



THE IMPACTS OF THAI CULTURE ON EXECUTIVE INFORMATION SYSTEMS DEVELOPMENTÄ

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Abstract

Competitive advantages of Thailand are gradually deteriorating due to the advance of other developing countries. To avoid lower cost competitors, Thai industries require urgent attention in upgrading and adapting themselves to the new competitive environment to protect their business. The success of Executive Information Systems (EIS) in developed countries stimulates Thai executives to adapt this information technology (IT) into their organisations in order to compete in an increasingly competitive environment. However, EIS is just in the beginning stage and also a new source of knowledge for Thai information systems (IS) professionals. Only a few organisations have started developing such systems. Developing an EIS requires not only technical knowledge but also an understanding about culture. In this paper we present how Thai culture influences the EIS development. The details discussed in this paper are based on the observation during interviews with four major Thai companies at the beginning of 1995.

Keywords: executive information systems, system development, culture

1. Introduction

In the last decade, Thai economy performance has been growing rapidly. In the late 1980s Thailand's economy growth rate was double-digit and Thailand became one of the fastest growing economies in the world. Rapid economic growth leads to structural transformation. Recently Thailand had to face increasing trade protection from major importing countries as well as competition from other developing countries keen to promote their manufactured exports. The major competitive advantages of Thailand, which are low cost unskilled labour and a large supply of agricultural raw materials, are gradually deteriorating when countries like China and Vietnam start to launch their manufactured products onto the world market. Additionally, the high rate of economic expansion creates various problems and pressures. These include rapid increases in land price and wages which have pushed up the cost of performing business in Thailand. Hence the future of further industrialisation in Thailand is not optimistic.

Presently, it is important to require an urgent attention in upgrading Thai industries to avoid lower cost competitors. These industries must quickly and effectively adapt themselves to the new competitive environment, otherwise it will result in missed opportunities and possibly economic losses. Information Technology (IT) is a strategic weapon which an industry can use to gain competitive advantage over its rivals. Porter and Millar (1985) state that IT can affect competition in three way. These are changing industry structure, creating competitive advantages and spawning whole new businesses. Similarly, McFarlan (1984) suggests several ways for a company to use IT to compete with its rivals. IT can help the company to build a barrier to entry, to build in switching

costs, and to completely change the basis of competition. Information systems technology is having an extreme impact on competition and competitive advantages due to the common role of information in value chains (Porter and Millar, 1985).

An Executive Information System (EIS) is a recent class of information systems technology. The success of EIS in developed countries, such as the US, UK, Canada and Australia, stimulates Thai executives to adapt this IT into their organisations in order to compete in an increasingly competitive environment. However, EIS is just in the beginning stage and a new source of knowledge for Thai information systems (IS) professionals. Only a few organisations have started developing such systems. Transferring this technology confronts not only technical knowledge limitations but also culture constraints as EIS is innovated for Western executives. EIS may meet with resistance when being implemented in a culture with different perspectives of time, individuality, and the importance and trustworthiness of quantifiable information (Carlsson et al., 1995). The study of national culture that affects the adoption of IT should be researched as it determines how senior managers use information and IT in decision making and how IS people adapt current methods to develop such sensitive systems.

In this paper, we firstly explain the definition and characteristics of EIS and its development approaches. Secondly, impacts of Thai culture on EIS development are discussed broadly based on the observation during interviews in four major Thai companies. Thai culture discussed in this paper is a by-product of my Ph.D. work concerning EIS development methodologies (Jirachiefpattana, 1996). Finally conclusion and implications for EIS development in Thailand are given, and case descriptions are also provided in the Appendix.

2. Executive Information Systems (EIS)

In this section, we explain what EIS is and what are its characteristics. Differences between EIS, MIS (Management Information Systems) and DSS (Decision Support Systems) are briefly provided. Approaches for developing EIS are also given.

2.1 EIS Definition and Characteristics

Many definitions for EIS have been used by EIS researchers (Paller and Laska, 1990; Rockart and DeLong, 1989; Turban, 1995; Watson et al., 1991). One of the most popularised definition is defined by Watson et al.(1991) as follows:

An EIS is defined as a computerised system that provides executives with easy access to internal and external information which is relevant to their critical success factors. The characteristics of EIS include tailoring to individual executive users; extracting, filtering, compressing and tracking critical data; providing online status access, trend analysis, exception reporting and "drill-down"; accessing and integrating a broad range of internal and external data; user-friendly and requiring minimal or no training to use; being used by executives without intermediaries; presenting graphical, tabular, and/or textual information.

