive cash flow up to the value of the goods/services. However, on a normal thirty day credit period, the customer may be offered a 2% discount for early payment, for example within ten days, and this is a cost to the firm if the discount is not taken and is a negative cash flow. A non-financial consideration is the supplier goodwill which is more difficult to measure but can carry a cost.

The increase in stock will create stock holding costs, warehouse storage and other associated costs. These costs will create a change in cash flow. The increase in cash reserves as a result of buying on credit will be measured as this cash belonging to the supplier will generate interest.

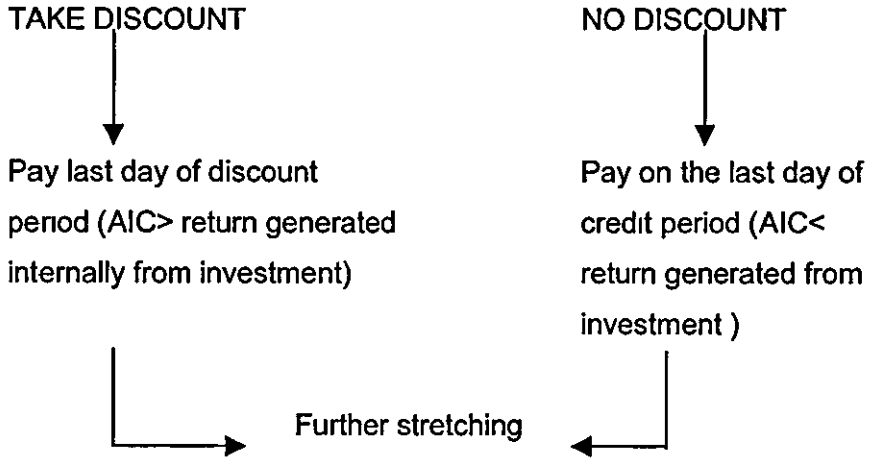
The net change in cash flow identified above resulting from the balance between the above working capital variables can be discounted to find the value change caused by the proposed working capital balance. The objective again would be to

conserve or add to company value by selecting a balance that gives the highest positive net change in cash flow. If the value change is zero or positive then the particular working balance between cash reserves, payables and inventory can be recognised as a solution consistent with the value addition aim of the company.

It is not economically worthwhile for a firm to take the discount should the return gained from employing this money exceed the cost. The failure to take a discount is equivalent to borrowing the amount of the payable for N number of days at an annual cost. According to Hill (1984) changes in credit terms are not viewed by many managers as substitutes for equivalent price changes. Hill & Sartoris (1984: p62) state, "It is suggested that market inefficiencies may be present in the market for trade credit, prices seem to be easier to enforce than payment dates." This confirms McConnell & Scott (1980).

Figure 2.3.2

A Simple Decision Making Tree Based Purely on Financial Grounds



The failure to take the discount is equivalent to borrowing the amount payable at a rate referred to as the Annualised Implicit Cost (AIC). Therefore, it is only economically worthwhile taking a discount if the AIC is lower than short-term interest rates. A firm may, as an option, extend payables beyond the credit period; this practice is known as stretching. If stretching is exercised the effective cost of the discount is reduced. Before carrying out such a practice, the manager needs to consider the non-quantifiable costs and benefits. The firm's credit standing will inevitably affect future credibility and sources of finance, reputation in the market place and relative strength in the market.

In practice, world-class companies have adopted lean and value adding approaches. For example, companies like Sainsbury and Tesco having significantly lower creditor days than for comparable large firms in the retail sector. At the same time, the operating margins for these firms are significantly higher than their sector comparators. This may be due to higher volumes, operational efficiencies and repeat sales to existing customers. The substantially lower level of creditors suggests that there is a fundamental difference of approach to supplier management within these world-class companies. The modern firms do not look at traditional working capital tools such as stretching accounts receivables to finance working capital. A flexible working capital balance that gives consideration to non-financial aspects makes the firm competitive. A firm that can retain customers through loyalty and innovation will be more profitable as the customer will put trust

in the firm. This suggests that the cash flow model discussed should ensure that non-financial considerations are evaluated. However, the practical complications of attaching financial values to non-financial benefits and costs will be discussed in section 2.3.4.

The option of extending the supplier payment period is always the easiest option. An article in Accountancy by Williams (1994) looked at the implications of imposing a penalty on late payments through legislation. This legislation is now available and can impose fixed interest on late payments to suppliers. Many firms have fallen victim to large, more powerful customers particularly during periods of recession. During this time, smaller firms are looking to secure business in order to survive. Should a larger customer delay payments to a supplier, the supplier may not be in a position to force the customer to pay as there is a risk of losing the customer. Large customers can exert pressure and negotiate better business terms, smaller suppliers often being forced into this situation because of the pressure from both the market and its customers.

This practice of managing working capital by delaying payments is therefore not regarded as value adding This further supported by Rafuse (1996). As mentioned earlier, Rafuse argues that the focal point of managing working capital should be to reduce stock levels and not simply spend resources on trying to collect cash quicker or to delay payments to suppliers.

The overall management of payables is of no less importance to the firm than any other component of working capital. A good understanding of the business environment is needed in order to manage effectively short-term sources of finance. Although it becomes increasingly important to have tighter control over working capital in a period of recession, it is important to manage these resources as carefully as is practicable under the constraints prevailing in the market environment. It has been mentioned earlier that the treasurer plays an important role in payable management; there is an overlap in responsibility since this involves the paying out of cash.

Effective accounts payable management requires an organised information system. When an invoice is received initially it must be validated, thus determining whether the order actually took place and to confirm whether the shipment arrived and is acceptable When the invoice is approved, the next stage is scheduling the payment. Many financial systems of today, for example, SAP systems are capable of integrating the various functions of the organisation and reducing the need for manual interventions.

The decision tree in Figure 2 3.2 can be used as a guide along with other factors to determine the payment date. In practice, large organisations normally have one or two payment runs in a month. The invoice approval process can sometimes take a few weeks as the paperwork does flow around the organisation. When the approval is complete, the invoice is normally processed by invoice date. This payment information is then fed into the company's cash forecast system, the forecast of future cash disbursements being updated automatically. This cash flow forecast is usually used as a guide for treasury to decide whether any surplus cash can be invested in financial markets. This cash forecast linkage will be discussed later on in this chapter when looking at cash management.

Having developed the firm's payment policy, it is important to monitor the execution of that policy. This information can be fed back into the system and management can use this information to learn about market changes, payment patterns, and if required can formulate policy to achieve wealth maximisation under the prevailing circumstances. Similarly, the monitoring of receivables policy can help give credit managers information about existing credit terms and general market conditions. It is important to note that the effective management of payables will not only ensure that the operational cycle adds the most value to the firm; efficient information systems will also capture data which can be used in conjunction with longer term strategic issues Market trends can be monitored and the level of operational risk can be measured.

The ingenious design of the payables policy can enhance the value of the firm as indicated by the net present value framework. However, this will only be achieved if the policies are efficiently communicated within the organisation and are in tune with the market.

Having addressed issues surrounding payables management, attention will be turned to the management of inventory which may possibly have been purchased on credit. The cash flow implications of changes in inventory have been discussed by linking inventory with receivables in the cash flow framework discussed earlier. The following section will now look at issues specifically relating to inventory management.

2.3.3 Inventory Management

Inventory is created when goods are purchased for the sole purpose of resale in the normal course of the business. Inventory like other resources in a firm can represent an opportunity cost to the firm in terms of time value of cash invested in the inventory and costs of storage. Inventory needs to compete against other assets for the firm's limited capital funds. The firm can either hold stock levels as an asset on the balance sheet or alternatively sell on credit with or without a discount to clear stock; with the latter the firm will record a trade receivable as an asset on the balance sheet. The question again is which combination adds the most value to the firm. The cash flow changes resulting from the bilateral balance between inventory and accounts receivable have been addressed in the previous section.

It is often argued that the inventory is an expense not an asset and accounting entries suggest the latter. According to Rafuse (1996 p63) "the management of stock is a beneficial process if managed properly. Most stock is simply physical evidence of wasted time and wasted resources throughout a value system". There are costs involved in keeping high levels of inventory, such as financing costs, interest foregone and handling costs. However, there have been innovations in the management of this expense. The just in time (JIT) method looks at cutting stock levels to the bare minimum over time. The inventory holding costs are shifted on to the suppliers, and carriers. An article in the Financial Times (1994), "Just In Time Now Too Much" suggests that suppliers are refusing to supply orders which are not economically beneficial. Suppliers have felt the cost burden, particularly during the recession. Suppliers are finding it difficult to carry out one-off orders as and when the customer makes a request, the overheads incurred by the level of resource

requirement to supply under the just in time terms are high, as a result the system has run into problems.

Rafuse (1996) further states "Reducing stock produces major financial benefits by simultaneously improving cash flow, reducing operating cost levels, lowering the asset base and reducing capital spending. It may be argued that no other single management action can generate such a high degree of financial leverage". The argument in favour of managing stock rather than managing debtors and creditors is mainly reinforced due to genuine waste reduction. The article suggests the need to refocus working capital management efforts on the basis that the management of debtors and creditors to improve working capital may simply pass the inefficiencies in the system from one company to another. However, if a company can benefit, then it may be happy to continue behaving in this way.

Another example is, according to Tully (1994), discussing Kampouri, the Egyptian born CEO of American Standard, "Kampouri's strategy is a model for managers, he has succeeded by relentlessly reducing American Standard's appetite for working capital, especially tied up in inventories." Kampouri states "To get working capital to zero, a company must push inventories so low they can be financed without borrowing. The idea is to deliver goods and to bill customers more rapidly, then use the customer's money to pay for more stock, without speeding up payments to supplier's." Kampouri believes it is possible to double the turnover of the business without adding any working capital. The relationship between inventory and receivables is quite strong. This can be identified and measured using the framework developed, the particular mix of the two key variables can be selected which gives an optimal change in cash flow and one that will enhance the value of the firm.

Competition among organisations in many industries and business sectors has intensified There is a growing need for better decision making and to allocate resources efficiently. Increased costs of money have placed additional pressures on managers to provide products and services without excessive investment in working capital. In terms of liquidity, inventory is the least liquid of the firm's current assets. Inventory affects all functional areas of a typical business either directly or indirectly. This is further complicated by its varying use within the firm and the

different cost components of inventory. Snyder (1974) points to three fundamental concepts, which form the foundation of any sound inventory control system. These are the Classification, Order Point and Economic Order Quantity. These controls are normally found in the manufacturing and automotive industry where there are a vast number of components involved.

The Economic Order Quantity model assumes future demand is known with certainty, inventory is used at a constant rate and delivery lead times are constant In reality, all of these factors are subject to uncertainty. A Corporation can compensate for the uncertainty by maintaining safety stock.

The specific function of an inventory model is to optimise the two opposing conditions of minimising the inventory investment while satisfying demand and reducing the possibility of stock-outs to an acceptable level. Almost every business requires some safety stock, the amount being largely determined by competitive practices and demands of the trade. Weighing up the costs of holding additional inventory against the loss of a sale and customer goodwill is an important inventory policy decision.

The problem of establishing an optimal level of inventory is further compounded by the fact that within the management group there are conflicting viewpoints. The sales manager will not tolerate stock-outs, the manufacturing manager desires long manufacturing runs and stable production, and the treasury manager will want minimal working capital tied up in the business. All these factors need to be taken into account when formulating an inventory policy. It is equally important to ensure that the firm's accounting and record keeping procedures can provide the system with current and reliable data. An inventory programme affects all phases of a business, it must therefore be an integral part of the business operations.

The latest technological advances in e-commerce require firms to meet the needs of the modern customer. This is critical for businesses to compete in the modern world. A customer may wish to order goods or services on the Internet, for a speedy delivery, the firm needs to have a logistics network in place to deliver on time. Many firms create partnerships with manufacturers and distributors in order to provide a competitive service.

The survey has so far reviewed literature in the management of receivables, payables and inventory under domestic market conditions. The existing conceptual tools of finance do offer ways of linking the key working capital variables in some kind of optimum balance. Once again the traditional tools of finance can be applied to the management of working capital. The link between payables, stock and cash can be investigated using the summary equation shown below.

SUMMARY EQUATION

Figure 2.4

Working Capital = Stock + Accounts Receivables + Cash – Payables

(Inventory) (Debtors) (Creditors)

(+ve, -ve) CF Change = +/- Stock CF +/- Receivables CF +/- Cash Rec'd

+/- Payables CF

= (Ro, Ri) CF Change

CF = Cash Flow

Ro = Risk of incremental Cash Flow

Ri = Risk to the overall Company cash Flow

The above model is an attempt to measure the cash flow change caused by the variation of the key working capital variables. The various techniques discussed in sections 2.3.1.to 2.3.3 will now be tested using the cash flow model.

Terms of the model:

- **CF** is the net cash change discounted to the present value caused by the proposed change in the variable
- **Ro** is the risk of the incremental cash flow. For example, offering discounts to customers which pay within thirty days will reduce debtors, however, the risk that not all customers will take up the offer will be present.
- **Ri** is the risk posed by the decision to the overall company cash flow. For example, by offering cash discounts to customers the profit margins can be eroded.

2.3.4 The application of the cash flow model

The various methods of managing receivables were discussed in section 2.3.1 and 2.3.2. Arguments against managing debtors as a way of improving working capital were put forward It was argued that companies take inefficiencies in the collection systems into account during the pricing and bidding process. The benefit of strict control over debtors was not effective as this moved the problem from one company to another. This is one view expressed by Rafuse (1996). The model applies to individual firms and the issue is for each firm to minimise the problem passed onto them while maximising the ones they pass to others.

As the author was unable to collect the required data to test the cash flow model, an illustrative example has been devised. This assumes a decision to increase sales by £5m over 5 years, additional sales on credit that will generate additional profits at 20%. The credit terms are set to 30 days, credit sales estimated to be 70% of the sales value. The assumed cost of capital is 7%. The resultant reduction in stock levels due to these additional sales assumed a cash flow increase of 3% of sales value based on cost of holding stock and stock handling. A bad debt provision is required at 1% to cover any customers from defaulting on payment. The following cash may be generated:

CF = + Cash released from lower stock (3% Sales)
- Cash reduced by bad debt and the cost of funding receivables
+ Cash flow from additional sales
+ Cash flow from additional creditors

The table (1) in Appendix (V) shows both the fixed and working capital investment required for the additional sales programme. The sub section III of Appendix (V) shows the cash flow movement in stock, debtors and creditors giving a net cash flow in sub section IV. The section V has discounted the net cash flows at different rates (5% - 15%) cost of capital. The discounted cash flows were all positive, with the highest value being at 5% cost of capital. We therefore conclude the net present value of the cash flow change caused by the increase in sales is positive using a range of cost of capital from 5% to 15%. The risk to the cash flow of the

company and the project must be quantified and applied. As this is a theoretical example, the author has assumed a low risk factor as the trading partners are assumed to be lean reputable firms in the industry. In practice, industry risk benchmarking is available. The specific risk factors affecting individual firms may be determined by, for example, information supplied by a credit agency.

The combined risk factor is assumed to be low depending on the credit worthiness of the companies involved in the decision. The cash flow change assumed a positive cash flow, and therefore we can say that by using the traditional tools of finance, working capital policy is consistent with the wealth maximisation objective of the firm. The decision tree developed in Figure 2.4.1 (see below) can be used to test different working capital balances to different economic situations.

As mentioned earlier in section 2.3 3, the management of stock is regarded as a wholly beneficial tool to the overall management of working capital. The net cash flow change resulting from the reduction in stock levels can be measured using the model developed above. However, it is important to recognise that the savings generated from reduced stock levels are not trade-offs but arise from genuine cost reductions. With more importance, process quality and customer service is greatly enhanced as waste stock is driven out of the value system.

The above Figure 2.4 assumes that the incremental change in cash flows and risk can be established. The changes in the key working capital variables as shown in the earlier section will bring about changes in cash flow. The objective of the firm is not to minimise the use of any specific variable or the whole set of working capital variables, this may not be possible without compromising the service provided to customers. If the present value change to the cash flow is zero or positive, then the particular working capital balance is consistent with the wealth maximisation objective of the firm. It is also important to measure the risk of the cash flow by the proposed change on the overall company cash flow and on the particular project. These financial considerations are useful in reviewing working capital decisions, however, the non-financial factors affecting the decision and consequently the firm must also be considered.

With new technology being introduced and the changing customer buying behaviour, an assessment of the new working capital position is required. For example, successful companies try to understand their customers. Mobil has adopted a balanced scorecard approach (Kaplan and Norton) which has a strategic map; the customer perspective being to delight the customer. In this situation, working capital policies need to reflect the strategic aims of the business. By providing immediate access to gasoline pumps (to avoid waiting), convenience stores stocked with fresh high quality food, etc., the focus moves away from purely managing internal performance measures to external customer focused measures.

A decision tree approach (see 2.4.1) may be adopted in which, say a number working capital balances are matched to different economic environments such as increased exchange rate volatility, or improvements in invoicing / payables / receivables technology. A one off balance of working capital may not be suitable to a firm under different economic conditions and this will be illustrated below. The cash flow changes resulting from different working capital policies under different economic conditions can be measured. Unfortunately, in this survey the author was not able to collect data to allow such assessment under different economic environments due to the time frames involved. However, the author has illustrated how a decision tree may be used to manage working capital. For the purpose of illustration, the diagram below shows a working capital review being conducted for three different situations; Interest rate volatility, Technological Change and a Recession. For the purpose of illustration, the model developed has assumed a working capital review under a period of recession.

In the example below the author has tried to illustrate how a decision tree may be used to assess working capital policies under different economic conditions. The working capital review leads to five different working capital decisions as shown in Figure 2.4.1. Due to the interrelationships between the key working capital variables, the altering of one variable will bring about change in another. The following scenario shows how the decision tree (Figure 2 4.1) can be used to assess the cash flow changes caused by changes to the working capital balance.

Scenario 1

It is inevitable that during a period of recession, firms will review all aspects of working capital. The working capital review can lead to 5 different options with the following assumed probabilities; Cash Management (0.1), Debtors (0.3), Stock (0.3) Creditors (0.2) and No Action (0.1). The altering of one variable will affect another. For example, by tightening the control over account receivables, consequently reducing the level of credit offered to customers, this may lead to lower sales and increased inventory costs. This decision may be recorded as policy R1 as indicated on the decision tree by a dotted green line.

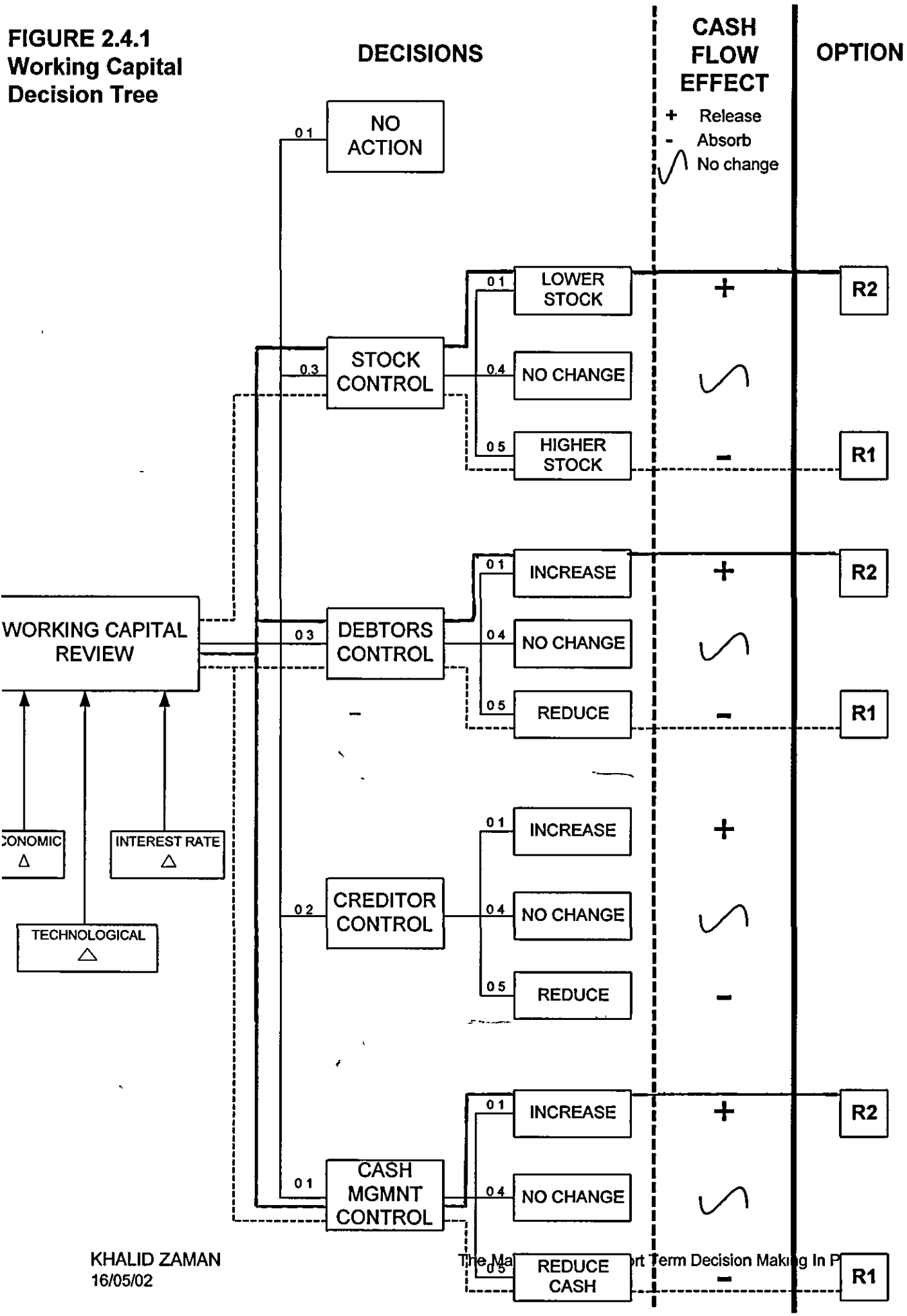
The decision probabilities are indicated on the decision tree. For example, at the point of the working capital review, the probability of the debtors being reviewed is 0 3 compared to 0.1 for Creditors. This weighting of the probabilities may be altered to suit individual firms. At the action stage of the decision tree, a further 3 options of equal chance are assumed. For example, at the Debtors review, the 3 options include Increase (0.1), Reduce (0 5) and No Action (0.4). The expected cash flow change expected from the review of debtors at each level can be identified. Similarly, a number of working capital policies can be mapped through the decision tree. The individual working capital balances will contribute to the overall working capital balance of the business. The Net expected value change under the economic situation can be measured.

Scenario 2

The tighter Stock control policy that has been described in section 2.3.4 can be depicted on the decision tree as indicated in blue. The decision to increase sales by offering credit will produce cash flow changes through lower stock levels and higher sales. This is shown as R2 on the decision tree. By increasing credit to customers, the debtor levels will rise causing a cost of funding and the additional risk of bad debt. The simultaneous effect is on stock. The expected stock reductions will produce cash flow benefits through reduced inventory costs and lower costs of stock loss and obsolescence. The expected value of the present value of cash flow change can be calculated by using the probabilities at each set of decisions.

The scenarios 1 and 2 show that the different working capital balances can be reviewed using a decision tree. The review can take place over a certain period of time, for example five years. The data collected can be used to determine the pattern of behaviour caused by the cash flow changes resulting from the different working capital balances under different economic conditions. For example, both scenarios discussed were attempting to formulate a working capital policy under a recession A similar analysis can be carried out under for example, a situation where technology is constantly changing or where there is interest rate volatility. The benefit of the decision tree is that it allows the decision-maker to calculate the expected value change resulting from a proposed working capital policy, as opposed to a one off balance. For a number of reasons mentioned earlier, the author was unable to collect data to test the model, mainly due to time and resource constraints However, the model when using theoretical examples can work.

FIGURE 2.4.1
Working Capital Decision Tree



The following section will now introduce the international environment.

2.4 Introducing the International Environment

This section of the research will look at the management of working capital from an international perspective. More and more firms now operate in international markets. Many firms expand their operations and services across borders in order to exploit new markets, and new opportunities. This decision to expand operations is one that can be taken over a long period of time or can be an ad hoc order and is a long run decision by its nature. However, when operating in an international environment, managers face additional risks, some risks being more important (to managers) than others. The survey will identify the nature of these risks, and outline the extent to which these risks influence short-term policy-making. These risks are unlike those that may have been well understood in domestic situations.

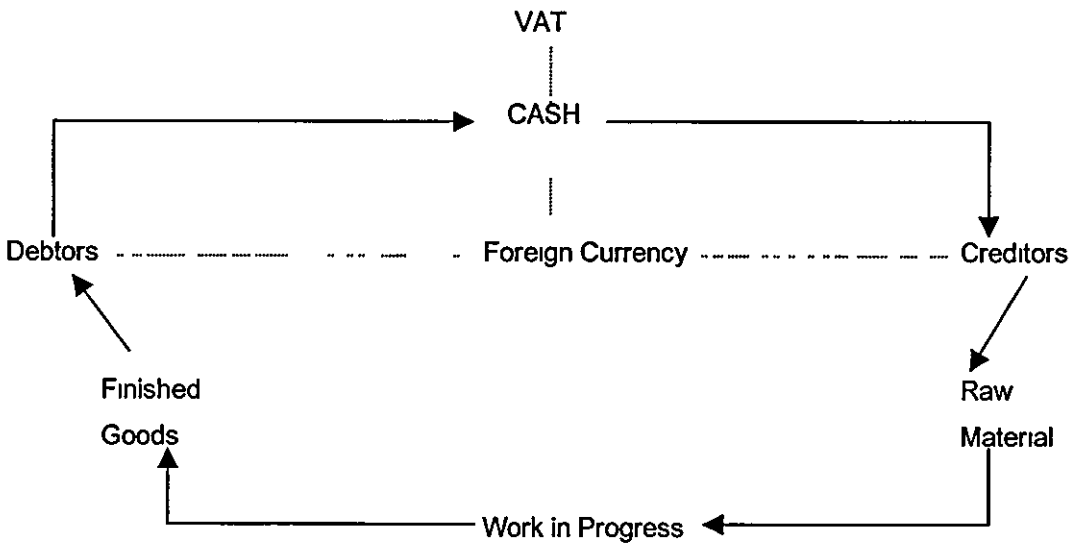
Many authors generally acknowledge that both short and long term decisions are interrelated. Long term decisions are strategic and have a longer time horizon whereas short-term decisions tend to be more tactical and are made over a relatively short time span. It then follows that the management of working capital of an organisation is important from a strategic point of view. As firms expand their marketing and supply operations throughout the world, they face complex problems of managing their cash flows within and between countries in unfamiliar environments. Many international companies, whether large or small, attempt to broaden their markets; they produce and purchase products in one market and sell them in another. The research sample consists of firms with a substantial turnover from overseas markets. For the purpose of analysis, the respondents have been categorised in terms of their degree of overseas involvement. All responses to the data collection instrument will be analysed against the sub-sample 'overseas involvement'. For further information please refer to Exhibit 0I in Chapter 4.

There are many factors that create additional challenges and add new dimensions to short-term financial management. In domestic short-term finance there is no need to worry about the currency collected from country X, which can then be

concentrated into another bank in country Y. When currencies move across borders, the rate of exchange between currencies becomes a major problem or concern. The currency in which these firms transact is not the same as the currency of their expenses. There are numerous methods available to corporations to hedge or protect themselves against this risk. Figure 2.4.1 shows the operating cycle of a firm in an international environment.

Figure 2.4.1

International Working Capital Management



Many articles have been written in the area of foreign exchange risk management. The significant changes in national and international financial markets have made the financial environments more volatile. On the other hand the markets to help companies cope with the risks have supplied a whole range of new and innovative financial products. It is also possible to make a financial gain from these risks; as stated by Belk & Glaum (1990), "it is wrong to state conclusively that UK multinationals are risk adverse and do not engage in speculative foreign exchange activities". It is apparent that foreign currency is the centrepiece when trading internationally. Firms not only manage this risk but also try to profit from it.

Further evidence comes from Mathur (1982) who states that "the primary goal in foreign exchange risk management is to shelter corporate profits from the negative

impact of exchange rate fluctuations. The secondary goal is possibly to profit from exchange exposure management". Belk & Glaum (1990) confirmed this

In many Latin American and other less developed countries with soft currencies, forward contracts may be limited. Other techniques, which are popular, include the advance purchase of imported materials and credit rationing. This affects both inventory and receivable balances. Shapiro (1973:p394) discusses inventory purchase strategies and credit granting policies in soft currency countries under both inflation and threat of devaluation and states "The problems necessitate sequential decision making". In soft currency countries, there is a persistent internal currency devaluation otherwise known as inflation. Expected price rises may lead a firm to increase its investment in inventory and to modify its credit policy. These are just some factors that affect a firm's inventory policy under international trading. The threat of devaluation or an expected general price rise may lead a firm to purchase materials in advance or speed up the importation of goods. The trade-off involves tying up money in inventory as well as not being able to take advantage of potentially favourable fluctuations in the price of materials. The summary equation in figure 2 4 would have reflected these additional factors affecting firms that trade in the international environment given that the data was available.

There is one aspect of granting credit that poses a constant problem to managers operating in an inflationary environment or in a soft currency country threatened with devaluation, and this is the determination of the length of time for which credit should be granted. The better the credit terms, the more sales are likely to be made. Against this, one needs to balance the risk of default, and the deterioration of accounts receivable through inflation or currency devaluation. On the other hand, the effectiveness of the conventional hedging strategies has been questioned. Kroner & Sultan (1993) give evidence that the return distributions of many assets are time varying and that asset prices are co-integrated and this raised concern about the risk reduction properties of conventional hedging models. A superior hedging strategy is proposed by Kroner & Sultan (1993) as opposed to the conventional hedge which ignores both of these properties.

There are also significant time delays when moving cash within countries and across international borders. There may be a certain degree of unreliability, for example, when posting cheques in rural areas from one country to another. International transactions are settled and export payments are normally made in the form of a letter of credit, and there seems to be wide scale usage of electronic systems such as SWIFT and CHAPS. The extent to which these systems are used and for what purpose will be discussed in Chapter 4. A procedure known as forward value is the crediting of the deposit after the date of the deposit and a back value is the posting of a debit before the date of presentation. Value dating is more than just a time delay. The transaction cost is not simply the nominal bank charge but the opportunity cost of cash also needs to be considered. This is why international funds transfer is potentially more expensive than domestic transfers. In addition, the following section will address the major areas of exposure to a firm.

