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CRITICAL SUCCESS FACTORS FOR THE MANAGEMENT OF EXECUTIVE INFORMATION SYSTEMS IN MANUFACTURING

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A research report submitted to the Faculty of Commerce, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Commerce

Johannesburg, November 1995

ABSTRACT

The provision of timely, accurate, and relevant information to executives is prime to ensuring that they make quick and informed decisions that are critical to the competitiveness of their organisations. One such source of information is meant to be the Executive Information System, a system which combines internal and external information for electronic presentation to management in individually customised formats. Whilst it is required that the system address the information needs of the executives, the dynamic and ever-changing business environment makes it difficult for such a system to keep up-to-date.

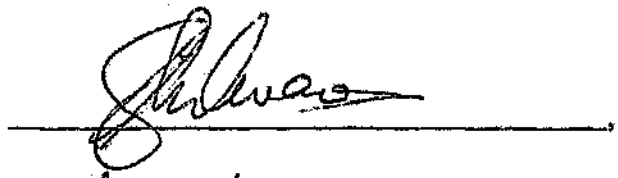
The aim of the research is to identify those critical issues, which when managed properly, will ensure that the system remains providing and meeting the needs of the executives. Ten interviews were conducted from business organisations in order identify these factors.

The report consists of chapter one which gives a brief background of the research; chapter two is the review of the available literature which covers the origin, purpose and structure of EIS, criteria for successful implementation, benefits and issues related to the management of an operating EIS; chapter three describes the research methodology used to undertake this research; chapter four describes the data collection phase of the research; chapter five is the analysis and testing of the empirical generalisations ending with a list of critical success factors for managing an operating EIS; and chapter six, which is also the last, which highlights the limitations of the research and areas for further research.

After analysing the interview transcripts from the semi-structured interviews using the content analysis method, it was concluded that the empirical generalisations were strongly supported. A list of ten critical success factors raised by the respondents is listed at the end of chapter five. This factors will contribute towards helping South African business organisations in the management of their operating Executive Information Systems investments.

Declaration

I declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Commerce in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.



14th day of November, 1995

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Many thanks to Ian Steer of Edgars, who as a previous research student in the same department gave a lot of input and guidance when needed.

Finally, I would like to thank my wife Molly and my daughter Neo for their encouragement, and for enduring the less glamorous side of this research.

Dedication

I would like to dedicate this research to my mother Elsie and my late father Watson for being there when I needed them most. Mom and Dad, thanks for all the love, advice and encouragement.

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CHAPTER 1

INTRODUCTION

1.1. Information and Competitive Advantage

In today's busi ss one of the most powerful weapons to success is to have a competitive advantage over your competitors. Competitive advantage can be gained in many ways by an organisation. One of these, especially in the information era, is the timely access to accurate and relevant information for decision making by an organisation's decision makers.

Senior executives need to make quick and accurate decisions based on both information internal and external to their organisations.

According to Mintzberg(1976):

> *"A great deal of the manager's inputs are soft and speculative - impressions and feelings about other people, hearsay, gossip, and so on."*

The ever changing business environment requires that information be readily available to executives in order for them to be able to compare themselves with their competitors. Delays in providing the required information to executives might have disastrous effects on the performance of their business organisations.

The success of manufacturing organisations have taken a completely new turn with the re-entry of South Africa into the global marketplace. A lot of external pressures are starting to bear on business organisations as more foreign organisations enter the South African business industry. Cost control, freedom of choice with respect to product alternatives by customers are just some of the problems faced by manufacturing companies. The most critical external pressure for organisations is the increasing competitive environment and the need to be proactive in dealing with the external environment (Watson et al, 1991).

Based on the competitive pressures of the modern business environment, top executives in companies have to make quick decisions based on information from a combination of different sources affecting their business. El Sawy (1985) says that as the business environment becomes more dynamic and complex, the need for top executives to scan the information environment to analyse opportunities and threats becomes even more vital.

1.2. Executives Information Systems

The evolution of computer support for organisational personnel has always excluded the senior executives of the firm (Watson et al; 1991). .

Information requirements for senior executives requires that information from internal systems be combined with external information manually before being presented to them. In order to eliminate this tedious process of consolidating and combining data from different sources, Executive Information Systems(EIS), a term coined by Rockart and Treacy (1982), were introduced and specifically designed to address this problem.

In a nutshell, EIS is meant to be the executive's right-hand man. It is a system used by top executives for the more effective use of information planning and control processes (Remenyi, 1991). The days of waiting for reports which are delivered three weeks after month-end should be the thing of the past in an organisation that has implemented EIS. However, in order to provide consistent information, an EIS needs continual strategic alignment.

Although executive information systems are gaining broad acceptance in the South African business industry, there are still no clear guidelines as to how to manage this investment once an EIS is implemented. It is not uncommon to learn about companies which have invested large amounts of capital and resources in EIS only to find that the usage of the system deteriorates after a couple of months or years. This might not be because the implementation of the system was not well planned or did not go well, but this might be because of the system being out-of-date with current business issues.

1.3. Critical Success Factors (CSF)

In any undertaking there is always some areas which are more critical than others in order to achieve success, and these areas are such that their failure has a ripple effect on the whole undertaking more than others. In business these areas or factors that determine the success or failure of business undertakings are called critical success factors (CSF).

Rockart (1979) defines critical success factors, in any business, as those limited areas in which if results are satisfactory, then the competitiveness of the organisation is ensured. This competitiveness will is based on the organisation's business goals.

The success of any endeavour whilst dependant on the planning and understanding of the task at hand requires that certain considerations be kept in check in order to detect if things are going astray.

According to Remenyi (1991):

> *"CSFs may be defined as the limited number of areas in which the enterprise must ensure success in order for the firm as a whole to have satisfactory performance."*

Critical success factors are those things that should be done in order to make the objective to happen (Ahituv and Neumann, 1986; Martin, 1989). This means among other activities or areas that need attention, the few areas or activities which when addressed properly will results in a generally successful outcome.

In the broader business environment, as Martin (1989) suggests, there is a hierarchy of critical success factors. At the highest level is the industry critical success factors, followed in order by corporate, organisational unit, and individual manager's critical success factors. This research is concerned with identifying those areas that need close management or monitoring to ensure the continued success of an operating EIS, thus the identification of the critical success factors for managing an operating EIS.

1.4. Summary

The provision of timely, accurate and relevant information to top executives has become one of the most challenging tasks of an information systems department in any organisation. This information is needed to make decisions that can mean survival or the collapse of a company, or the gaining or loss of market share by a company. The nature and uniqueness of the information that top executives require makes it even more difficult to provide the information as it is not a case of simply summarising the available operational data, but a totally different combination of information from different sources.

This research aims to identify the critical success factors associated with managing an operating executive information system to ensure that the system continues to mee. information requirements of its target population.

CHAPTER 2

EXECUTIVE INFORMATION SYSTEMS (EIS)

2.1. Introduction

This chapter goes through the background of Executive Information Systems. It looks at the origin and purpose of EIS, the background of EIS, the nature and structure of EIS, the criteria for the successful implementation of EIS, the benefits associated with EIS and the issues related to the management of an operating EIS.

This is meant to provide an in-depth understanding of this technology, how it fits into an organisation, and the people affected by EIS within those organisations. Once this is understood, it will provide a solid foundation for the purpose of undertaking the research and testing the support of the empirical generalisations of this report.

2.2. Origin and Purpose of Executive Information Systems

Different authors have written many papers in which the origin and purpose of Executive Information Systems is discussed. This ties up with the evolution of computer support for organisations starting with the time when computers were used merely to automate clerical functions through to this age where they are used to enhance an organisation's competitive position. This is done through the provision of timely and accurate information to decision makers.

According to Watson et al (1991) the target audience for computer support in organisations has evolved from the time of simple automation through to the emergence of Management Information Systems (MIS) and Decision Support Systems (DSS) which provided more specialised functions. In the words of Watson et al (1991):

> *"As the evolution of computer support for organisational personnel is considered, one group is conspicuously missing: the senior executive of a firm. They have not been omitted by design, and in fact, previous advances were originally thought to potentially serve them (e.g. MIS and DSS), but for a variety of reasons little support has been provided."*

Executives or top management, whilst also part of an organisation, have information requirements that seldom matches that of their subordinates. As previously stated, the emergence of MIS and DSS whilst providing valuable functionality, still lacked in terms of richness and presentations when it came to the needs of the executives.