EIS distinguishes from MIS and DSS in terms of target users, type of problems and type of information needed (see Table 1). Major users of MIS are operational managers who require precisely internal data to solve structure problems while DSS's users are middle managers who typically focuses on data manipulation via models to solve semi-structure problems and pay little attention to external data. EIS provides information for executives so that they can identify problems and opportunities by combining information from both internal and external databases (Rockart and DeLong 1988; Friend 1986; Turban and Schaeffer 1987; Turban 1995; Warmouth and Yen 1992; Keen and Scott Morton, 1978).

Table 1 A Comparison of characteristics of MIS, DSS and EIS

	Users	Problems	Information
MIS	Operational managers	Structured problem (accounts receivable, order entry and inventory control)	Internal , high detailed and current
DSS	Middle managers	Semi-structured problems (budget preparation and variance analysis overall budget)	Most from internal and some from external , moderate detailed
EIS	Senior manager	Unstructured problems (new product planning and R&D planning)	Most from external , aggregate , wide and old

2.2 EIS Development Approaches

2.2.1 Outsourcing

Lacity and Hirschhiem (1993) define information systems outsourcing as applying to a wide range of contractual arrangements from contract programmers to third party facilities management. They argue that the three most meaningful classification of these contracts are: body shop, project management and total outsourcing. Body shop is the use of contract programmers/personnel who are managed by company employees. Project management is outsourcing for a specific project or portion of the information development work while total outsourcing is the total provision by a vendor of a significant information system. Fitzgerald (1994) further categorised the reasons for outsourcing by an organisation under three broad factors: technical, financial, and strategic and organisational. The development of EIS in Bank B and the Energy Company were to some extent outsourced. However the activities that were outsourced and the rationale behind the adoption of outsourcing differ between the two cases (Jirachiefpattana et al., 1996).

In case of the Bank B, a major US-based consulting company was contracted to provide requirements identification, general system design, system architecture design and construction by working closely with the internal project manager and business system analysts of the Bank. This is close to total outsourcing according to Lacity and Hirschheim. The formal reason for employing the consultant was that the internal staff lacked experiences in the conceptual design of data presentation for executives (Jirachiefpattana et al., 1996).

In the Energy Company, outsourcing is the standard development policy of the Information Systems Department. The department believes that this is the way to increase its productivity with limited personnel. Rather than allocating all to one development project, the department can allocate professional IS staff to manage and co-ordinate several projects with different vendors. However, the department requires that requirements analysis, and the specification of input, process and output formats are the responsibility of its own staff. This is "bodyshop" outsourcing for strategic reasons (Jirachiefpattana et al., 1996).

2.2.2 A Waterfall Approach

The famous waterfall traditional development approach from Boehm was introduced in the 1970s. The system development life cycle of waterfall is a systematic and sequential pattern, sometimes with iterations. It typically begins with requirements analysis through software requirements, preliminary design, detailed design, code and debug, test and pre-operations, and operations and

maintenance as presented in Figure 1 (Sage and Palmer, 1990). Many researchers, such as Sage and Palmer (1990), Weinberg (1991), Dos Santos (1986); and Bischofberger and Pomberger (1992), indicate several limitations of applying the traditional approach to information systems development. These limitations are due to incorrect assumptions that the development process can be carried out in order and that iterations between phases are only necessary in exceptional cases. These limitations include: well-defined requirements, lack of flexibility to improve initial imperfections in one phase, time-consuming, too much documentation and high expense.

The disadvantages of the waterfall model are also significant barriers for applying it to EIS development. The requirements of executives are not static;