Credit risk is the potential risk of default when selling to a customer (domestic or foreign). Thus creating international trade receivables may potentially cause a greater risk than selling to a domestic customer. The domestic firm's credit can be evaluated relatively easily as information about customer characteristics is usually readily available; however, when dealing with an international customer, with different accounting standards, distance factors, and various other uncertainties the analysis of published reports becomes complicated. However, with globalisation, agencies exist which can provide financial information about a company's credit history and status.

Political and economic problems can potentially restrict the cash flow out of a country, or may impose the threat of nationalisation on a firm, and legal remedies to resolve any disputes may be difficult to put into place. Other factors which may influence operational policy under this environment include the international tax agreements between countries which are very complex and may also vary from nation to nation, and transaction costs of transferring funds between banks internationally, which may also vary from country to country. As a result, the international transfer of funds can be significantly more expensive than domestic transfers. It is more often than not multiple banks may get involved and charge a fee.

Management attitude towards cash management is another important factor; for example, do management believe that as long as a sale is made, it makes no difference to the bottom line as long as the cash arrives some time? The periods of high inflation and currency devaluation can teach managers the time value of money. Certain countries impose restrictions on providing data across borders, especially bank data. Therefore information availability is important in the provision of cash management and credit services, such as balance reporting and credit reporting.

Companies, which serve overseas markets, will encounter at least one of the risks mentioned, if not more. The principal activities of the organisation as depicted by Figure 2.4.1 will be exposed to additional risks. All thing being equal, the operating cycle is expected to be longer than in a domestic situation. For firms which trade in international markets, cash payments or receipts will involve dealing in a currency other than the home currency and the firm will immediately face the possibility of foreign exchange risk. In order to understand fully the responses to the survey, the author will look at the sales and sourcing of material and the control of these activities. Sales refer to the geographical region of sales, sourcing is the supply of raw materials and finished goods, and the control element looks at where the management decisions are made in the organisation. Inventory may move from one country to another, however, in practice, many firms source from local markets and often supply local markets through local units. Hence, there may be little value added in extending inventory management into international markets. The risks of stock deterioration, loss, holding costs and information availability may be circumvented if local units manage their own stock. The international diversification effect may reduce the level of risk exposed to the firm in terms of all working capital variables since a loss in value of an asset in one market may be compensated by a gain in another market.

Equally important are time delays resulting from international trading, the availability of information regarding stock and the risk of loss when making sales abroad. There are tools available to hedge against a fall in the value of debtors and increased in the creditors, but these are all at a cost. The management of debtors and creditors is far more complicated here than in the domestic environment. The

distance factor makes it difficult to assess realistically the risk of credit, as information about the customers may be difficult to obtain.

The majority of respondents (see section 4 2 2) confirmed that receivables were mainly affected by the risks in the international environment. Although localised units may operate with autonomy, there must be some centralised control over working capital policies. There are a limited number of references in the area of International short-term financial management. It is hoped that this discussion will lay down the foundations for developing working capital policies to cope with risks in the international markets. The following chapter will discuss the research methodology and the scope of the research.

2.5 Conclusions

This chapter has introduced the reader to the literature on the main components of working capital. It has been illustrated that the conceptual tools of finance can be used to link the key working capital variables. The cash flow changes caused by the bilateral balance between the key working capital variables can be identified as illustrated earlier in 2 3.4. This process can be repeated for all of the main working capital variables. When the incremental change in cash flow is established, the cash flow change can be discounted to find the value change caused by the proposed working capital. The decision tree developed in Figure 2.4.1 can be used to collect working capital data and to match to different economic situations over a period of time. As mentioned earlier, the author was unable to collect the data as part of this study in order complete the requirements to construct the basic tenets of a working capital policy. However, the importance of the short-term decision making policy on the value of the firm has been highlighted. In addition, many authors including McConnell & Scott (1980) support the view that short-range decision making can influence the value of the firm.

The traditional financial tools can be used to show the various linkages between the key working variables. However, modern techniques such as the balanced scorecard by Kaplan and Norton show that successful companies need to balance the need for operational efficiency and the ability to delight the customer. This approach requires establishing a number of financial measures and non-financial measures. A world-wide leader in the Petroleum Industry has successfully applied this concept

The Internet has also affected the way in which firms manage working capital. With the transaction processing time significantly reduced, the technological innovations in integrated systems have reduced the need to support large warehouses, material handling overheads and credit control departments. Much of the routine tasks that were carried out by administrative staff are now automated. These changes in the environment have created many opportunities for financial managers and many challenges lie ahead.

The following chapter will give an account of the steps the author has taken to achieve the objectives of the survey.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The objective of this chapter is to explain the research method used in this project and, in particular, to discuss the sources and means of collecting and analysing the empirical data. It deals with the general methodology, the actual survey design and the nature of the limitations.

The following Section 3.2 discusses the research methodology, the choice of research design, the survey design, dealing with both the construction of the actual questionnaire and the selection of the sample. Finally, the limitations in the data collection are exposed in Section 3.4.

3.2 The General Revised Methodology

The main underlying objective of this study was to investigate the management of working capital using the cash flow framework identified in Figure 2.4. This required establishing the link between the key working capital variables. It has previously been mentioned that working capital problems can be linked to conventional ideas of finance. The apparent discontinuity between literature review, research hypotheses and research problem definition was due to the problems of data collection within the timescales of the project.

The original objectives of the survey were to investigate the interrelationships between the working capital variables using the traditional finance tools. The literature review and the research hypotheses were constructed in line with the original objectives of the study. The pilot study revealed that the original objectives were too ambitious for a study of this nature. The diversity of data required and the time over which the data was to be collected contributed to the restating of the study objectives. The problem definition was restated in line with the research objective as being the management of working capital in practice. The hypotheses were set to show how firms belonging to different sub-groups managed the various

components of working capital. The firms in the survey sample were grouped into three categories, the size, the level of overseas involvement and the degree of centralisation of decision making. The author is trying to establish whether firms with certain characteristics behave in a certain way.

As far as the literature review is concerned, over time more up-to-date material has been added to the original literature review. For example, the author has reviewed the workings of Kaplan and Norton (2000), Rause (1996) and Scrinivasan (1999) in an attempt to add recent literature to the original review. However the original review is to some extent frozen, and this may again have contributed to the inconsistency between literature review and research hypotheses. The research hypotheses have been changed to reflect the revised general objectives of the survey. The research questions and hypotheses are structured around each component of working capital in line with the main objectives. For example, in trying to assess the management of each variable, a set of questions and hypotheses have been drafted for Inventory, Receivables, Stock and Cash. The hypotheses are set to test if a firm belonging to a particular group (size, level of overseas involvement and degree of centralisation) behaved in a particular way.

The original objective of the study required conducting interviews with individual practitioners responsible for the key working capital variables within the organisation. As the pilot study will reveal, the practitioners were not prepared to commit resources to co-operate in this research study. A second questionnaire was then developed which was piloted and was regarded as favourable by the respondents.

The data collected are now focused on how the individual working capital variables are managed rather than the linkages between the variables As mentioned earlier, this is the revised objective of the study. The analysis is based on the size of the firm, level of overseas involvement and centralisation of decision making. The hypotheses set out below will be tested to see whether firms belonging to a particular group respond with a particular working capital balance. The increased internationalisation of the firm has accentuated the need for a decision-making framework that will help managers cope with the increased complexity of their investment and financing decisions. The data analysis looks at the difference

between large and small companies for each working capital variable, the analysis by sub-samples will also allow the conceptual framework to extend to international working capital management.

The research problem addressed by this study dealt with the examination of corporate activities, which form part of working capital. The three sub-objectives mentioned in Chapter 1 were addressed by a total of 46 questions as detailed in the data collection instrument in Appendix II. The general introduction of the questionnaire was used to gather background information about the firms used in the sample, for example, the nature of risks faced by the firms and the individual firm's perceptions on working capital management. The specific elements of working capital were then questioned in more detail. The peripheral questions have nevertheless revealed some useful data that may be used in the background to the main analysis. For example, at the outset, the management attitude towards managing working capital was established.

Further statistical testing was not carried out on this data due to both time constraints and the limited usefulness of any further analysis. However, a list of the main research questions is given below. The main research questions are representative of the questions in the data collection instrument. They have been set up mainly to aid the meaningful interpretation of the data collected. Each research question refers to a particular question in Appendix II, as indicated below. The research questions have been analysed using Exhibits, and each Exhibit corresponds to the research question. For example, Exhibit 1 refers to research question number one. Further information about the data contained in each Exhibit can be found in Appendix II, the data analysis.

3.2.1 Research Questions and Hypotheses

Framework

Q1:Ref Q1 Have these selected large and small international firms responded differently when ranking risks encountered by the firms?

1a Are there differences in the ranking of credit risk relative to size and overseas involvement?

1b Are there differences in the ranking of funding risk relative to size and overseas involvement?

Hypothesis 1 : There are no differences in how the selected large and small firms responded to the ranking of the various risks relative to size and overseas involvement.

Q2.Ref Q6 Have these selected large and small international firms ranked the different elements of working capital differently as affected by the international environment?

6a Are there any differences in the ranking of debtors relative to size and overseas involvement?

6b Are there any differences in the ranking of creditors relative to size and overseas involvement?

6c Are there any differences in the ranking of cash relative to size and overseas involvement?

6d Are there any differences in the ranking of stock relative to size and overseas involvement?

Hypothesis 2. There are no differences in how the selected large and small firms have ranked the various aspects of working capital under the influence of international trading relative to size and overseas involvement.

Q3.Ref Q7 Have these selected large and small international firms responded differently in the extent to which short-term decisions are centralised relative to size and overseas involvement?

Hypothesis 3: There are no differences in how the selected large and small international firms have centralised short-term decision making relative to size and overseas involvement.

Q4.Ref Q8 Have these selected large and small international firms responded differently to the opinion that short-term financial management has been neglected relative to size and overseas involvement?

Hypothesis 4: There are no differences in how the selected large and small international firms have responded to the opinion that short-term financial management has been neglected relative to size and overseas involvement.

Q5:Ref Q9 Have these selected large and small international firms responded differently with regard to the importance of working capital relative to size and overseas involvement?

Hypothesis 5. There are no differences in how the selected large and small international firms have responded to the importance of working capital relative to size and overseas involvement.

Inventory

Q6·Ref Q11 Have these selected large and small international firms responded differently relative to the factors affecting inventory management?

a Are there differences in the importance of production costs relative to size, overseas involvement and centralisation?

b Are there differences in the importance of holding costs relative to size, overseas involvement and centralisation?

c Are there differences in the importance of customer satisfaction relative to size, overseas involvement and centralisation?

Hypothesis 6: There are no differences in how the selected large and small international firms responded to the factors affecting inventory policy relative to size, overseas involvement and centralisation of decision making.

Q7.Ref Q12 Have these selected large and small international firms responded differently to the centralisation of inventory management relative to size and overseas involvement?

Hypothesis 7: There are no differences in how the selected large and small international firms responded to the centralisation of inventory management relative to size and overseas involvement.

Q8.Ref Q13 Have these selected large and small international firms responded differently to the factors affecting inventory management relative to size and overseas involvement?

Hypothesis 8: There are no differences in the respondent's position on the importance of factors affecting inventory management relative to size and overseas involvement.

Q9.Ref Q15 Have these selected large and small international firms responded differently to the opinion that international risk is seen as just another business risk relative to size, overseas involvement and centralisation?

Hypothesis 9: Both large and small international firms view international risk as just another business risk 7relative to size, overseas involvement and centralisation.

Receivables

Q10.Ref Q20 Have these selected large and small international firms responded differently relative to the factors affecting receivables policy?

20a Are there differences in how they rank the impact of credit on sales relative to the size, overseas involvement and centralisation?

Hypothesis 10: There are no differences in how the selected large and small international firms have ranked the individual factors influencing receivables policy relative to size, overseas involvement and centralisation.

Q11·Ref Q21 Have these selected large and small international firms responded differently to the extent to which outside agencies are used to evaluate credit relative to size, overseas involvement and centralisation?

Hypothesis 11: There are no differences in how the selected large and small international firms use outside agencies to evaluate credit relative to size, overseas involvement and centralisation.

Q12:Ref Q23 Have these selected large and small international firms viewed differently the factors affecting receivables policy when dealing in the international environment relative to size, overseas involvement and centralisation of decision making?

Hypothesis 12: There are no differences in how the selected large and small international firms responded to the altering of opinion to Exhibit 20 relative to size, overseas involvement and centralisation

Q13:Ref Q24 Have these selected large and small international firms responded differently to the extent to which receivables are centralised relative to size and overseas involvement?

Hypothesis 13: There are no differences in how the selected large and small international firms centralise receivables management relative to size and overseas involvement.

Q14:Ref Q25 Have these selected large and small international firms responded differently to the importance of managing receivables relative to size, overseas involvement and centralisation?

Hypothesis 14: There are no differences in how the selected large and small international firms view the importance of receivables relative to size, overseas involvement and centralisation.

Payables

Q15.Ref Q29 Have these selected large and small international firms responded differently to the practice of delaying payments relative to size, overseas involvement and centralisation.

29a Are there any differences in how the firms have responded relative to size, overseas involvement and centralisation.

Hypothesis 15: There are no differences in how the selected large and small international firms responded to the practice of delaying payments relative to size, overseas involvement and centralisation

Q16: Ref Q30 Are there any differences in how the firms have responded relative to size, overseas involvement and the firms attitudes towards delaying payments?

Hypothesis 16: There are no differences in how the selected large and small international firms responded to the feasibility of imposing legislation against late payments relative to size, overseas involvement and centralisation.

Q17:Ref 31 Have these selected large and small international firms responded differently regarding the review of suppliers?

31a Are there any differences in how the firms responded relative to size, overseas involvement and centralisation?

Hypothesis 17: There are no differences in how the selected large and small international firms responded to the frequency of review of suppliers relative

to size, overseas involvement and centralisation.

Q18 Ref Q32 Are there differences in how frequently the firms monitor payables relative to size, overseas involvement and centralisation?

Hypothesis 18: There are no differences in how frequently the selected large and small international firms monitor payables relative to size, overseas involvement and centralisation.

Q19.Ref Q32 Have these selected large and small international firms responded differently regarding the extent to which the monitoring of payables is centralised?

32b Are there differences in how the firms have responded relative to size, overseas involvement and centralisation?

Hypothesis 19: There are no differences in how the selected large and small international firms responded to the centralisation of payables relative to size, overseas involvement and centralisation.

Q20 Ref Q34 Have the selected large and small international firms responded differently regarding the tools used when managing payables under a recessionary environment?

34a Are there any differences in how management view deliberate remote disbursements relative to size and overseas involvement

34b Are there any differences in how management view controlled disbursements relative to size and overseas involvement.

34c Are there any differences in how management view stretching of payables relative to size and overseas involvement.

34d Are there any differences in how management view debt factoring relative to size and overseas involvement.

Hypothesis 20: There are no differences in how the selected large and small international firms responded to the use of various tools in a recessionary environment.

Q21:Ref Q36 Have these selected large and small international firms responded differently to the factors affecting payables policy?

36a Are there differences in how firms ranked exchange rates relative to size and overseas involvement

36b Are there differences in how firms ranked time delays relative to size and overseas involvement

36c Are there differences in how firms ranked taxation relative to size and overseas involvement

Hypothesis 21: There are no differences in how the selected large and small international firms responded to the factors which affect payables policy relative to size, overseas involvement and centralisation.

Cash

Q22 Ref Q40 Have these selected large and small international firms responded differently to the extent to which both payables and receivables are automated?

40a Are there differences in the extent of automation of payables relative to size, overseas involvement and the delay of payments?

40b Are there differences in the extent of automation of receivables relative to size, overseas involvement and the delay of payments?

Hypothesis 22: There are no differences in the extent to which the selected large and small international firms automated both payables and receivables relative to size, overseas involvement and the delay of payment.

Q23.Ref Q43 Have these selected large and small international firms responded differently to the importance of customer attitudes towards the various payment systems?

43a Are there differences in the level of importance given to customer attitudes relative to size and overseas involvement?

Hypothesis 23: There are no differences in the extent to which the selected large and small international firms ranked the importance of customer attitudes relative to size and overseas involvement.

Q24.Ref Q46 Have these selected large and small international firms responded differently to the notion that net cash flow is good indicator of working capital management.

Hypothesis 24: There are no differences in the extent to which the selected large and small international firms viewed cash position as an indicator of how well a firm has managed its working capital relative to size, overseas involvement and the concept of working capital.

3.2.2 The Research Design

The research design is the distinction between formalised and exploratory research. The exploratory research includes methods such as the literature review, as in Chapter 2. This is a major step in any research study. This allows the author or the researcher to look at the work carried out in the areas by others. The present study, although formalised, goes beyond exploratory research. This research requires a structured approach with research questions and hypotheses. The conclusions made regarding the hypotheses are presented in Chapter 4.

Another view regarding the data collection method is the observational approach. This approach, in contrast to the survey, involves the questioning of subjects. The survey approach is adopted in this research in that the approach questions the management of working capital in practice.

In the survey, the researcher has no control over independent variables in any experimental study. The aim is to give a report on the state of affairs, with all other factors being equal.

The present study is descriptive in nature. The research design may be either cross sectional, which is carried out at one point in time, or longitudinal, that is, research is repeated to find out what changes have occurred over time. The present survey has a cross sectional time dimension set in quarter one of the year 1995. The limitations of the research include both time constraints and resource availability. However, under the circumstances, the cross sectional approach was found to be suitable. The present study looks at short-term financial management

at a particular point in the business cycle. Business cycles are unique and do not repeat themselves in any determinable manner. However, this data will be useful in developing further the theory of working capital management and identifying further areas of research

Research studies may be qualitative or quantitative. With the initial objectives, the author would have carried out a purely qualitative study since the subject matter required a close investigation. However, as the pilot study will reveal, a change in strategy was required in order to collect the data successfully.

It is also very important to consider the quality of the research results in relation to the major considerations of validity and reliability. The term validity refers to the extent to which any measuring instrument is measuring what it is intended to measure. An important type of validity is the face or content validity. This is the extent to which the instrument covers the topic under study. The determination of such validity may be judgmental as stated by Emery (1985).

Reliability is concerned with the degree to which a measurement gives consistent results (Emery, 1985). Reliability can be improved by standing, as far as possible, from the conditions under which the measurement takes place, for example, the author has tailored the research instrument to be completed by senior treasury personnel The reliability aspect has two main perspectives, equivalence and stability. While equivalence is concerned with variations at one point in time among investigators and even samples, stability is concerned with personal and situational fluctuations from one time to another. While the latter is usually difficult to measure in survey studies, interest has centred on the improvement of equivalence. In this project equivalence has been enhanced by the use of only one investigator, the author himself, to conduct the whole survey. The following section will look at the various approaches to the survey and comment on the approach used in this research.

3.2.3 The Survey Approach

A survey may be conducted by a mailed questionnaire, a telephone interview or a personal interview. A mailed questionnaire is low cost and allows the respondent time to consider and check his responses. However, the percentage of non-responses and incomplete responses can cripple the findings. Exhibit 0ii shows the non-responses to this survey. A telephone interview is relatively economical in time and money and ensures the respondent's anonymity in comparison with the mailed questionnaire, but there may be distrust or lack of co-operation and the interview may be terminated prematurely. The interviewer has no control over the situation and is unable to gather the detailed information or relevant non-verbal data.

This study required recording the attitudes and opinions prevalent among practitioners towards the management of short lived assets. As mentioned in Chapter 1, clear objectives of managing liquidity are usually missing, and linkages between various accounts are not fully understood by practitioners or theorists. In trying to highlight the importance of managing the short lived assets and liabilities under review, the author will look at the practical decision making process from the point of view of the organisation.

As mentioned earlier in this section, this study is a qualitative one In such a study, the researcher needs to get close to the people or the situation prevailing at the centre of the study. Due to the nature of the research it was felt that it was more important to gain an in-depth understanding of the situation, therefore less emphasis was placed on the sample size and more on the detail of the findings. The author felt it was therefore necessary to concentrate effort on a sample of selected UK multinational firms in varied markets. As will be seen later, due to the responses from the pilot interviewees, the author adopted an alternative approach in order to serve the raw data needs of the survey. The revised data collection instrument was mailed to respondents for completion.

3.2.4 Other Possible Research Approaches

Alternative approaches for the collection of data were considered, but unlike the present approach were discarded because they were found either impractical or

not giving the right sort of response. As mentioned earlier, the case study approach was considered and Appendix 1.1 shows the document which was originally designed to serve as a data collection instrument. If adopted, this would have involved a more qualitative approach than that actually used and already described. However, given the confidential nature of the data, the attitude of practitioners and the time commitment required, many practical difficulties were encountered in finding companies who were willing to furnish the required detailed information. The author therefore pursued the alternative approach.

3.2.5 Question Structure Technique

The research questions or hypotheses, which guide the direction of the study, are broken down into subsidiary investigative questions to delineate further the scope of the study. The data collection instrument in this research project gathers data on the management practices relating to short-term decision-making. The data collection is broken down into four subsidiary investigative sections, the four main elements of working capital as depicted by Figure 1.1. These are further broken down into more specific measurement questions, which the respondent can answer.

Once the questionnaire schedule has been drafted, it must be tested on a small number of persons typical of the proposed respondents. Such a pilot scheme is necessary to check how effective the questions will be when tested. While the respondents must not be told of the testing stage, they should later be asked about their understanding and interpretation of the questionnaire and the degree of ease in answering the questions As you will see in Section 3 2 6 the respondents were group treasurers at four multinational firms in the UK, and these were considered representative of the characteristics of the sample.

Question design involves a degree of response structure to be adopted and looks at how far one is to use open-ended or closed-response items. Open-ended questions have the advantage of discovering the respondent's opinion, his frame of reference and his amount of knowledge. Close-ended or fixed-alternative questions, which can be dichotomous or multiple choice, give uniformity of measurement and thus greater reliability, and the task of coding is easier. The

original questionnaire in the research was designed to meet the author's initial approach in collecting data (refer to Appendix 1). The content and wording of the questions were left open-ended. Each question was seeking information which was relevant, not too wide in coverage and which the respondents would be able and willing to give.

The following section will give a detailed account of the effectiveness of the original questionnaire.

3.2.6 Pilot Study

A pilot study was carried out on the originally planned semi-structured interview schedule and the opinion questionnaire. As mentioned earlier, senior treasury personnel from UK based multinationals were used which met the same character requirements as the study population. These firms were also used in the study population. The purpose of the pilot study was to determine the validity of the instrument. All stages of the data collection instrument were tested in the pilot study.

A preliminary contact was established with a sample of six firms consisting of manufacturing and retailing organisations. This secured immediate success with four firms. All participants were asked to evaluate the instrument with regards to the suitability of the questions in the instrument. The following comments came to light as the pilot study was carried out. The original questionnaire in Appendix 1 that tries to capture qualitative information was evaluated unfavourably. The instrument was marked as too ambitious with too much ambiguity as all questions were deliberately left open-ended. The initial case study approach was designed for an interview scenario. The aim was to gather the views of the practitioners, allowing the participant the freedom to contribute to the research. For many reasons including the time pressure faced by senior personnel due to year end commitments, and the management attitude towards the importance of research studies in general, the author was unable to proceed with the initial research problem.

Ideally, in order to evaluate the linkages between the various key components of working capital, it was necessary to interview all key personnel from the various disciplines of the organisation, which directly or indirectly may affect the management of working capital. For example, the payables manager, credit control, production, inventory and treasury The data collected would have revealed some of the relationships between the main working capital variables. However, due to the time constraints faced by the author it was decided to collect data from senior treasury personnel. The pilot study clearly indicated that the present strategy was not feasible under time and resource constraints. The author was therefore, unable to proceed with evaluating the interactions between the various components of working capital

The research approach was discussed with both practitioners and academics. The most common view put forward by academics was that the survey was too ambitious. The author does accept the view that for a Master of Philosophy thesis the original objectives may have been too optimistic. Many practitioners put forward the view that there was little point in devoting valuable resources to an area that will add so little value to the firm One senior personnel stated "the survey was revealing nothing more than what we already know". This is a clear indication that management attitudes towards working capital play a key role in progress of the research.

These findings are evidence to support the author's view that short-term financial management may be lacking in interest and innovation. The data collection task was made difficult due to the resistance from industry to co-operate. This attitude gave the author the incentive to devote considerable effort in establishing findings which will help overcome this neglect and develop better working relationships between academics and practitioners.

The main problem of carrying out research in finance is the identification of a problem area to investigate, for which practitioners will be prepared to sacrifice time and resources when providing the required data. The practitioners, to some extent, should be involved in the research, design and problem definition. The research problem should be relevant to the problems faced by managers in the prevailing economic environment. It is then that the practitioners will be prepared to

commit the required resources and co-operate with the researcher. A partnership between academics and practitioners is the key to better innovation. This will lead to a two way process, in which both academics and practitioners will benefit.

There are a number ways of dealing with the problems encountered above. The two key problems were that the original survey was considered to be too ambitious as it covered the entire working capital process. At the pilot study, a revised project definition could have been drafted that focused on one particular aspect of working capital. For example, how does working capital management fit into the modern e-commerce economy; another important issue was the timing of the survey. The data collection efforts coincided with the year end commitments of the firms participating in the survey. The timing of the data collection may have been managed more effectively, by pre-arranging dates after the year end commitments. However, due to the practical demands placed on managers in industry, one cannot be certain that all data may be gathered by this way.

3.3 The Survey Design

3.3.1 Data Sources

This section provides descriptions of data sources. In order to analyse the opinions and attitudes towards short-term financial management, respondents were taken from a selected sample of thirty firms consisting of manufacturing and retailing organisations. To qualify as a data source, each firm was required to have international operations that may cause the firm to alter their policies towards the various components of working capital management. The study population sample was drawn from the directory of UK Multinationals in Britain, available in most libraries.

In the selection of respondents, the main aim was to obtain the views of more influential personnel, holding senior positions at the organisations participating in the study sample. Under the time constraints, it was felt that a group treasurer or equivalent would be in a suitable position to provide the required data. Although treasury is not directly responsible for making short-term decisions in an organisation, this segment of the organisation does have knowledge of the

workings of the organisation as a whole. Certainly the management of liquidity rests within their capability.

A practical problem was the identification of the group treasurers. Upon further contact with the Association of Corporate Treasurers, it was found that such identification could be made from their manual, the "Association of Corporate Treasurers' Manual 1994/95". A list of fifty names was identified in the original sample of eighty companies.

Although the author believes that the original questionnaire was workable from an academic point of view, the author was reluctantly forced to tailor the design of the instrument to suit practitioners; this may have limited the quality of the data collected. This has made the research a more quantitative study rather than purely qualitative. The new questionnaire (refer to Appendix II) was designed to serve an identical purpose to the original one. The pilot study indicated a preference for a dichotomous or multiple choice response questionnaires, so the new questionnaire reflected this preference. Under these circumstances the redesigned questionnaire was further piloted with the existing sample of four manufacturing firms. The revised questionnaire received positive attention and the instrument was therefore regarded as valid.

3.3.2 Procedures

Stage one

The survey population of thirty UK multinational companies was used to provide the raw data required to carry out the research. Firstly, the data source criteria was established It was decided to collect data from corporate treasury as the author was looking at practicalities of managing working capital on an organisational scale.

Stage two

The specific data sources were chosen. The names of personal contacts were obtained from the Association of Corporate Treasurers' Annual Handbook, 1994/95. The questionnaires were mailed to the respondents in March 1995.

The respondents were then mailed reminders six weeks from the date of the original questionnaire. Many respondents had still not replied two weeks after the reminder. The author then phoned the companies to get a decision. The responses were finally received by May 1995.

Stage three

The data collected was organised according to sub-sample size, overseas involvement and centralisation of decision making. The organised data was then analysed using twenty-four main research questions which were stated as hypotheses. Details of the statistical techniques used will be discussed in the following chapter. The remaining data was used at the outset of the analysis. The final conclusions were then drawn with the three initial objectives in mind

3.4 Data Collection Limitations

It was necessary to make certain assumptions concerning validity and reliability. These are:-

a) The instrument used (reference Appendix II) would identify and measure what it is intended to measure, in this study that is to capture information on the decision making process and management attitudes towards the management of working capital. To motivate the respondents to participate, the introductory questions of the questionnaire were set in broad terms.

b) That each participant would answer the questions honestly. There could exist some reservations about revealing certain information to an outsider.

3.5 Conclusions

This chapter has been concerned with the research method design, the collection of the relevant data for the project, and the data collection limitations. This study has a formalised descriptive, cross sectional and essentially a qualitative survey design. The adopted strategy of the survey consists of the examination of short range decision making process by means of mailed questionnaires to senior personnel at corporate treasury departments, in thirty UK multinational firms. The preferred method of collecting data through interviews would have been time consuming and more costly. However, personal contact with personnel managing the key short-term decisions would have revealed any apparent links between the main components of working capital. Under the circumstances, the general questionnaire designed and mailed to respondents was accepted. The responses to the new data collection instrument will now be analysed in detail in Chapter Four.

CHAPTER 4

RESEARCH FINDINGS

4.1 Findings

The revised objectives of the survey are to: Address the issues surrounding the management of short-term assets and liabilities within the framework of working capital management, identify the possible reasons why it is believed that limited progress has been made in this area and to review the modern methods applied in practice and to investigate the effect of internationalisation on working capital. The previous chapters have also indicated that traditional finance tools can be used to identify the links between the key working capital variables In order for British industry to remain competitive under varied economic conditions, a better understanding of all aspects of working capital management within the context of the organisation as a whole is therefore required.

Altman (1968) showed that a close relationship between working capital management and business failure has been empirically verified. It is clear from the literature review that short-term policies relating to many aspects of working capital including receivables, payables, inventory and cash can be designed ingeniously, and the firm can benefit in the short run. Optimising the amount of funds tied up in working capital is one way of increasing shareholder value.