Wallis (1989) sums the situation as follows:

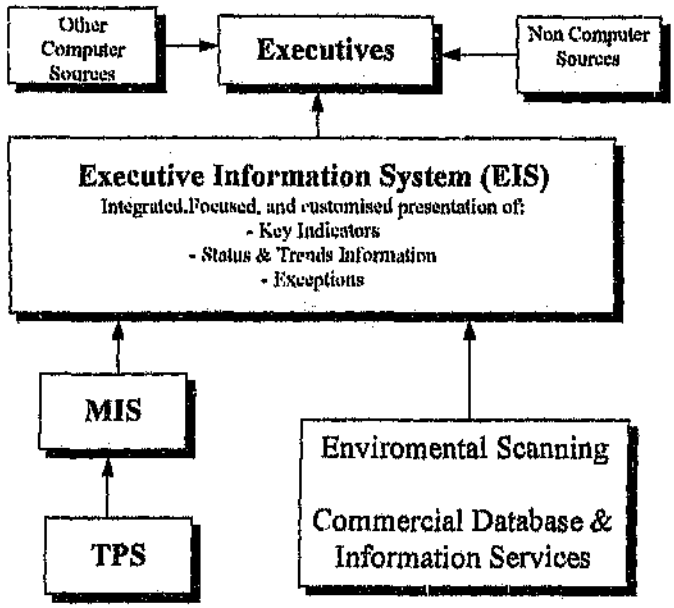
> *"Executives make important decisions, a lot of them. But as they grapple for the best outcomes, they become exasperated, panning the dross and silt of corporate computer databases, searching for nuggets of information. Too many information systems have been designed for everybody and everybody in the company except for the high-level decision-makers, who tend to find them data rich and insight poor."*

To quote Goldratt (1990) in his analysis of information and data, he says:

> *"We are drowned in oceans of data; nevertheless it seems as if we seldom have sufficient information."*
>
> *"How many times have you seen a computer package offered under the title 'information system' that, after a casual examination, you immediately discovered was just a 'data system'".*
>
> *"We almost cannot escape the realisation that the distinction between data and information does not lie in the content of a given string of characters. It lies more in its relationship to the required decision."*

In order to address this discrepancy, organisations are developing or acquiring a different kind of information system, the Executive Information System (EIS) as a specialised system geared towards addressing the problem.

Millet and Mawhinney (1992) suggest that an Executive Information System is a monitoring system that draws information from different sources for use by executives. The following diagram (Figure 2.1) illustrates the role and positioning of an Executive Information System in relation to Management Information Systems (MIS), Decision Support Systems (DSS), and the normal transaction processing systems (TPS).



(Millet and Mawhinney, 1992)

Figure 2.1: The Executive Information System role.

An executive information system is that computer application that serves the information needs of top executives (Omar, 1992). Top management or executives are concerned with the task of making decisions under pressurised circumstances for the competitiveness of their companies, hence they need information in a flexible format and at short notice.

James Martin (1989) supports this by stating that an Executive Information System is specifically designed to help executives to gain insight and track critical success factors. The focus is to aid a decision-maker in assimilating information quickly and identifying problems and opportunities, and not as an aid to analyse and resolve problems.

The purpose of an executive information system is very clearly defined as providing executives with timely and accurate information for better decision making. Given the ever changing business environment what is important today might be totally irrelevant tomorrow for senior executives. The continued alignment to business strategy should ensure that the information provided to management by an EIS is relevant. The author believes that management of this kind of evolution factor will greatly contribute towards the sustenance of the competitiveness of EIS in an organisation.

2.3. Nature and Structure of Executive Information Systems

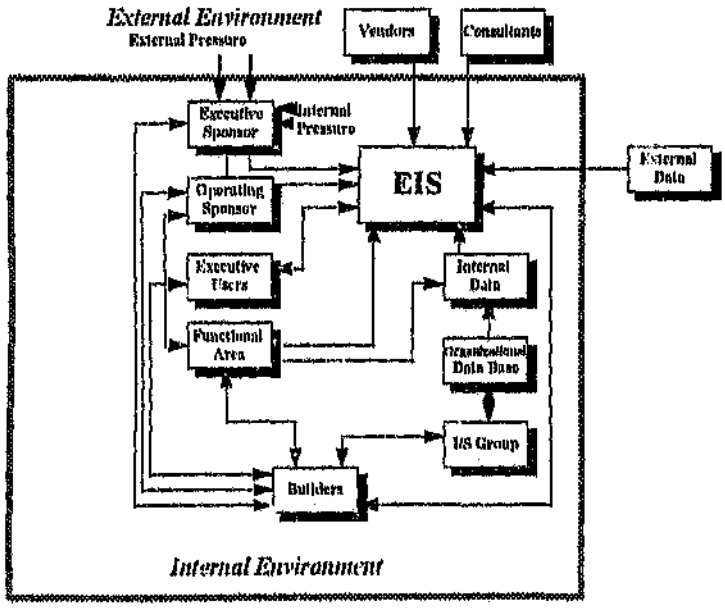
An Executive Information System is different from other information systems in that its target population's information requirements are very dynamic and changes with the business environment.

Millet and Mawhinney (1992) define EIS as follows :

> *"... a system that integrates information from internal and external data sources enabling executives to monitor and request information of key importance to them via customised presentation formats."*

EIS is meant to help executives find problems rather than analyse them. In order to be most effective, it must provide information from many areas (Houdeshel and Watson, 1987). EIS can provide information about the industry, company information, information of interest to only one executive and it can also span subsidiaries, divisions, functional areas and departments.

In the following diagram (Figure 2.2), Watson et al (1991) provide a development framework that illustrates the positioning of an Executive Information System with respect to the development environment and possible stakeholders or participants in the project.



(Watson, Rainer and Koh, 1991)

Figure 2.2: Structural Perspective of the EIS Development Framework.

Of particular importance to this research is the role of the executive sponsor as illustrated on the above diagram. The external and internal pressures for competitive, timely and accurate information needed by executives makes it critical to ensure that EIS developers understand the critical success factors of the target executives if the system is to meet their information requirements.

The following characteristics of an EIS have been adapted from Omar (1992):

- An EIS must be designed to meet the CEO information needs.
- It must be tailored to the CEO management style.
- It must be easy to use and learn.
- It must principally be used for tracking and control.
- The system must contain extensive graphic capabilities.
- An EIS must provide timely information for decisions.
- It must provide keyboard alternatives, such as a mouse, touch screen, and voice input.
- The system must provide "drill-down" capability for quick access to detailed information.
- It must support exception reporting and ad hoc types of enquiries.
- And it must provide access to data on the organisation's environment (competitors, customers, industry, markets, government, international).

Based on the above characteristics, such information from so many diverse sources and different formats can only be achieved if the executives themselves are actively involved in defining the deliverables. However, Watson and Frolick (1993), argue that a major problem with the development stage is getting the executives to specify what they want. Once this is overcome, the second problem that arises is the question of keeping abreast with the changing information needs and desires of the executives.

2.4. Criteria for Successful Implementation of Executive Information Systems

There has yet to be a documented step by step methodology for implementing EIS. However there are factors which researchers and those with implementation experience reckon, are critical towards contributing to the success of an EIS implementation process.

According to Barrow (1990):

> *"Successful implementation of an Executive Information System (EIS) is not an easy job for any organisation. But, of the many factors to consider, the success or failure of an EIS ultimately depends on how well the implementation process is managed in terms of technology and users."*

He further states that since EIS differs from other information systems it requires a different approach with respect to planning and implementation. An EIS is more dynamic and users constantly require new changes as their needs changes according to the business environment. Thus the EIS must be flexible enough to comply with this new requirements.

One of the most critical issues towards a successful implementation of an EIS is ensuring that the system developers or implementation teams get the correct information requirements from the target population, i.e. where and how do executives get the information they require for decision-making.

Watherbe (1991) makes an interesting statement when he says:

> *"Most managers spend half their time trying to get the information they need, whether it be informally through meetings, phone conversations, or reading, or formally through organisational computer-based information, a situation commonly referred to as 'information overload'. With the proliferating capabilities and plummeting cost of computers it seems relief should be in sight for weary executives."*

He (Watherbe, 1991) then goes on to say that unfortunately most information systems do not meet the information requirements of executives.

What could be the problem, what needs to be put in place to ensure that EIS meets the needs of the executives. Gulden and Ewers (1989) cite the two major reasons for delivery as the lack of clarity on the part of the executive and the failure by information system departments to incorporate the system into the management processes of the organisation

Thus, the implementation of a successful EIS largely depends on whether the system will meet the information needs of executives. Watson and Frolick (1993) describes the process as follows:

> *"The development of an EIS can be thought of as an ongoing journey rather than as a destination. The system continues to evolve over time in response to market, industry, and organisational changes that affect executives' information needs."*

They (Watson and Frolick (1991)) further suggest that multiple methods should be used when determining information requirements. The methods they suggest include participation in strategic planning sessions, formal critical success factor sessions, formal discussions with executives, tracking executives activity, discussions with executives support personnel, examination of computer and non-computer generated information, attendance at meetings, and software tracking of EIS usage.

