UNIVERSITI PUTRA MALAYSIA

AN EMPIRICAL STUDY OF FACTORS AFFECTING INFORMATION TECHNOLOGY PROJECTS IMPLEMENTATION

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ABSTRACT

Information Technology (IT) systems have much to offer in almost all sectors of industry and commence. Every year organizations make substantial investments of money and other resources into developing new information systems to meet their business operation requirements. Unfortunately, a significant amount of all Information Technology projects development undertaken is never completed or not used if completed (Kweku, Zbigniew 1994). There are many problems that have contributed to the failure of IT projects implementation. It is very easy to find negative examples or horror stories of IT implementation but some cases stand out precisely because things have gone right. The success and failures of IT projects implementation within an organization ultimately depends on several key factors.

This study identified several major factors as contributing to the failure and success of IT implementation in two companies, a shipping and a telecommunication consortium located in the Klang Valley. This two-phase study first rank-ordered the three most common problems identified (quality, costs and time) in terms of its frequency of occurrences and then assessed the level of importance of the key factors grouped under the main areas of Organization & Management, Business Requirement, IT Investment and IT Infrastructure. The second phase then examined each of the key factors in the groups to determine the underlying interacting relationship associated with each other.

A literature review of the key factors and previous research findings are presented. The results from this study is of great interest to the IS community in attempting to explain what issues or factors that might have contributed to the failure and success of IT project implementation.

CHAPTER 1

INTRODUCTION

1.0 BACKGROUND

Today we are living in a global information society with a global economy that is increasingly dependent on the creation, management and distribution of Information Technology (IT) resources. Information Technology plays a vital role in the business success of an organization. Many organization have realized the importance of developing an IT strategy for strategic advantage and as a competitive weapon. (Steve and Peter, 1995). An organization can use IT to gain competitive advantage by improving operational efficiency, improving managerial effectiveness, making product and service innovations and increasing bargaining power over particular customer and supplier.

However, if IT projects do not properly support the organization's strategic objectives, business operations or management needs of an organization, they can seriously damage its prospects for survival and success.

One study found that almost 75% of all IT projects are never completed, while other studies have estimated that between one-third and one-half of all IT projects never reach the implementation stage, (Guinan et al, 1997). In a survey conducted by Price Waterhouse, 25% of senior executive responsible for IT project implementation in the financial services sector reported that over 50% of IT projects end in failure (Alan and Andrew, 1994). So, proper implementation and management of IT projects is a major challenge for managers.

Thus, IT systems function represents:

- An important factor affecting operational efficiency, employee's

productivity and customer service and satisfaction.

- A major source of information and support needed to promote effective managerial decision-making.
- A major functional area of business that is important to business success.
- An important tool in developing competitive products and services that enables an organization to compete in the global marketplace.
- A major part of resources of an organization and its cost of doing business.

This study identified several major factors as contributing to the failure and success of IT implementation in a shipping and telecommunication consortium company. This two-phase study first identified, rank-ordered the three most common failures factors (quality, costs and time) in order of its frequency. The key success factors are categorized under four main areas (Organization & Management (OM), Business Requirements (BR), IT Investment (ITV) and IT Infrastructure (ITF). These key factors are rank-ordered in order of its significant. The second phase then examined each major factor the underlying interacting relationship associated with other key factors. Finally to propose solutions to overcome some of these problems.

1.1 INFORMATION TECHNOLOGY DEVELOPMENT IN MISC

Malaysia International Shipping Corporation (MISC), the Nation Shipping Line of Malaysia was incorporated as a public company on 6 November 1968 with the responsibility of providing efficient shipping services to the countries exports and import trade. This was to complement Malaysia's role as a leading producer and

exporter of raw materials. Malaysia's steady growth as well as development as an industrialized nation through the years has led MISC to diversify into a wide range of shipping and non-shipping related activities such as shipbuilding and repair, container haulage, warehousing, trucking, container and prime mover container depot and ship stores as well as travel and port management.

MISC operates in a competitive global environment and has offices worldwide over 35 countries. Recognizing the important role of IT in national development, an IT program has been incorporated. The objectives of the IT development program would be to:

- Improve productivity of business operation functions
- Promote the availability and accessibility of information
- Enhance managerial decision making effectiveness
- Develop an IT infrastructure and
- Assist the government's aspiration of creating an information rich society.

MISC IT development program could be classified into 3 distinct phases over the years since its incorporation namely.

1.1.1 Phase I : Period 1968 to mid 1970's

The installation of the first ICL minicomputer in 1968 marked the dawning of the computer age in MISC. The computer installed then was used primarily for accounting and payroll purpose. Computer systems installed during this period were

basically stand-alone systems without remote terminal locations and telecommunication facilities.