A model was developed in Chapter 2 (Figure 2.4) that can be used to understand and assess the cash flow resulting from changes in the working capital variables. An example of how this may be carried out in practice given the data was available was shown in section 2.3.4. It was not possible to use this model in a study of this nature due to the time constraints. The data required to test the model over varied economic conditions can take up to five years. Here, the net cash flow change caused by the proposed sales programme between the working capital variables was discounted and adjusted for risk. The objective of the decision would be to conserve or add to company value. It would not be to minimise the use of a specific variable, or the whole set of working capital variables. If the value change is zero or positive, then the particular balance between the cash reserve, receivable, payable and inventory, can be recognised as a solution consistent with

the value addition aims of the company. It is evident that short-term financial management influences the value of the firm.

The one-off working capital balances that are investigated may not be suitable under different economic decisions. To allow flexibility in the decision-making process, a decision tree approach was suggested in section 2.4.1. Although, these processes were identified and illustrated, the author was not able to collect the data to develop the working capital model for reasons mentioned earlier. The practical application of the decision tree to real life problems will prove be a challenge. A working capital balance, which may be suitable under periods of prosperity, may not be in the best interest of the business during a recession For example, during difficult times, a firm must take extra vigilant steps to control working capital, particularly account receivables, as the risk of default may be higher.

The author believes this framework is in place for developing modern working capital theories and one that can be developed over time. The data collected during 1995 was at a point in time during an economic cycle. The framework developed can be used to collect data during different stages of the economic cycle. The framework can be refined to explore more linkages between the various components of working capital

Although much of the research in this area is carried out in the US, the data is valuable for the UK economy. However, in order to get a better understanding of the problems faced by the firms within the UK, it is necessary to carry out the research in the prevailing environment. Therefore the research has investigated how firms of different sizes and types respond to the management of short-term assets and liabilities, both in domestic and international markets. More specifically, the study was aimed at investigating and analysing certain broad factors which, when taken together, describe the working capital management. These factors include the organisation, decision-making strategy and automation. Interestingly, Petty & Scott (1980) proved that liquidity changes induced by economic fluctuations are not the same among firms that are categorised as belonging to different classes. This highlights the importance of looking at the nature of the industry in which the firm operates and the industry sensitivity to economic

changes. These issues are important as they may influence certain processes within the framework of working capital management, for example, when seeking or granting credit.

The survey was conducted using a 46-question survey. A variety of questions were used. Some questions asked the respondents to choose one answer among several possibilities, whilst other questions asked the respondents to rank alternatives in terms of their relative importance to the firm. Where appropriate the respondents were encouraged to write comments.

4.1.1 Analysis

For the purpose of statistical analysis, the 24 main research questions were stated as hypotheses. The data collected from the remaining questions have been used at the outset of the analysis. The hypotheses were set to illustrate any differences in how the selected firms responded to each question. For analytical purposes, the data collected were organised according to sub-samples size, overseas involvement and the centralisation of decision-making. A corresponding Exhibit supported each research question.

In order to determine whether there is any difference in how the firms responded to each question in the survey, the data collected were organised according to sub-samples. The following headings briefly describe the sub-sample characteristics used.

Size: The data collected were organised by firm size This category includes not very large firms (NVL), large firms (L) and very large firms (VL).

Overseas involvement: The data collected were organised by the level of overseas involvement. The extent to which a firm's involvement in overseas trading influences the response to a particular question was measured by the percentage of turnover from overseas markets. There are four categories of involvement: less than 25% between 25-50%, 50-75% and above 75%.

Centralisation of decision making: The data collected were categorised in this sub-sample to show whether a firm with a particular organisational structure responds in a certain way. The categories of this sub-sample are: None (N), Extensive (Ext) and Partial (Par).

The above three main sub-samples will form the basis of the analysis and will be referred to throughout the research. For further details, please refer to Appendix IV.

The data analysis was carried out in two stages; first, the data were collected and categorised into Exhibits. Each Exhibit categorised the responses by size, level of overseas involvement and centralisation, as appropriate. The second stage identified relationships between working capital behaviour and the sub-sample characteristic by means of a statistical technique that will be discussed shortly. The patterns of behaviour were observed and relevant Exhibits were then selected for further testing.

An Excel spreadsheet was used to carry out statistical tests on the data. The significance of each sub-sample was tested statistically against the data collected for all questions to establish whether there was any relationship between the firm behaviour and the sample characteristics. The significance test was based on the Normal distribution. From one sample it is possible to make certain statements about the possible range of values which include the population mean If an assumption or a null hypothesis is made about the population mean, a sample can be used to test if the hypothesis is a reasonable one.

The statistical analysis provides a Z value statistic which can be used to test one sub-sample comparison against another. A test for the population mean was carried out on all working capital variables. This technique has been successfully used in other research studies and is suitable for data with a low population size. The statistical calculations were sufficient for the level of detail required. In testing the null hypothesis, the population mean has a certain value, known as the Z value. The Z value for all 24 hypotheses has been calculated and compared with a critical value; if the calculated value is less than the critical value the result is not significant and the null hypothesis value of the population mean is rejected in

favour of the alternative hypothesis. For a two-tail test, the critical values at the 0 05 level of significance are –1.96 and +1.96. At this level, we are assuming that the data collected is normally distributed, and the level of confidence is 95%. For example, we are 95% confident, the average will be in this range.

In very few cases, the student t-distribution test was carried out. Where this is the case, the results clearly state the use of the Student t-distribution test Otherwise, all Exhibits to follow have been subjected to a Z score When the sample size is too small to give a reliable result using the Normal distribution, the Student t-distribution can be used. The methods of testing are the same as those described above. The critical values are found from the t-table and depend on the degrees of freedom, as well as on the type of test and the level of significance. This technique takes into account the pooled standard error of the two samples in the population and eliminates any bias. This test can be used to confirm that Z value test (which is based on the Normal distribution) has been correctly applied. If conflicting results arise, then it may be that the sample mean is not distributed normally.

The survey sample consists of 16 firms, on which information including size and overseas involvement is contained in Exhibit 0i. The sample includes 13 manufacturers and 3 retailers. The proportion of turnover from overseas markets for 9 manufacturing firms was in excess of 50%, the retailer involvement being well below that. The analysis of the respondents shows that the firms in the survey sample vary in terms of size, products and geographical location The data received were varied, and these characteristics need to be borne in mind when drawing conclusions.

Exhibit 0i Responses to short-term decision making theory

		Size			Overseas Involvement			
		NVL	L	VL	0-25	25-50	50-75	75+
Manufacturer	13/60		0	10	2	2	5	4
Retailer	3/15		0	0	2	1	0	0
No of Responses	16		0	10	4	3	5	4

Exhibit 0ii No reply analysis

POSITION	MANUFACTURER	RETAILER	TOTAL
No Reply	35	6	41
Letter of Regret	12	6	18

4.2 The Framework

Exhibit 1 through to Exhibit 5 look at the broad factors affecting working capital. These issues require addressing at the outset, and when combined together help to interpret the data collected. In particular, Exhibit 1.1 shows the nature of the risks encountered by the firms in the survey sample. Approximately 60% of the respondents ranked credit risk as very important compared with 76% for foreign exchange risk. The level of importance of credit risk illustrates that the respondents are involved in offering credit, and as a result face credit risk.

The firms were then asked to rank each risk encountered. The responses were then categorised by size and overseas involvement. As the Z value statistic for sub-sample size indicates a value less than 1.96, this comparison is insignificant and there is no reason to reject the null hypothesis that states the ranking of credit risk is independent of the size of the firm. This evidence suggests the importance of credit risk does not depend on the size of the firm

The Z value for the level of overseas involvement is also less than the critical value, and therefore the null hypothesis is accepted and the result is insignificant. The above findings confirm what would normally be the case, for example, the credit risk is determined largely by the level of credit granted. This finding has enabled the author to remove any possible bias, or any coincidence, that size or overseas involvement may be related to the ranking of credit risk.

A further Chi-squared test was carried out to see whether the distribution of the responses (Total) was independent of credit ranking. The calculated Chi-squared value is greater than the critical value, leading to the result being significant. There appear to be other factors which influence the way the firms have responded to the

ranking of credit risk, for example, a comparison of firms in other categories of overseas involvement may possibly explain the difference in the results. Not all of the categories were tested statistically as it was felt this would be a purely theoretical examination, and would add little value to the research.

Exhibit 1.1 The ranking of credit risk encountered by the firms

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Credit Rank								
1	**8**	3	0	5	2	2	2	2
2	**2**	0	0	2	0	0	1	1
3	**3**	2	0	1	1	0	1	1
4	**2**	1	0	1	1	0	1	0
5	**1**	0	0	1		0	0	0
No of responses	**16**	6	0	10	5	2	5	4
Significance Z – Value		0.1			0.7			

1 = Very Important

5 = Not Very Important

Funding risk was also regarded as very important but by fewer firms. The null hypothesis was set as funding risk is independent of size and overseas involvement. As the Z value was calculated to be less than the critical value, the result is insignificant, and the null hypothesis is acceptable. The importance of funding risk to a firm is not influenced by the size of the firm. The statistical comparison with the level of overseas involvement was found to be insignificant.

Hypothesis 1 is therefore acceptable.

Exhibit 1.2 The ranking of funding risk

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Funding Rank								
1	**6**	2	0	4	1	2	2	1
2	**2**	2	0	0	2	0	0	0
3	**3**	0	0	3	0	0	1	2
4	**2**	1	0	1	0	0	1	1
5	**2**	0	0	2	1	0	1	0
No of responses	**15**	5	0	10	4	2	5	4
Significance Z – Value		-1.01			-0.29			

Both funding risk and credit risk appear to bear little relation to the size of a firm or its level of overseas involvement. Foreign exchange risk was regarded as very important to the firm by more than 76% of the respondents. As foreign exchange risk is not the subject matter of this research, further statistical tests were not carried out. However, one would expect the level of overseas involvement to be significant when statistically compared with the ranking of foreign exchange risk. This risk would increase as a result of greater overseas involvement. Although credit risk is not directly related to the main characteristics of size and overseas involvement, evidence suggests that credit risk pose a major risk to the firm. Therefore, the management of credit risk is a major issue, which falls under the heading of working capital management. The following section looks at the various aspects of working capital and determines to what extent they are influenced by international risk.

The individual components that are affected by international risk are listed in Exhibit 2. The debtors appear to be mainly affected by this risk and are regarded as very important by a majority of the firms. The ranking of the individual working capital accounts were then categorised by size and the level of overseas involvement. The null hypothesis was set to the ranking of the individual aspects of working capital is independent of size and overseas involvement. The statistical comparison of the debtors ranking with size and overseas involvement was found to be insignificant and weakly significant respectively. There is no evidence to

suggest that the size of the firm be related to the ranking of debtors. However, the greater the overseas involvement, the more debtors are affected by international risk and therefore are consequently ranked higher in importance.

Exhibit 2.1 The ranking of working capital accounts affected by the international environment

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Debtors Rank								
1	**9**	3	0	6	2	2	1	4
2	**5**	1	0	4	1	0	4	0
3	**0**	0	0	0	0	0	1	0
4	**0**	0	0	0	0	0	0	0
5	**0**	0	0	0	0	0	0	0
No of responses	**14**	4	0	10	3	2	5	4
Significance Z – Value		-0.56			-1.43			

The ranking of creditors was compared with size and overseas involvement; creditors are affected by this risk for at least 50% of the respondents. The Z values calculated proved insignificant for both size and overseas involvement, therefore the null hypothesis is accepted.

Exhibit 2.2 The ranking of creditors

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Creditors Rank								
1	**4**	2	0	2	2	1	0	1
2	**3**	1	0	2	0	0	2	1
3	**1**	0	0	1	0	0	0	1
4	**2**	0	0	2	0	0	1	1
5	**3**	2	0	1	1	1	1	0
No of responses	**13**	5	0	8	3	2	4	4
Significance Z – Value		0.05			0.87			

When the ranking of cash was statistically compared with size and overseas involvement, there was no significance found. Although cash was ranked as very

important by more than half of the respondents, cash was mainly affected by exchange rates in the international environment.

Exhibit 2.3 The ranking of cash

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Cash Rank								
1	**6**	3	0	3	2	2	1	1
2	**2**	0	0	2	0	0	1	1
3	**4**	2	0	2	0	1	1	2
4	**1**	0	0	1	0	0	1	0
5	**0**	0	0	0	0	0	0	0
No of responses	**13**	5	0	8	2	3	4	4
Significance Z – Value		-0.72			0.36			

Finally, stock is least affected by the threat of international risk. The statistical sub-sample comparisons with size and overseas involvement were found to be insignificant. Evidence suggests debtors appear to be mainly influenced by the international involvement. The other aspects of working capital are not influenced by size or level of overseas involvement. This shows that there may be other factors that influence the individual elements of working capital. The main internal influence is the organisational structure of the firm. This is further investigated in Exhibit 3, which looks at the centralisation of short-term decision making

Exhibit 2.4 The ranking of stock

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Stock Rank								
1	**2**		0	1	1	1	0	0
2	**4**		0	4	0	0	2	2
3	**2**		0	0	0	1	0	1
4	**3**		0	3	0	0	2	1
5	**1**		0	0	1	0	0	0
No of responses	**12**		0	8	2	2	4	4
Significance Z – Value		0.46			0.38			

Hypothesis 2 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms have ranked the various aspects of working capital under the influence of international trading relative to size and overseas involvement

Exhibit 3 looks at the extent to which short-term decisions are centralised. In the main, short-term decisions are decentralised to local units. The responses were categorised by size and overseas involvement to establish any pattern in the firms' responses. The hypothesis was set, as the centralisation of short-term decision-making is independent of size and overseas involvement. The Z value statistic for size is greater than the critical value, the result is significant and the null hypothesis is rejected in favour of the alternative. Evidently, the extent to which a firm's short-term decision-making is centralised depends not only on the size of the firm but on many other factors. Larger firms are generally more complicated and pose more difficulties when managed centrally, for strategic reasons a localised structure is therefore preferred by a majority of respondents.

However, evidence suggests overseas involvement does not influence a firm's decision to centralise or localise short-term decision-making. The statistical calculations show there is no reason to reject the null hypothesis. Larger firms are more likely to have a localised structure; this would mean that working capital decisions are made locally.

Hypothesis 3 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms have centralised short-term decision making relative to size and overseas involvement.

Exhibit 3 The extent to which short-term decisions are centralised

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Policy								
None	3	1	0	2	0	1	1	1
Extensive	4	2	0	2	2	0	2	0
Partial overview	8	3	0	5	2	2	2	2
No of responses	15	6	0	9	4	3	5	3
Significance Z – Value		-2.27			-0.52			

Having looked at the risks faced by the firms in the survey sample, the components of working capital that are affected by international risks, and the structure of the firms, attention is now turned to management perceptions about short-term financial management. Exhibit 4 measures the extent to which management perceives short-term financial management to be neglected. The vast majority of the firms believe to the contrary. Practitioners believe that short-term financial management has not been neglected, but academics have a different opinion. This split in opinion may contribute to the belief that very little progress has been made in this area The respondents' views were then categorised into size and the level of overseas involvement The null hypothesis was set as the extent to which short-term financial management has been neglected is independent of both size and overseas involvement. The statistical values calculated indicate the results to be insignificant and there is no reason to reject the hypothesis. Management views appear to be unrelated to the sample characteristics tested.

Exhibit 4 The neglect of short-term financial management

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Policy								
Yes	4	2	0	2	0	1	2	1
No	12	4	0	8	3	2	4	3
No of responses	16	6	0	10	3	3	6	4
Significance Z – Value		-0.58			-0.26			

Hypothesis 4 is therefore accepted.

The importance of managing working capital was measured in Exhibit 5, which looks at whether the importance of working capital is greater than before. Around 80% of the respondents agree that the importance attached to working capital management is greater than before; this confirms that practitioners recognise the importance of managing this area. The responses to Exhibit 5 were then categorised by size and overseas involvement to test any relationship between the responses and the particular characteristics of the firms. The null hypothesis was set as the response to Exhibit 5 is independent of size and overseas involvement. The statistical value calculated for size was significant, and the hypothesis therefore rejected. According to the data collected, as the size of the firm increases the importance of managing working capital is reduced. Over 30% of the large firms were of the opinion that the importance of management of working capital is not greater now than before. These findings suggest that larger firms tend to develop working capital policies over time.

Hypothesis 5 is rejected in favour of the alternative. There are differences in how the selected large and small international firms have responded to the importance of working capital relative to size and overseas involvement.

Exhibit 5 The importance of working capital

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Policy								
Yes	13	6	0	7	2	3	6	2
No	3	0	0	3	1	0	0	2
No of responses	16	6	0	10	3	3	64	
Significance Z – Value		-2.10			-0.26			

SUMMARY

Evidence suggests credit risk is a major issue faced by many firms. This finding is further supported by Exhibit 2, which confirms that of the four main variables of working capital, debtors are mainly affected in the international environment. With

Credit risk being created by selling on credit, it has been illustrated that the importance of managing debtors is related to the level of overseas involvement. The higher the level of overseas involvement, the higher the credit risk and the greater the importance given to this area of management Stock was least affected in the international environment. In terms of the structure of the firm, larger firms showed a preference for a localised structure, as indicated by Exhibit 3. Given that the firms structure this way, this will influence attitudes towards short-term financial management. The literature review suggests that academics are of the opinion that the level of research in this area is poor. However, evidence from the research suggests that practitioners believe there is sufficient research being done in the area.

The following section will look at the individual components of working capital. Due to the nature of difficulties encountered in the data collection, the author was unable to identify the relationships between the key working capital variables. However, there is scope for further research that can help contribute to understanding the various links between the working capital variables. The data collection is now focussed on how the firms of different sizes, level of overseas involvement and centralisation of decision making will manage the various components of working capital.

4.2.1 Inventory Management

The management of inventory is a very important aspect of the working capital cycle as illustrated by Rafuse (1996). Many firms survived the recession of 1994, and the upturn in the economy was a good opportunity from which to benefit. Inevitably, cash is absorbed as firms start to expand their operations. This area of management is critical as reducing stock levels can produce major financial benefits, by simultaneously improving cash flow through reducing operating costs and lowering the asset base

This section will examine the management of inventory. Exhibit 6 reports on the composition of the variables that are important when managing inventory. All four variables were considered to be important; however 60% of the firms viewed customer satisfaction as the most important factor, compared with just over half of

the respondents ranking holding costs in the same category. Production costs were also in the same category for a smaller proportion of the firms.

Exhibit 6.1 The factors affecting inventory management

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
Purchase/ Production Cost	**TOTAL**										
1	**3**	1	0	1	1	1	0	1	1	0	2
2	**6**	2	0	4	1	1	4	0	3	3	0
3	**3**	2	0	1	1	0	1	1	0	1	2
4	**0**		0	0	0	0	0	0	0	0	0
5	**0**		0	0			0	0		0	0
No of responses	**12**	5	0	6	3	2	5	2	4	4	4
Significance Z - Value		0.5			-0.5				0.46		

1 = Very Important

5 = Not Very Important

The purchasing/production costs were tested for any significance. The findings were categorised into size, overseas involvement and the centralisation of decision making The null hypothesis was set as the ranking of purchase/production costs which influence inventory policy are independent of size, overseas involvement and the centralisation of decision making. The statistical values calculated are below the critical value, therefore there is no evidence to reject the hypothesis.

The holding costs were significantly more important to a higher proportion of the firms and these costs include the opportunity cost of money, losses resulting from damaged inventory or obsolescence, and the cost of space occupied in holding inventory. With the cost of money increasing, inventory has to compete for the limited resources available to a firm. When holding costs were categorised by size, overseas involvement and the centralisation of decision making, the null hypothesis was set as the ranking of holding costs is independent of all three

characteristics. The statistical values calculated show a significant comparison with centralisation. However, overseas involvement was weakly significant.

The firms that have a localised structure with a centralised partial overview have ranked holding costs as having a strong influence on inventory policy. Firms that have extensive centralisation, tend to regard holding costs on a lower scale of importance. It appears that a firm's decision-making structure influences the ranking of factors affecting the various elements of working capital.

Exhibit 6.2 The importance of holding costs

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
Holding Costs	**TOTAL**										
1	**7**	32	0	4	2	2	2	1	1	1	5
2	**5**	10	0	3	1	0	2	2	1	2	2
3	**2**	0	0	1	0	1	1	0	1	1	
4	**0**		0	0	0	0	0	0			
5	**0**		0	0	0		0				
No of responses	**14**	6	0	8	3	3	5	3	3	5	7
Significance Z - Value		0.12			-1.1				2.62		

1 = Very Important

5 = Not Very Important

Finally, evidence suggests customer satisfaction is vital for a majority of the firms. These firms' are a mixture of both very large and not very large firms and with a varied level of overseas involvement. There was no significant comparison established between the importance of customer satisfaction and the size and level of overseas involvement. The hypothesis is therefore accepted, customer satisfaction is independent of size and the level of international involvement. However, it is significant when compared with the centralisation of decision making. Firms with a localised structure and some partial central overview have ranked customer satisfaction as top priority. Firms with centralised decision making tend to regard this as comparatively less important.

Exhibit 6.3 The importance of customer satisfaction

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
Customer Satisfaction	**TOTAL**										
1	**9**	41	0	5	2	2	3	2	1	2	6
2	**3**	10	0	2	1	0	2	0	1	1	1
3	**2**	0	0	1	0	1	1	0	1	1	0
4	**0**		0	0		0	0	0			
5	**0**		0	0		0	0				
No of responses	**14**	6	0	8	3	3	6	2	3	4	7
Significance Z – Value		0			-0.82				2.14		

Both holding costs and customer satisfaction showed a significant comparison. Therefore the null hypothesis 6 is rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the factors affecting inventory policy relative to the centralisation of decision making. Firms with a localised structure appear to regard both holding costs and customer satisfaction more important compared to firms with a centralised structure. Local firms are closer to the market and may have different priorities. This may have caused the attitude towards short-term decision making to differ. The structure of the firm and the market conditions will dictate working capital management practice. The next stage of analysis is the centralisation of decision making. Evidence suggests that firms are mainly concerned with satisfying demand and with demand not being met, the stock levels have been piling up. Under the prevailing economic climate firms were taking the risk of not selling stock should demand fall short of supply.

Having examined the factors influencing inventory policy evidence suggests customer satisfaction is the main factor influencing stock policy. Customer satisfaction is applied on a company-wide scale for strategic reasons. The place of

decision making and the organisational structure influence the importance of holding costs and customer satisfaction. The management of working capital varies due to the unique circumstances surrounding an organisation.

Exhibit 7 looks at the extent to which inventory management decisions are made centrally. Firms will structure their operations according to the products in the product portfolio, the markets served and the source of those products. Over 80% of the respondents claim inventory is managed locally, this particularly being the case for all the very large firms compared with 50% of the not very large firms. In order to comment on the style of management, it is necessary to look at the individual firms. The not very large firms that manage inventory centrally operate in varied markets including edible oil products, industrial chemicals and rubber. The revenue of these firms is mainly generated within the UK. Centralised control may suit the individual style or culture of these firms.

The place of decision making was statistically compared with the size of the firm and the level of overseas involvement. The null hypothesis was set as the response to Exhibit 7 is independent of size and overseas involvement. The size of the firm does to an extent influence the firm's structure. A further test, the student t-test, was carried out to confirm the Z value findings. The t-test produced a t value of 5.2 for size. As this was greater than the critical value of 2.95 the null hypothesis was rejected in favour of the alternative. The overseas involvement produced a t value that was less than the critical value. Therefore, in this case, the null hypothesis was accepted. Many factors other than the size of the firm are regarded important, including product positioning, sales, etc. There appears to be a clear pattern that establishes the inventory management conduct of a firm.

The null hypothesis 7 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the centralisation of inventory management relative to size and overseas involvement.

Exhibit 7 The extent to which inventory management decisions are made centrally

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Policy								
Locally	13	3	0	10	3	2	5	3
Centrally	4	4	0	0	1	2	0	1
No of responses	17	7	0	10	4	4	5	4
Significance Z – Value		2.1			-1.1			

To establish the possibility of extending the management concept of working capital to the international scene, the respondents were asked to indicate to what extent they were likely to alter their opinion to Exhibit 6 when managing inventory. A substantial 87% of the respondents said they would not alter their opinion, and the factors affecting inventory management remained as identified under Exhibit 6. It is possible the responses to Exhibit 6 may have been made with the international environment in mind as the firms in the survey are involved in international trade. The earlier findings are supportive of this view, for example, stock was the least affected by the risk in the international environment A firm is likely to be insulated from any risk by the localised structure of the firm.

The response to Exhibit 8 was statistically tested against the centralisation and the level of overseas involvement The null hypothesis was set as the altering of opinion to Exhibit 6 is independent of both the centralisation of decision making and the level of overseas involvement. The results below show both comparisons are insignificant. The null hypothesis 8 is therefore acceptable.

Exhibit 8 The altering of opinion to Exhibit 6

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Policy								
Yes	**2**	2	0	0	0	0	0	2
No	**14**	10	4	0	4	4	5	1
No of responses	**16**	12	4	0	4	4	5	3
Significance Z – Value		-0.5			N/A			

Finally, Exhibit 9 establishes to what extent international risk is seen as just another risk. Approximately 90% of the respondents agree that this is the case. Business risk is seen as a strategic risk, which must be addressed at the planning stages.

The responses were then categorised by size, overseas involvement and centralisation of decision making. The null hypothesis was set to; Exhibit 9 is independent of the mentioned characteristics. The statistical values show one significant comparison, that of the centralisation of decision making. A larger proportion of firms which operate a local structure with a partial central overview agree strongly, compared with those respondents which have pure centralised decision making.

Exhibit 9 The opinions on whether international risk is seen as just another business risk

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	Lo	C	O
Option	**TOTAL**										
Strongly Agree	**1**	0	0			1	0	0	2		
Agree	**13**	0	0	1	0	0	0		0	0	
Neutral	**2**	4	0	0	0	2	4	3	11		
Disagree	**0**	2	0	9	4	1	0	1	0	1	
Strongly Disagree	**0**		0			0	0		0	2	
									0		
No of responses	**16**	6	0	10	4	4	4	4	13	3	
Significance Z - Value		1.1			-0.6				-2.8		

The null hypothesis 9 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms view international risk as another business risk relative to size, overseas involvement and centralisation.

SUMMARY

The various factors that were believed to influence inventory policy were identified and their importance measured. The most important of these were found to be holding costs and customer satisfaction. Firms with a particular type of structure responded in a certain way. The centralisation issues were then examined and it was established that most of the larger firms organise their operations by using a local structure. The introduction of further elements of the international environment was found to have very little effect on the ranking of factors that influence inventory policy. The additional risk was seen as another business risk and this risk may be absorbed by the organisational structure. Stock, as an aspect of working capital, was exposed to very little risk according to evidence gathered in Exhibit 2 in the framework. The findings in this section confirm what was discussed at the outset of the research. The research will now look at the debtors, which were classed as being greatly affected by international risk.

4.2.2 Receivable Management

Receivable management is a consequence of selling on credit and is another very important aspect of working capital. It is vital for firms to ensure that all receivables are collected appropriately and monitoring becomes an important part of the management process. The efficient management of receivables will release cash that can be used to re-invest in the business for future growth. Exhibit 14, later in the section will confirm the inverse relationship between the importance of managing receivables and the size of the firm The research utilises eight questions to explore the management of receivables.

The factors that are believed to be important in determining a particular receivables policy are identified in Exhibit 10. The majority of firms have ranked the "impact of credit on sales" as the primary factor in the decision-making It follows therefore that receivables are largely determined by the change in sales resulting from the change in receivables. With the process of selling on credit, the firm will reduce stock levels and increase sales. However, temporary finance will be required to cover the cost of selling on credit. It is this cost that needs to be matched with the net gain from credit sales. By collecting receivables as efficiently as possible, the cost of funding credit will be reduced.

The "impact of credit sales" as a factor which influences receivables policy was then categorised by the size of the firm, overseas involvement and the centralisation of decision making. The null hypothesis was set as the response to Exhibit 10 is independent of size, overseas involvement and centralisation of decision making. The statistical calculations show one significant comparison with the level of overseas involvement. The null hypothesis is therefore rejected for overseas involvement and accepted for the categories size and centralisation of decision making. The greater the overseas involvement, the more influence this factor will have on receivables policy making.

The null hypothesis 10 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the particular factors affecting receivables policy relative to size, overseas involvement and centralisation.

As mentioned in the framework of the research, Exhibit 2 shows debtors are significant when statistically tested against overseas involvement. Similarly, the change in the level of credit affects sales, which ultimately impacts receivable policy. Evidence suggests the level of overseas involvement influences this relationship. The credit period for international sales is over a longer time span. The need to weigh up the costs of extending credit against the impact of credit on sales therefore becomes more important. Assuming it is economically beneficial to extend credit over a certain period of time, the next step would be to check the credibility of the customer. The evaluation of credit can be carried out both internally or externally by an outside agency.

Exhibit 10 The factors affecting receivables policy

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
Credit Sales	**TOTAL**										
1	**9**	4	0	5	2	2	2	3	1	2	6
2	**2**	1	0	1	0	1	1	0	2	0	0
3	**3**	0	0	3	1	0	2			1	2
4	**0**		0	0		0	0				0
5	**0**		0	0		0	0				
No of responses	**15**	5	0	9	3	3	5	3	3	3	8
Significance Z - Value		-0.5			2.5				0.3		

1 = Very Important

5 = Not Very Important

Exhibit 11 looks at the extent to which the respondents use outside agencies in order to evaluate the creditworthiness of their customers. Eighty three percent of the firms use or have used an outside agency at some stage. Exhibit 20 shows that debt factoring is not appropriate to a majority of the firms. Evidence suggests that firms use outside agencies to collect information on customers, and that this information is used to assess the level of credit risk the firm may face. The actual collection of receivables is carried out in house by specialist departments.

The responses to Exhibit 11 were categorised by size, overseas involvement and the centralisation of decision-making The null hypothesis was set to. the frequency of use of outside agencies to evaluate credit is independent of the above three characteristics. The null hypothesis was accepted for overseas involvement and centralisation, and rejected for size. The very large firms in the survey have multiple objectives with sales generated from all over the world. It may not be in the interests of the firm to commit resources to carry out this function or it might not be economically justifiable The work can be contracted out to specialists in the area who can provide up to date information quickly and efficiently.

The null hypothesis 11 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms use outside agencies to evaluate credit relative to size, overseas involvement and centralisation.