Some methods are better for identifying initial information requirements while others are better for ongoing requirements. The use of methods like participating in critical success factor

sessions are appropriate for identifying industry and organisation-related information requirements, while informal discussions with executives are useful for identifying unique individual requirements (Volonino and Watson, 1990).

The following guidelines are suggested by Volonino and Watson (1990) for the successful development of EIS:

- The purpose that the EIS is to serve should be carefully defined.
- A prototyping/evolutionary method of development should be used.
- Ensure that the initial version of the EIS supports the strategic business objectives of the organisation.
- Plan for the EIS evolution.
- The evolution of the EIS should continue to support the strategic business objectives.

Using the above guidelines organisations can use the Strategic Business Objectives method (SBO). This method takes a company-wide perspective for EIS development focusing on developing a system supportive of the strategic business objectives and the information needs of personnel throughout the organisation. The method relies heavily on corporate needs to guide the development and evolution of the EIS (Volonino and Watson, 1990).

Watherbe (1991) describes an interesting approach to interviewing executives to determine information requirements which was developed through research done at the MIS Research Center at the University of Minnesota. This approach combines three requirement determination methodologies, namely:

- Business Systems Planning (BSP)(developed by IBM), which helps with the specification of problems and decisions of an executive's area of responsibility.
- Critical Success Factors (CSF) method (Rockart, 1979), helps to determine an executives critical success factors in relation to their area of responsibility.
- Ends/Means Analysis (E/M analysis), which helps in evaluating the effectiveness and efficiency of business processes used to provide the business services and goods.

To quote him (Watherbe, 1991) about this approach he says:

> *"The method of using these three methodologies as a basis for indirect questions for obtaining a reasonably correct and complete set of information requirements is both simple and powerful. It is simple because it consists of simple components that can be learned by an analyst and a manager in a relatively short time. It is powerful because it is based on fundamental theories of human information processing and human strengths and limitations. It provides a comprehensive set of approaches that are additive to their results."*

2.5. Benefits of Executive Information Systems

One of the most important aspects of an Executive Information System is the question related to the benefits it brings to an organisation.

Executive work is fundamentally different from that of all other employees within an organisation. Whilst many information systems implementations bring about a positive impact on the productivity of users, Wallis (1989) suggests that the executives themselves fail to see how their productivity can be improved by a computer system, and in fact for them productivity is not a big issue.

Jim Carlisle, cited in Wallis (1989), a consultant who helped both Xerox Corporation and Westinghouse Electric Corporation with their EIS says:

> *"Anyone who has made Senior Vice President probably can't have his personal productivity improved. However, he can have his vision and comprehension of the business improved."*

An Executive Information System is meant to ensure that executives get accurate and timely information that is relevant to their critical success factors in order to make better decisions for the competitiveness of their organisations.

Paul Lego, then chairman designate of Westinghouse, cited in Omar (1992) says:

> *"The EIS hasn't completely changed the way I manage, but I feel comfortable with the decisions I have made."*

Duracell CEO, C. Robert Kidder, also cited in Omar (1992) reckons that an EIS gives him the information he needs faster and better than before the system was implemented; while William Jeffrey, a Senior Vice President at United Research agrees that with a good EIS furnishing participants in a meeting with the same information, the duration of a meeting can be reduced.

According to Garelick (1987):

> *"Amongst the benefits claimed for the electronic delivery of information over the use of conventional paper documents is the ability to extract relevant data more easily. There is a greater focus of attention on critical items consistently throughout a management team; there is faster access to the data, with the elimination of manual filing and retrieval; it is easier to locate the official source of accurate information. No less important, the computer can present information in a form - primarily through high quality graphics - that is accessible even to the untrained business professional."*

Rockart and De Long (1988) list the following as being EIS attributes based on executives comments which are most important in enhancing mental models:

- Improved access to external data.
- New ways to combine data from multiple sources.
- Presentation of data in more meaningful formats.
- Sophisticated analytic and modelling capabilities.
- The ability to identify and test assumptions about performance.
- Off-hours data access.

So whilst the benefits are not easily measurable, the literature clearly indicates the positive impact an EIS can bring into a company if it addresses the correct information requirements of the organisation's executives. According to Spraque Jr and Watson (1993):

> *"A successful EIS, however, can generate a variety of benefits. It can provide information that is timely, accurate, relevant, concise, and in an attractive format. It can support strategic business objectives such as improving the firm's competitive position or improving the quality of goods and services provided. It may even facilitate downsizing the organisation."*

In fact as the usage of the system spreads and evolves, i.e. more users become interested to use the system as a result of which more functionality is included, so does the cost/benefit ratio and value of the EIS (Mawhinney and Millet, 1992).

2.6. Managing an Operating Executive Information System

As already mentioned in previous sections, a very important aspect of ensuring the successful implementation of an Executive Information System is that of correctly and accurately determining the information needs of the target population. The reality that the business environment is dynamic and hence influencing changes in the critical success factors of executive management requires that an operating EIS be monitored closely to ensure continued delivery of relevant information to executives.

According to Watson and Frolick (1993) what works with the initial version of an EIS may not work well with the ongoing version. The responsibility of keeping an EIS up-to-date is more serious than that of most computer-based applications, because the average business significance of each data value is very high.

Bittlestone (1990) suggests that,

> *"The rate of structural change in the business, and the need to reflect these changes in the EIS, also call for an approach that is fundamentally business-oriented rather than computer oriented. Once an organisational change has been introduced, it must immediately be reflected in the EIS, otherwise the EIS becomes just another out-of-date computer system."*

According to David Friend (1990),

> *"The key to long-term success with EIS is to think ahead, beyond what may be reasonably anticipated today."*

As more companies implement EIS in the South African business industry, the need to manage the investment to ensure that the system delivers the required results will become even more critical. Bittlestone (1990) argues that because of the value of the information provided by an EIS, should a senior executive be ever fed unknowingly with incorrect data, that will be the end of the project.

As and when EIS becomes popular in an organisation more people including non-executive users begin to use it (Friend, 1990; DeLong and Rockart, 1986; Watson and Satzinger, 1994). This poses challenges with respect to the differing needs of users at different levels in an organisation. Friend (1990) argues that the spread and evolution of an EIS is a natural progression of the implementation, otherwise the system is likely to stagnate and die.

The literature suggests that some of the critical factors that could be taken into consideration are, the evolution and spread of the system (DeLong and Rockart, 1986; Friend, 1990; Watson, 1990), ease of use (Armstrong, 1990; Barrow, 1990), continued strategic alignment to business goals or support of critical success factors of executives (Bittlestone, 1990; Watson, 1990; Wetherbe, 1991), continued executive involvement (Volonino and Robinson, 1991; DeLong and Rockart, 1986), quick access to information (Armstrong, 1990; Volonino and Robinson, 1991), and data consistency (Armstrong, 1990) in managing an EIS.
The lack of formalised guidelines for managing these critical factors that will ensure continued success of the EIS leads to the collapse of many EIS endeavours.
According to Watson (1990) and Barrow (1990), there should be plan or at least a planning process for the management of the evolution of EIS. An important part of this plan is to ensure that an operating EIS continues to address the significant needs or problems of its users. Volonino and Robinson (1991) suggest that continued executive involvement is needed to ensure the necessary financial support for an operating EIS. Monitoring of system usage trends will also help to monitor the system.

CHAPTER 3

THE RESEARCH METHODOLOGY

3.1. Introduction

The aim of this chapter is to define the objectives of the research study, and to explain the methodologies which were used in conducting the research.

3.2. Objective of the Research

Executive Information Systems are a reality and many organisations have invested millions in such systems in order to provide timely, accurate and relevant information to their management. However, the ever-changing business environment requires that since an Executive Information System is meant for top managers, it must also reflect the dynamism of the business in the information that it provides. The fact that many Executive Information Systems implementations reduces to a non-existent state a few months or years after implementation can be attributed to the fact that business organisations fail to closely monitor those factors that are important in keeping the system alive, up-to-date and relevant.

> **By identifying the critical success factors for managing an operating Executive Information System, the research aims to establish guidelines which will go a long way towards helping South African business organisations to ensure that their Executive Information Systems investments continue to contribute to the competitiveness of their organisations despite changes in the business environment.**

3.3. Why this Research is Important

The re-entry of South Africa into the global business arena has brought along a lot of pressures and challenges for our business organisations, of which the manufacturing sector is no exception. As more and more foreign players enter the local market the competition becomes even more stiffer than ever-before. Executive managers are faced with internal and external pressures that affect the decisions they make in the running of their organisations.