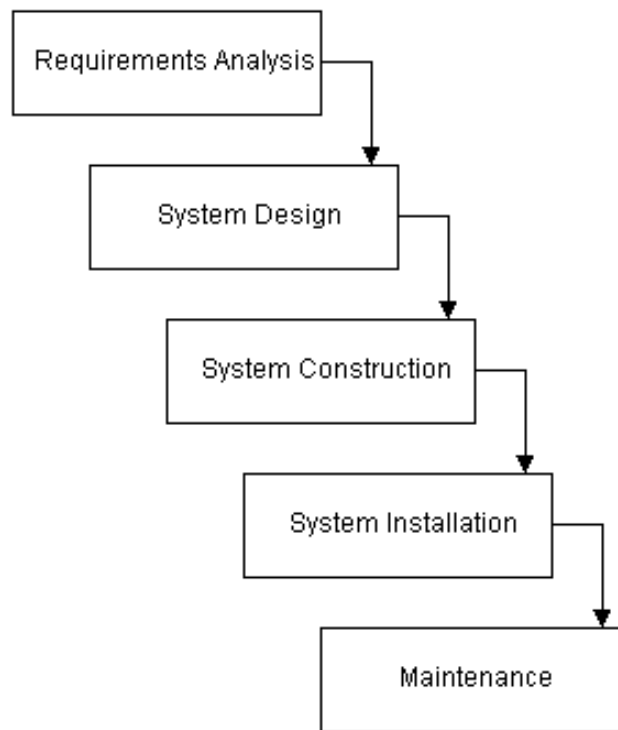


Figure 1 The Waterfall Development Approach

they change over time in response to changes in organisational environments, in tasks, and in perceptions of tasks by executives (Barrow, 1990; Hurst et al., 1983; Keen, 1980). Even though the waterfall model is not in accord with the nature of an EIS which requires evolution, some researches suggest that the EIS development life cycle process based on this approach should integrate with a prototyping technique in order to increase user confidence and increase the likelihood of ultimate system acceptance and success (Byun and Suh, 1994). By applying this classical development approach, however, it allows EIS developers to utilise available techniques and tools in the development process. For example, Bank A employed a traditional waterfall development approach to direct and manage the EIS development project. The development process involved a largely linear execution of requirements analysis, system development, user acceptance, system installation, use and maintenance (Jirachiefpattana et al., 1996).

2.2.3 Evolutionary Development Approach

The evolutionary approach is an alternative model to overcome some of the shortcomings of the classical waterfall approach. Synonyms of this approach are adaptive design (Keen, 1980), middle-out design (Hurst et al., 1983), expanding subsets (Moore and Chang, 1983), and prototyping

(Fitzgerald, 1992; Sage and Palmer, 1990). This approach combines four traditional system development activities (requirements analysis, design, construction and implementation) into a single phase which is repeated in a relatively short time. Figure 2 is an example of the evolutionary approach copied from Jirachiefpattana (1996). The essential concept of the approach is that executives and EIS developers agree on a small but significant application. Then design and development of the initial system are started. After the first version is operated for a few weeks, new functions and applications are added. This approach requires intensive user involvement in designing, implementing and modifying the system (Sprague and Carlson, 1982, Suvachittanont et al., 1994; Jirachiefpattana, 1996).

The underlying concept of the evolutionary model clearly corresponds to the nature of the EIS and executive environments i.e. the EIS must be evolved and adapted. Rockart and DeLong (1988: 233) defined evolution of an EIS as the growth of the [EIS] application set available to users. The findings of a recent EIS survey by Watson et al. (1995) showed that more than 80 percent of respondents applied this approach to their development. The results indicate that an evolutionary approach is suited to an EIS development. The Transportation Company is the only case which clearly applied an evolutionary approach to EIS development (Jirachiefpattana et al., 1996).

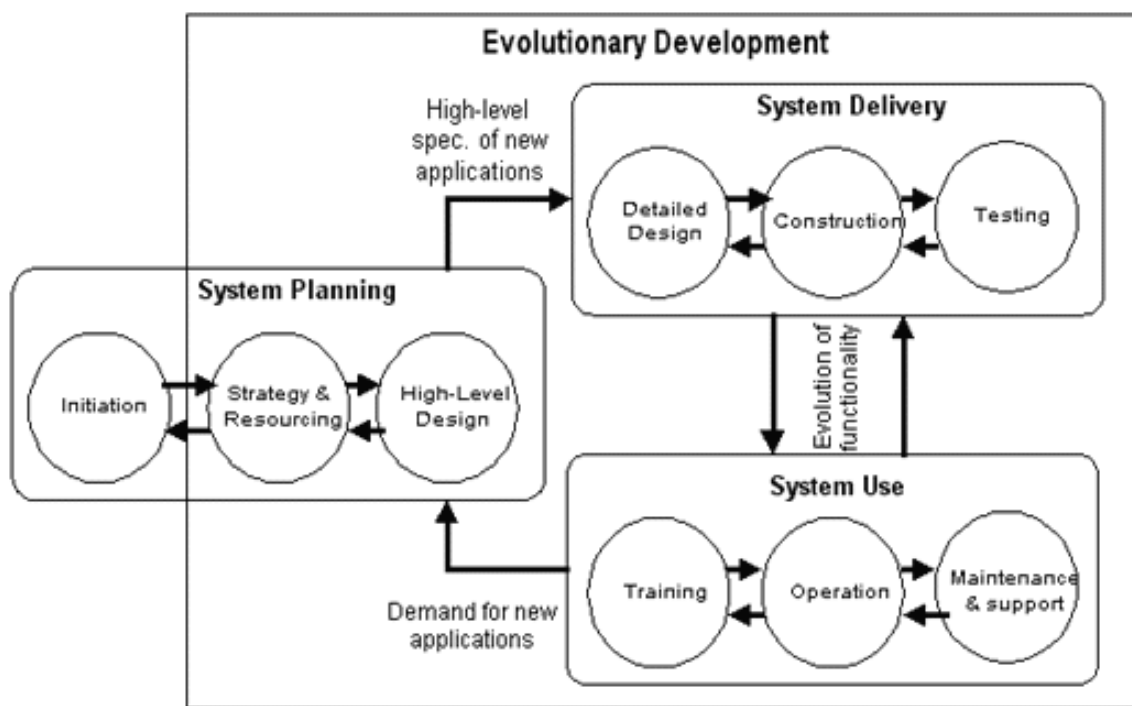


Figure 2 The Evolutionary Development Approach for EIS (Jirachiefpattana, 1996)