As a precautionary check, the Student t-test was carried out to confirm the significant Z value for size. The t-test showed a significant comparison that confirmed the Z value calculated. The implications of contracting out work relating to the various aspects of working capital suggest that the responsibility of managing this area becomes diverse. The process becomes company-wide from a practical point of view. This may have contributed to the belief that little progress has been made in short-term financial management. As mentioned in Chapter 1, Hill & Sartoris (1984) support this view and propose that working capital decisions have been historically segmented into widely separated organisational structures, and as a result the management of working capital has developed along fragmented lines.

Exhibit 11 The extent to which a firm uses outside agencies to evaluate credit

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
	TOTAL										
Very Often	8	4	0	4			2	1	2	1	
Often	4	0	0	4	3	2	2	2	1	1	5
Seldom	2	1	0	1	0	0	1	0	0	1	2
Once or Twice	0		0	0	0	1	0	0		1	1
Never	0		0	0			0				
No of responses	14	5	0	9	3	3	5	3	3	3	8
Significance Z – Value		-2.1			-0.2				1.0		

* Student –t test applied

The firms were asked to indicate to what extent they would alter their responses to Exhibit 10 in the light of international trading. A substantial 93% said they would not alter their opinion on factors influencing receivables policy and the relative importance of these on policy making. It appears that the factors influencing policy-making were selected with the international arena in mind. On the other hand, international risk may be seen as another business risk. The responses were categorised into the three main characteristics and tested to see whether the way a particular firm responded was due to a particular characteristic of the firm. The statistical values show a weak comparison with overseas involvement and an insignificant comparison with size and the centralisation of decision making.

The null hypothesis 12 is therefore acceptable. The centralisation issues are explored further in the section that follows.

Exhibit 12 The altering of the responses to Exhibit 10

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	Ext	Par
	TOTAL										
Yes No	1 13	05	0 0	1 8	0 3	1 2	0 5	03	03	03	17
No of responses	14	5	0	9	3	3	5	3	3	3	8
Significance Z – Value		1.1			-1.21				1.1		

For the purpose of control, Exhibit 13 tries to ascertain where the monitoring of receivables is carried out. The majority of the respondents (87%) indicate that this activity is carried out locally compared with 13% centrally.

The management of receivables policy making was then statistically tested to see if the place of monitoring for control is influenced by the three main characteristics. Evidence suggests there was no relationship established. It follows that the decision to monitor receivables either on a local level or centrally is independent of the sub-sample characteristics. The firms that manage debtors locally will also monitor at the local level but with a central overview.

The null hypothesis 13 is therefore acceptable. The management structure of a firm may explain why the respondents remain indifferent when responding to Exhibit 12. The management structure may insulate the firm from any additional risks faced in the environment.

Exhibit 13 The extent to which the management of receivables is centralised

Policy	TOTAL	Centralisation			Overseas Involvement (%)			
		N	E	P	0-25	25-50	50-75	75+
Centrally	2	0	1	1	2	0	0	0
Locally	9	3	1	5	0	2	4	3
Both of the above	3	0	1	2	1	0	1	1
No of responses	14	3	3	8	3	2	5	4
Significance Z – Value		-0.9			-0.9			

When the respondents were asked to rank the importance of managing receivables to the overall survival of the firm, the respondents indicate a balanced split as shown in Exhibit 14; Fifty percent of firms responded in the 1-5 rank, and the remaining firms were in the 5-10 category. A wider scale was used here so that the sensitivity of the response could be measured. The importance of managing receivables was then categorised by size, overseas involvement and centralisation. There was one significant comparison found, with the size category. The larger the firm, the lesser importance was given to receivables management. As previously stated, this confirms Herbert's (1995) view.

The null hypothesis 14 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms have responded to delaying payments relative to size, overseas involvement and centralisation.

Exhibit 14 The importance of managing receivables

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	E	Par
Rank	TOTAL										
0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0
3	1	0	0	1	0	0	1	0	0	1	0
4	1	0	0	1	0	0	1	0	0	0	1
5	5	1	0	4	0	1	1	3	1	1	3
6	1	1	0	0	0	1	0	0	1	0	0
7	0	0	0	0	0	0	0	0	0	0	0
8	1	0	0	1	0	0	1	0	0	0	1
9	1	0	0	1	0	0	1	0	1	0	0
10	5	3	0	2	3	1	0	1	0	1	4
No of responses	15	5	0	10	3	3	5	4	3	3	9
Significance Z - Value		1.6			-0.3				-0.8		

SUMMARY

This section of the research has highlighted the importance of managing receivables. The various factors believed to influence receivables policy were identified and their importance noted. It is evident that firms regard the "impact of credit on sales" factor as the one that predominantly influences receivables policy This suggests that the theory of profit maximisation may apply to the management of receivables. The management of receivables is generally carried out locally and any additional risks faced as a result of international trading will be absorbed within the organisational structure. It appears that management of the various aspects of working capital in practice is very diverse and is spread over the organisation as a whole. This makes the isolation of particular aspects of working capital practically impossible The following section will examine the management of payables.

4.2.3 Payables Management

Trade payables constitute a major component of total payables and a major part of working capital. Although payables are funds belonging to a third party, the effective management of these can help the firm achieve its long-term growth. Just under half of the respondents indicated that trade payables constitute between 25% and 50% of the total cash outflow. This clearly indicates that trade payables represent substantial resources and potential savings may be made by managing payables efficiently. A firm has more control over payables than it has over receivables and any policy set can be executed to gain the maximum benefit. This section on payables will address issues surrounding the payment habits of firms; one firm's payables are someone else's receivables.

Exhibit 15 looks at the extent to which a firm may find it expedient to delay payments. Eighty percent of the firms responded negatively. Many firms indicated that delaying payments to suppliers was not good business practice. The responses to Exhibit 15 were categorised by size, overseas involvement and centralisation to establish whether there was a pattern in the behaviour of the firms. Following the statistical tests, one comparison was found to be significant. The way in which firms have responded to Exhibit 15 is significant when compared with the centralisation of short-term decision making. Firms with a local structure and a partial central overview find it expedient to delay payments compared to firms with centralised decision making and little local control. The null hypothesis 15 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms have responded to delaying payments relative to size, overseas involvement and centralisation.

It may be in the best interests of the firm to structure on a local basis. A certain element of central control will help to ensure that local divisions do not operate in a way that may be detrimental to the organisation as a whole. It may therefore be more appropriate for firms that have both local and central co-operation to delay payments where possible, and to make efficient use of outsider funds to finance working capital. On the other hand, it may be argued that a firm with extensive centralisation may have a better overall view of the firm, and this may put the firm in a better position to evaluate the need to delay payments. It is very difficult to

generalise the behaviour of firms and not all firms with a particular size or level of overseas involvement will behave in a similar manner. The firm's position in the market, the type of products sold and the relationships with key suppliers are just some of the factors influencing the behaviour of the firm.

One of the respondents to this survey made an interesting comment "from a practitioner's perspective, the worst thing that a company with cash flow problems can do is to stop paying suppliers". Firms in the chemical industry, garments and home furnishings accept that delaying payments to suppliers is a common practice. However, it was pointed out that this practice is carried out strictly in two conditions. Firstly, it is agreed with the party involved, and secondly, under exceptional circumstances. These firms tend to apply an aggressive working capital management policy, incurring high risk and expecting a high return. The type of policy a firm might adopt would largely depend on management style Aggressive firms that do not operate with conservative policies may take risky decisions. A financial manager's attitude to working capital is partly determined by his/her attitude towards risk.

Exhibit 15 The firms' attitudes towards delaying payments

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	E	Par
	TOTAL										
Yes	2	2	0	0	1	0	0	1	0	0	2
No	10	1	0	9	1	2	4	3	3	1	6
Not applicable	3	2	0	1	2	0	0	0	0	2	1
No of responses	15	5	0	10	4	2	4	4	3	3	9
Significance Z - Value		-0.2			0.1				2.5		

Although the majority of respondents indicated they would not even contemplate delaying payments, the following Exhibit will try to assess the feasibility of imposing fixed interest penalties on late payments to suppliers. A substantial 60% of the respondents remained neutral, 20% agreed with the proposal, and the remainder claimed to be unaware of any such legislation. The legislation now enacted

imposes fixed interest penalties on firms, which deliberately delay payments. This practice is used widely in Europe and as a result the average delay to suppliers in these areas was lower than in the UK.

The respondents' views on legislation were statistically compared against the firms' opinions on delaying payments to suppliers, and there was no significance found. The firms' views on litigation were independent of whether the firms believed in delaying payments to suppliers. It seems very strange that some respondents predominately remained neutral although they were against the delaying of payments. The majority of the respondents remained neutral. There may be various reasons behind this, one of which may be that firms are against state intervention as this will affect free market forces.

As mentioned earlier, a firm's relationship with its suppliers is one factor that may influence the behaviour of the firm in terms of managing payables. Exhibit 17 shows the review of suppliers is carried out more often by not very large firms compared to larger firms. The frequency of the review of suppliers was categorised into size, overseas involvement and the centralisation of decision making. The null hypothesis was set as: the frequency of the review is independent of the three main characteristics The statistical tests carried out show size to be weakly significant and centralisation to be strongly significant. Firms that are not centralised tend to review their suppliers very often, whereas firms with centralised control did so less often. The need to review suppliers more often may be a consequence of having a localised structure, according to the evidence gathered in Exhibit 17. The need to review suppliers very often is a potential cost to the firm together with the loss of control under a local structure.

The null hypothesis 17 is rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the frequency of review of suppliers relative to size, overseas involvement and centralisation.

Exhibit 17 The review of suppliers

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	E	Par
	TOTAL										
Very Often	3	2	0	1	2	0	1	0	120	1	1
Often	11	3	0	7	2	3	4	1	00	3	6
Seldom	2	1	0	1	0	0	0	20		0	2
Once or Twice	0		0	0		0	0	1			1
Don't Know	1		0	1		0	0				
No of responses	16	6	0	10	4	3	5	4	3	4	9
Significance Z - Value		-1.5			-0.98				-2.4		

The monitoring of payables is an important aspect of the overall management process. Exhibit 18 looks at the frequency of monitoring payables. Evidence suggests that the majority of the respondents monitored payables frequently. When measuring the frequency, time limits were deliberately not given as these would depend on the industry in which a firm operates. For example, a firm in the tarmac and construction industry reviewed suppliers every two years and this may be regarded as frequent; however, a retailer may regard four weeks as frequent. The payables system allows the organisation to monitor how effectively payment systems are operating. The reviewing of suppliers is an integral part of monitoring payables as it looks at the individual payments to suppliers. The non-financial measures include quality control and customer service as these will feed through to the products or services the creditor offers. The above statistical comparison showed insignificant results, therefore the null hypothesis 18 is acceptable.

Exhibit 18 The frequency of monitoring of payables

		Size			Overseas Involvement (%)				Centralisation		
		NVL	L	VL	0-25	25-50	50-75	75+	N	E	Par
Rank	TOTAL										
1	8	3	0	5	3	1	4	0	2	3	3
2	7	3	0	4	1	2	1	3	1	1	5
3	0	0	0	0	0	0	0		0	0	0
4	0		0	0	0	0	0				
5	0		0	0		0	0				
No of responses	15	6	0	9	4	3	5	3	3	4	8
Significance Z - Value		0.2			0.2				-0.2		

The data regarding the place of monitoring were gathered in Exhibit 19. The findings confirm that the monitoring of payables is carried out locally with a partial central overview. The extent to which the monitoring of payables is centralised was statistically tested against both size and overseas involvement. The two comparisons made were found to be significant. The larger firms tend to monitor payables locally compared with not very large firms that managing centrally. The decision to monitor payables and receivables locally or centrally is determined by the market. Firms structure their operations in such a way that they serve the local market in the most cost effective and profitable way.

The null hypothesis 19 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the centralisation of payables relative to size, overseas involvement and centralisation. A localised structure for sub-divisions within an organisation may influence the decision to delegate the monitoring of payables. Other factors, such as sourcing of products and production sites, may influence the decision. The firms with less overseas involvement tended to monitor centrally, according to Exhibit 19, and those with a higher level of overseas involvement adopted a more localised structure.

Exhibit 19 The extent to which the monitoring of payables is centralised.

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Rank								
1	2	2	0	0	2	0	0	0
2	0	0	0	0	0	0	0	0
3	2	1	0	1	1	1	0	0
4	5	2	0	3	1	1	1	2
5	6	1	0	5	0	1	4	1
No. of responses	15	6	0	9	4	3	5	3
Significance Z- value		-2.4			-3 8			

This chapter has so far looked at the respondents' views on payables management, legislation surrounding late payments and the location of decision making. The following section will now look at the various tools a firm may use, particularly during a period of recession. These findings will confirm or reject some of the views gathered earlier on in the chapter.

During 1994 the British economy was just finding its way out of the deep recession of 1991, the management attitudes over this period have been observed. The author is trying to assess whether there has been a change in behaviour towards payables management during the period of economic downturn. The following findings were gathered from Exhibit 20.

A policy of deliberate remote disbursements (RB) was indicated to be totally inappropriate under all circumstances. This method has in the past known to be used to delay payments. However, these findings support Exhibit 15, which generally argues that payments to suppliers should not be delayed. The responses were categorised into size and overseas involvement, and the statistical tests carried out were found to be insignificant.

Exhibit 20.1 The tools used in managing payables in a recessionary environment

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Deliberate RB								
1	1	0	0	1	0	0	1	0
2	6	3	0	3	1	1	3	1
3	4	1	0	3	0	2	1	1
No. of responses	11	4	0	7	1	3	5	2
Significance Z- value		-0.12			-1.7			

Another practice of delaying payments is known as controlled disbursements. As the firm has more control over payables than it has over receivables, the firm can control the timing of the payments to suppliers in order to retain cash in the business. The effective management of payables will help to release resources that can be used in the business at very little cost This practice is acceptable to 60% of the respondents, as it enables firms to utilise resources efficiently. The responses were categorised into size and overseas involvement. Two sub-sample comparisons were significant, 80% of the not very large firms find this practice appropriate compared with 60% of the very large firms. This indicates that not very large firms exercise caution and therefore adopt strict controls on cash outlays.

Exhibit 20.2 The use of controlled disbursements

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Controlled Disbursements								
1	9	5	0	4	4	2	3	0
2	2	1	0	1	0	0	1	1
3	2	0	0	2	0	0	1	1
No. of responses	13	6	0	7	4	2	4	2
Significance Z- value		-1.73			-1 68			

The stretching of payables is regarded as appropriate under the right circumstances by 40% of the respondents, and the remaining firms regard this as totally inappropriate. The responses were then categorised into size and overseas involvement. One significant comparison was found, with the size of the firm This practice is more appropriate to smaller firms than their larger counterparts. The stretching of payables is a very sensitive area and the decision to stretch payables should be carried out with a great deal of scrutiny.

Exhibit 20.3 The stretching of payables

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Stretching of Payables								
1	5	3	0	2	1	2	1	1
2	7	3	0	4	2	1	3	1
3	1	0	0	1	0	0	1	0
No. of responses	13	6	0	7	3	3	5	2
Significance Z- value		-1.5			-0.8			

Debt factoring is regarded as totally inappropriate by at least 80% of the respondents. This clearly indicates that the firms are not selling debtors in the

market. Firms are using outside agencies to evaluate credit as observed in Exhibit 11 and collecting debt through specialised departments within the organisation. The responses were statistically compared with size and overseas involvement and were found to be significant. It appears that firms which are classified as not very large found this option appropriate under the right circumstances; however, very large firms indicated that this was totally inappropriate The established firms may know the market well and may have developed specialist skills in collecting their debt. The decision to sell debts may also be influenced by the type of market a firm is in.

The firms that indicated the use of this policy were predominantly from the retailing sector, which includes clothing and home furnishings. The nature of these businesses and the fluctuations in cash flows may necessitate the need to adopt this policy. The majority of firms in this survey are well established and have been in existence for more than fifty years. Debt factoring is more appropriate for firms that have lower overseas involvement. The greater the overseas involvement, the less appropriate it is. Additionally, debt factoring may not be available in foreign markets or it may be limited to some extent.

Exhibit 20.4 The level of debt factoring

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Debt Factoring								
1	3	3	0	0	1	2	0	0
2	7	3	0	4	2	1	2	2
3	3	0	0	3	0	0	3	0
No. of responses	13	6	0	7	3	3	5	2
Significance Z- value		-3.5			-7.6			

The null hypothesis 20 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the extent to which the management tools have been used in a recessionary environment relative to size and overseas involvement.

The following section looks at the various factors, which are believed to have some influence on payables policy. These factors are mainly external to the firm. Exhibit 21 suggests that the most important factor for majority of the respondents was exchange rates. The response was statistically tested against size and overseas involvement, but there was no significant comparison found.

Exhibit 21.1 The factors which affect payables policy

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Stretching of Payables								
1	5	4	0	1	2	1	0	2
2	5	0	0	5	1	1	3	0
3	0	0	0	0	0	0	0	0
4	2	0	0	2	0	0	1	1
5	1	1	0	0	1	0	0	0
No. of responses	13	5	0	8	4	2	4	3
Significance Z- value		-0.8			-0.3			

Time delays were also regarded as important but by fewer firms as compared with that for exchange rates. The responses to the time delays were statistically tested against size, overseas involvement and centralisation One comparison was significant, that of overseas involvement. The lower the overseas involvement, the more influence time delays have on determining payables policy. It appears that firms regard time delays as inevitable when dealing with international markets. International firms tended to have systems in place to circumvent or reduce the loss in value, due to time delays. In comparison, other factors may be more important than time delays. However, when a firm is dealing in domestic markets, time delays are a more important factor as they can be controlled. Relative to other domestic issues, time delays may be given a higher priority.

Exhibit 21.2 The importance of time delays on payables policy

		Size			Overseas Involvement (%)				Centralisation		
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+			
Time Delay											
1	1	1	0	0	1	0	0	0	0	0	1
2	3	2	0	1	1	1	1	0	1	1	1
3	5	1	0	4	1	1	0	3	1	0	4
4	2	0	0	2	0	0	2	0	0	1	1
5	1	0	0	1	0	0	1	0	0	0	1
No. of responses	12	4	0	8	3	2	4	3	2	2	8
Significance Z- value		-0.9			-2.4				0		

Credit risk is regarded as important by fewer firms. The responses were tested to see if there was any relationship with size and overseas involvement. Size was found to be weakly significant and overseas involvement was strongly significant. The lower the overseas involvement, the greater the credit risk will influence payables policy; the greater the overseas involvement, the lesser this influence.

Exhibit 21.3 The importance of credit risk on payables policy

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Credit Risk								
1	4	1	0	3	2	0	0	1
2	2	1	0	1	1	0	1	0
3	1	1	0	0	0	1	0	0
4	4	0	0	4	0	0	2	2
5	1	0	0	1	0	1	1	0
No. of responses	12	3	0	9	3	2	4	3
Significance Z- value		-1.4			-2.0			

Finally, when examining the effect of taxation on payables policy, not many firms regarded this factor as important. When the responses were organised by size and overseas involvement, the statistical tests carried out did not reveal any significant relationships Therefore evidence suggests that the firms have ranked the importance of taxation on payables policy independently of size and overseas involvement.

The null hypothesis 21 is therefore rejected in favour of the alternative. There are differences in how the selected large and small international firms responded to the factors that affect payables policy relative to size and overseas involvement.

Exhibit 21.4 The effect of taxation on payables policy

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Taxation								
1	5	2	0	3	2	1	1	1
2	1	0	0	1	0	1	0	0
3	3	0	0	3	0	0	1	2
4	2	0	0	2	0	0	2	0
5	1	1	0	0	1	0	0	0
No. of responses	12	3	0	9	3	2	4	3
Significance Z- value		-0.1			-0.5			

SUMMARY

This section has looked at attitudes towards the management of payables. As mentioned earlier, a firm has more control over payables than receivables as it can control the timing of the payments. The various practices that are used to manage payables were tested statistically. The firms' attitudes towards delaying payments were monitored and their opinions towards legislation were identified. Other factors which may influence a firms decision on payables were also tested, for example, the relationship with suppliers and the place of monitoring payables. The tools used to manage payables were also identified. It is clear that the effective management of payables can enhance the value of the firm. However, there appear to be very few new innovative products or procedures that are being used to manage payables. The following section will now look at the issues surrounding cash management

4.2.4 Cash Management

The management of cash is a separate area that is normally managed by corporate treasury. However, certain factors affecting cash management are also relevant to the various aspects of working capital management. Every individual

item of working capital will be transformed into cash at some stage within the working capital cycle. The research used ten questions to ascertain cash management techniques relevant to the working capital management issues discussed in the previous section.

Exhibit 22 looks at the automation of both receivables and payables. Ninety Three percent ranked the automation of payables in the medium to high category compared to Eighty Seven percent, who ranked receivables in the same category. The data collected were categorised by size, overseas involvement and the firms' attitudes towards the delaying of payments according to Exhibit 15. The statistical tests carried out show two significant comparisons with the size of the firm and attitude towards delaying payments. Accordingly, the firms' responses to Exhibit 22 are dependent on the size and the firms' responses to delaying payments. The smaller firms have lower levels of automation in comparison with firms in the larger category, and firms that find it expedient to delay payments are in the lower category of automation relative to firms that are against this practice,

Exhibit 22.1 The extent to which both payables and receivables are automated

		Size			Overseas Involvement (%)				E (29)		
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+	Y	N	N/A
Payables											
1	2	1	0	1	0	1	0	1	0	2	0
2	9	5	0	4	4	1	2	2	2	5	2
3	5	0	0	5	0	1	2	2	1	3	1
No of Responses	16	6	0	10	4	3	4	5	3	10	3
Significance Z – Value		-2.5			-0.6				11.7		

A similar analysis was carried out on the data collected for the automation of receivables. Again, there were two statistical comparisons found to be significant, overseas involvement and attitudes towards delaying payments. The greater the level of overseas involvement, the higher the level of automation of receivables. With lower levels of overseas involvement, the automation is in the lower category.

Generally speaking, a firm has less control over receivables compared with payables. The firm cannot control the timing of receivables, but the firm subject to certain external factors sets the timing of payables. It follows that an investment in the payables system may be utilised to the full. In contrast to the payables, there may be little benefit to be gained from automating receivables.

The null hypothesis 22 is therefore rejected in favour of the alternative. There are differences in the extent to which the selected large and small international firms automated both payables and receivables relative to size, overseas involvement and centralisation.

Exhibit 22.2 The automation of receivables

		Size			Overseas Involvement (%)				E (29)		
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+	Y	N	N/A
Payables											
1	2	0	0	2	0	0	2	0	0	2	0
2	10	5	0	5	4	2	3	1	1	6	3
3	4	1	0	3	0	1	0	3	2	2	0
No of Responses	16	6	0	10	4	3	5	4	3	10	3
Significance Z - Value		0.3			1.83				4.9		

The level of automation of both payables and receivables will undoubtedly affect management attitudes towards the various aspects of working capital. In the process of automation both internal and external customer attitudes towards the payment systems were regarded as very important, according to Exhibit 23. These attitudes were compared statistically with size and overseas involvement to establish whether firms of a particular characteristic responded in a determinable way; however both comparisons were found to be insignificant.

Hypothesis 23 is therefore accepted.

Exhibit 23 The importance of customer attitudes towards the various payment systems

		Size			Overseas Involvement (%)			
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+
Not Important	6	1	0	5	1	1	2	2
Important	4	2	0	2	2	0	2	0
Neutral	4	3	0	1	1	1	1	1
Very	1	0	0	1	0	0	0	0
Important	1	0	0	1	0	0	0	1
Vital								
Don't Know								
No of Responses	16	6	0	10	4	3	5	4
Significance Z - Value		0.6			0.4			

Finally, the notion that the net cash position is a good indicator of how well a firm has managed its short-term assets and liabilities was acceptable to over 70% of the respondents. The responses were then statistically tested against size, overseas involvement and the concept of working capital as depicted in Question 2, in Appendix II. All three comparisons were insignificant, which indicate the responses to Exhibit 24 were made independently of working capital. The null hypothesis 24 is therefore accepted.

Exhibit 24 Net cash position as an indicator of the management of working capital components

		Size			Overseas Involvement (%)				E (2)		
	TOTAL	NVL	L	VL	0-25	25-50	50-75	75+	Agree	S/ Disagree	S/ Agree
Strongly Agree	2	0	0	2	0	1	1	0	2	0	0
Agree	4	2	0	2	2	0	0	2	2	1	1
Neutral	5	2	0	3	1	1	2	1	4	0	1
Disagree	3	0	0	3	0	0	2	1	2	0	1
Strongly Disagree	2	2	0	0	1	1	0	0	1	0	1
No of Responses	16	6	0	10	4	3	5	4	11	1	4
Significance Z – Value		1.1			0				-1.1		

SUMMARY

This section has dealt with, albeit at a superficial level, issues which are relevant when investigating the various aspects of working capital. Although cash managers are not directly responsible for inventory, receivables and payables, the decisions made in this area may influence the workings of, for example, receivables in another part of the organisation. Although theoretically the concept of working capital management is seen as a single concept, when it is employed company-wide it becomes very diverse in its application. The automation of payables and receivables requires taking into account customer attitudes, bearing in mind that these customers may be internal or external to the organisation. Evidence suggests that size and the level of overseas involvement influence the level of automation in both receivables and payables.

4.4 Summary

This chapter has analysed the main research questions as hypotheses. A hypothesis per research question was set to illustrate how firms belonging to different groups respond to the research questions. The responses to the questions have been analysed into five sections. The general section reviews questions that were regarded as peripheral and set the scene before moving to the specific components of working capital. The individual components of working capital were then analysed. A total of 24 hypothesis were set and either accepted of rejected based on the Z value statistical test. A Student t-distribution was carried out only where indicated to confirm the Z value.

A number of interesting findings have been revealed from the analysis. For example, among the factors affecting inventory management, firms ranked customer satisfaction as critical. Firms have realised the importance of managing the customer with a view to exceeding the customer expectations. The inventory holding costs were ranked next. The receivables management appears to be carried out locally, although debt factoring is used to speed up the cash flow. A firm has more control over payables than receivables The modern payment systems can control the payables effectively, however, although automation will reduce some work in receivables, some management of this area is required. Many companies have evaluated the benefits of offering discounts to customers in return for payment by a certain time period. For example, Utility companies and most modern e-commerce businesses offer discounts if orders are placed via the Internet or by paying by direct debit. The whole business environment has changed in the face of new technology, and the modern company can take advantage of this opportunity when managing working capital. The greater the level of automation, the lower the overhead base required. The efficient order processing techniques and reduced transaction times for both delivery and payment can help improve the flow of cash and lower non value added overheads, such as stock holding costs and manual processing. These efficiencies can help reduce the need to invest cash in working capital for longer than necessary. This will lead to enhanced value for both the company and the customer.

The following chapter will present the major conclusions that have emerged from this study.

CHAPTER 5

GENERAL CONCLUSIONS

5.1 Summary

It has been recognised that short range financial planning is an essential part of the financial management process. Although working capital is an individual balance sheet item, it is also part of the firm's total financial resources. Managers realise the need to create competitive advantage and this can be achieved through operational efficiencies. Section 5.2.1 (Reflections) reviews the inconsistency between the literature review, problem definition and research hypotheses. Although the author was unable to achieve the original objective of evaluating the linkages between the key working capital variables, the author has acknowledged that cash flow changes caused by the variation in key working capital variables can be identified as illustrated in Chapter 2. The equation in figure 2.4 could be applied to review the sensitivity of a particular working capital policy on the cash flow and risk of a firm. The author has set a framework within which different working capital balances can be reviewed. The net cash flow changes resulting from the variation in the key variables can be matched to different economic situations. For example, figure 2.4.1 shows that a decision tree approach could used to assess the linkages between the key working capital variables. This is a clear indication that working capital problems can be linked to the conventional ideas in finance.

The main fold objectives of the survey as stated in Chapter 1 were to:

i) Address the issues surrounding the management of short-term assets and liabilities within the framework of working capital management and attempt to investigate the linkages between the key variables using traditional financial tools. The latter has been compromised due to complications during the data collection (see section 5.2.1)

ii) Identify the possible reasons why it is believed that little progress has been made in this area of management, and the effect of e-commerce on the management of working capital through reduced transaction times and electronic data interchange.

iii) Investigate the international effects on working capital management policies, extending the existing conceptual framework to cope with the additional risks and challenges faced in this environment

The international aspect of working capital management is an area of interest and is increasing in importance as more and more organisations are trading globally. As a result, the management decisions both in the long and short run are likely to be affected. The survey sought to bring an awareness of how the existing financial tools can be used effectively to manage an increasingly growing area of finance.

Equally important to managing working capital is the changing nature of the way in which businesses operate. With e-mail and Internet technology growing rapidly, this will bring about many opportunities and challenges for the financial manager. This survey has briefly outlined some of the factors affecting the traditional focus on working capital. It is necessary to adjust to the new environment in order to gain competitive advantage. Many UK retailers have made significant progress through reducing transaction times and lower stock replenishment costs. These benefits are achieved through direct supplier access to daily sales and stock data, coupled with automatic stock replenishment arrangements

As mentioned earlier, the review of the interrelationship between the key working capital variables was compromised due to the complexities of data collection. The author considered alternative approaches for the collection of data, but unlike the present approach, these were regarded as impractical. A pilot study questionnaire was sent to senior treasury personnel in a variety of UK multinationals. Following the responses from the pilot study, certain amendments were made to the original data collection instrument. The revised instrument that can be found in Appendix II was used to collect the data.

Sixteen respondents completed and returned the questionnaires. The responses were analysed in Chapter 4 using a statistical technique called the Z-score analysis. This statistical technique has been applied to all data exhibits shown in Chapter 4. Where a further test known as the student t-test was required, this is clearly illustrated at each table of analysis. Having analysed the data, this section now presents the major conclusions and implications of the study. A detailed review of the study limitations and suggestions for further research will follow thereafter.

5.2 Major Conclusions

The study concludes that working capital can be managed in a way that can add value or, at least, conserve the value of the firm. This has been illustrated by using the equation developed in Figure 2.4. For reasons beyond the control of the author, the author was not able to collect data to test the model in practice (See reflections 5 2.1) below. The major limitation of the model is that it is assumed all cash flow changes resulting from the decision to alter the key working capital variables can be clearly identified and measured. However, in reality this may prove to be very complicated as discussed in the next section. Nevertheless, this is a useful financial model in trying to understand the complex issues involved in trying to measure the financial impact of short tern decision-making.