As already mentioned, the increasing competitive environment and the need to be proactive in dealing with it poses the most critical external pressure for organisations (Watson et al, 1991). Executive Information Systems are meant to be the providers of such external and internal information about the market-place in a timely and accurate manner. The dynamic business environment and the ever increasing competitiveness calls for an Executive Information System that will dynamically reflect business changes as and when they happen (Bittlestone, 1990). This

responsibility of keeping an Executive Information System up-to-date is more serious than that of most computer applications because the average business significance of each data value is very high, due to executive managers basing their decisions about their organisations on them. Bittlestone (1990) suggests that because of the value of the information provided by Executive Information Systems being so high, nothing but relevant, up-to-date and accurate information should be provided by the system as the opposite might mean the death of such a system.

The strategic nature of some of the information provided through Executive Information Systems goes a long way towards helping companies to position themselves competitively in the market-place. At the same time, given the dynamic business environment, Information Technology (IT) departments need to ensure that their Executive Information System investment keeps on delivering the relevant, timely and accurate information that executives require in order to make critical decisions affecting the performance of their business organisations.

By identifying the critical success factors for managing an operating Executive Information System, this research aims to provide South African business managers with guidelines that will go a long way towards ensuring that their investment in the system is sustained despite changes in the business environment.

3.4. Research Methodology Used

A structured research methodology is a very important part of a research project because it ensures that the research has integrity (Remenyi and Williams, 1993), while also providing the researcher with a basis on which to assert the validity of the research findings.

Since research is about contributing to the established body of knowledge in the discipline of interest, according to Remenyi and Williams (1993), in order to do this satisfactorily:

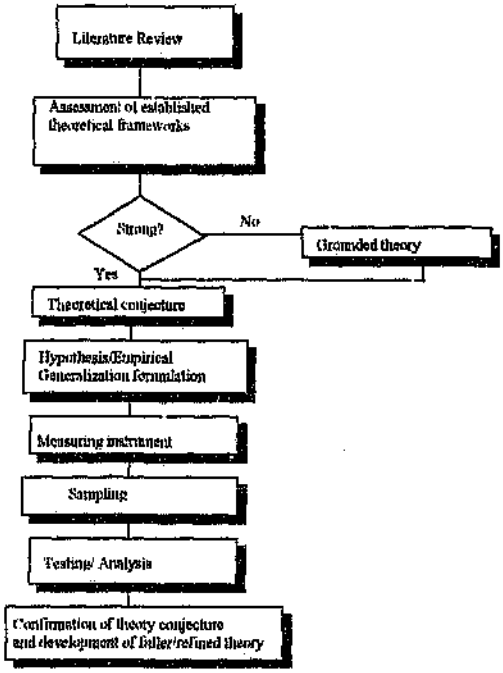
> *"..., the researcher should comply with the 'scientific method', i.e. an informal but strict set of rules that have evolved to ensure the integrity, reliability and reproducibility of the work."*

Van Maanen (1983) cited in Easterby-Smith et al (1991) defines qualitative methods as :

> *"...an array of interpretative techniques which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world."*

The study in this research report uses passive observation which according to Remenyi and Williams (1993) may be defined as when the researcher draws conclusions from information

collected during interviews, from reports and through questionnaires. This approach can be illustrated as follows:-



(Remenyi and Williams, 1993)

Figure 3.1: Steps in the research process - Passive Observation

3.4.1. Literature Review

One of the most important aspects of research is the literature review which helps to reveal the established facts of the situation and also to establish the current theories and models which have been used by previous researchers (Remenyi and Williams, 1993).

This research aims at looking at issues related to the management of an operating Executive Information System. The study of the available literature (Chapter 2) revealed several issues that are critical to the continued success of the system. While available research has been conducted into the benefits that can be brought about by Executive Information Systems, the development framework for successful implementation, problems associated with the systems implementation, etc., the fact that more and more Executive Information System's investments end up in the drain after going live prompted the researcher to look at critical success factors associated with an operating EIS. These factors should be such that if managed and monitored closely, the system will continue to contribute to the competitiveness of the organisation despite changes in the business environment, and thus provide South African business managers with

guidelines for safeguarding their Executive Information Systems investment for the benefit of their companies.

3.4.2. Assessment of the Established Theory

The concept of Executive Information Systems was first introduced in the early 1980's, but only made an impact towards the end of that decade. The main drive towards this impact was the increasing importance of timely and accurate information as a strategic resource for competitiveness.

Previous Executive Information Systems research has concentrated on the technology and how it can benefit executives in organisations, but there is little as to what organisations need to do or put in place in order to ensure that their investment in this technology continues to contribute to their organisation's competitiveness despite the ever-changing business environment.

Remenyi and Williams (1993) suggest that it is very important to ensure early that the problem identified in the literature is sufficiently explicit and accepted by people in the field. This will ensure that the researcher will be able to develop a theoretical framework and derive testable hypothesis. For this research, there is enough literature to be able to construct a theoretical conjecture.

3.4.3. Theoretical Conjecture

Based on the information gathered during the literature review the researcher is able to make a theoretical conjecture. The basis of the research was to identify critical success factors for the management of an operating Executive Information System as seen by South African organisations who have implemented this technology in the manufacturing business sector.

The following theoretical conjecture was made:

> The critical success factors for the management of an Executive Information System are:
>
> - Continually aligning an EIS to the strategic business goals;
> - The continued involvement of executive management in the monitoring of an operating EIS.

From the theoretical conjecture, the next stage is to derive an hypothesis or empirical generalisations.

3.4.4. Empirical Generalisation

In order to test the new theory, it must be stated as a set of clearly defined empirical generalisations. From the above theoretical conjecture, the following empirical generalisations where developed:

- An operating EIS must be continually aligned to the ever-changing business goals or objectives.
- Executive management should always be involved in the monitoring of an operating EIS.

3.4.5. Measuring Instrument

In order to test the theory a research methodology has to be selected. Since the research is empirical, the sample consisted of management in the selected target organisations. During data gathering the researcher had to have a clear understanding of the respondents views on the empirical generalisations, and thus the interview approach was selected.

According to Kerlinger (1964):

> *"The interview is probably man's oldest and most often used device for obtaining information. It has important qualities that objective tests and scales and behavioral observations do not posses. When used with a well-conceive schedule, an interview can obtain a great deal of information; it is flexible and adaptable to individual situations, and it can often be used when no other method is possible or adequate."*

Easterby-Smith et al (1991), suggest that:

> *"The most fundamental of all qualitative methods is that of in-depth interviewing, ..."*

An in-depth interview schedule was constructed and used to drive the semi-structured interviews. The schedule ensured that the interviewee addressed the core set of issues which would later be evaluated against responses of the other interviewees. The schedule can be seen in Appendix A.

3.4.6. The Interview Format

The interview was structured to analyse the respondents views and experiences with respect to critical success factors for managing an operating Executive Information System. Before undertaking the actual interviews the schedule was piloted with the Executive Information Systems manager of a large transport company who deemed the questions to be adequate to

extract the necessary information required. This was essential in order to ensure that the questions are intelligible and clear to the target population (Remenyi and Williams, 1993).

It was important to ensure that the respondents addressed the core issues whilst not restricting them from including issues which they thought were important. Thus, a semi-structured interview approach was used.

The interviews were tape recorded and later transcribed. The average time for the interviews was 45 minutes. The interviewees were very responsive and in many cases they were forthcoming with other issues which they though were critical in the topic of discussion. While they expressed the difficulties in getting executives committed they were undivided with respect to the value an Executive Information System adds to an organisation. Many of them felt it would be interesting to see the outcome of the research results as they felt the issues addressed by the research were critical to organisations that had implemented Executive Information Systems.

3.4.7. Sample Selection

The target population for this research is the business organisations in the South African business arena who have already taken the decision to invest in Executive Information Systems, in fact those companies that have already implemented EIS. The importance of this research to them is that it looks at issues that are critical to ensuring that the EIS investment decision can be protected by avoiding the pitfalls that led to many EIS investments going to waste after a few months of implementing the system.

As it is impossible to test the theory against the total population, a sample was selected from the overall population (Remenyi and Williams, 1993). The sample selected for this research was further narrowed down to only those organisations which are in the manufacturing business. The sample was selected using the "snowball" approach in that the researcher approached vendors of two of the most popular EIS software packages in South Africa (in terms of the number of implementations in the industry) and they in turn suggested potential respondents from their client base in the manufacturing sector. The respondents were companies with at least two years experience of an operating EIS environment. The interviewees were very senior IT people who were responsible for the success of the investments in their organisations.