1.1.2 Phase II : Period from mid 1970's to mid 1980's

As business expands, the need of managerial information arises. The mid 70' saw the emergence of management information systems being implemented on the WANG computers to support decision making, planning and control. One such system was the CARGO management system installed to monitor cargo movement at a few selected overseas branch offices. These computers utilized basic telecommunication facilities for data transmission to headquarter.

1.1.3 Phase III : Period from mid 1980's onward

The need for networking and distributed processing has since then increased during this period. The network enables the overseas offices to access and transmit data to headquarter on the wide area network. Due to poor communication infrastructure in some countries, the networking and telecommunication facilities were extended to only 23 overseas branches worldwide.

The Hewlett Packard computers were installed at headquarter and its branches to replace the obsolete WANG computers. On-line application systems on Equipment management system, Invoicing system were installed at its overseas branches to enhance its business operations and provide better customers' support and satisfaction.

1.1.4 Phase IV : Beyond 1990's

Beyond 1990's, it was expected that the trend towards wide area networking interconnections between computer systems and the branches and to other external organizations such as port authority, customs and tax departments would increase.

1.2 INCREASING USE OF IT IN MISC

Two main factors contributed towards the increasing use of IT in MISC are product quality and market competitiveness.

Product Quality

The strong management emphasis to provide quality services and increased productivity has caused many departments to introduce IT to manage the office information more efficiently and effectively to reflect its commercial importance and competitiveness.

Market Competitiveness

The market competitiveness in the shipping industry has increased over the years.

Increasing competitiveness in the global market in the delivery of products and services and in line with MISC's business expansion to gain competitive advantage, an IT program was initiated to identify the business areas, which requires computerization and the use of IT. Several processes on the 65 MISC's vessels and the core shipping business operations were identified and implemented in the computerization program.

1.3 IT PROJECT INVESTMENTS IN MISC

The value of the computerization investments from 1990 to 1997 is as per table 1.

TABLE 1. IT PROJECT INVESTMENTS

Year	Total approval (RM million)
1990	1.0
1991	2.5
1992	6.5
1993	6.5
1994	12
1995	5.0
1996	2.5
1997	2.0

Source : Management approval papers

The largest computerization project approved was in 1994 (RM 19.5million). for the replacement of Hewlett Packard computers by the IBM AS/400 computer systems.

This amount is to be spent over 3 years. The 2 million spent in 1997 was for the upgrading of computer hardware to address the Year 2000 or Millennium Bug issue.

1.4 PROBLEM STATEMENT

The growth of computerization in MISC has increased since the introduction of the first ICL computer in 1968. However the sophistication of IT usage has not matched the high rate of IT acquisition and investment. Many IT projects encountered problems during implementation and some were abandoned. Even when such IT systems were implemented, the usage were limited to basic operational use and not meeting the business strategies and organization objectives. Improper evaluation of IT projects resulted in projects cost and often project time overruns. Technological constraint such as selection of proprietary hardware and software, which are non-communicable between other computer systems, has hindered efforts towards widespread of information exchange and sharing of IT resources within MISC group of companies.

1.5 OBJECTIVE OF THE STUDY

The general objectives of this study are to identify, rank and examine the perceptions of executives of two companies in a shipping consortium (MISC) and a telecommunication company (O'CONNOR's) on the existing key factors that have contributed to the failure and success of IT project implementation. The specified objectives are :

i) to identify the key factors contributing to the failure and success of IT implementation in two companies.

ii) to rank-ordered the key failures factors (quality, costs and time) in order of its frequency and the four main success factors (Organization & Management, Business Requirement, IT Investment and IT Infrastructure) in order of its significant.

iii) to further examine each major factor the underlying interacting relationship associated with other key factors.

iv) to propose suggestions and solutions to overcome some of these IT implementation problems.

1.6 SIGNIFICANCE OF THE STUDY

The assertion that information technology (IT) is critical to the success if not the very survival of a business has been made by commentators. The failure rate of information systems projects is high. Estimates of the success rate put in as low as 20% or lower (Philip and Jonathan, 1996).

Problems affecting the implementation and development of IT projects are widely known and usually manifest themselves in the various forms. The most common problems that have contributed to the failure of IT project implementation are Quality, Cost and Time Escalation. The study will examine the existing key problems faced by both MISC and O'Connor's in IT implementation and to propose solutions to overcome some of these problems.