Evidence from data collected suggests that a practical financial manager may have other priorities over optimising the working capital balance. A pure focus on working capital management may be a thing of the past. The balanced scorecard approach is a good example of a technique developed to guide a balance between financial and non-financial objectives For example, internally focused financial performance measures must be balanced by externally focused customer satisfaction measures. The management of inventory according to data collected is mainly determined by customer satisfaction (see section 4.2.1). This factor seems to override other factors such as holding costs, and production costs. Nevertheless, these are important.

The structure of a firm is also important when considering the appropriate working capital balance. The prevailing market condition and the future outlook of the firm largely determine a firm's structure. Over time, market conditions change, a firm's marketing strategy and the market environment have a large influence on the structure of the firm. It therefore follows, the efficient management of working capital requires looking outside the firm, and the external environment. Successful and forward-looking firms interact with the external environment. These ideas link well with the corporate appraisal of a firm. A short-term corporate appraisal is therefore required which looks at the number of possible options that a firm may have to deliver the long-term goals, effectively and efficiently.

5.2.1 Reflections

The original objective of the research has been compromised due to the inability to collect the empirical data, using Appendix 1. The actual data collection was carried out using Appendix 2 in which the data relating to the interrelationships between the various components of working capital are not apparent. The author has reflected on this, and has identified a number of areas of further research that will help develop the theory of working capital.

For example, in the literature review, section 2.3.4 looks at the concept of determining the present value of the cash flow change caused by the various working capital combinations. In practice, decisions are not made purely on a financial basis that optimises the present value of incremental cash flow. A number of other important factors include the market position, product life cycle, competitor reactions and customer loyalty. For example, a company may wish to enter a new market through product differentiation or price leadership. Therefore, it is important that the proposed working capital balance integrates with the strategic objectives of the firm.

The detailed findings of the study can be found in sections 5.3.1 to 5.3.5. It is important to point out there are many useful theoretical contributions made over the last decade.

The author feels that this survey will also add data to the existing knowledge. It is hoped that the following findings derived from the survey will stimulate further interest in the area The following section will outline the major findings in each area of working capital management.

5.3.1 The Framework

The framework in Figure 4.2 was established to look at the broad factors affecting short-range decision-making The combination of these broad factors helps to interpret the data collected in a meaningful way. The various risks were measured and identified as being encountered by the firms in the survey. A high percentage of these firms ranked credit risk amongst other risks. Selling on credit creates credit risk. When a firm sells on credit, other things being equal, the debtor balance will increase together with credit risk. This clearly indicates the need to manage debtors appropriately. It is important to balance the need to offer credit and sustain sales against the credit risk created, therefore the two extremes should lead to an optimal situation. This relationship is illustrated below in Figure 5.3.1.1.

Figure 5.3.1.1

Credit risk and the Value of the Firm

Δ Debtor balance $\longrightarrow$ Δ Credit Risk $\longrightarrow$ Δ Value of the firm

Other risks were also regarded as important but by far fewer respondents. For example, funding risk was also measured and found to be equally important but to fewer firms. A firm that has substantial liquid resources and has growth potential is less likely to see funding risk as a main threat. Firms may find

themselves facing risks that are pertinent to the markets they serve, management styles and the structure of the firm. This information was important when evaluating the responses to the survey to assess whether firms facing particular risks respond in a predictable manner. However, Figure 5.3.1.1 is valid and would hold whatever other risks a firm may or may not face.

Still looking at the risks and opportunities faced by firms, the individual components of working capital that are affected by international risk were then identified. This illustrates that it is necessary to adapt working capital management to overseas markets. Exhibit 2 shows that debtors are regarded as the most important when dealing within international markets. Inevitably the sub-sample overseas involvement was found to be significant. It has been observed that the greater the firm's involvement in overseas markets, the higher the debtor balance the firm is likely to hold leading to increased exposure to credit risk.

Although the management of cash is designated to corporate treasury, it was listed as being affected by international risks, mainly by foreign exchange risk. However, creditors and stock are also affected by international risks but to a far lesser magnitude.

The next broad factor considered was the centralisation of decision-making. Short -term decision-making can take place centrally or at a local divisional level. The choice of policy making may explain the slow progress in developing new and advanced techniques for short-term financial management. The null hypotheses set out in Exhibit 3 against size and overseas involvement are significant and insignificant respectively. It has emerged that larger size firms in the main are managed locally, compared with smaller sized firms where the decisions are made centrally. However, many firms have indicated a halfway approach of local decision making with partial central overview.

Whilst larger firms delegated short-term decision making to localised units, the company head office concentrates limited resources on longer-term issues.

There is a risk that short-term financial management may be neglected at both senior management level and operational level. The firms were organised such that the management of working capital was not amongst the top priorities of senior personnel. If this is the case, then firms need to train lower level management in the most effective way to manage short-term finance. This will help those in positions of responsibility to understand the role they play in the organisation as a whole.

The vast majority of the respondents believed short-term financial management has not been neglected. It is possible that the respondents may have defined this neglect differently. However, there is no evidence to suggest that this belief relates to the size of responding firms or the level of overseas involvement. The theorists have expressed concern that short-term financial management is neglected, and this view is supported by Gallinger & Healey (1987) However, there appears to be no acknowledgement by practitioners of this neglect.

Interestingly the majority of respondents indicated the importance of managing working capital is greater than before. However, Herbert (1995) reports that research priority in this area is low for firms of a large size and high for smaller firms. Smaller firms give cash management a higher priority, thus requiring a disciplined working capital policy. Many firms develop working capital procedures over time. It is more often the case that those working capital procedures remain not revised for long periods of time. The updating of procedures to keep in tune with the market environment is a very important aspect of financial management. With few innovations being produced firms may not be exploiting alternative solutions to short-term financial problems. The priority given to research in this area may benefit from a review. The efficient management of short-term finance is essential if a firm is to deliver a quality service and maximise its profitability.

The section to follow will look at the individual components of working capital, and issues surrounding the management of the individual items will be discussed.

5.3.2 Inventory Management

The management of inventory according to the data collected is mainly determined by customer satisfaction. This factor seems to override other factors. The holding costs and production costs were also regarded as important inputs in the decision making process. As far as production costs are concerned, there was no significant relationship found when testing against sub-samples size, overseas involvement and centralisation of decision making.

The holding costs of money tied up in inventory were significantly more important to firms than production costs. These costs include the opportunity costs of money and the potential losses from damaged inventory or the obsolescence of stock. These findings clearly demonstrate that management recognised the need to evaluate the cost of holding stock, in effect stock needs to compete against other limited resources.

The ranking of holding costs was significant when compared against the sub-sample centralisation of decision making. Interestingly, the firms with local decision making and partial central overview regard holding costs as a very influential factor on inventory policy. Firms with purely centralised decision making ranked holding costs on a lower scale of importance. In fact, holding costs influence inventory policy irrespective of the structure of a firm. Under a localised structure the priority given to this cost is higher, as local units operate with a higher degree of autonomy. Although holding costs are important to firms with a purely centralised structure, individual firms may regard customer satisfaction as their top priority. With a centralised decision making structure, the line of communication is greater than that of a localised firm, and therefore the process of decision making is longer. The effective communication of short-term financial policies is essential in order for the organisation to benefit from any capital market inefficiencies.

The effect of customer satisfaction was significant when compared against the centralisation of decision making The firms with localised structures and partial central overview ranked customer satisfaction higher than respondents

with a centralised structure. These findings contradict earlier comments regarding the ranking of holding costs. It appears other factors may also be influencing inventory policy together with customer satisfaction.

The current market conditions and the future outlook of the firm largely determine a firm's organisational structure. Over time market conditions may change, and so do factors which are important in determining the various issues affecting working capital and working capital policies. It is evident that the majority of the multinational firms in the survey manage short-term decisions on a local basis. The firms structure their operations in a way that is believed to be the most effective method of serving the markets. The customer focus is critical if a business is to compete. Other operational issues such as the sourcing of materials for production and the sales region will also influence the management structure of the firm; this is illustrated in Figure 5.3.2.1.

Figure 5.3.2.1

Working Capital Management and the External Environment

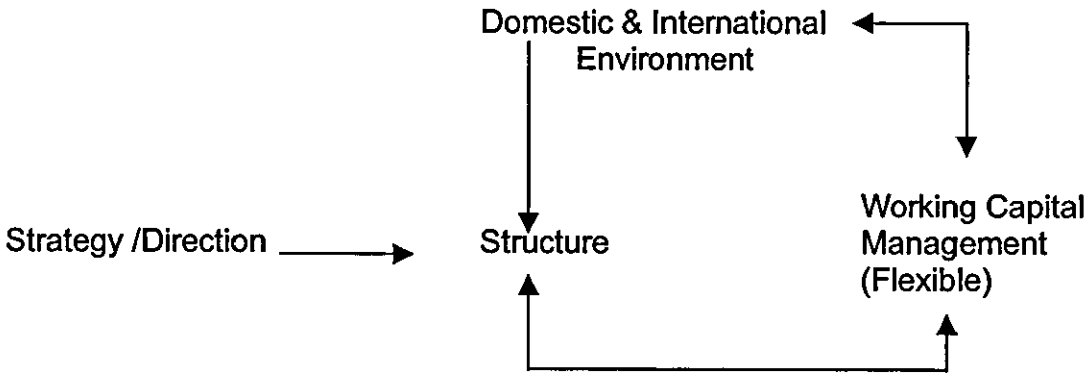


Figure 5 3 2.1 illustrates that both a firm's marketing strategy and the market environment have a large influence on the structure of the firm. It is this structure that feeds through and shapes working capital management policies. However, changes in the environment will lead to the requirement of flexibility in working capital.

Many factors influence the structure of the firm. For example, the centralisation of decision making was found to be significant when compared with the size of

firms. It appears that larger firms are more likely to structure locally, whereas smaller firms prefer a centralised structure.

The international environment in Figure 5 3 2 1 was investigated to see whether the inevitable risks of operating in such an environment influence a firm's inventory management decision. The majority of respondents regarded international risk as just another business risk. The respondents' views were found to be significant when compared with the centralisation of decision making. A higher proportion of localised firms regarded the risk as another business risk compared with those firms with a centralised structure. Many localised firms may have considered this risk when expanding into overseas markets. This area of working capital is further explored in the section to follow.

5.3.3 Receivables Management

The management of receivables is reported to be vital to the success of an organisation and forms the backbone of working capital. It has been mentioned in the preceding chapter that a firm's decision to grant credit is largely determined by the impact of granting credit on sales. However, a certain amount of credit is required in order to compete in the market environment. Although firms may have to match the forms of credit offered by other firms in the market, the efficient management of receivables can prove to be very beneficial to the firm. When a firm decides to increase credit sales or extend credit periods to existing or new customers, the debtor balance will rise and stock levels will fall as indicated in Figure 5 3.1. Hill (1992) correctly points to the importance of understanding the relationship between granting credit and profitability. Although credit programmes stimulate sales and solve the inventory problems, they can eat into the profitability of a firm unless they are strictly monitored.

As has been mentioned earlier, Herbert (1995) makes particular reference to receivables and payables management. This report suggests larger firms regard the management of receivables as less important compared with smaller firms. The impact of not receiving a payment from a debtor on time or

even losing a debtor through default may be of more severe consequence for a smaller firm. Once again the size of a firm influences working capital.

With the management of debtors, it is evident that firms continue to use outside agencies to evaluate credit and to get information on customers. It seems that specialised departments within the firm carry out debt collection. This suggests a high level of activity to justify the in-house collection of debts. The extent to which a firm uses outside agencies to evaluate credit worthiness was found to be significant when compared with size. Large firms indicate a stronger preference for using outside agencies compared with smaller firms. Many issues surrounding working capital, including the evaluation of credit, an important input in a firm's decision making process, are being contracted out by larger firms. These factors may have contributed to the reduced importance of debtor management to larger firms. Another reason for the reduced activity in this area is due to advanced accounting systems capable of managing receivables, for example, automated reminders or changes in buying habits. Internet shopping as mentioned earlier may contribute to such changes.

The structure of a firm will influence its working capital policy decision making. The research suggests that the majority of the respondents make short-term decisions at local level. A relationship was established between the use of outside agencies and the monitoring of receivables. When the monitoring of receivables is carried out locally with a partial central overview, there is a higher degree of usage of outside agencies compared with firms that have centralised structures. Firms with local structures may not have access to all of the information on customers and may prefer to contract out this responsibility.

When looking at the management of receivables in international markets, firms do not appear to alter their attitudes. Exhibit 12 confirms that the majority of respondents are unlikely to alter their opinions on factors influencing receivables policy There was no significant comparison made with sub-samples size, overseas involvement and centralisation of decision making. The evidence in Exhibit 10 suggests that the impact of credit on sales can influence the receivables policy more as the level of overseas involvement increases. Exhibit 10 supports the statistical comparison that debtors are

significant when compared with overseas involvement. From the four main components of working capital, debtors were mainly affected in the international environment

5.3.4 Payables Management

Payables are created when a firm purchases on credit as opposed to selling on credit. A very important point that distinguishes payables from receivables is the level of control. A firm can exercise more control over payables compared with receivables. Hence the value added to the firm can be significant, as the firm should manage what it can control.

It has been mentioned that a firm has more control over its payments than it has over receivables. Purchasing materials or products on credit creates the payables. The increase in trade creditors release funds to the organisation, and the increase in debtors will drain cash from the firm. However, there is a cost of releasing funds through trade credit; this is someone else's money that is tied up in the business as working capital.

When monitoring the payment habits of firms, the majority of respondents indicated that delaying payments to suppliers beyond the agreed credit periods is not good business practice. Evidence from the survey suggests that firms that have a localised structure with a partial central overview are more likely to delay payments compared with firms that are centralised. Many firms have been driven out of business during the economic downturn of the 1990's and cash flow problems are amongst the main factors that have contributed to this. The well-established firms may drive smaller firms out of business simply by delaying payments to their suppliers. The government has shown some initiative to help the victims by imposing fixed interest penalties on late payments to suppliers. A similar system has been used successfully across Europe. It was surprising to find that when evaluating the acceptance of this legislation by the respondents, a mere 20% of the respondents agreed with this legislation, and 60% remained neutral. There was no relationship established between the firms' habit of delaying payments to suppliers and their views on the enactment of this legislation (Exhibit 15).

The views on legislation were found to be significant when compared with sub-sample overseas involvement It is evident that the greater the overseas involvement, the more these firms are in favour of legislation. Firms with a substantial turnover from overseas markets stand to lose more should payments be delayed, not just in terms of the opportunity cost of money but also the probability of losing the real value of money resulting from fluctuations in exchange rates.

When investigating the influence a firm's structure has on payables policy making, the survey suggests firms with a localised structure are likely to review their suppliers more often than firms which have centralised decision-making. The monitoring of payables is carried out very frequently. Although there was no time limit given, this may vary from industry to industry. This finding indicates firms regard payables as an important source of short-term finance that needs to be managed efficiently.

The monitoring of payables is mainly carried out locally. When the monitoring of payables hypothesis was tested against overseas involvement the results were strongly significant It is evident that smaller firms monitor payables centrally, whereas large firms monitor locally. Firms with a higher level of overseas involvement are likely to be structured into local units. Many issues relating to working capital appear to be company-wide. It may be difficult to generalise and enforce policymaking. Nevertheless, Dauten (1965) admits there are difficulties involved in formulating a theory of working capital. However, it is possible to develop a theory of working capital that can serve as a basis for working capital policies. In trying to measure the change in management behaviour towards short-term policy making, evidence suggests there is very little change. The various tools used to manage payables have been reviewed, and there appears to be little evidence of fresh thought or ideas of short-term financial management.

The idea of deliberately delaying payments to suppliers is totally inappropriate; this is consistent with the finding in Exhibit 15. Controlled disbursements are acceptable as this enables the firm to utilise limited resources. The sub-sample comparison size and overseas involvement influence a firm's decision

to adopt this strategy. A larger proportion of smaller firms find this practice appropriate than large firms.

The stretching of payables is considered to be acceptable to fewer firms The smaller size firms find this more appropriate than their larger counterparts. The issue of debt factoring, which was mentioned earlier in this chapter, in practice is likely to be more relevant to firms which are not very large and have low levels of overseas involvement.

The most important factor in determining payables policy is exchange rates, and this suggests that firms have taken the international environment into account. Other factors including time delays and credit risk were found to be significant influences on payables policy, but for fewer firms. Credit risk and time delays are dependent on overseas involvement; the lower the overseas involvement, the more credit risk and time delay influence payables policy. With increasing overseas involvement, other factors will come into play. Evidence suggests this may not be the case when managing both inventory and receivables, since the responses remain unaltered with international trading.

Having reviewed inventory, receivables and payables, the author will now turn attention to the management of cash. Although the responsibility in cash management lies with treasury, there is some overlap with other positions within the organisation.

5.3.5 Cash Management

Although cash management is seen as a separate area in itself, the research reveals certain findings, which are directly relevant to the main components of working capital. Many firms continue to automate processes. The introduction of information technology affects all aspects of the organisation and with it the working capital components. The examination of payables addressed the issue of deliberate remote disbursements, whilst under cash management the automation of payables and receivables will be discussed. A larger proportion of the firms ranked the automation of payables in the medium to high category

of automation compared with receivables. As mentioned earlier, firms have more control over payables than receivabes. It seems logical to automate first processes that can be controlled, as greater benefits can be reaped from the system.

The respondents were found to link both the size of the firm and the habit of delaying payments to the automation of payables. Large firms are more likely to have higher levels of automation compared with firms of smaller size. Firms that are in favour of delaying payments to suppliers are in the lower category of automation. The size of the firm indicates resource availability and the behaviour towards working capital management practices.

With the automation of receivables, a significant comparison was found with size and the firms' opinions on delaying payments. Customer attitudes towards the various payment systems were monitored. The majority of the respondents regard customer attitudes as a vital factor although both comparisons were found to be insignificant. This confirms the earlier comments that customer satisfaction seems to be the main factor in many decisions faced by management. With the present pace in technological advances, payment systems are being introduced which make payment easier and more convenient, and give customer value for money. With the modern Internet technology access to information is much easier and cheaper.

By giving customers the ability to access their accounts and make payments, some of the management of working capital issues are removed from the equation and other issues may become relevant. The benefits of cost efficiency and increased profitability for the firm are a motivation for introducing this change.

Finally, the concept of cash is more readily understood by and has more appeal to humans since it affects nearly every aspect of human life. Over 70% of the respondents believe that the net cash position is a good indicator of how well a firm has managed its short-term assets and liabilities. Working capital management is about managing the cash tied up in the various components of working capital. When trying to establish a relationship with size, overseas

involvement and the role of working capital, evidence suggests there were no significant comparisons

The next section will look at the limitations of the survey.

5.4 A Note on the Study Limitations

This study has provided useful evidence in an area that would benefit from more empirical research. However, the limitations of the research must be borne in mind. While its scope limitations have already been pointed out in Sections 1.3 and 3.4, a final word of caution is required on the limited applicability of the findings to the population as a whole. This is normally the case with all research that uses samples as raw data. The depicted picture of the views on working capital was limited by the respondents' treasury personnel bias, experience and perceptions. At the same time much of the evidence gathered was related to attitudes towards the concept of working capital. While many organisations used in the research were among the market leaders, it can only be hoped that the given picture approximates rather than coincides with the existing situation.

In addition, the approach taken in the examination of the various components of working capital includes some subjectivity, for example, the areas of concentration and the importance given to these areas, particularly with the selection of sub-samples size, overseas involvement and centralisation of decision making. The author felt the mentioned sub-systems may explain a certain behaviour. However, another researcher may have concentrated differently and even drawn different conclusions. Nonetheless, some indications have emerged about the management of short-term assets and liabilities

5.5 Areas for Further Research

In Chapter 1 the hope was expressed that this project would stimulate further research studies. The need for a particular line of research on the adaptation of international models has been referred to, as has the need to construct a visual presentation of working capital components to illustrate the concept more clearly.

The following suggestions come to light as a result of the survey;

(i) The representation of small and medium sized firms in the field of research needs to be addressed. Section 5.2 shows that a lower priority is given to short-term issues such as payables and receivables. An increase in priority may encourage innovation and new ideas.

(ii) The impact of information technology on short-term policy making, for example, on the automation of payables and receivables. The introduction of the Internet will change the working practices of the firms and ultimately the performance measures.

(iii) The practical application of the model developed in Figure 2 4. A closer look at the interrelationships between the key components of working capital needs to be established over time (See Reflections in section 5.2.1)

(iv) The effect of contracting out to third parties work relating to short-term issues.

(v) The impact of short-term issues on longer-term strategy. The relationship needs to be identified and the importance of this needs to be acknowledged.

5.6 Final Concluding Remarks

It is hoped that these suggestions together with the summary and final conclusions will stimulate further interest in this area of finance. It is apparent that developments in working capital have been made but along fragmented lines as suggested by Hill & Sartoris (1984). The management of working capital has however, been identified as a cause of business failure for many businesses. The efficient management of these limited short-term resources would not only help to reduce the risk of business failures, but might also help create internal growth under imperfect market conditions (McConnel & Scott 1984). The research has shown ways of using the traditional tools of finance to link the key working capital variables.

A framework has been developed in Figure 2 4 that can help the reader to understand the effect on cash flow caused by the variation in the key working capital variables. This framework is by no means complete and would benefit from further development. The main aim of the model is to help evaluate the different working capital balances in financial terms. The non-financial evaluation is equally important and should be carried out when reviewing the decision framework.

It has been illustrated that short-term decisions can be designed which can benefit the organisation. For example, having reviewed the various components of working capital, it is clear that all key variables must be managed in order to achieve sustained competitive advantage However, the most effective method of managing working capital is through stock management. The finance manager may be advised to review stock levels as a top priority and reduce stock if possible. This single management action can generate a high degree of financial leverage. The reduction of stock is a very difficult concept to understand However, the benefits are real and not simply due to reshuffling resources around a value system.

This research has revealed certain areas for further research, for example, the impact of the international environment on working capital management, and

these suggestions would provide some very important data which is not readily available at present, especially in the UK. The modern approaches to management are an indication that traditional finance tools can be used to manage short-term decision-making For example, practices such as the balanced scorecard require setting internal performance measures and externally focused non-financial measures. The concept proposes that a balance is reached between all objectives. Many organisations benchmark against the industry leader or with other companies within the group. The common thread running through these concepts is that policies affecting short-term decision making can no longer be made without considering the external consequences.

APPENDIX 1

QUESTIONNAIRE

Company:

Date and place:

Interview partner:

Position held:

Company Details

Number of operating (producing) foreign subsidiaries:

Mode of Direct Foreign Investment

Export	( )
Own Subsidiary/ies	( )
Manufacturing plants	( )
Patents/ licence	( )

Number of countries present in total:

Turnover total:

Turnover abroad:

* **Production abroad:**

* **Exports from home country:**

The importance attached to working capital management has increased over the past decade. It is also becoming increasingly important to manage risk in the international context. It is therefore vital for multinational firms with significant turnover from overseas markets to ensure that adequate procedures are in place to ensure that the company's operating capabilities are insulated from risk.

1 Please describe the nature of your company's business and the main types of financial risks to your company ? Please rank in order of importance:

1= most important
5= least important

2 Do you monitor this risk?

- Do you take any steps to manage it?
- If yes, why do you do that? and how?
- What significance do you think this type of risk has on your business?

3 What do you regard as the role of working capital management or liquidity management?

- please define working capital management

Definition: from literature search

Working capital cycle refers to the continual flow of resources through the various working capital accounts such as accounts receivables, payables, inventory and cash.

4 Who decides on the approach to managing the various accounts i.e. the short term decision making process?

The decision making process

Please describe below the nature of the models or principles used to manage each major component of liquidity as listed below.

RECEIVABLES

5 Approximately what proportion of your sales are made on credit?

6 Please indicate which of the following factors you regard as important factors in determining receivables policy. Please rank in order of importance : 1= most important, 5= least important

- Investing costs [ ]
- Losses from bad debts [ ]
- Impact of credit on sales [ ]
- Cash flow effect [ ]
- Other, please state [ ]

CREDIT SELECTION

7 What techniques do you use to evaluate credit applicants?

8 Do you use any of the following, or please indicate which of the following you have used?

- Five C's
- Sequential decision making
- Simple probability
- Linear discriminant model

9 What additional factors do you consider important when dealing with a credit applicant from abroad?

10 How do you monitor accounts receivables both in domestic and international situations?

11 Please indicate any issues of major concern when managing receivables?

ACCOUNTS PAYABLE

12 Approximately what percentage (%) of your total cash outflow is represented by payables?

13 Accounts payable have been regarded in the past as a 'poor man's' method of dealing with cash flow problems. Do you agree with this? please explain why you agree or disagree.

14 Many suppliers offer credit facilities in order to induce sales and compete successfully. Say, for example, you were offered terms on a specific contract as follows:

1/10, n/60 How would you evaluate this?

15 Have you (The company) been involved in what is often referred to as stretching, i.e. delaying payments to suppliers beyond the credit period? If you have, at what point would you stop stretching?

16 Are you in favour of legislation which imposes fixed interest penalties on late payments? If yes, why? If no, why not?

17 Please indicate your relative strength with your top three suppliers?

Supplier 1
Supplier 2
Supplier 3

18 Who monitors your payables and how often is this done?

19 What role if any do banks and other financial institutions play when managing payables?

20 Which of the following do you regard as

A) appropriate in the right circumstances
B) hardly applicable
C) totally inappropriate to corporate asset/ liability management

Deliberate remote disbursement
Controlled disbursement

21 Which of the following factors affect your payables policy in the light of international trade? Please rank in order of importance: 1=most, 5= least

Exchange rates	[ ]
Time delays	[ ]
Credit risk	[ ]
Taxation	[ ]
High transaction costs	[ ]
Attitudes towards cash management	[ ]
Information availability	[ ]

INVENTORY

22 In your opinion what are the most important factors which need to e taken into account when managing inventory in domestic markets?

23 Would you alter your opinion to when looking at inventory management on an international scale?

24 Have you ever used Variance Analysis or Turnover ratios?
If so, have you used these:

Very often [ ]
Often [ ]
Seldom [ ]
Once or Twice [ ]

25 Are your short term decision making policies based on any written down rules? If so, who sets those rules?

26 What mode of Direct Foreign Investment do you have?

Export [ ]
Own Subsidiary/ies [ ]
Manufacturing plant [ ]
Patents/ Licences [ ]

27 What do you understand about the current ratio objective?
Please comment on the diagram handed out at the beginning of the session.
Does this diagram accurately depict the overall approach to working capital management in your firm?

28 Which individual components do you regard as being affected by risk when trading internationally? Please indicate in order of importance.

29 Looking at each model individually, what additional risk do you regard as important to manage when dealing in an international environment?

30 Do you use derivatives to hedge against risk created in the international trade? If yes, please state the nature of the hedge.

31 Is there a natural hedge or in other words a hedge created by diversification?

32 How do you define the aim of your company's short term decision making?

33 Has this aim been clearly defined by your company's top management? Is it written down? Does it form part of an explicit written down strategy?

34 In the limited literature, short term financial management has been neglected and efforts have concentrated on long term value enhancing.

Do you agree with this?

Do you believe that the importance of short term liquidity management is greater than before?

If so, why is this? What factors have attributed to this?

35 Does your company incorporate short term financial management decisions into the overall general management decision making process?

36 Do you anticipate the effects of risk on your company's cash flow?

37 Are exchange rate considerations integrated into the general decision making process of your company? Are these also integrated into the nn-financial decisions such as sourcing, sales etc.

38 Do you provide your local operating managers with the real exchange rate risks?

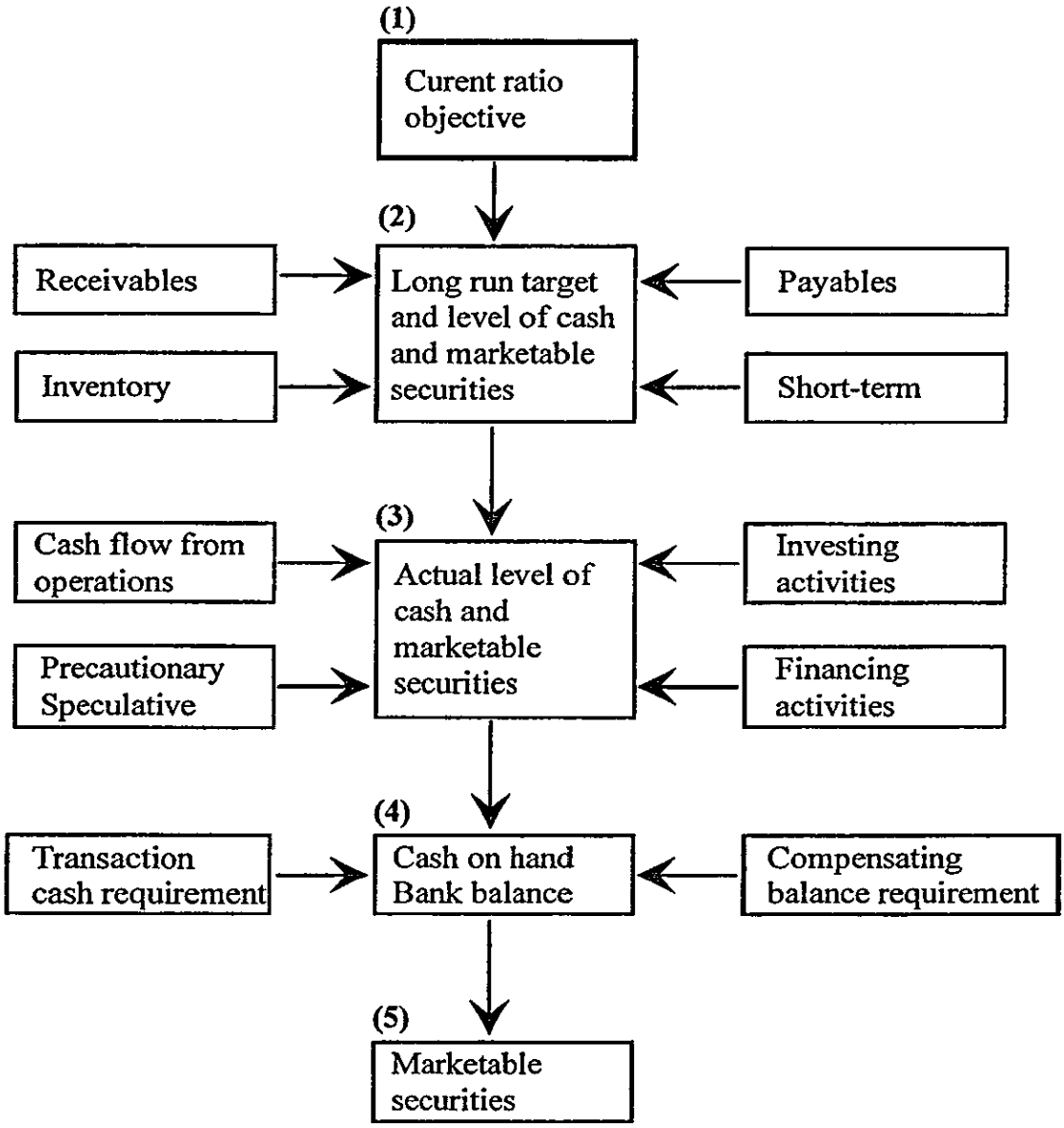
39 Have you ever used any of the following tools to evaluate working capital?