In total 10 interviews were conducted in 9 different manufacturing organisations. It was very interesting to note that whilst the respondents were from a variety of organisations in the manufacturing sector, the responses of their perceptions of the core success factors were similar and this allowed the researcher to identify the common critical areas as seen by the majority of the respondents.

3.4.8. Testing and Analysis

Content analysis was used to analyse the data once it was collected in order to test the empirical generalisations. According to Berelson (1952), content analysis is:

> *"a research technique for the objective, systematic and quantitative description of the manifest content of communications."*

He further suggests words, themes, characters, items and space-time measurements as the applicable units of analysis. This research uses the theme as the unit of analysis.

The researcher counts the number of times a concept is mentioned during the interviews, which gives an indication of the importance the respondents place on the concept. The researcher further identifies the proportion of the sample population that made mention of each concept in the form of a percentage of the total population. A weighted average is them calculated by multiplying the number of times a particular concept was mentioned with the percentage of respondents who mentioned the concept. The weighted average figure is used to sequence the list of critical success factors for managing an operating EIS in order of importance, with the first being the most important and the last being the least important.

3.5. Summary and Conclusions

This was a core chapter of the research as it outlined the objective, importance and the empirical methodology used to conduct the research and analyse the results. By describing the theoretical basis of the research the relevance and validity of this research can be regarded in context.

CHAPTER 4

CRITICAL SUCCESS FACTORS FOR MANAGING EXECUTIVE INFORMATION SYSTEMS

4.1. Introduction

This chapter highlights the critical issues that were identified during the data collection phase. A total of ten interviews were conducted in a total of nine companies. The interviews were tape recorded, transcribed and analysed using the content analysis technique.

4.2. Strategic Alignment of EIS to Business Goals

While it is important to ensure that the EIS meets the information requirements of users when the system is implemented, the business environment is dynamic and ever-changing, and thus, it is critical that an operating EIS should reflect this.

4.2.1. Content analysis on the continued alignment of EIS to business goals

The first proposed critical success factor that was raised with the respondents, was their views on the whole question of alignment of an operating EIS to the business goals. The following issues and opinions, detailed in Table 4.1, were raised by the respondents.

Concept	%	Total
An EIS should be flexible to accommodate the dynamic business environment.	100%	25
As EIS spreads new requirements should be reflected in the system.	90%	21
EIS data should always be consistent with the operational data it summarises.	70%	15
Continued alignment of EIS ensures that the system remains useful to the users.	100%	29
An EIS should help individual managers to monitor their individual critical success factors (CSFs).	80%	20

Table 4.1 - Content Analysis on the alignment of an operating EIS

4.2.2. The flexibility of an EIS to accommodate the dynamic business environment

There was an overwhelming agreement by the respondents that if an Executive Information System was not flexible enough to be quickly adaptable to change in order to maintain its value by providing comprehensive information that was timely and relevant, then its future would be limited.

In fact 100% of the population highlighted the speed with which the system c adapted as a critical success factor for the EIS. Executives are very impatient people w ose interest quickly if they think the system is rigid and inflexible.

The researcher agrees with the research findings. An Executive Information System should contribute to the competitiveness of an organisation by providing relevant and timely information to the target population. If it fails to do this, then an organisation might loose its competitiveness due to decisions based on inf mation that is late and out-of-date.

4.2.3. Reflecting new requirements as the system spreads within the organisation

As and when lower level managers realise that an Executive Information System provides their managers with information about their activities before they forward it to them from the operational systems, they also demand their share of the EIS. But because, they are on the lower ranks, they have different needs and presentation formats than their managers.

90% of the respondents mentioned that for the system to maintain its value to all its users, these new requirements need to be build into the system. They maintain that while it is difficult to build a reputation, it takes a flash of a camera to destroy it. Another component is when the system expands into other areas whose executives did not use the system previously. Again it must be ensured that their functional requirements are reflected in the information that they get from the system.

It is the belief of the researcher that, carefully managing the spread of the system can only contribute to the stability, relevance and accuracy of the output of the Executive Information System to the satisfaction of all users.

4.2.4. There should be consistency between operational systems data and EIS data

An Executive Information System presents information from different operational systems and other sources in a comprehensive and attractive format to management. 70% of the respondents highlighted the need to ensure that downloading and uploading procedures and activities are closely monitored to ensure that the information presented by the two different sources is consistent.

Since the value of the decisions made by management are greatly influenced by the information they receive, it is critical that they are satisfied that the information is accurate.

The researcher agrees with the findings in that it is critical to ensure data consistency between the EIS and other operational systems.

4.2.5. Continued alignment ensures that an EIS system remains valuable to its users

As already mentioned, the business environment is very dynamic and ever-changing. For an Executive Information System to continue providing or meeting the needs of its users it must be continually aligned to the changing environment as and when changes occur. In fact 100% of the respondents indicated that if this was not achieved the system will die a slow death as the requirements move slowly away from what the system provides.

The respondents felt that this was a primary requirement for the system to be aligned to the core business goals if it has to provide any meaningful information. This will ensure that the system contributes directly to the competitiveness of the organisation. The researcher agrees with the findings.

4.2.6. An EIS helps management to monitor their individual critical success factors

It is interesting to note that only 80% of the respondents agrees with this factor, when 100% agreed with the previous one. This is because of the fact that two of the respondents i.e. 20% of the population highlighted that their Executive Information Systems, whilst aligned to the core business, might not necessarily satisfy all the users individual needs, but are rather based on the corporate needs which are still relevant to all executives. Therefore they were not certain as to whether the system would help individual managers to monitor individual critical success factors.

80% of the respondents maintained that if the system has to be valuable to executives, it has to take into account the individual performance indicators and customise them into the information that the system provides to individual executives. They reckon that an EIS can never be the same system across the entire user population, but rather many systems tailored to individual needs, based on the total broader picture of the whole company.

The researcher agrees with the majority that whilst the system should encompass corporate-wide competitive information, it should also take into account individual requirements.

4.3. Executive or User Involvement in managing EIS

If it is critical to ensure that an Executive Information System is always aligned to the dynamic and ever-changing business environment, it is important that the new information requirements based on the new issues be incorporated in the system. This can only be done accurately and quickly if the leaders or drivers of the organisational goals, i.e. senior executives are closely involved in monitoring the deliverables of the system to ensure that changes take place as soon as their focus on the business changes.

4.3.1. Content analysis on executive or user involvement in managing EIS

The respondents were asked for their opinions on executive involvement in the managing of an operating EIS. Their responses are summarised in Table 4.2 and thereafter discussed in detail in the following sub-sections.

Concept	%	Total
ISD should provide somebody who knows the business to look after the users.	90%	18
Executives or users should provide regular feedback on the EIS either formally or informally.	100%	32
Continued executive involvement ensures success of the system.	100%	28

Table 4.2 - Content Analysis on management involvement

4.3.2. An IT person who knows the business should look after the users

Whilst it is important to ensure that the system is flexible enough to accommodate changes, an IT person who understands the business should work with the users. This person will act as the first line support and also as a monitor of users with respect to their usage of the system. Another important function that this person will perform is that by working closely with the users he can then appreciate individual preferences and their importance to the affected individuals. This will ensure that he/she can help them to specify their information requirements.

While there was a 90% support of this factor, the researcher agrees it is a critical factor, but not strong enough as there should be a support and maintenance function for any other system that could also perform the same duties.

4.3.3. Regular formal or informal feedback should be provided by Executives or users on the EIS

This was the most popular critical success factor as it was mentioned by 100% of the population and the highest number of times, i.e. thirty two times. The respondents felt that if executives agreed that the EIS system was meant to provide them with their information needs in order for them to make important decisions affecting the competitiveness of their companies, then by providing regular feedback and input as to what the system should deliver, they will be helping to align the system to ensure that it remains contributing to the monitoring of both their individual and corporate-wide critical success factors, one of which is to keep the organisation competitive. It will be interesting to also note that the respondents felt that informal discussions with executives can highlight critical information needs.

The researcher agrees with the findings and also subscribes to the thinking that since it is top executives that define corporate goals and strategy, if they give regular feedback on new requirements or changing requirements, then the system is bound to remain focused and relevant.

4.3.4. Continued executive involvement ensures success of the system

The researcher was expecting the respondents to read the meaning of this factor as the one in 4.3.3, but 100% of the respondents felt that if senior managers realised the commitment of top executives or directors in monitoring the success of the system, then they will also ensure that they are not left over, and in fact they will commit themselves to ensure that the system succeeds by giving their full support and time if required.