CHAPTER 2

LITERATURE

REVIEW

2.0 LITERATURE REVIEW

A detailed literature study was conducted to identify how the issue under study was handled in the past. The literature survey provided additional insights and explanations to the issues under study. The literature review focuses on the types of computer-based information systems and the related issues on IT project implementation.

2.1 TYPES OF COMPUTER-BASED INFORMATION SYSTEMS

IT systems have much to offer in almost all sectors of industry and commence. In the past different types of computer-based systems have been promoted to address the information needs of top management. Several empirical and theoretical studies were carried out on the following types of computer-based information systems:

Management Information System (MIS)

MIS are the most common forms of management support systems, which provides managerial end-users with information products that support day-to-day decision-making needs. MIS retrieve information about internal operations from databases that have been updated by transactions processing systems. These systems serve the basic business requirements of an organization. However as the level of information increased, these MIS are slowly being replaced by more sophisticated information systems.

Decision Support System (DSS)

According to Richard and Marcus (1994), all DSS are designed to improve decision-making effectiveness, yet a review of the experimental literature reveals that achievement of this objective is mixed. These mixed results happened because DSS effectiveness is contingent upon a number of environmental factors such as the task complexity, DSS sophistication and experience of DSS users. Study revealed that the benefits of a DSS appear in the long term and the early poor results in DSS implementation should not discouraged further studies of DSS effectiveness.

Executive Information System (EIS)

According to Brian et al, (1994), MIS and DSS have failed to satisfy top management's information needs. Today's executives operate in turbulent environments that challenge organization survival with constant technological, competitive, regulatory and economic changes. Executives must be able to responds proactively to threats and opportunities and to react quickly to new conditions. In many organization, this executive challenge is being supported by EIS. These systems provide executive with easy access to internal and external information that is relevant to their critical success factors. Although many organization receive significant benefits from their EISs, these still are high-risk and as shown by the large number of EIS failures (Kelly and Watson, 1995).

Expert Systems (ES)

According to James A. O' Brian, not all type of business problems are suitable to expert system solutions. Expert systems excel only in solving specific types of problems in a limited domain of knowledge that is in well-defined problem area. ES failed miserably in solving problems requiring a broad knowledge base and subjective problem solving. ES are difficult and costly to develop and maintain properly. The costs of resources may be too high to offset the benefits expected from some applications.

2.2 FACTORS AND ISSUES RELATED TO IT PROJECT IMPLEMENTATION

A number of studies have been examined on factors and related issues that have contributed to the success and failure of IT project implementation. Kelly and Watson (1995), highlighted that the most important factors affecting information system success are: system quality, information quality, ease of use, user satisfaction, impact on executive work and organization aspect. Tom (1991) identified several barriers such as lack of resources to engage in user-education, unsuitable technology, difficulties of measuring benefits, management's attitude and resistant to change. Barbara et al (1992, 1996) examined that there is a lack of formal evaluation procedures and no consistency to cost justification and the limited evaluation techniques being used. Table 2 summaries the key issues of a number of empirical studies reported in the IT literature which have addressed the factors contributing to success and failure of IT project implementation.

TABLE 2. SUMMARY OF PREVIOUS STUDIES

Study	Nature of Research	Key issues addressed	Key Findings
Kweku & Zbigniew (1994)	Survey of Fortune 500 companies in US	a) Type of IT project likely to be abandoned b) Examine factors contributing to abandonment of IT systems	a) Majority of projects abandoned at design phase b) Escalating project costs & time overruns are major factors in abandonment of IT projects.
Kelly & Watson (1995)	48 executives user EIS professionals & vendors in US	Address the key success factors in implementation of EIS.	a) Key success factors are management's continued involvement & operations affecting executives and their works.
Ballantine et al (1996)	Survey on 179 Times Top 1000 companies	Examine IT project evaluation practices & problems in evaluating IT investments.	a) There is a lack of formal evaluation procedures. b) IT evaluation was associated with large companies in terms of turnover levels, larger project and IT budgets.
Barbara et al (1992)	16 IT projects in UK	Consideration of the investment decision process & evaluation techniques used to justify IT investments.	a) No consistency to cost justification, limited evaluation techniques being used. About 50% of companies had formal justification procedure.
Guinan et al (1994)	100 projects at 22 sites in 15 Fortune 500 companies	Evaluate effectiveness of automated tool on IT development.	a) there were mixed impact, does not guarantee decrease in development cycle.
Brian & Ciaran (1994)	Personal interviews conducted on 4 organization in Ireland.	Examine factors organizations are motivated to use EIS.	Factors contributed to use of EIS.Availability of appropriate technology &