Ratio analysis
Financial accounts
Valuation methods

Overall Approach to Working Capital Management
DIAGRAM A

Liquidity Management

Question 27



Explanation

The above diagram is a theoretical approach to managing working capital and the decision making process surrounding this. The current ratio objective is a measure set by the firm i.e. what level of risk management are prepared to take and also other parties such as banks and rating agencies. This ultimately determines component (2). The main elements of working capital also interact to shape up this component. On an operational level, cash flow from operations and speculative activities together with investing and financing influence the actual level of cash and marketable securities (3) which determines (4).

APPENDIX 11

QUESTIONNAIRE

Company:

Date and place:

Interview partner:

Position held:

Company Details

Number of operating (producing) foreign subsidiaries:

Mode of Direct Foreign Investment

Export	( )
Own Subsidiary/ies	( )
Manufacturing plants	( )
Patents/ licence	( )

Number of countries present in total:

Turnover total:

Turnover abroad:

* **Production abroad:**

* **Exports from home country:**

The importance attached to working capital management has increased over the past decade. It is also becoming increasingly important to manage risk in the international environment, It is therefore vital for multinational firms with a significant proportion of turnover from overseas markets to ensure that adequate procedures are in place to ensure that the company's operating capabilities are insulated from risk.

General Introduction

1. Do you encounter any of the following risks? Please rank in order of importance, Do you monitor this risk?

1 = Very Important
5 = Not Important

	Encountered	Monitored; please tick if Yes
Credit Risk	[ ]	[ ]
Funding Risk	[ ]	[ ]
Foreign Exchange Risk	[ ]	[ ]
Interest Rate Risk	[ ]	[ ]
Political Risk	[ ]	[ ]
Other .. please specify	[ ]	[ ]

2. The role of working capital management is seen as the management of short term assets and liabilities such as to optimise the level of cash invested in the various elements of working capital. As regards this statement, do you:

Strongly Disagree Disagree Neither Agree Strongly Agree

Please mark appropriately..
If you disagree, how would you define it?

---

3. What do you think about the concept ' working capital management'? Please select from below:

not much	[ ]
very little	[ ]
not practical	[ ]
text book term	[ ]
nothing positive	[ ]

With reference to diagram (A):

4. Is there a norm for the current ratio in your industry?

Yes	[ ]
No	[ ]

5. Does this diagram depict the overall approach used in practice particularly in your firm?

Yes	[ ]
No	[ ]
Partially	[ ]

Please explain.

6. From a corporate standpoint which of the following would you regard as being mostly affected by the risks caused in the international environment? Please indicate in order of importance;

1= Very Important
5= Not Important

Debtors	[ ]	Creditors	[ ]
Stock	[ ]	Cash	[ ]

7. To what extent are these short term decisions centralised?

None at all	[ ]
Extensively	[ ]
Partial central overview	[ ]

8. In the limited literature short term financial management has been neglected and efforts have concentrated on long term value enhancing.

Do you agree with this?

Yes	[ ]
No	[ ]

9. Do you believe that the importance attached to short term liquidity management is greater than before ?

Yes	[ ]
No	[ ]

10. If yes, why is this ? What factors have attributed to this?

INVENTORY

11. Which of the following factors do you regard as being important when managing inventory; please indicate in order of importance.

1= Very Important
5= Not Important

purchase / production costs	[ ]
order costs/ set up costs	[ ]
holding costs / opportunity costs of money invested in asset	[ ]
customer satisfaction , probability of stock out	[ ]
other, please state	[ ]

12. Please indicate where these inventory management decisions are made

Locally / Divisional	[ ]
Centrally/ HQ	[ ]
Other, please state	[ ]

---

13. Would you alter your opinion to question number 9 when looking at inventory management on an international scale?

Yes [ ] please give details
No [ ]

14. Have you ever used Variance Analysis or Turnover Ratios?

Yes [ ] please give details below
No [ ]

If so, how often have you used these:

Very often?	[ ]		
Often?	[ ]		
Seldom?	[ ]	Once or twice?	[ ]

15. The risks faced by businesses in the international environment with reference to managing inventory are seen as just another business risk. As regards this statement do you:

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

16. To what extent would you alter your inventory policies to adjust for the additional risk faced in the international environment? Please indicate on the scale below:

Scale	Would not	A Little	Rigorously
	0	5	10

17. Please indicate the level of importance given to the management of stocks/ work in progress in your organisation in accomplishing the overall goal of the firm?

Scale;
please mark
the scale with an X

10	Vital
	Important
5	
	Not Important
0	

18. How often are inventory policies reviewed?

Very often [ ]
Often [ ]
Seldom [ ]
Once or twice [ ]
Do not know [ ]

RECEIVABLES

19. Approximately, what proportion of your sales are made on credit?

< 10 %	[ ]
10 - 25 %	[ ]
25 - 50 %	[ ]
50 - 100 %	[ ]
Do not know	[ ]

20. Please indicate which of the following factors you regard as important factors in determining receivables policy. Please rank in order of importance: 1= Very Important 5= Not Important

Interest cost of credit	[ ]
Losses from bad debts	[ ]
Impact of credit on sales	[ ]
Cash flow effect	[ ]
Other, please state below	[ ]

21. In the evaluation of credit applicants do you use or have you ever used an outside agency?

Very often	[ ]
Often	[ ]
Seldom	[ ]
Once or twice	[ ]
Never	[ ]

22. Which of the following techniques do you recognise as being used or which have been used in the past? Please tick the appropriate box.

Five C's model	[ ]
Sequential decision making	[ ]
Simple probability model	[ ]
Linear discriminant model	[ ]
None	[ ]

23. When dealing with a credit applicant from abroad, would you alter your response to question 20?

Yes [ ]
No [ ]

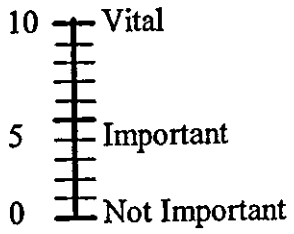
Please briefly explain your choice

---

24. Where is the monitoring of accounts receivable done?

Centrally [ ]
Locally [ ]
Both of above [ ]
Other, please state where [ ]

25. How important do you regard the effective management of receivables to the overall survival of the firm? Please indicate on the scale below:



26. Please indicate any issues of major concern when managing receivables?

ACCOUNTS PAYABLE

27. Approximately what proportion of your total cash outflow is made up of trade payables?

< 10 %	[ ]
10 - 25 %	[ ]
25 - 50 %	[ ]
50 - 100%	[ ]
Don't know	[ ]

28. Many suppliers offer credit facilities in order to induce sales and compete successfully, If you were offered anything different, how would you evaluate this? Would you:

Ignore terms	[ ]
Evaluate - cost of funds	[ ]
Evaluate - other, please state below	[ ]

---

29. If you have cash flow problems do you find it expedient to delay payments to creditors?

Yes	[ ]
No	[ ]

Please explain your decision.

---

30. What do you think about the 'legislation' which if enacted will impose fixed interest on late payments to suppliers?

Please indicate below:

What legislation?	Disagree	Neutral	Agree

31. How often do you review suppliers?

Very often	[ ]
Often	[ ]
Seldom	[ ]
Once or twice	[ ]

32. Please describe the monitoring of payables on each of the scales below by circling the number that best describe this management area.

Centrally	1	2	3	4	5	Locally
Monthly	1	2	3	4	5	Yearly

33. What role if any do banks and other financial institutions play when managing payables?

None	[ ]
A little	[ ]
A lot	[ ]

34. Under a recessionary environment which of the following do you regard as

A) appropriate in the right circumstances
B) hardly applicable
C) totally inappropriate to corporate asset/liability management

Deliberate remote disbursement	[ ]
Controlled disbursements	[ ]
Stretching of payables	[ ]
Debt factoring	[ ]
Monitoring of payables	[ ]

35. What new techniques have you used to manage payables in the recessionary environment ?

---

36. Which of the following factors affect your payables policy in the light of international trade? Please rank in order of importance.1= Very Important 5= Not Important.

Exchange rates	[ ]
Time delays	[ ]
Credit risks	[ ]
Taxation	[ ]
High transaction costs	[ ]
Attitudes towards cash management	[ ]
Information availability	[ ]

[illegible] [ ]

CORPORATE CASH MANAGEMENT

The effective cash management of inventory, receivables and payables frees up cash, but the ultimate benefit is predicated on the effectiveness of the company's cash management system.

37. Please indicate which of the following paper based and electronic based payment systems you have in place at present:

Electronic based		Paper based	
Wire transfers -Bilateral	[ ]	Cheque	[ ]
Automated clearing houses (ACH)	[ ]	Drafts	[ ]
Debit/ Credit cards	[ ]	Depository Tfrs	[ ]

38. Which of the listed systems do you have in place to deal with international payments?

SWIFT	[ ]
CHAPS	[ ]
Other, please indicate	[ ]

---

39. Are your cash disbursements centralised or decentralised?

Centralised	[ ]
Decentralised	[ ]
Decentralised with central overview	[ ]
Other, please indicate below	[ ]

---

40. Please indicate the level of automation in the following areas; please mark clearly with X:

Payables	High
	Moderate
	Low
Receivables	High
	Moderate
	Low

41. Please indicate which risks need to be evaluated when administering international disbursements?

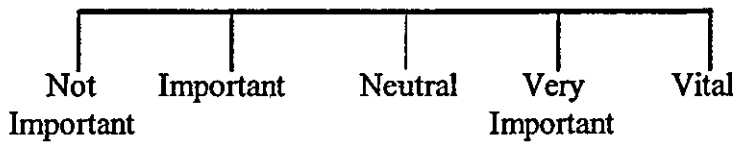
Banking system	[ ]
Country risk	[ ]
Foreign exchange	[ ]
Political risk	[ ]
Other, please state below	[ ]

---

42. Which of the following payment systems do you use for intra corporate payments?

None	[ ]
Electronic funds transfer (EFT)	[ ]
BACS	[ ]
Cheques	[ ]

43. How important are customer attitudes towards the various payment systems?
Please indicate on the scale below with X:
Scale:



44. How would you briefly describe the aims of your overall disbursement policy?

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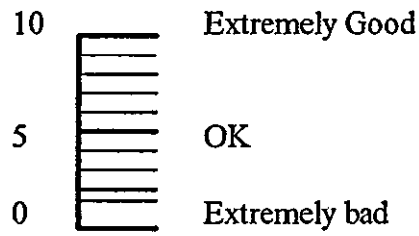
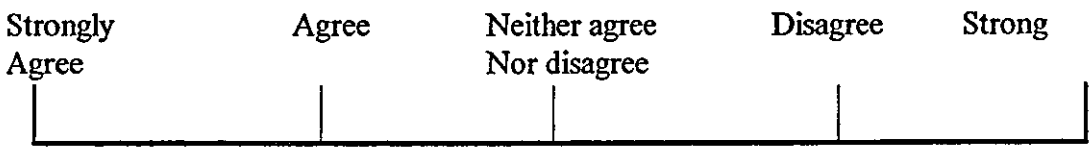
45. How would you describe your relationship with your bank /s?
Please mark clearly on the scale below:



46. It seems that many firms see the net cash position as a good indicator of how well one has managed debtors, payables and stock. Do you:



ppendix (III)

NALYSIS 1		SIZE							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
dit	1	2.166667	-1.166667	1.361111		1	2.1	-1.1	1.21
k	1	2.166667	-1.166667	1.361111		1	2.1	-1.1	1.21
	1	2.166667	-1 166667	1.361111		1	2.1	-1.1	1 21
	3	2.166667	0 833333	0.694444		1	2 1	-1 1	1.21
	3	2.166667	0.833333	0.694444		1	2.1	-1.1	1.21
	4	2 166667	1 833333	3 361111		2	2 1	-0.1	0 01
						2	2.1	-0.1	0.01
						3	2 1	0 9	0.81
						4	2.1	1.9	3.61
						5	2.1	2 9	8.41
al x	13					21			
an	2.166667					2.1			
al Squared / n				1.472222					1.89
ndard deviation =			x =	1 213352				y =	1.374773
Squared/n				0 24537					0 189
are root of (E24+J24)			0 659068						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n)									
			Z =	0 101153					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2.8	-1.8	3.24		1	2.2	-1.2	1.44
	1	2.8	-1.8	3.24		1	2.2	-1.2	1.44
	3	2.8	0.2	0.04		2	2.2	-0.2	0.04
	4	2.8	1.2	1.44		3	2.2	0.8	0.64
	5	2.8	2.2	4.84		4	2.2	1.8	3 24
	14					11			
	2.8					2.2			
Squared / n				2.56					1.36
ard deviation =			x =	1.6				y =	1.16619
uared/n				0.512					0 272
e root of (E24+J24)			0 885438						
rst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0 677631					

	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
ng	1	2	-1	1		1	2.7	-1.7	2.89
	1	2	-1	1		1	2.7	-1 7	2.89
	2	2	0	0		1	2.7	-1.7	2.89
	2	2	0	0		1	2.7	-1.7	2.89
	4	2	2	4		3	2.7	0.3	0.09
						3	2.7	0.3	0.09
						3	2.7	0.3	0.09
						4	2.7	1.3	1.69
						5	2.7	2.3	5.29
						5	2.7	2 3	5.29
x	10					27			
	2					2.7			
Squared / n				1 2					2.41
ard deviation =			x =	1.095445				y =	1.552418
uared/n				0 24					0.241
e root of (E24+J24)			0.693542						
rst sample mean - second sample mean)/ St error of difference between means									
r of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-1.00931					

		Overseas Involvement								
ing	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.5	-1.5	2.25		1	2.8	-1.8	3.24	
	2	2.5	-0.5	0.25		1	2.8	-1.8	3.24	
	2	2.5	-0.5	0.25		3	2.8	0.2	0.04	
	5	2.5	2.5	6.25		4	2.8	1.2	1.44	
						5	2.8	2.2	4.84	
x	10					14				
	2.5					2.8				
Squared / n				2.25					2.56	
ard deviation =			x =	1.5				y =	1.6	
quared/n				0.5625					0.512	
e root of (E24+J24)			1.036581							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0.28941						

quared Distribution Test						
						(O-E)squ/E
		0bserved	Exp	Obs - Exp	(O-E) squ	
		8	3.2	4.8	23 04	7.2
		2	3.2	-1.2	1.44	0.45
		3	3.2	-0.2	0.04	0.0125
		2	3.2	-1.2	1.44	0.45
		1	3 2	-2.2	4.84	1.5125
	Total x	16				
	mean x	3.2				
	Total	X " Squared				9.625
	Degrees of freedom V = n-1,					
	For a 0.05 level of significance, critical value =					9.49
		Thererfore reject assumption that response				
		is independant of ranking of scale.				
		Result is significant if calculated value				
		exceeds crtical value.				
uared Distribution Test						
						(O-E)squ/E
		0bserved	Exp	Obs - Exp	(O-E) squ	
g Risk		6	3	3	9	3
		2	3	-1	1	0 333333
		3	3	0	0	0
		2	3	-1	1	0 333333
		2	3	-1	1	0.333333
	Total x	15				
	mean x	3				
	Total	X " Squared				4
	Degrees of freedom V = n-1,					
	For a 0 05 level of significance, critical value =					9 49
		Dont reject hypothesis -				
		Result is insignificant since the calculated				
		value is less than the critical value				

NALYSIS 2									
	The ranking of working capital acconts as affected by the International environment								
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.25	-0.25	0.0625		1	1.4	-0.4	0.16
tors	1	1.25	-0.25	0.0625		1	1.4	-0.4	0.16
	1	1.25	-0.25	0.0625		1	1.4	-0.4	0.16
	2	1.25	0.75	0.5625		1	1.4	-0.4	0.16
						1	1.4	-0.4	0.16
						1	1.4	-0.4	0.16
						2	1.4	0.6	0.36
						2	1.4	0.6	0.36
						2	1.4	0.6	0.36
						2	1.4	0.6	0.36
l x	5					14			
n	1.25					1.4			
l Squared / n				0.1875					0.24
dard deviation =			x =	0 433013				y =	0 489898
Squared/n				0.046875					0.024
are root of (E24+J24)			0 266224						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.56344					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
rs									
	1	1.333333	-0.333333	0.111111		1	1.8	-0.8	0.64
	1	1.333333	-0.333333	0.111111		2	1 8	0 2	0.04
	2	1.333333	0.666667	0.444444		2	1.8	0.2	0.04
						2	1.8	0.2	0.04
						2	1 8	0 2	0.04
x	4					9			
	1.333333					1.8			
Squared / n				0.222222					0.16
ard deviation =			x =	0.471404				y =	0.4
quared/n				0.074074					0.032
e root of (E24+J24)			0.32569						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n)									
			Z =	-1.43286					

	SIZE									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.8	-1.8	3.24		1	2.75	-1.75	3.0625	
tors	1	2.8	-1.8	3.24		1	2.75	-1.75	3.0625	
	2	2 8	-0.8	0.64		2	2.75	-0.75	0.5625	
	5	2.8	2.2	4.84		2	2.75	-0.75	0.5625	
	5	2.8	2.2	4.84		3	2.75	0.25	0.0625	
						4	2.75	1.25	1.5625	
						4	2.75	1.25	1.5625	
						5	2.75	2.25	5.0625	
x	14					22				
	2.8					2.75				
Squared / n				3.36					1.9375	
ard deviation =			x =	1.83303				y =	1.391941	
quared/n				0.672					0.242188	
e root of (E24+J24)			0 956132							
rst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0.052294						

		Overseas Involvement							
	50-75					75+			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
tors									
	2	3.25	-1.25	1.5625		1	2.5	-1.5	2.25
	2	3.25	-1.25	1.5625		2	2.5	-0.5	0.25
	4	3.25	0.75	0.5625		3	2.5	0.5	0.25
	5	3 25	1.75	3.0625		4	2.5	1.5	2.25
x	13					10			
	3.25					2.5			
Squared / n				1.6875					1.25
ard deviation =			x =	1.299038				y =	1.118034
quared/n				0 421875					0.3125
e root of (E24+J24)			0.856957						
rst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0 87519					

	SIZE									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	3	-2	4		1	2.625	-1.625	2.640625	
(	3	3	0	0		2	2.625	-0.625	0.390625	
	3	3	0	0		2	2.625	-0.625	0.390625	
	5	3	2	4		2	2.625	-0.625	0.390625	
						2	2.625	-0.625	0.390625	
						4	2.625	1.375	1.890625	
						4	2.625	1.375	1.890625	
						4	2.625	1.375	1.890625	
x	12					21				
)	3					2.625				
Squared / n				2					1.234375	
dard deviation =			x =	1.414214				y =	1.111024	
squared/n				0.5					0.154297	
re root of (E24+J24)			0.808886							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0.4636						

		Overseas Involvement							
	50-75					75+			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	3	-1	1		2	2.75	-0.75	0.5625
	2	3	-1	1		2	2.75	-0.75	0.5625
	4	3	1	1		3	2.75	0.25	0.0625
	4	3	1	1		4	2.75	1.25	1.5625
x	12					11			
	3					2.75			
Squared / n				1					0.6875
ard deviation =			x =	1				y =	0.829156
quared/n				0.25					0.171875
e root of (E24+J24)			0 649519						

irst sample mean - second sample mean)/ St error of difference between means

or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

			.Z =	0 3849					

	SIZE									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	1.8	-0.8	0 64		1	2 125	-1.125	1.265625	
	1	1.8	-0.8	0.64		1	2.125	-1.125	1.265625	
	1	1.8	-0.8	0.64		1	2.125	-1.125	1.265625	
	3	1.8	1.2	1.44		2	2.125	-0.125	0.015625	
	3	1.8	1.2	1.44		2	2.125	-0.125	0.015625	
						3	2.125	0.875	0.765625	
						3	2 125	0 875	0.765625	
						4	2 125	1.875	3.515625	
x	9					17				
	1.8					2.125				
Squared / n				0.96					1.109375	
lard deviation =			x =	0.979796				y =	0.330719	
quared/n				0.192					0 013672	
re root of (E24+J24)			0.453511							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0.71663						

		Overseas Involvement							
	50-75					75+			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2.5	-1.5	2.25		1	2.25	-1.25	1.5625
	2	2.5	-0.5	0.25		2	2.25	-0 25	0.0625
	3	2.5	0.5	0.25		3	2.25	0.75	0.5625
	4	2.5	1.5	2.25		3	2 25	0.75	0.5625
x	10					9			
	2.5					2.25			
Squared / n				1.25					0.6875
dard deviation =			x =	1.118034				y =	0 829156
Squared/n				0.3125					0.171875
re root of (E24+J24)			0 695971						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0.359211					

ALYSIS 3

extent to which short term decisions are centralised

	SIZE x	meanx	(x-xmean)	Squared	y	meany	(y-ymean)	Squared
	1	2.333333	-1.33333	1.777778	1	3 875	-2.875	8.265625
	2	2 333333	-0.33333	0.111111	1	3 875	-2.875	8.265625
	2	2.333333	-0.33333	0.111111	2	3.875	-1.875	3.515625
	3	2.333333	0.666667	0.444444	2	3.875	-1.875	3.515625
	3	2.333333	0.666667	0.444444	5	3.875	1.125	1.265625
	3	2 333333	0 666667	0.444444	5	3.875	1.125	1.265625
					5	3.875	1.125	1.265625
					5	3.875	1.125	1.265625
					5	3 875	1.125	1.265625
Total x	14				31			
Mean	2.333333				3 875			
Total Squared / n				0.555556			3.321181	
Standard deviation =			x =	0.745356		y=	1.822411	
Std Squared/n				0.092593			0.36902	
Square root of (E24+J24)			0.679421					

Z =(First sample mean - second sample mean)/ St error of difference between means

St error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = -2.26909

ANALYSIS 4		SIZE							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1 666667	-0.66667	0.444444		1	1.8	-0.8	0.64
	1	1.666667	-0 66667	0.444444		1	1.8	-0.8	0.64
	2	1.666667	0.333333	0.111111		2	1.8	0.2	0.04
	2	1.666667	0.333333	0.111111		2	1.8	0.2	0.04
	2	1.666667	0.333333	0.111111		2	1.8	0.2	0.04
	2	1.666667	0.333333	0.111111		2	1.8	0.2	0.04
						2	1.8	0.2	0.04
						2	1.8	0.2	0.04
						2	1 8	0.2	0.04
						2	1.8	0.2	0.04
Total x	10					18			
Mean	1 666667					1 8			
Total Squared / n				0.222222					0.16
Standard deviation =			x =	0.4714				y =	0.4
Std Squared/n				0.037036					0.016
Square root of (E24+J24)			0.23029						

Z =(First sample mean - second sample mean)/ St error of difference between means

St error of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n}

Z = -0.57898

			Overseas Involvement						
		x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
		1	1.666667	-0.66667	0.444444		1	1.75	-0.75	0.5625
		1	1.666667	-0.66667	0.444444		2	1.75	0.25	0.0625
		2	1.666667	0.333333	0.111111		2	1.75	0.25	0.0625
		2	1.666667	0.333333	0.111111		2	1.75	0.25	0.0625
		2	1.666667	0.333333	0.111111					
		2	1.666667	0.333333	0.111111					
	Total x	10					7			
	Mean	1.666667					1 75			
	Total Squared / n				0 222222					0.1875
	Standard deviation =			x =	0.4714				y =	0.433
	Std Squared/n				0.055554					0.046872
	Square root of (E24+J24)			0.32						
	Z =(First sample mean - second sample mean)/ St error of difference between means									
	St error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
				Z =	-0.26042					

ALYSIS 5		SIZE							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1	0	0		1	1.3	-0 3	0.09
	1	1	0	0		1	1.3	-0.3	0.09
	1	1	0	0		1	1.3	-0.3	0.09
	1	1	0	0		1	1.3	-0 3	0.09
	1	1	0	0		1	1.3	-0.3	0.09
	1	1	0	0		1	1.3	-0.3	0.09
						1	1.3	-0.3	0 09
						2	1.3	0.7	0.49
						2	1.3	0.7	0.49
						2	1.3	0.7	0.49
al x	6					13			
an	1					1.3			
al Squared / n				0					0.21
ndard deviation =			x =	0				y =	0.458257
Squared/n				0					0.021
uare root of (E24+J24)			0.1449						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-2.07039					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.666667	-0 666667	0.444444		1	1.75	-0.75	0.5625
	1	1.666667	-0.666667	0.444444		2	1.75	0.25	0.0625
	2	1.666667	0.333333	0.111111		2	1.75	0.25	0.0625
	2	1.666667	0.333333	0.111111		2	1.75	0.25	0.0625
	2	1.666667	0.333333	0.111111					
	2	1.666667	0.333333	0.111111					
al x	10					7			
n	1.666667					1.75			
al Squared / n				0.222222					0.1875
ndard deviation =			x =	0 4714				y =	0.433
Squared/n				0.055554					0 046872
are root of (E24+J24)			0 32						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 26042					

				INVENTORY						
tors Important		SIZE								
NALYSIS 6										
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.2	-1.2	1.44		1	2	-1	1	
hase	2	2.2	-0.2	0.04		2	2	0	0	
luction	2	2.2	-0.2	0.04		2	2	0	0	
	3	2.2	0 8	0.64		2	2	0	0	
	3	2.2	0.8	0 64		2	2	0	0	
						3	2	1	1	
l x	11					12				
n	2.2					2				
l Squared / n .				0.56					0 333333	
dard deviation =			x =	0.74833				y =	0.57735	
Squared/n				0.112					0.055556	
are root of (E24+J24)			0.40934							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0 488591						

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2	-1	1		2	2.2	-0.2	0 04
	2	2	0	0		2	2.2	-0.2	0 04
	3	2	1	1		2	2.2	-0.2	0.04
						2	2.2	-0.2	0.04
						3	2 2	0.8	0.64
l x	6					11			
n	2					2.2			
l Squared / n				0 666667					0.16
ndard deviation =			x =	0.8165				y =	0.4
Squared/n				0.133334					0.032
are root of (E24+J24)			0.4066						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 49188					

	Input Data									
)										
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.2	-1.2	1.44		1	2	-1	1	
ding	2	2.2	-0.2	0.04		2	2	0	0	
sts	2	2.2	-0.2	0.04		2	2	0	0	
	3	2.2	0 8	0 64		2	2	0	0	
	3	2.2	0.8	0 64		2	2	0	0	
						3	2	1	1	
tal x	11					12				
an	2.2					2				
tal Squared / n				0.56					0.333333	
ndard deviation =			x =	0.74833				y =	0.57735	
Squared/n				0.112					0.055556	
uare root of (E24+J24)			0.40934							
(First sample mean - second sample mean)/ St error of difference between means										
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0 488591						

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2	-1	1		2	2.2	-0 2	0.04
	2	2	0	0		2	2.2	-0 2	0.04
	3	2	1	1		2	2.2	-0.2	0.04
						2	2.2	-0 2	0.04
						3	2.2	0 8	0.64
al x	6					11			
an	2					2.2			
al Squared / n				0.666667					0.16
ndard deviation =			x =	0.8165				y =	0.4
Squared/n				0.133334					0.032
uare root of (E24+J24)			0 4066						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.49188					

RAUCATION.									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.833333	-0.833333	0 694444		2	2	0	0
	1	1.833333	-0.833333	0 694444		2	2	0	0
	2	1.833333	0.166667	0.027778		2	2	0	0
	2	1.833333	0.166667	0.027778		2	2	0	0
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0 027778					
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0.027778					
	2	1.833333	0.166667	0.027778					
x	22					8			
	1.833333					2			
Squared /n				0.138889					0
ard deviation =			x =	0.37268				y =	0
quared/n				0.011574					0
e root of (E24+J24)			0.3402						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 48991					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2	0	0		2	2	0	0
	2	2	0	0		2	2	0	0
	2	2	0	0		2	2	0	0
	2	2	0	0		2	2	0	0
						2	2	0	0
x	8					10			
	2					2			
Squared / n				0					0
lard deviation =			x =	0				y =	0
quared/n				0					0
re root of (E24+J24)			0						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	#DIV/0!					