Another dimension to this factor was that the executive sponsor needs to be continually involved in managing an operating EIS so that he can be the seller of the system to other executives and managers and also add his/her weight in motivating for further funds to manage the spread within the organisation.

Based on the arguments of the respondents, the researcher agrees with the findings, though as previously mentioned, the researcher saw 4.3.3 and 4.3.4 forming one broad critical success factor.

4.4. Other Important Critical Success Factors for Managing EIS

There were other important concepts that were highlighted by the respondents as contributing to the success of an operating EIS. These factors were not covered in the categories of the interview schedule, but the researcher felt it was important to highlight them as they also enjoyed the mention of the majority of the respondents.

4.4.1. Content analysis on other critical success factors for managing EIS

The respondents highlighted the following concepts as listed in Table 4.3.

Concept	%	Total
An EIS should be portable i.e. loaded on a notebook and accessed off-line.	70%	10
There should be prompt attention to user queries and requirements.	60%	12

Table 4.3 - Content Analysis on other success factors

4.4.2. An EIS should be portable

Executives are very busy people who spend little time in their offices. Their working day is filled mostly in attending to appointments which are at different locations as they go about doing their duties. 70% of the respondents felt it is very critical for the success of the system to ensure that executive can download the latest information to an EIS version residing on a notebook so that they can access the information even if they are not in their offices.

One of the respondents mentioned that portability was one of the strongest selling points in his organisation. He further mentioned that they are imagining of a future where executives will only take their notebook computers into meetings and actually use something like a magnabyte to report progress on their functional areas directly from the Executive Information System.

The researcher while not having included this category in the interview schedule, agrees with the thinking of the respondents in this regard.

4.4.3. Prompt attention should be given to user queries and requirements.

In order for the confidence levels of the users to be kept high, an IT department should ensure that executives don't wait for long periods of time waiting for attention when they have problems. The respondents reiterated that executives are very impatient people who work under pressurised circumstances and never have enough time, so their requirements should always be highly prioritised and attended to promptly.

From the total population, 60% supported or mentioned this need, whilst the other 40% did not mention this concept. The researcher feels that if the executives are involved in giving regular feedback this factor will be taken care of automatically.

4.5. Summary

The analysis revealed a number of concepts associated with the management of an operating EIS as perceived by the respondents. The results now need to be considered in the light of the theoretical conjecture as presented in chapter 3 of this report, and to consider whether the findings support or reject the empirical generalisations. They are discussed in chapter 5.

CHAPTER 5

RESULTS AND FINDINGS

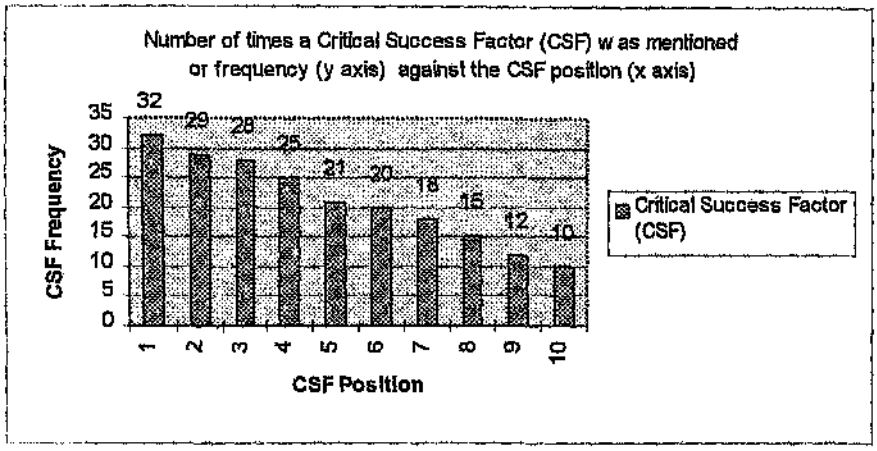
5.1. Introduction

The empirical generalisations will be examined in relation to the findings in order to ascertain whether they are critical for the management of an operating Executive Information System. Table 5.1 provides a summary of the findings sorted in descending order of the total number of times a critical success factor (CSF) was mentioned.

	Critical Success Factor	Total
1	Executives or users should provide regular feedback on the EIS either formally or informally.	32
2	Continued alignment of EIS ensures that the system remains useful to the users.	29
3	Continued executive involvement ensures success of the system.	28
4	An EIS should be flexible to accommodate the dynamic business environment.	25
5	As EIS spreads new requirements should be reflected in the system.	21
6	An EIS should help individual managers to monitor their individual critical success factors (CSFs).	20
7	ISD should provide somebody who knows the business to look after the users.	18
8	EIS data should always be consistent with the operational data it summarises.	15
9	There should be prompt attention to user queries and requirements.	12
10	An EIS should be portable i.e. loaded on a notebook and accessed off-line.	10

Table 5.1 - Summary of the findings in descending frequency order

The above table (Table 5.1) indicates the emphasis placed on each critical success factor by highlighting the number of times the respondents made mention of each of the 10 critical success factors. The graph below, i.e. graph 5.1 shows the distribution and relative importance of each critical success factor.



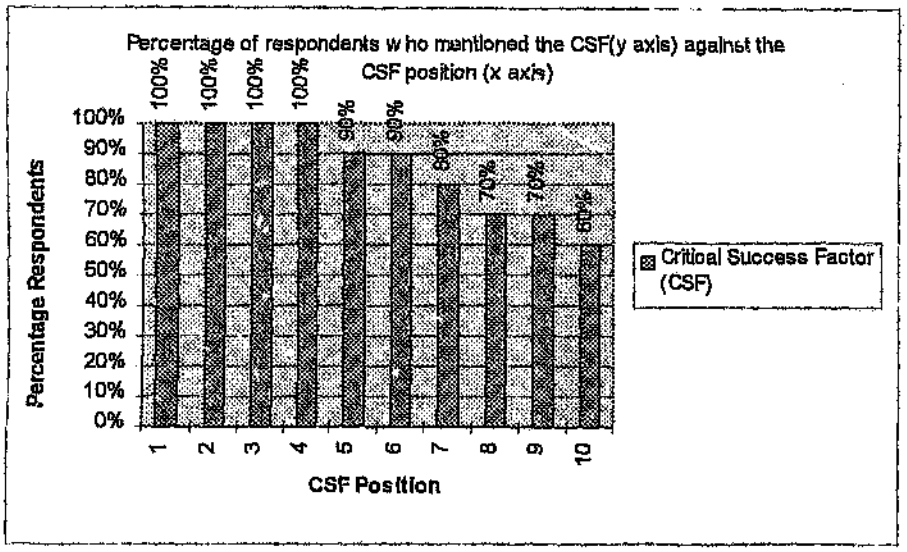
Graph 5.1 - Relative importance of CSF's using content analysis

Further, each CSF was analysed from the perspective of the percentage number of respondents who mentioned the CSF. These analyses is contained in table 5.2 sorted in descending percentage order.

	Critical Success Factor	%
1	Executives or users should provide regular feedback on the EIS either formally or informally.	100%
2	Continued alignment of EIS ensures that the system remains useful to the users.	100%
3	Continued executive involvement ensures success of the system.	100%
4	An EIS should be flexible to accommodate the mic business environment.	100%
5	As EIS spreads new requirements should be reflected in the system.	90%
6	ISD should provide somebody who knows the business to look after the users.	90%
7	An EIS should help individual managers to monitor their individual critical success factors (CSFs).	80%
8	EIS data should always be consistent with the operational data it summarises.	70%
9	An EIS should be portable i.e. loaded on a notebook and accessed off-line.	70%
10	There should be prompt attention to user queries and requirements.	60%

Table 5.2 - Summary of the findings in descending percentage order

The corresponding graphical representation is depicted in graph 5.2 below.



Graph 5.2 - Relative importance of CSF's using respondent percentages

5.2. Support of the empirical generalisations

5.2.1. First empirical generalisations

An operating EIS must be continually aligned to the ever-changing business goal objectives.

The respondents stated very clearly that an EIS that was not aligned to the core business of an organisation was doomed to a slow death. In fact this concept was mentioned 29 times by 100% of the respondents. Based on an EIS that was aligned to the core business, individual critical success factors can then be modelled around the core offering.

It is interesting to note that overall the critical success factor occupies second position on tables 5.1, 5.2 and 5.3 instead of the first as the researcher had wished. Despite this there was overwhelming support for the concept and thus, the empirical generalisation was strongly supported.