ALYSIS 7		SIZE								
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	1.571429	-0.571429	0.326531		1	1	0	0	
	1	1.571429	-0.571429	0.326531		1	1	0	0	
	1	1.571429	-0.571429	0.326531		1	1	0	0	
	2	1.571429	0.428571	0.183673		1	1	0	0	
	2	1.571429	0 428571	0.183673		1	1	0	0	
	2	1.571429	0.428571	1.142857		1	1	0	0	
	2	1.571429	0.428571	1.142857		1	1	0	0	
						1	1	0	0	
						1	1	0	0	
						1	1	0	0	
l x	11					10				
n	1.571429					1				
l Squared / n				0 51895					0	
dard deviation =			x =	0.72038				y =	0	
Squared/n				0.074135					0	
are root of (E24+J24)			0.272277							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	2.098703						

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1	0	0		1	1.25	-0.25	0.0625
	1	1	0	0		1	1.25	-0.25	0.0625
	1	1	0	0		1	1 25	-0 25	0.0625
	1	1	0	0		2	1.25	0.75	0.5625
	1	1	0	0					
x	5					5			
	1					1.25			
Squared / n				0					0.1875
ard deviation =			x =	0				y =	0.433
quared/n				0					0.046872
e root of (E24+J24)			0 2165						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-1.15473					

LYSIS 9									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2.333333	-0.333333	0.111111		1	2.1	-1.1	1.21
	2	2.333333	-0.333333	0.111111		2	2.1	-0.1	0.01
	2	2.333333	-0.333333	0 111111		2	2.1	-0.1	0.01
	2	2.333333	-0.333333	0.111111		2	2.1	-0.1	0.01
	3	2.333333	0.666667	0.444444		2	2.1	-0.1	
	3	2.333333	0.666667	0.444444		2	2.1	-0.1	
						2	2.1	-0.1	
						2	2.1	-0.1	
						2	2.1	-0.1	
						2	2.1	-0.1	
						2	2.1	-0.1	
x	14					21			
	2.333333					2.1			
Squared /n				0.222222					0.124
ard deviation =			x =	0 4714				y =	0.352136
quared/n				0 037036					0.0124
e root of (E24+J24)			0 2234						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1 044464					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2	-1	1		2	2.25	-0.25	0.0625
	2	2	0	0		2	2.25	-0.25	0 0625
	2	2	0	0		2	2.25	-0.25	0.0625
	3	2	1	1		3	2.25	0.75	0.5625
x	8					9			
	2					2.25			
Squared / n				0 5					0.1875
ard deviation =			x =	0.70712				y =	0.433
quared/n				0 125005					0.046872
e root of (E24+J24)			0.4146						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.60299					

		Centralisation							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.846154	-0.846154	0.715976		2	2.666667	-0.66667	0.444444
	1	1.846154	-0.846154	0.715976		3	2.666667	0.33333	0.111111
	2	1.846154	0.153846	0.023669		3	2.666667	0.33333	0.111111
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0 023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0.023669					
	2	1.846154	0.153846	0 023669					
x	24					8			
	1.846154					2 666667			
Squared / n				0.130178					0.222222
dard deviation =			x =	0 3608				y =	0.4714
quared/n				0 010014					0.074073
re root of (E24+J24)			0.28998						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-2.82955					

	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1	0	0		1	1	0	0
	1	1	0	0		1	1	0	0
	1	1	0	0		1	1	0	0
	1	1	0	0		1	1	0	0
						1	1	0	0
						1	1	0	0
						1	1	0	0
						1	1	0	0
x	4					8			
	1					1			
Squared /n				0					0
dard deviation =			x =	0				y =	0
quared/n				0					0
re root of (E24+J24)			0						
First sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	#DIV/0!					

		Overseas Involvement								
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	1	0	0		1	1	0	0	
	1	1	0	0		1	1	0	0	
	1	1	0	0		1	1	0	0	
	1	1	0	0		1	1	0	0	
x	4					4				
	1					1				
Squared / n				0					0	
ard deviation =			x =	0				y =	0	
quared/n				0					0	
e root of (E24+J24)			0							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	#DIV/0!						

ALYSIS 10									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.5	-0.5	0.25		1	1.777778	-0.77778	0 604938
	1	1.5	-0.5	0.25		1	1.777778	-0 77778	0.604938
	1	1.5	-0.5	0.25		1	1.777778	-0 77778	0.604938
	1	1.5	-0.5	0.25		1	1.777778	-0.77778	0.604938
	2	1.5	0.5	0.25		1	1.777778	-0 77778	0.604938
						2	1.777778	0 22222	0.049383
						3	1.777778	1.22222	1.493827
						3	1.777778	1.22222	1.493827
						3	0	3	9
I x	6					16			
n	1.5					1.777778			
J Squared /n				0.3125					1.673525
dard deviation =			x =	0.559				y =	1.2936
Squared/n				0.07812					0.185933
are root of (E24+J24)			0.51386						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 54057					

		Overseas Involvement							
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2	-1	1		1	1	0	0
	1	2	-1	1		1	1	0	0
	2	2	0	0		1	1	0	0
	3	2	1	1					
	3	2	1	1					
x	10					3			
	2					1			
Squared / n				0.8					0
dard deviation =			x =	0 89442				y =	0
Squared/n				0.159997					0
re root of (E24+J24)			0.399996						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	2 500025					

ralisation									
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.666667	-0.666667	0 444444		1	1.5	-0.5	0.25
	1	1.666667	-0.666667	0.444444		1	1.5	-0.5	0.25
	3	1.666667	1.333333	1.777778		1	1.5	-0.5	0.25
						1	1.5	-0.5	0.25
						1	1.5	-0.5	0 25
						1	1.5	-0.5	0 25
						3	1.5	1.5	2 25
						3	1.5	1.5	2 25
x	5					12			
n	1.666667					1.5			
Squared / n				0.888889					0.1875
dard deviation =			x =	0.94281				y =	0.433013
Squared/n				0 296297					0.023437
re root of (E24+J24)			0 565402						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0 294776					

NALYSIS 11

e

	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.2	-0.2	0.04		1	1.666667	-0.66667	0.444444
	1	1.2	-0.2	0.04		1	1.666667	-0.66667	0.444444
	1	1.2	-0.2	0.04		1	1.666667	-0.66667	0.444444
	1	1.2	-0.2			1	1.666667	-0 66667	0.444444
	2	1.2	0.8			2	1.666667	0 33333	0.111111
						2	1.666667	0.33333	0.111111
						2	1.666667	0.33333	0 111111
						2	1 666667	0 33333	0.111111
						3	1 666667	1 33333	1 777778
al x	6					15			
an	1.2					1.666667			
al Squared / n				0.024					0 222222
ndard deviation =			x =	0.15492				y =	0.471402
Squared/n				0.0048					0 024691
uare root of (E24+J24)			0 227398						

(First sample mean - second sample mean)/ St error of difference between means

error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = -2 0522

rseas Involvement									
	)								
	25-50					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.666667	-0.666667	0.444444		1	1.8	-0.8	0.64
	1	1.666667	-0.666667	0.444444		1	1.8	-0 8	0.64
	3	1.666667	1.333333	1.777778		2	1.8	0.2	0.04
						2	1.8	0.2	0.04
						3	1.8	1.2	1.44
al x	5					9			
n	1.666667					1.8			
al Squared / n				0 888889					0.56
ndard deviation =			x =	0.94281				y =	0 7483
Squared/n				0.296297					0.111991
are root of (E24+J24)			0.63897						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 20867					

tralisation									
	)								
	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2	-1	1		1	1.5	-0.5	0.25
	2	2	0	0		1	1.5	-0.5	0.25
	3	2	1	1		1	1.5	-0.5	0.25
						1	1.5	-0.5	0.25
						1	1.5	-0.5	0.25
						2	1.5	0.5	0.25
						2	1.5	0.5	0.25
						3	1.5	1.5	2.25
al x	6					12			
an	2					1.5			
al Squared / n				0 666667					0.1875
ndard deviation =			x =	0.8165				y =	0.433013
Squared/n				0 222224					0 023437
are root of (E24+J24)			0.495658						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1.00876					

ANALYSIS 12									
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2	0	0		1	1 888889	-0 88889	0.790123
	2	2	0	0		2	1 888889	0 11111	0 012346
	2	2	0	0		2	1 888889	0.11111	0.012346
	2	2	0	0		2	1.888889	0 11111	0.012346
	2	2	0	0		2	1 888889	0.11111	0.012346
						2	1 888889	0.11111	0.012346
						2	1 888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
l x	10					17			
n	2					1 888889			
l Squared / n				0					0 09465
dard deviation =			x =	0				y =	0.307409
Squared/n				0					0.0105
are root of (E24+J24)			0 10247						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1 084333					

seas Involvement									
	25-50					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.666667	-0 666667	0.444444		2	2	0	0
	2	1.666667	0.333333	0.111111		2	2	0	0
	2	1.666667	0.333333	0.111111		2	2	0	0
						2	2	0	0
						2	2	0	0
l x	5					10			
ı	1.666667					2			
l Squared / n				0.222222					0
dard deviation =			x =	0.471402				y =	0
Squared/n				0.074073					0
ıre root of (E24+J24)			0 27216						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-1.22477					

ntralisation									
	)								
	)								
	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2	0	0		1	1.875	-0.875	0.765625
	2	2	0	0		2	1.875	0.125	0.015625
	2	2	0	0		2	1.875	0.125	0.015625
						2	1 875	0.125	0 015625
						2	1.875	0.125	0.015625
						2	1 875	0 125	0 015625
						2	1 875	0.125	0.015625
						2	1.875	0 125	0.015625
al x	6					15			
an	2					1.875			
al Squared / n				0					0.105469
ndard deviation =			x =	0				y =	0.32476
Squared/n				0					0.013184
uare root of (E24+J24)			0.1148						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1.08885					

ALYSIS 13									
tralisation									
	None					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2	0	0		1	2.125	-1.125	1.265625
	2	2	0	0		2	2.125	-0.125	0.015625
	2	2	0	0		2	2.125	-0.125	0 015625
						2	2.125	-0.125	0.015625
						2	2 125	-0.125	0.015625
						2	2.125	-0 125	0 015625
						3	2.125	0 875	0.765625
						3	2.125	0 875	0.765625
al x	6					17			
n	2					2.125			
al Squared / n				0					0.167969
ndard deviation =			x =	0				y =	0.40984
Squared/n				0					0.020996
are root of (E24+J24)			0 1449						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 86266					

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.666667	-0.666667	0.444444		2	2.2	-0.2	0 04
	1	1.666667	-0.666667	0.444444		2	2.2	-0 2	0.04
	3	1.666667	1.333333	1.777778		2	2.2	-0 2	0.04
						2	2.2	-0.2	0.04
						3	2.2	0 8	0.64
x	5					11			
	1.666667					2.2			
Squared / n				0 888889					0.16
dard deviation =			x =	0.942809				y =	0.4
Squared/n				0.296296					0.032
re root of (E24+J24)			0 572971						
First sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.93082					

NALYSIS 14									
e									
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	5	8.2	-3.2	10.24		3	6.4	-3.4	11.56
	6	8.2	-2.2	4 84		4	6.4	-2.4	5.76
	10	8.2	1.8	3 24		5	6.4	-1.4	1.96
	10	8.2	1.8	3 24		5	6.4	-1.4	1.96
	10	8.2	1.8	3 24		5	6 4	-1.4	1.96
						5	6.4	-1.4	1.96
						8	6.4	1.6	2.56
						9	6.4	2.6	6.76
						10	6.4	3.6	2.8
						10	6.4	3.6	2 8
al x	41					64			
an	8 2					6 4			
al Squared / n				4.96					2.516
ndard deviation =			x =	2 227				y =	1.5862
Squared/n				0 991906					0.251603
are root of (E24+J24)			1.11513						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1.614162					

rseas Involvement									
	50-75					75+			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	3	5.8	-2.8	7.84		5	6 25	-1.25	1.5625
	4	5.8	-1.8	3.24		5	6 25	-1.25	1.5625
	5	5.8	-0.8	0.64		5	6.25	-1.25	1.5625
	8	5.8	2.2	4.84		10	6.25	3.75	14.0625
	9	5.8	3.2	10.24					
al x	29					25			
n	5.8					6.25			
al Squared / n				5.36					4.6875
ndard deviation =			x =	2.3152				y =	2.1651
Squared/n				1.07203					1.171915
are root of (E24+J24)			1.49798						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.3004					

ıtralisation									
	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	3	6	-3	9		4	7.444444	-3.44444	11.8642
	5	6	-1	1		5	7.444444	-2.44444	5.975309
	10	6	4	16		5	7.444444	-2.44444	5.975309
						5	7.444444	-2.44444	5.975309
						8	7.444444	0.55556	0.308642
						10	7.444444	2.55556	6.530864
						10	7.444444	2.55556	6.530864
						10	7.444444	2.55556	6.530864
						10	7.444444	2.55556	6.530864
al x	18					67			
an	6					7.444444			
al Squared / n				8.666667					4.069959
ndard deviation =			x =	2.943902				y =	2.0174
Squared/n				2.888853					0.452211
uare root of (E24+J24)			1.827858						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.79024					

ALYSIS 15

NVL					VL			
x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
1	2	-1	1		2	2.1	-0.1	0.01
1	2	-1	1		2	2.1	-0.1	0 01
2	2	0	0		2	2.1	-0.1	0.01
3	2	1	1		2	2.1	-0.1	0.01
3	2	1	1		2	2.1	-0.1	0.01
					2	2.1	-0.1	0.01
					2	2.1	-0.1	0.01
					2	2.1	-0.1	0.01
					2	2.1	-0 1	2 2
					3	2.1	0 9	1.2
l x 10					21			
n 2					2.1			
l Squared / n			0 8					0 006
ndard deviation =		x =	0.89443				y =	0 07746
Squared/n			0.160001					0 0006
are root of (E24+J24)		0 400751						

First sample mean - second sample mean)/ St error of difference between means

rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = -0 24953

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2.25	-1.25	1.5625		2	2.2	-0.2	0.04
	2	2.25	-0.25	0.0625		2	2.2	-0.2	0.04
	3	2.25	0.75	0.5625		2	2.2	-0.2	0.04
	3	2.25	0.75	0.5625		2	2.2	-0 2	0.04
						3	2 2	0.8	0.64
x	9					11			
n	2.25					2.2			
Squared / n				0.6875					0.16
dard deviation =			x =	0.82916				y =	0.4
Squared/n				0.171877					0.032
re root of (E24+J24)			0 45153						
First sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0.110735					

tralisation

	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2.666667	-0.666667	0.444444		1	1.888889	-0.88889	0.790123
	3	2.666667	0.333333	0.111111		1	1.888889	-0.88889	0.790123
	3	2.666667	0.333333	0.111111		2	1.888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
						2	1.888889	0.11111	0.012346
						2	1 888889	0.11111	0.012346
						3	1.888889	1.11111	1.234568
l x	8					17			
n	2.666667					1 888889			
l Squared / n				0.222222					0.18107
dard deviation =			x =	0.471402				y =	0 42552
Squared/n				0.074073					0 020119
are root of (E24+J24)			0.30691						

First sample mean - second sample mean)/ St error of difference between means

ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = 2.534221

ALYSIS 16

)

Yes					No			
x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
3	3	0	0		1	2.9	-1.9	3.61
3	3	0	0		2	2.9	-0.9	0.81
3	3	0	0		2	2.9	-0.9	0.81
					3	2.9	0.1	0.01
					3	2.9	0.1	0.01
					3	2.9	0.1	0.01
					3	2.9	0.1	0.01
					4	2.9	1.1	1.21
					4	2.9	1.1	1.21
					4	2.9	1.1	1.21
al x 9					29			
in 3					2.9			
al Squared / n			0					0 526
ndard deviation =		x =	0				y =	0.72526
Squared/n			0					0 0526
are root of (E24+J24)		0 22935						

First sample mean - second sample mean)/ St error of difference between means

rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = 0 436015

bit 30									
)									
	N/A					No			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	3	3.333333	-0.333333	0.111111		1	2 9	-1.9	3.61
	3	3.333333	-0.333333	0.111111		2	2 9	-0.9	0.81
	4	3.333333	0.666667	0.444444		2	2.9	-0.9	0.81
						3	2.9	0.1	0.01
						3	2.9	0.1	0.01
						3	2.9	0.1	0.01
						3	2.9	0.1	0.01
						4	2.9	1.1	1.21
						4	2.9	1.1	1.21
						4	2 9	1 1	1.21
l x	10					29			
n	3.333333					2.9			
l Squared / n				0.222222					0.526
dard deviation =			x =	0.471404				y =	0.72526
Squared/n				0.074074					0 0526
are root of (E24+J24)			0.355913						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1 217526					

ibit 30 - continued

	SIZE								
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	3	3.166667	-0.166667	0.027778		1	2.9	-1.9	3.61
	3	3.166667	-0.166667	0.027778		2	2.9	-0.9	0.81
	3	3.166667	-0.166667	0.027778		2	2.9	-0 9	0.81
	3	3.166667	-0.166667	0 027778		3	2.9	0 1	0.01
	3	3.166667	-0.166667	0.027778		3	2.9	0.1	0 01
	4	3.166667	0 833333	0 694444		3	2.9	0.1	0.01
						3	2.9	0.1	0.01
						4	2.9	1.1	1.21
						4	2.9	1.1	1.8
						4	2.9	1.1	1.8
al x	19					29			
n	3.166667					2.9			
al Squared / n				0.138889					0.526
ndard deviation =			x =	0 37268				y =	0.72526
Squared/n				0.023148					0 0526
are root of (E24+J24)			0 275224						

First sample mean - second sample mean)/ St error of difference between means

rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

			Z =	0 96891					

rseas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2.75	-0.75	0.5625		3	3 4	-0.4	0.16
	3	2.75	0.25	0.0625		3	3.4	-0 4	0.16
	3	2.75	0.25	0 0625		3	3.4	-0.4	0.16
	3	2.75	0.25	0.0625		4	3.4	0.6	0.36
						4	3.4	0.6	0.36
l x	11					17			
n	2.75					3.4			
l Squared / n				0.1875					0 24
ndard deviation =			x =	0.433013				y =	0.489898
Squared/n				0.046875					0.048
are root of (E24+J24)			0.308018						

First sample mean - second sample mean)/ St error of difference between means

rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

			Z =	-2.11027					

ALYSIS 17

NVL					VL			
x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
1	1.833333	-0.833333	0.694444		1	2.3	-1.3	1.69
1	1 833333	-0.833333	0.694444		2	2.3	-0.3	0.09
2	1.833333	0.166667	0.027778		2	2.3	-0.3	0 09
2	1.833333	0.166667	0.027778		2	2.3	-0.3	0.09
2	1.833333	0.166667	0.027778		2	2.3	-0 3	0 09
3	1.833333	1.166667	1.361111		2	2.3	-0.3	0 09
					2	2 3	-0.3	0 09
					2	2.3	-0 3	0.09
					3	2 3	0.7	1.6
					5	2 3	2.7	-0.4
tal x 11					23			
an 1.833333					2.3			
tal Squared / n			0 472222					0 214
andard deviation =		x =	0.687184				y =	0 4626
d Squared/n			0 078704					0.0214
uare root of (E24+J24)		0.316392						

=(First sample mean - second sample mean)/ St error of difference between means

error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = -1.47496

rseas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.5	-0.5	0.25		1	1.8	-0 8	0.64
	1	1.5	-0.5	0.25		2	1.8	0 2	0.04
	2	1.5	0.5	0.25		2	1.8	0.2	0.04
	2	1.5	0.5	0.25		2	1.8	0.2	0.04
						2	1.8	0 2	0.04
al x	6					9			
an	1.5					1.8			
al Squared / n				0 25					0 16
ndard deviation =			x =	0 5				y =	0.4
l Squared/n				0 0625					0.032
uare root of (E24+J24)			0.30741						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 9759					

tralisation

	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.75	-0.75	0.5625		1	2.4	-1.4	1.96
	2	1.75	0.25	0.0625		2	2.4	-0.4	0.16
	2	1.75	0 25	0.0625		2	2.4	-0.4	0.16
	2	1.75	0.25	0.0625		2	2.4	-0.4	0.16
						2	2.4	-0.4	0.16
						2	2.4	-0.4	0.16
						2	2.4	-0.4	0.16
						3	2.4	0 6	0 36
						3	2.4	0.6	0 36
						5	2.4	2.6	6.76
al x	7					24			
an	1.75					2.4			
al Squared / n				0.1875					0 276
ndard deviation =			x =	0.433013				y =	0.52536
Squared/n				0.046875					0.0276
uare root of (E24+J24)			0 272901						

(First sample mean - second sample mean)/ St error of difference between means

error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = -2 38182

ALYSIS 18										
	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	1.5	-0.5	0.25		1	1.444444	-0 44444	0.197531	
	1	1.5	-0.5	0.25		1	1 444444	-0.44444	0.197531	
	1	1.5	-0.5	0.25		1	1.444444	-0.44444	0 197531	
	2	1.5	0.5	0.25		1	1.444444	-0 44444	0.197531	
	2	1.5	0.5	0.25		1	1.444444	-0.44444	0.197531	
	2	1.5	0.5	0.25		2	1.444444	0.55556	0.308642	
						2	1.444444	0 55556	0 308642	
						2	1 444444	0 55556	0.308642	
						2	1.444444	0.55556	0.888889	
al x	9					13				
an	1.5					1.444444				
al Squared / n				0 25					0.144033	
ndard deviation =			x =	0.5				y =	0 379517	
Squared/n				0.041667					0.016004	
are root of (E24+J24)			0 240148							
(First sample mean - second sample mean)/ St error of difference between means										
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0 231339						

rseas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.25	-0.25	0.0625		1	1.2	-0.2	0.04
	1	1.25	-0.25	0.0625		1	1.2	-0.2	0.04
	1	1.25	-0.25	0.0625		1	1 2	-0 2	0.04
	2	1.25	0.75	0.5625		1	1.2	-0.2	0.04
						2	1.2	0.8	0.64
al x	5					6			
an	1.25					1.2			
al Squared / n				0.1875					0.16
ndard deviation =			x =	0.433013				y =	0.4
Squared/n				0.046875					0.032
are root of (E24+J24)			0.280847						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	0.178033					

tralisation									
	Extensively					Partially			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.25	-0.25	0 0625		1	1.3	-0.3	0.09
	1	1.25	-0.25	0.0625		1	1.3	-0.3	0.09
	1	1.25	-0.25	0.0625		1	1.3	-0.3	0.09
	2	1.25	0.75	0.5625		2	1.3	0.7	0.49
						2	1.3	0.7	0.49
						2	1.3	0.7	0.49
						2	1.3	0.7	0.49
						2	1.3	0.7	0.49
al x	5					13			
an	1.25					1 3			
al Squared / n				0 1875					0.2175
ndard deviation =			x =	0.433013				y =	0.46637
Squared/n				0 046875					0 027188
uare root of (E24+J24)			0 272145						
(First sample mean - second sample mean)/ St error of difference between means									
error of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0.18373					

ALYSIS 19									
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	3	-2	4		3	4.444444	-1.44444	2.08642
	1	3	-2	4		4	4.444444	-0.44444	0.197531
	3	3	0	0		4	4.444444	-0.44444	0.197531
	4	3	1	1		4	4.444444	-0.44444	0.197531
	4	3	1	1		5	4.444444	0.55556	0.308642
	5	3	2	1		5	4.444444	0.55556	0.308642
						5	4.444444	0.55556	0 308642
						5	4 444444	0.55556	0.308642
						5	4.444444	0.55556	3.888889
l x	18					40			
n	3					4.444444			
l Squared / n				1.833333					0.366255
dard deviation =			x =	1.35401				y =	0.60519
Squared/n				0.305557					0 040695
are root of (E24+J24)			0.588443						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-2.45469					

rseas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	2.25	-1.25	1.5625		4	4 8	-0.8	0.64
	1	2.25	-1.25	1.5625		5	4 8	0.2	0.04
	3	2.25	0.75	0.5625		5	4 8	0.2	0.04
	4	2.25	1.75	3.0625		5	4 8	0.2	0.04
						5	4.8	0.2	0.04
l x	9					24			
n	2.25					4.8			
l Squared / n				1.6875					0.16
ndard deviation =			x =	1.29904				y =	0 4
Squared/n				0 421876					0.032
are root of (E24+J24)			0 673703						
First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-3.78505					

LYSIS 20									
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2.25	-0.25	0.0625		1	2.285714	-1.28571	1.653061
	2	2.25	-0 25	0.0625		2	2 285714	-0.28571	0.081633
	2	2.25	-0.25	0.0625		2	2.285714	-0 28571	0.081633
	3	2.25	0 75	0.5625		2	2.285714	-0.28571	0.081633
						3	2.285714	0.71429	0.510204
						3	2.285714	0.71429	0.510204
						3	2.285714	0.71429	0.510204
x	9					16			
	2 25					2 285714			
Squared / n				0 1875					0 41691
dard deviation =			x =	0.433013				y =	0 645686
Squared/n				0 046875					0.059559
re root of (E24+J24)			0.326242						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 10947					

seas Involvement									
	25-50					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	2.666667	-0.666667	0.444444		1	2	-1	1
	3	2.666667	0.333333	0.111111		2	2	0	0
	3	2.666667	0.333333	0.111111		2	2	0	0
						2	2	0	0
						3	2	1	1
x	8					10			
	2.666667					2			
Squared / n				0.222222					0.4
lard deviation =			x =	0.471404				y =	0.63245
quared/n				0 074074					0.079999
re root of (E24+J24)			0.392521						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1 698422					

	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.166667	-0.166667	0.027778		1	1.714286	-0 71429	0 510204
	1	1.166667	-0.166667	0.027778		1	1.714286	-0.71429	0.510204
	1	1.166667	-0.166667	0.027778		1	1.714286	-0.71429	0.510204
	1	1.166667	-0.166667	0.027778		1	1.714286	-0.71429	0.510204
	1	1.166667	-0.166667	0.027778		2	1.714286	0.28571	0.081633
	2	1.166667	0.833333	0.694444		3	1.714286	1.28571	1.653061
						3	1.714286	1 28571	1.653061
l x	7					12			
ı	1.166667					1 714286			
l Squared / n				0.138889					0.539359
dard deviation =			x =	0.372678				y =	0.734411
Squared/n				0 023148					0.077051
are root of (E24+J24)			0 316542						

First sample mean - second sample mean)/ St error of difference between means

rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

			Z =	-1.73					

eas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1	0	0		1	1.6	-0 6	0.36
	1	1	0	0		1	1.6	-0.6	0.36
	1	1	0	0		1	1.6	-0 6	0.36
	1	1	0	0		2	1.6	0.4	0.16
						3	1.6	1.4	1.96
x	4					8			
	1					1.6			
Squared / n				0					0.64
lard deviation =			x =	0				y =	0.8
quared/n				0					0.128
re root of (E24+J24)			0.357771						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-1.67705					

LYSIS 20										
	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
hing of										
les	1	1.5	-0.5	0.25		1	1.857143	-0.85714	0.734694	
	1	1.5	-0 5	0 25		1	1.857143	-0.85714	0 734694	
	1	1.5	-0 5	0 25		2	1 857143	0.14286	0.020408	
	2	1.5	0 5	0 25		2	1.857143	0.14286	0.020408	
	2	1.5	0.5	0.25		2	1.857143	0 14286	0.020408	
	2	1.5	0.5	0.25		2	1 857143	0.14286	0.020408	
						3	1.857143	1.14286	1.306122	
x	9					13				
	1.5					1.857143				
Squared / n				0 25					0.221574	
lard deviation =			x =	0 5				y =	0.47072	
quared/n				0.041667					0 031654	
re root of (E24+J24)			0 241261							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-1.48032						

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
ching of									
bles	1	1.666667	-0.666667	0.444444		1	2	-1	1
	2	1.666667	0.333333	0.111111		2	2	0	0
	2	1 666667	0.333333	0.111111		2	2	0	0
						2	2	0	0
						3	2	1	1
x	5					10			
	1.666667					2			
Squared / n				0.222222					0.4
dard deviation =			x =	0 471404				y =	0 632455
quared/n				0.074074					0.08
re root of (E24+J24)			0.392523						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 84921					

	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1									
ɔring	1	1.5	-0.5	0.25		2	2.428571	-0.42857	0.183673	
	1	1.5	-0.5	0.25		2	2.428571	-0.42857	0.183673	
	1	1.5	-0.5	0.25		2	2.428571	-0.42857	0.183673	
	2	1.5	0.5	0.25		2	2 428571	-0.42857	0.183673	
	2	1.5	0.5	0.25		3	2.428571	0.57143	0.326531	
	2	1.5	0.5	0.25		3	2.428571	0.57143	0.326531	
						3	2.428571	0.57143	0.326531	
x	9					17				
	1 5					2.428571				
Squared / n				0.25					0.198251	
dard deviation =			x =	0.5				y =	0 445254	
Squared/n				0 041667					0 028322	
re root of (E24+J24)			0.264554							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-3.50995						

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
ring	1	1.666667	-0.666667	0.444444		2	2.6	-0.6	0.36
	2	1.666667	0.333333	0.111111		2	2.6	-0.6	0.36
	2	1.666667	0.333333	0.111111		3	2.6	0.4	0.16
						3	2 6	0.4	0.16
						3	2.6	0 4	0.16
x	5					13			
	1.666667					2.6			
Squared / n				0 222222					0.24
dard deviation =			x =	0 471404				y =	0.489898
quared/n				0 074074					0 048
re root of (E24+J24)			0.122074						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-7.64564					

	NVL					VL				
	) x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
toring of										
bles	1	1	0	0		1	1.428571	-0.42857	0.183673	
	1	1	0	0		1	1.428571	-0.42857	0.183673	
	1	1	0	0		1	1.428571	-0.42857	0.183673	
	1	1	0	0		1	1.428571	-0.42857	0.183673	
	1	1	0	0		1	1.428571	-0.42857	0.183673	
	1	1	0	0		2	1.428571	0.57143	0 326531	
						3	1.428571	1.57143	2 469388	
x	6					10				
	1					1 428571				
Squared / n				0					0.177843	
dard deviation =			x =	0				y =	0 421714	
Squared/n				0					0 025406	
re root of (E24+J24)			0.159393							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-2.68877						

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
toring of									
bles	1	1	0	0		1	1.5	-0.5	0.25
	1	1	0	0		1	1.5	-0.5	0.25
	1	1	0	0		1	1.5	-0.5	0.25
						3	1.5	1.5	2.25
x	3					6			
n	1					1.5			
Squared / n				0					0 75
dard deviation =			x =	0				y =	0.489898
Squared/n				0					0.06
re root of (E24+J24)			0.24495						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n)									
			Z =	-2 04123					

ALYSIS 21										
	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
ange										
s	1	1.8	-0.8	0.64		1	2.375	-1 375	1.890625	
	1	1.8	-0.8	0.64		2	2.375	-0.375	0.140625	
	1	1.8	-0.8	0.64		2	2 375	-0 375	0.140625	
	1	1.8	-0.8	0.64		2	2.375	-0.375	0.140625	
	5	1.8	3.2	10.24		2	2.375	-0.375	0.140625	
						2	2.375	-0.375	0.140625	
						4	2.375	1.625	2.640625	
						4	2.375	1.625	2 640625	
x	9					19				
	1.8					2.375				
Squared / n				2.56					0 324219	
dard deviation =			x =	1.6				y =	0.5694	
quared/n				0 512					0 040527	
re root of (E24+J24)			0 743322							
First sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0.77355						

seas Involvement										
	)									
	)									
	0-25					50-75				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
ange										
	1	2.25	-1.25	1.5625		2	2.5	-0.5	0.25	
	1	2.25	-1.25	1.5625		2	2.5	-0.5	0.25	
	2	2.25	-0.25	0.0625		2	2.5	-0.5	0.25	
	5	2 25	2.75	7.5625		4	2.5	1.5	2.25	
x	9					10				
	2.25					2.5				
Squared / n				2.6875					0 75	
lard deviation =			x =	1.63936				y =	0.866	
quared/n				0.671875					0.187489	
re root of (E24+J24)			0.92702							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0 26968						

	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
delay	1	2	-1	1		1	2.375	-1.375	1.890625
	2	2	0	0		2	2.375	-0.375	0.140625
	2	2	0	0		2	2.375	-0.375	0.140625
	3	2	1	1		2	2.375	-0.375	0.140625
						2	2.375	-0.375	0.140625
						2	2.375	-0 375	0.140625
						4	2 375	1.625	2.640625
						4	2.375	1 625	2.640625
l x	8					19			
n	2					2.375			
l Squared / n				0.5					0 324219
dard deviation =			x =	0.707107				y =	0.5694
Squared/n				0 125					0.040527
are root of (E24+J24)			0.40685						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 92172					

seas Involvement										
	0-25					50-75				
	} x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2	-1	1		2	3.75	-1.75	3.0625	
s	2	2	0	0		4	3.75	0.25	0.0625	
	3	2	1	1		4	3.75	0 25	0 0625	
						5	3.75	1 25	1.5625	
x	6					15				
	2					3.75				
Squared / n				0.666667					1.1875	
dard deviation =			x =	0.8165				y =	1 089725	
quared/n				0 222224					0.296875	
re root of (E24+J24)			0 720482							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-2 42893						

alisation										
	Extensively					Partially				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	2	3	-1	1		1	3	-2	4	
	4	3	1	1		2	3	-1	1	
s						3	3	0	0	
						3	3	0	0	
						3	3	0	0	
						3	3	0	0	
						4	3	1	1	
						5	3	2	4	
x	6					24				
	3					3				
Squared / n				1					0 625	
lard deviation =			x =	1				y =	0.79057	
quared/n				0.5					0.078125	
re root of (E24+J24)			0 76034							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0						

	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2	-1	1		1	2.888889	-1.88889	3.567901	
	2	2	0	0		1	2.888889	-1.88889	3 567901	
	3	2	1	1		1	2.888889	-1.88889	3.567901	
						2	2.888889	-0 88889	0.790123	
						4	2.888889	1.11111	1.234568	
						4	2 888889	1.11111	1.234568	
						4	2.888889	1.11111	1.234568	
						4	2.888889	1.11111	1.234568	
						5	2.888889	1.11111	0	
x	6					26				
	2					2 888889				
Squared / n				0.666667					1.55144	
lard deviation =			x =	0.816497				y =	1.245568	
quared/n				0.222222					0.172382	
re root of (E24+J24)			0.628174							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root((sd (a)squared)/n +(sd (b)squared)/n)										
			Z =	-1 41504						

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	1	1.333333	-0.333333	0.111111		1	2.75	-1.75	3.0625
	1	1.333333	-0 333333	0.111111		2	2.75	-0.75	0.5625
	2	1.333333	0.666667	0.444444		4	2.75	1.25	1.5625
						4	2.75	1.25	1.5625
x	4					11			
	1.333333					2.75			
Squared / n				0.222222					1.6875
dard deviation =			x =	0.471404				y =	1 299038
quared/n				0.074074					0.421875
re root of (E24+J24)			0 704236						
First sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-2 01164					

	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
ion	1	2.333333	-1.333333	1.777778		1	2.444444	-1.44444	2.08642	
	1	2.333333	-1.333333	1.777778		1	2.444444	-1.44444	2.08642	
	5	2.333333	2.666667	7.111111		1	2.444444	-1.44444	2.08642	
						2	2.444444	-0.44444	0.197531	
						3	2.444444	0.55556	0.308642	
						3	2.444444	0.55556	0.308642	
						3	2.444444	0.55556	0.308642	
						4	2.444444	1.55556	2.419753	
						4	2.444444	1.55556	0	
x	7					22				
	2.333333					2.444444				
Squared / n				3.555556					0.786008	
lard deviation =			x =	1.88562				y =	0.886571	
quared/n				1.185188					0 087334	
re root of (E24+J24)			1.12806							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0 0985						

eas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
on	1	2.333333	-1.333333	1.777778		1	3	-2	4
	1	2.333333	-1.333333	1.777778		3	3	0	0
	5	2.333333	2.666667	7.111111		4	3	1	1
						4	3	1	1
x	7					12			
	2.333333					3			
Squared / n				3.555556					1.5
ard deviation =			x =	1.88562				y =	1.224745
quared/n				1.185188					0 375
e root of (E24+J24)			1.249075						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 53373					

			CASH MANAGEMENT							
Data										
	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.333333	-1.333333	1.777778		1	2.444444	-1.44444	2.08642	
	1	2.333333	-1.333333	1.777778		1	2.444444	-1.44444	2.08642	
	5	2.333333	2.666667	7.111111		1	2.444444	-1.44444	2.08642	
						2	2.444444	-0.44444	0.197531	
						3	2.444444	0.55556	0.308642	
						3	2.444444	0.55556	0.308642	
						3	2.444444	0.55556	0.308642	
						4	2.444444	1.55556	2.419753	
						4	2.444444	1.55556	0	
x	7					22				
	2.333333					2 444444				
Squared / n				3.555556					0.786008	
lard deviation =			x =	1.88562				y =	0 886571	
quared/n				1.185188					0 087334	
re root of (E24+J24)			1.12806							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0.0985						

eas Involvement										
	0-25					50-75				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.333333	-1.333333	1.777778		1	3	-2	4	
	1	2.333333	-1.333333	1.777778		3	3	0	0	
	5	2.333333	2.666667	7.111111		4	3	1	1	
						4	3	1	1	
x	7					12				
	2.333333					3				
Squared / n				3.555556					1.5	
dard deviation =			x =	1.88562				y =	1.224745	
Squared/n				1.185188					0.375	
re root of (E24+J24)			1 249075							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-0 53373						

LYSIS 22										
	J									
	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
bles	1	1.833333	-0.833333	0.694444		1	2.4	-1.4	1.96	
	2	1.833333	0.166667	0.027778		2	2.4	-0.4	0.16	
	2	1.833333	0.166667	0.027778		2	2.4	-0.4	0.16	
	2	1.833333	0.166667	0.027778		2	2.4	-0.4	0.16	
	2	1.833333	0.166667	0.027778		2	2.4	-0 4	0.16	
	2	1.833333	0.166667	0.027778		3	2.4	0.6	0 36	
						3	2.4	0.6	0.36	
						3	2.4	0.6	0.36	
						3	2.4	0.6	0.36	
						3	2.4	0 6	0.36	
x	11					24				
	1.833333					2.4				
Squared / n				0.138889					0.296	
dard deviation =			x =	0.37268				y =	0 54406	
Squared/n				0.023148					0.0296	
re root of (E24+J24)			0 22967							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-2.46731						

seas Involvement									
	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
bles									
	2	2	0	0		1	2.2	-1.2	1.44
	2	2	0	0		2	2.2	-0.2	0.04
	2	2	0	0		2	2.2	-0.2	0.04
	2	2	0	0		3	2 2	0.8	0 64
						3	2.2	0 8	0.64
x	8					11			
n	2					2 2			
Squared / n				0					0 56
dard deviation =			x =	0				y =	0.74833
Squared/n				0					0.112
are root of (E24+J24)			0.3347						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	-0 59755					

	Yes					No			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
bles									
	2	2.333333	-0.333333	0.111111		1	1	0	0
	2	2.333333	-0.333333	0.111111		1	1	0	0
	3	2.333333	0 666667	0.444444		2	1	1	1
						2	1	1	1
						2	1	1	1
						2	1	1	1
						2	1	1	1
						3	1	2	4
						3	1	2	4
						3	1	2	4
x	7					10			
	2.333333					1			
Squared / n				0.222222					0.4
dard deviation =			x =	0.471404				y =	0.632455
Squared/n				0.074074					0.04
re root of (E24+J24)			0 114074						
First sample mean - second sample mean)/ St error of difference between means									
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	11.68832					

	NVL					VL				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
ivabl	2	2.166667	-0.166667	0.027778		1	2.1	-1.1	1.21	
	2	2.166667	-0.166667	0.027778		1	2.1	-1.1	1.21	
	2	2.166667	-0.166667	0.027778		2	2.1	-0.1	0.01	
	2	2.166667	-0.166667	0.027778		2	2.1	-0.1	0.01	
	2	2.166667	-0.166667	0.027778		2	2.1	-0.1	0.01	
	3	2.166667	0.833333	0.694444		2	2.1	-0.1	0.01	
						2	2.1	-0.1	0.01	
						3	2.1	0.9	0 81	
						3	2.1	0 9	0.81	
						3	2.1	0.9	0.81	
l x	13					21				
n	2.166667					2.1				
l Squared / n				0.138889					0.246	
dard deviation =			x =	0 372678				y =	0.495984	
Squared/n				0 023148					0.0246	
are root of (E24+J24)			0 218513							
First sample mean - second sample mean)/ St error of difference between means										
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0 305092						

	)									
eas Involvement										
	0-25					50-75				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
ivables										
	2	2	0	0		1	1.6	-0 6	0 36	
	2	2	0	0		1	1.6	-0.6	0.36	
	2	2	0	0		2	1 6	0.4	0.16	
	2	2	0	0		2	1.6	0 4	0 16	
						2	1.6	0.4	0.16	
x	8					8				
	2					1.6				
Squared / n				0					0.24	
dard deviation =			x =	0				y =	0 489898	
Squared/n				0					0 048	
re root of (E24+J24)			0 2191							
First sample mean - second sample mean)/ St error of difference between means										
ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	1 82565						

)									
	↓								
	↓								
	Yes					No			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
eivables									
	2	2.666667	-0.666667	0.444444		1	1	0	0
	3	2.666667	0.333333	0.111111		1	1	0	0
	3	2 666667	0.333333	0.111111		2	1	1	1
						2	1	1	1
						2	1	1	1
						2	1	1	1
						2	1	1	1
						2	1	1	1
						3	1	2	4
						3	1	2	4
al x	8					10			
n	2.666667					1			
al Squared / n				0.222222					0 4
ndard deviation =			x =	0 471404				y =	0 632456
Squared/n				0 074074					0.04
are root of (E24+J24)			0.337749						
(First sample mean - second sample mean)/ St error of difference between means									
rror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	4 934631					

LYSIS 23

NVL					VL			
x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
1	2.333333	-1.333333	1.777778		1	2.1	-1.1	1.21
2	2.333333	-0.333333	0.111111		1	2.1	-1.1	1.21
2	2.333333	-0.333333	0.111111		1	2.1	-1.1	1.21
3	2 333333	0.666667	0.444444		1	2.1	-1.1	1.21
3	2.333333	0.666667	0.444444		1	2.1	-1.1	1.21
3	2.333333	0 666667	0.444444		2	2.1	-0.1	0.01
					2	2.1	-0.1	0.01
					3	2.1	0.9	0.81
					4	2.1	0.9	0.81
					5	2.1	1.9	3.61
x 14					21			
2.333333					2.1			
Squared / n			0.555556					0 606
dard deviation =		x =	0.745356				y =	0.77846
Squared/n			0.092593					0.0606
re root of (E24+J24)		0 391399						

First sample mean - second sample mean)/ St error of difference between means

ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

			Z =	0 596152				

seas Involvement										
	0-25					50-75				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2	-1	1		1	1.8	-0 8	0.64	
	2	2	0	0		1	1.8	-0.8	0.64	
	2	2	0	0		2	1.8	0 2	0.04	
	3	2	1	1		2	1.8	0.2	0.04	
						3	1 8	1.2	1.44	
x	8					9				
	2					1.8				
Squared / n				0 5					0 56	
dard deviation =			x =	0.70711				y =	0 74833	
quared/n				0.125001					0.112	
re root of (E24+J24)			0 48683							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	0 410821						

ALYSIS 24									
	NVL					VL			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	3 333333	-1.333333	1.777778		1	2.7	-1.7	2 89
	2	3.333333	-1.333333	1.777778		1	2.7	-1.7	2.89
	3	3.333333	-0.333333	0.111111		2	2.7	-0.7	0.49
	3	3.333333	-0.333333	0.111111		2	2.7	-0.7	0.49
	5	3.333333	1.666667	2.777778		3	2.7	0.3	0.09
	5	3.333333	1.666667	2.777778		3	2 7	0.3	0.09
						3	2.7	0.3	0.09
						4	2.7	1.3	1.69
						4	2.7	1.3	1.69
						4	2.7	1.3	1 69
x	20					27			
	3.333333					2.7			
Squared / n				1.555556					0 694
dard deviation =			x =	1.24722				y =	0.8331
squared/n				0 25926					0.069406
re root of (E24+J24)			0 573294						
irst sample mean - second sample mean)/ St error of difference between means									
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}									
			Z =	1.104727					

seas Involvement

	0-25					50-75			
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared
	2	3	-1	1		1	3	-2	4
	2	3	-1	1		3	3	0	0
	3	3	0	0		3	3	0	0
	5	3	2	4		4	3	1	1
						4	3	1	1
l x	12					15			
n	3					3			
l Squared / n				1 5					1.2
dard deviation =			x =	1.2247				y =	1 095445
Squared/n				0.374973					0 24
are root of (E24+J24)			0.784202						

First sample mean - second sample mean)/ St error of difference between means

ror of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}

Z = 0

	Agree					S/Agree				
	x	meanx	(x-xmean)	Squared		y	meany	(y-ymean)	Squared	
	1	2.818182	-1.818182	3.305785		2	3.5	-1.5	2.25	
	1	2.818182	-1.818182	3.305785		3	3.5	-0.5	0 25	
	2	2.818182	-0.818182	0.669421		4	3.5	0.5	0 25	
	2	2.818182	-0.818182	0.669421		5	3.5	1.5	2 25	
	3	2.818182	0 181818	0.033058						
	3	2.818182	0.181818	0.033058						
	3	2.818182	0.181818	0.033058						
	3	2.818182	0.181818	0.033058						
	4	2 818182	1.181818	1.396694						
	4	2.818182	1.181818	1.396694						
	5	2.818182	2.181818	4.760331						
x	31					14				
	2.818182					3.5				
Squared / n				0.728775					1.25	
ard deviation =			x =	0.85368				y =	1.118034	
quared/n				0.066252					0 3125	
e root of (E24+J24)			0.61543							
irst sample mean - second sample mean)/ St error of difference between means										
or of difference between means = Square root{ (sd (a)squared)/n +(sd (b)squared)/n}										
			Z =	-1.10787						

Appendix (IV)

The review of companies in the survey sample

The key to sub-samples;

SIZE: Turnover;	50m	-100m	=	Not Very Large
	100m	-Billion	=	Large
	1 Billion	-5 Billion	=	Very Large

OVERSEAS INVOLVEMENT	0 %	- 25%
	25%	- 50%
	50%	- 75%
	75%	+

CURRENCY DENOMINATION The number of currencies used by the firm

YEARS IN BUSINESS The number of years in business

SUMMARISED DATA

		Sub-Sample Category	
Name of firm	Size	Overseas Involvement	Trading period (years)
BICC Plc	Very Large	25-50%	50
Rolls Royce	Very Large	50-75%	89
Guinness	Very Large	75%+	235
RMC Plc	Very Large	50-75%	65
Tarmac Plc	Very Large	0-25%	82
Pilkington Plc	Very Large	75%+	170
GKN Plc	Very Large	50-75%	9
Johnson Matthey Plc	Very Large	75%+	168
Pearson Group Plc	Very Large	50-75%	126
Acatos & Hutcheson Plc	Not Very Large	0-25%	-
Courtaulds Plc	Very Large	50-75%	-
Allied Colloids	Not Very Large	75%+	-
Goodyear GB	Not Very Large	25-50%	50
Laura Ashley Plc	Not Very Large	25-50%	-
Betterware Plc	Not Very Large	0-25%	-
Burton Group (The)	Not Very Large	0-25%	-

Detailed Financial Information

BICC Plc

Turnover	DEC				
	1989	1990	1991	1992	1993
	3.46b	3.55b	3.45b	3.38b	3.61b
ROCE	34.5%				13.1%
EPS	11.77				2.66
P/E ratio	10.19				52.61
Gearing	32.1				54.4
Current;					
Assets	1.38b	1.46b	1.52b	1.71b	1.55b
Liabilities	1.13b	1.04b	1.23b	1.36b	1.33b

Activity (1993);	Balfour Beatly	47%
	BICC cables	27%
	Metal Manufacturers	13%
	North America Cables	15%
	Other	2%

Geographical;	UK	69%
	Australasia	13%
	North America	15%
	Other	3%

Diversified operations worlwide. strategy : extend into servicing the electronics sector with acquisitions

Rolls Royce

Turnover;	1989	1990	1991	1992	1993
	2.9b	3.6b	3.5b	3.5b	3.5b
ROCE	21.2%				6.8%
EPS	12.39				3.68%
P/E ratio	8.96%				33.28%
Gearing	15.5%				25.8%
Current;					
Assets	1.8b	2.0b	2.0b	1.9b	2.19b
Liabilities	.98b	1.16b	1.22b	1.37b	1.30b

Activity (1993):	Aerospace	61%
	Industrial Power	39%

Geographical:	UK	28%
	Europe	11%
	USA	35%
	Canada	4%
	Asia	16%
	Africa	5%
	Australia	2%
	Other	1%

Rools Royce was founded in 1906. Nationalised in 1971 and floated again in 1987.

Guinness

Turnover;	1989	1990	1991	1992	1993
	2.9b	3.38b	4.08b	4.36b	4.56b
ROCE	34.6%				24.8%
EPS	9.34%				7.59%
P/E Ratio	12.82%				14.84%
Gearing	-				-
Current;					
Assets	2.48b	2.77b	3.17b	3.62b	3.42b
Liabilities	1.89b	1.78b	2.05b	2.55b	2.36b

Activity (1993):	Spirits;	59%
	Brewing;	41%

Geographical;	UK	20%
	Europe	35%
	N.America	19%
	Asia / Pacific	17%
	Elsewhere	9%

RMC Plc

Concrete, Cement, Construction Industry. Established in 1930, geographical dispersion commenced at an early stage of the groups history.

Turnover	Dec 1989	1990	1991	1992	1993
	2.57b	2.59b	2.79b	3.14b	3.17b

ROCE	31.8%	13.6%
EPS	14.22%	4.56%
P/E ratio	8.73%	24.78%
Gearing	19.1%	32.1%

Current;					
Assets	680m	665m	715m	797m	816m
Liabilities	590m	613m	632m	643m	664m

Activity (1993)	Ready mixed Concrete, cement	59%
	Cement Concrete	24.8%
	Merchantising/ DIY	14.5%
	Discontinued operations	1.5%

Geographical;	UK	29%
	Germany	42.2%
	Other European	21%
	Outside Europe	7.8%

Affected by the world wide recession;

Tarmac Plc

Turnover;	1989	1990	1991	1992	1993
	3.4b	3.6b	3.2b	2.9b	2.7b
ROCE	30.8%				5.5%
EPS	17.51%				2.21%
P/E ratio	7.59%				67.22%
Gearing	24.6%				34.8%

Current;					
Assets	1.64b	1.58b	1.41b	1.24b	1.25b
Liabilities	1.04b	0.97b	.82b	.84b	.84b

Activity (1993);

Quarry Products	19%
Construction	35%
Housing	23%
Building Materials	4%
Tarmac America	8%
Business sold / Terminated	11%

Geographical location;		
	UK	73%
	US	11%
	Europe	5%
	Business Term	11%

Tarmac: UK controlled building materials and construction group, incorporated in 1913. Source of products. France location production and Tarmac US.

Pilkington Plc

Turnover;	1990	1991	1992	1993	1994
	2.91b	2.65b	2.6b	2.58b	2.73b
ROCE	18.4%				6.8%
EPS	11.71%				1.72%
P/E ratio	9.97%				87.13%
Gearing	36%				43%
Current;					
Assets	1.23b	1.13b	1.08b	1.15b	1.06b
Liabilities	.72b	.70b	.56b	.58b	.64b

Activity (1994)

Flat & Safety Glass	93.5%
Other Trading Co's	6.5%

Geographical	UK	18.1%
	Europe	36.8%
	North America	31.0%
	ROW	14.1%

World largest producer of flat and safety glass. Innovator in products / processes in the glass industry established in 1826.

GKN Plc

Turnover;	Dec				
	1989	1990	1991	1992	1993
	2.11b	2.04b	1.92b	1.99b	2.02b
ROCE	26.3%				11.5%
EPS	14.06%				3.24%
P/E ratio	7.98%				43.57%
Gearing	32.2%				6.6%

Current;					
Assets	.83b	.72b	.71b	.71b	.66b
Liabilities	.66b	.55b	.52b	.56b	.61b

Activity (1993)

Automative/ Engineered Production	77%
Industrial Services / distribution	23%

Geographical;		
	UK	33%
	Europe	38%
	America	24%
	Elsewhere	5%

GKN originated in 1906. the company was renamed in 1986. Production facilities ave been established in in the major vehicle producing countries (Manufacturing of utomotive Components).

Johnson Matthey Plc

	Mar 31				
	1990	1991	1992	1993	1994
Turnover	1.51b	1.73b	1.74b	1.85b	1.95b
ROCE	18.5%				16.6%
EPS	10.72%				5.39%
P/E ratio	10.53%				20.70%
Gearing	34.3%				28.2%
Current;					
Assets	.48b	.45b	.39b	.36b	.36b
Liabilities	.35b	.31b	.25b	.23b	.23b

Activity (1994)	Materials Technology	28.9%
	Catalytic systems	14.5%
	Precious Metals	51.0%
	Colour and Print	5.6%
Geographical	UK- Europe	54.6%
	North America	30.9%
	Asia and Pacific	13.7%
	Africa / Middle East	0.8%

Pearson Group Plc

	Mar 31				
	1989	1990	1991	1992	1993
Turnover	1.46b	1.53b	1.6b	1.63b	1.87b
ROCE	32.8%				15.9%
EPS	11.98%				4.63%
P/E ratio	9.97%				24.15%
Gearing	39.9%				30.0%
Current;					
Assets	.86b	.96b	1.12b	.1.33b	1.13b
Liabilities	.48b	.72b	.67b	.66b	.51b

Activity (1993)	Newspapers	21%
	Books	44%
	Television	2%
	Visiotors Attractions	4%
	Discontinued Operations	29%

Geographical	UK	26%
	North America	27%%
	Continental Europe	9%
	Asia / Pacific	7%
	ROW	2%
	Discontinued ops	29%

Acatos & Hutcheson Plc

	SEP 1990	1991	1992	1993	1994
Turnover	0.25b	0.23b	.2b	.22b	0.25b
ROCE	14.1%				28.7%
EPS	5.49%				11.97%
P/E ratio	24.32%				10.44%
Gearing	39.9%				30.0%
Current;					
Assets	40.7m	36.2m	34.9m	39.4m	51m
Liabilities	39.8m	32.7m	33.3m	31.7m	36.4m

Activity (1993)	Processing & marketing of edible oil products	
Geographical	UK	96%
	Continental Europe	4%

Courtaulds Plc

	March (1990)	(1991)	(1992)	(1993)	(1994)
Turnover (£m)	2627	1911	1943	2092	1995
ROCE (%)	23.3				16.2
EPS (%)	12.26				2.91
P/E Ratio (%)	9.09				42.98
Gearing (%)	43.9				32.7

Current;

Assets	758	716	733	758	703
Liabilities	595	591	605	660	600

Activity :1994

Coating and sealants 44%, Polymer products 18%, Fibres and Chemicals 36%, DISC 2%.

Geographical Activity:

UK 39%, R.O Europe 16%, America 30%, Asia Pacific 12%, ROW 1%, and Discontinued 2%.

Allied Colloids

	Mar 1990	1991	1992	1993	1994
Turnover	220m	233m	254m	295m	327m
ROCE	34.4%				24.8%
EPS	7.87%				5.38%
P/E ratio	16.94				22.1%
Gearing	10.1				11.5
Current;					
Assets	114m	117m	120m	143m	155m
Liabilities	65m	62m	67m	61m	63m

Activity (1994) Manufacture and sale of speciality industrial chemicals

Geographical	UK	13.2%
	America	32.1%
	Europe	34.6%
	Asia	11.6%
	Australasia	6.0%
	Africa	2.5%

Goodyear GB

	1989	1990	1991	1992	1993
Turnover (£m)	376	380	381	405	432
ROCE(%)	11.48				5.03
Gearing (%)	11.14				24.43

Current;

Assets	0.15
Liabilities	.052

Geographical activity (1989)

UK	63%
Overseas	37%

Laura Ashley PLC

	Jan 1990	1991	1992	1993	1994
Turnover	296m	327m	262m	247m	300m
ROCE	5.1%				5.0%
EPS	0%				0.48%
P/E ratio	16.94%				22.09%
Gearing	10.1%				11.5%
Current;					
Assets	134m	114m	101m	118m	104m
Liabilities	135m	46m	47m	63m	54m

Activity (1993) Design, manufacture, distribution and sale of garments and accessories, home furnishings and perfumed products.

Geographical	UK & Ireland	53%
	North America	29%
	Continental Europe	15%
	Other	3%

Betterware

	1990	1991	1992	1993	1994
Turnover	19m	28m	41m	56m	63m
ROCE	41%				59.1%
EPS	8.51%				10.82%
P/E ratio	15.66%				11.56%
Gearing	4.3%				6.6%
Current;					
Assets	8m	8m	14m	23m	20m
Liabilities	4.5m	6.2m	9.6m	16.6m	15m

Activity (1994)	Direct Selling	83.1%
	Investments	16.9%
Geographical	UK	94.1%
	Europe	5.7%
	Other	2.1%

Burton Group (The)

	1990	1991	1992	1993	1994
Turnover	1.8b	1.6b	1.7b	1.8b	1.9b
ROCE	16.2%				5.7%
EPS	26.8%				3.56%
P/E ratio	4.95%				35.18%
Gearing					
Current;					
Assets	627m	547m	560m	575m	598m
Liabilities	629m	663m	580m	387m	424m

Activity (1994)	Retailing of menswear, womenswear, and home furnishings	
	Multiples	(51.1)%
	Dorothy Perkins	13.2%
	Burton	13.8%
	Evans	7.2%
	Top Man	11.3%
	Principles	5.6%
	Plus Debenhams	47.7%
	Principles	5.5%

APPENDIX (V)
TABLE 1

No input required output schedule only!!!!!!!!!!!!!!

PROJECT Projects S **FORM CAP2**

SECTION I
FIXED CAPITAL INVESTMENT

YEAR No	FIN YEAR	GROSS CAPITAL COST £000	DISPOSAL PROCEEDS /GRANTS £000	NET COST £000
0	2001	(545,222)	(10,000)	(555,222)
1	2002	(30,000)	(2,500)	(32,500)
2	2003	0	0	0
3	2004	(5,000)	(2,500)	(7,500)
4	2005	0	0	0
5	2006	0	0	0
6	2007	0	0	0
7	2008	0	0	0
8	2009	0	0	0
9	2010	0	0	0
10	2011	0	0	0
11	2012	0	0	0
12	2013	0	0	0
13	2014	0	0	0
14	2015	0	0	0
15	2016	0	0	0
TOTALS		(580,222)	(15,000)	(595,222)

SECTION II
FORECAST PERFORMANCE

ANNUAL SALES (UNITS)	ANNUAL SALES VALUE £000	ANNUAL COST OF SALES £000	GROSS MARGIN £000	INCREASE/ (DECR) IN O/HEADS £000	ONE OFF PROJECT COSTS £000	OPERATING PROFIT BEFORE TAX & DEP'N £'000	TAXATION 30% £000	OPERATING PROFIT AFTER TAX £'000
154,722	1,547,223	(1,237,778)	309,445	(60,000)	(5,000)	374,445	112,333	252,112
85,700	857,000	(685,600)	171,400	(20,000)	(3,500)	194,900	58,470	126,430
50,555	505,555	(404,444)	101,111	(12,000)	0	113,111	33,933	69,178
54,522	545,222	(436,178)	109,044	(12,000)	0	121,044	36,313	74,731
154,500	1,545,000	(1,236,000)	309,000	(10,000)	0	319,000	95,700	213,300
0	0	0	0	0	0	0	0	(10,000)
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
499,999	5,000,000	(4,000,000)	1,000,000	(114,000)	(8,500)	1,122,500	336,749	725,751

SECT III
WORKING CAPITAL INVESTMENT

SECT IV

YEAR No	FIN YEAR	(INCREASE)/ DECREASE STOCKS £000	(INCREASE)/ DECREASE DEBTORS £000	INCREASE/ (DECREASE) CREDITORS £000	WORKING CAPITAL INVEST'T £'000	TOTAL NET CASH FLOW £'000
0	2001	386,806	(1,083,056)	600,000	(96,250)	(399,361)
1	2002	214,250	(599,900)	542,000	156,350	250,280
2	2003	126,389	(353,889)	602,552	375,052	444,230
3	2004	136,306	(381,655)	254,322	8,972	76,204
4	2005	386,250	(1,081,500)	652,214	(43,036)	170,264
5	2006	0	0	0	0	(10,000)
6	2007	0	0	0	0	0
7	2008	0	0	0	0	0
8	2009	0	0	0	0	0
9	2010	0	0	0	0	0
10	2011	0	0	0	0	0
11	2012	0	0	0	0	0
12	2013	0	0	0	0	0
13	2014	0	0	0	0	0
14	2015	0	0	0	0	0
15	2016	0	0	0	0	0
TOTALS		1,250,000	(3,500,000)	2,651,088	401,088	531,617

SECTION V
DISCOUNTED NET CASH FLOWS

NET PRESENT VALUES @

5% £000	10% £000	15% £000
(399,361)	(399,361)	(399,361)
238,362	227,527	217,635
402,930	367,132	335,902
65,827	57,253	50,105
140,077	116,293	97,349
(7,835)	(6,209)	(4,972)
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
440,000	362,635	296,658

SECTION VI
INTERNAL RATE OF RETURN (IRR)

54 10%

IRR guess

SECTION VII
PAYBACK PERIOD

ANNUAL NET CASH FLOW £000	CUMULATIVE NET CASH FLOW £000	PAYBACK PERIOD MONTHS
(399,361)	(399,361)	
250,280	(149,081)	31
444,230	295,150	31
76,204	371,353	31
170,264	541,617	31
(10,000)	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
0	531,617	31
531,617	531,617	

APPENDIX (V)
TABLE 1

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