5.2.2. Second empirical generalisation

Executive management should always be involved in the monitoring of an operating EIS.

This empirical generalisation was broken down into different involvement scenarios by the respondents. They felt involvement should be backed by actions such as making time to provide regular feedback on impressions and opinions about the system, involvement in terms of providing the necessary support for funds to manage the system, and involvement in the form of an executive sponsor taking the responsibility to represent the needs of the EIS users in executive meetings.

100% of the respondents felt that this involvement scenarios were critical to the success of an operating EIS. It is therefore also concluded that this empirical generalisation was strongly supported by the research.

5.3. Additional critical success factors (CSF)

The research also brought out a number of interesting findings which the respondents felt strongly about. These concepts included portability of the EIS as a critical success factor, prompt attention to user queries, and the provision by an information technology department of someone who can be a watchdog to the needs and concerns of the users. Data consistency was also mentioned as a critical success factor.

5.4. Critical success factors for managing an operating EIS

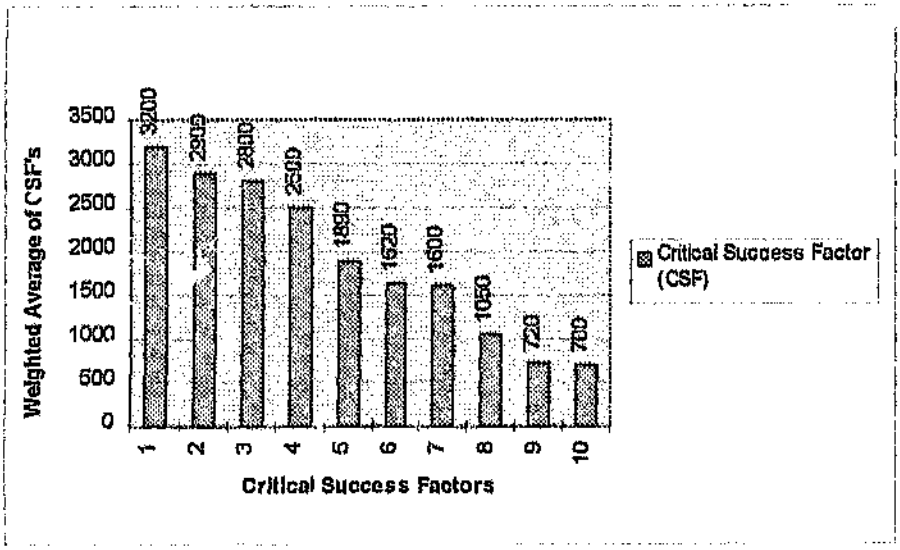
The following table 5.3 presents the critical success factors for managing an operating Executive Information System (EIS) as seen by respondents whose organisations have implemented EIS. Ensuring that these factors are monitored will contribute to sustaining the investment an organisation has made in this technology. The weighted average figure is the result of multiplying the percentage of respondents with the number of times a critical success factor was mentioned.

	Critical Success Factor	Weighted Average
1	Executives or users should provide regular feedback on the EIS either formally or informally.	3200
2	Continued alignment of EIS ensures that the system remains useful to the users.	2900
3	Continued executive involvement ensures success of the system.	2800
4	An EIS should be flexible to accommodate the dynamic business environment.	2500
5	As EIS spreads new requirements should be reflected in the system.	1890
6	ISD should provide somebody who knows the business to look after the users.	1620
7	An EIS should help individual managers to monitor their individual	1600

	critical success factors (CSFs).	
8	EIS data should always be consistent with the operational data it summarises.	1050
9	There should be prompt attention to user queries and requirements.	720
10	An EIS should be portable i.e. loaded on a notebook and accessed off-line.	700

Table 5.3 - Critical success factors for the management of an operating Executive Information System

Graph 5.3 shows the relative importance of the Critical Success Factors.



Graph 5.3 - Relative importance of CSF's using weighted average

5.5. Conclusion

While all the empirical generalisations where strongly supported in this research, the researcher would like to point out that several other important critical success factors emerged which also enjoyed the majority of the respondents. One critical success factor was also divided into several executive involvement scenarios including feedback sessions, involvement in monitoring the system and continued executive sponsor role even after the system has gone live. The researcher was comfortable with this analysis by the respondents.

The listed 10 critical success factors for managing an operating executive information system are according to the researcher very vital for ensuring that an EIS investment remains protected.

CHAPTER 6

LIMITATIONS AND AREAS FOR FURTHER RESEARCH

6.1. Limitations of the research

It is possible to identify several potential limitations of this research.

6.1.1. Sample Size

The size of the sample was relatively small. Having interviewed 10 respondents out 9 organisations represents a small sample size given the number of organisations that have EIS implemented. But, based on the empirical generalisations the researcher feels that the results would not have changed drastically if the number of interviews were increased. Time constraints made it difficult to interview more organisations. It would nave without doubt been more reassuring if the evidence covered more than 100 respondents.

6.1.2. Sample Selection

It was difficult to identify potential respondents without relying on the vendors of EIS software, and this might have the effect that one could have missed to interview organisations that had more experience and input into the research. The researcher is however satisfied with the sample selection as all the organisations interviewed had more that 2 years in an operating EIS environment.

6.1.3. Focus on alignment and involvement issues

The fact that the interview schedule was more focused on strategic alignment and executive involvement issues might have had the effect that other equally important factors were excluded by the respondents. Whilst taking cognisance of this, the researcher still feels the focus on alignment and executive involvement is crucial as all the other factors will still be weak if this ones are not comfortably managed.

6.2. Areas for further research

The following have been identified as areas that could be explored further.

6.2.1 Executive Information System vs Enterprise Information Systems

There is a school of thought that Executive Information Systems should be renamed Enterprise Information Systems as the system should be used by everybody within an organisation. The

thinking that an Executive Information System needs to be evolved to the lowest levels of management or personnel within an organisation requires that the purpose of such a system be examined. An Executive Information System combines information from internal and external sources for senior executives. Should this information also be made available to junior people or is it relevant to them? What role will DSS and MIS play in relation to Enterprise Information Systems?

6.2.2. Other critical Success Factors

This research only concentrated on alignment and executive involvement issues and this might have made the respondents biased in their response during the interviews. There might be several other critical success factors that are equally or even more important in managing an Executive Information System that were not picked up during this research. An open ended study or a broad case study into critical success factors for managing an operating EIS is an area that could bring out other interesting findings.

REFERENCES

- Ahituv, Niv, and Neumann, Seev, Principles of Information Systems for Management, Wm. C. Brown Publishers, 1986, Iowa (US).

- Armstrong, David A. *How Rockwell Launched its EIS*, Datamation, March 1, 1990.

- Armstrong, David A. *The People Factor in EIS Success*, Datamation, April 1, 1990.

- Barrow, Craig *Implementing an Executive Information System: Seven Step for Success*, Journal of Information Systems Management, Volume 7, Number 2, Spring 1990.

- Berelson H. cited in Krippendorff, K., Content Analysis, Sage Publications, 1985, Beverley Hills.

- Bittlestone, Robert. *Financial Control in the 1990s*, International Journal of Information Resource Management, Volume 1, Number 1, 1990, p.12-18.

- Decision Support Systems: Putting Theory Into Practice, edited by Spraque Jr, Ralph H. and Watson, Hugh J, Third Edition, Prentice Hall, 1993.

- DeLong, David. and Rockart, John F. *Identifying the Attributes of Successful Executive Information Systems Implementation, Transactions of the Sixth International Conference on Decision Support Systems*, 1986.

- Easterby-Smith, Mark; Thorpe, Richard; and Lowe, Andy, Management Research: An Introduction, Sage Publications, 1991, London.

- El Sawy, Omar A., *Personal Information Systems for Strategic Scanning in Turbulent Environments: Can the CEO GO On-Line?*, MIS Quarterly, March 1985.

- Friend, David *EIS and the Collapse of the Information Pyramid*, Information Center, Volume 6, Number 3, March 1990.

- Garelick, Howard, *Executive Information Systems: Marketing Hype or Invaluable Management Aid*, IMDS, March/April, 1987.

- Goldratt, Eliyahu M. The Haystack Syndrome: Sifting Information Out of the Data Ocean, North River Press, Inc., New York, 1990.

- Gulden Gary K., and Ewers Douglas E. *Is Your ESS Meeting The Need?*, Computerworld, Volume 23, Number 28, July 1989.

- Houdeshel, George, and Watson, Hugh J. *The Management Information and Decision Support (MIDS) System at Lockheed-Georgia*, MIS Quarterly, March 1987, p.127-140.

- Kerlinger, Fred N. Foundations of Behavioral Research, Holt, Rinehart and Winston, London, 1964.

- Martin, James, Strategic Information Planning Methodologies, Prentice Hall, 1989, New Jersey.

- Millet, Ido, and Mawhinney, Charles H. *Executive Information Systems: A critical perspective*, Information and Management, Volume 23, Number 2, August 1992, p.83-92.

- Mintzberg, Henry, *Planning on the Left Side and Managing on the Right Side*, Havard Business Review, July-August 1976.

- Omar, Mohammed H. *Executive Information Systems: The Time Has Come*, Executive Development, Volume 5, Number 2, 1992, p.13-16.

- Remenyi, Dan. and Williams, Brian Some Aspects of Methodology for Research in Information Systems, University of the Witwatersrand: Working Paper Series No. 002, March 3, 1993.

- Remenyi, Dan. and Williams, Brian The Nature of Research: Qualitative or Quantitative, Narrative or Paradigmatic?, University of the Witwatersrand: Working Paper Series No. 005, May 1993.

- Remenyi, Dan. Introducing Strategic Information Systems Planning, NCC Blackwell Limited, Manchester, 1991.

- Rockart, John F. *Chief executives define their own data needs*, Harvard Business Review, March/April 1979 p.81-93.

- Rockart John F., and De Long David W., *Moments of Executive Enlightenment*, Information Strategy: The Executive's Journal, 1988.

- Rockart, John F. and Treacy, Michael E. *The CEO goes on-line*, Harvard Business Review, January/February 1982, p.82-88.

- Volonino, Linda and Robinson, Stephen *EIS Experiences at Marine Midland Bank, N.A.* Journal of Information Technology Management, Volume 2, Number 2, 1991.

- Volonino, Linda, and Watson Hugh J. *The Strategic Business Objectives Method For Guiding Executive Information Systems Development*, Journal of Management Information Systems, Volume 7, Number 3, 1990.

- Wallis, Lou. *Power Computing At The Top*, Across The Board, January/February, 1989.

- Watson, Hugh J. *Avoiding EIS Pitfalls*, Computerworld, June 25, 1990.

- Watson, Hugh J. and Frolick, Mark N. *Determining Information Requirements for an EIS*, MIS Quarterly, September 1993.

- Watson, Hugh J., Rainer, Jr. Kelly R. and Koh, Chang E. *Executive Information Systems: A Framework for Development and a Survey of Current Practices*, MIS Quarterly, March 1991.

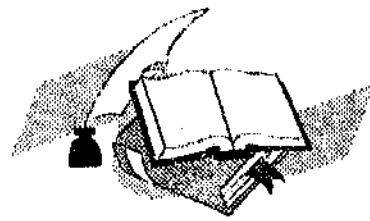
- Watson, Hugh J. and Satzinger, John. *Guidelines for designing EIS interfaces: Meeting the Executives' Information Needs*, Information Systems Management, Volume 11, Number 4, FALL 1994.

- Wetherbe, James C. *Executive Information Requirements: Getting it Right*, MIS Quarterly, March 1991.

APPENDIX A: INTERVIEW SCHEDULE

LIST OF INTERVIEW QUESTIONS

CRITICAL SUCCESS FACTORS FOR THE MANAGEMENT OF EXECUTIVE INFORMATION SYSTEMS (EIS) IN MANUFACTURING.



Course	:	Master of Commerce (MCom - Information Systems)
Project	:	Final Year - Research Report University of the Witwatersrand Faculty of Commerce Dept of Information Systems
Supervisor	:	Prof Dan Remenyi
Interviewer	:	Livingstone Chilwane

PART 1:

1) Name of organisation
2) Name of interviewee
3) Designation of interviewee
4) Number of EIS users in the organisation

PART 2: SCALE

1 = Strongly Agree
2 = Agree
3 = Disagree
4 = Strongly Disagree.

PART 3: STRATEGIC ALIGNMENT OF EIS TO BUSINESS GOALS

The availability to executive management of both external and internal information that is relevant, given the ever changing and dynamic business environment, is not only critical but also crucial to the continued competitiveness of an organisation. This is because it is upon this information that management base their decisions about the direction of their companies.

1. Is EIS in your organisation mostly used by,
   - Executive Managers
   - Middle Managers
   - Junior Managers
   - Financial Managers
   - Production Managers
   - Marketing Managers

2. What kind of information does the EIS provide to them.
   - Strategic
   - Financial
   - Production
   - Marketing
   - Other

3. Is the information that they get critical to their activities as decision makers? (Yes/No)

   If Yes: What makes it so critical.

   If No: Why is it not critical. Is it because the system is out-of-date with their requirements? (Yes/No)

   If Yes: What is the cause of this.

   If No: Why then.

4. Does the EIS help management in monitoring their critical success factors (CSFs).

5. Does management require different information from the EIS resulting in changes to the system. (Yes/No)

   If Yes: - What is the cause of the changes.

- Does the changes have any relationship to the changes in the executive's KPAs or the organisations business goals.

If No: Is it because the system is stable and provides information that is relevant or the executive's KPAs (Yes/No)

If No: Why then.

6. What is management's attitude towards the EIS. Can they do without it (Yes/No).

If Yes: How will the information currently provided by the EIS system be obtained.

If No: Is it because the EIS gives them accurate, timely and well presented information that is critical to their decision-making and thus to the success of their functions and the organisation as a whole (Yes/No).

If Yes: OK.

If No: What is the reason.

7. The importance of an EIS to executive management can to some extent be determined by the frequency that they interact with the system. How often do executives in your organisation use the EIS.

- Once a day or
- Many times during the day or
- Once a week or
- More than once a week or
- Once a month or
- Not frequently but as and when necessary or needed.

8. What do you think is the future of EIS in your organisation in the next 3 to 5 years. Will it still be critical (Yes/No).

If Yes: What would be the factors contributing to the continued competitiveness of the system.

If No: Why will this happen.

9. Is your EIS directly aligned to your business objectives?

10. On a scale of 1 to 4 (See Part 2, page 2), how would you rate your position with respect to the following statement,

> Continually aligning the Executive Information System to the ever changing business goals is critical to the continued success of the system.

PART 4: CONTINUED EXECUTIVE INVOLVEMENT IN THE MANAGEMENT OF AN OPERATING EIS.

Executive Information systems are there to provide executives with timely and accurate information which is relevant to their specific critical success factors in their functions. The dynamic business environment requires an EIS system that is flexible and up-to-date.

1. How do you ensure that the EIS is not out-of-date with the requirements of the users of the system. Is there somebody who monitors the situation with regards to changing requirements in order to effect the necessary changes? (Yes/No)

   If Yes: - What exactly is the function of this person.
   - What is his/her relationship with the users of the system.
   -

   If No: How then do you ensure that the situation is monitored in order to that the system is not out-of date.

2. Do your executives regularly give advise on what changes are needed to keep your EIS aligned to the business strategy. (Yes/No).

   If Yes: Briefly explain how this happens.

   If No: How are changes approved before they are effected. What role do users play in the process.

3. Do you still have steering committee meetings with the initial project sponsors to ensure their continued contribution to the evolution and spread of the EIS system? (Yes/No)

   If Yes: Explain how this takes place and how often.

   If No: How do you ensure the continued support of the executive project sponsors.

4. How would you rate the following statement about executive management involvement using the scale provided in Part 2. (page 2).

PART 4: CONTINUED EXECUTIVE INVOLVEMENT IN THE MANAGEMENT OF AN OPERATING EIS.

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   -

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2. Do your executives regularly give advise on what changes are needed to keep your EIS aligned to the business strategy. (Yes/No).

   If Yes: Briefly explain how this happens.

   If No: How are changes approved before they are effected. What role do users play in the process.

3. Do you still have steering committee meetings with the initial project sponsors to ensure their continued contribution to the evolution and spread of the EIS system? (Yes/No)

   If Yes: Explain how this takes place and how often.

   If No: How do you ensure the continued support of the executive project sponsors.

4. How would you rate the following statement about executive management involvement using the scale provided in Part 2. (page 2).

Continued executive management involvement in the management of an operating Executive Information System is critical to the continued success of the system.

PART 5: GENERAL

1. How long have you had the EIS in your organisation?

   - Less than a year or
   - More a year or
   - More than two years or
   - More than three years etc.

2. Has the number of users increased or decreased?

   If they increased: What do you attribute to this.

   If they decreased: What was the cause of this.

3. Has the profile of the users evolved or stayed the same. (i.e. are even other employees who are not necessarily executives using the system). (Yes/No).

   If Yes: What is the main driver towards this situation.

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