Table 2 A Summary of Impacts of Thai Culture on EIS Development

Culture	Impacts on EIS Development
Power Distance	- Structure of the development team
- Strict to a hierarchical structure	- Determination of requirements of executives
- Authoritarian	- Requirement of EIS functions
	- EIS data
Collectivism	- Sources of information

- People involved in the project
- Using outsourcing services

Uncertainty Avoidance

- EIS functionality and applications
- Type of data and information
- Environment of the system development

Thai language

- Maintaining EIS data
- Ability to quick consolodate data
- Ability to create multi-dimensional databases

3. Impacts of Thai Culture on EIS Development

Thai culture affecting the development of an EIS is discussed broadly because this discussion is the results gained indirectly from my Ph.D. research (Jirachiefpattana, 1996) which should not be ignored. Since EIS initially focuses on top management which is very different from the development of operational systems, understanding the impacts of culture may improve the degree of success of EIS. Impacts of Thai culture on the development of an EIS will be examined in terms of power distance, collectivism, uncertainty avoidance and Thai language. A summary of these impacts is given in Table 2.

3.1 Power Distance

Power distance is related to the degree of centralisation of authority and the degree of autocratic leadership. In low power distance nations, inequalities among people will tend to be minimised. Subordinates expect to be consulted by superiors. Conversely, in high power distance nations, centralisation is more normal and subordinates are likely to be separated from their bosses (Hofstede, 1983; Brown, 1995).

According to Hofstede (1983), Thai culture is considered as high power distance. The Thai management style is based on the maintenance of formal organisational relations through a hierarchical structure. This influences the structure of the EIS development team. Most Thai development teams are organised like a steering committee rather than a working team which contrasts to the Western countries. The members of the Thai development team usually include heads of relevant business units in the organisation while system analysts or developers are regarded as technical workers. This kind of structure prevents Thai EIS developers from direct access executives users. Only the heads of business units may have opportunities to meet them. However, frequency of access and time is very minimal.

A lack of contact with executives reduces the ability of the developers to design EIS to accord their requirements. The developers have to guess what their requirements might be unless the members of the team are working closely with the executives and can indicate what are needed. In case Bank A, the developers designed user interfaces and identifies information from their experiences which mostly are operational systems. By contrast, the members of the development team of Transportation Company can identify what kind of information the executive needs because they normally provide that information.

Lack of close relationships between superiors and subordinates influences not only the structure of the EIS development team but also features of the EIS. The EIS is likely to include functions that

enable detailed monitoring of subordinate performance. The requirement of this monitoring functionality can be found in the objectives of EIS in Transportation Company and Bank A. This sort of requirement is also affected by mistrust of out-group people which will be discussed in the next section.

In addition, Thai managers typically are authoritarian. Each individual seems to try to exert as much control as possible (Harrison, 1972). Today information is regarded as a power. People who control information automatically have power. Developing an EIS is likely to change the power structure of the organisation because it contains necessary information for senior managers. These people are reluctant to give their information to the EIS. This can result in lack of cooperation and delays in releasing information which eventually reduces the effectiveness of the EIS (Rockart and DeLong, 1988). Lack of cooperation among departments in Bank B resulted in updating information in the EIS, but the information could not be refreshed as it would be. Consequently, this EIS is rarely used by the executives.

3.2 Collectivism

In collective societies, people are integrated into strong cohesive in-groups which protect them in exchange for unquestioning loyalty. Thai society is characterised as collectivism (Hofstede, 1983; Brown, 1995). Personal and family connections play an integral part in operations of Thai business. Views and opinions have a greater impact on business management when expressed by members of family or in-group members. When the EIS development team determines information requirements and designs the EIS, they need to consult and involve these persons into the process of EIS development. These persons can help the team identify what information their bosses use, where they come from and what their bosses like and dislike. This is a way to solve the problem of inability to access the executives. Moreover, these people could be users of the EIS as their bosses may not have time to use the EIS by themselves or the executives may not be comfortable with using a computer. As a consequence, in-group members can affect the success of the EIS if they do not cooperate with the EIS development team.

In addition, collective culture extend impact on using the outsourcing development approach as managers normally trust people close to them. Managers may not be confident in ethical conduct of outsourcing vendors or consulting firms if they express what information they use for decision making. This fear is reasonable since Thai IS professionals lack ethical codes to follow. How these managers are confident that their information is secured is a problem of using the outsourcing approach or even in-house IS staff.

3.3 Uncertainty Avoidance

Uncertainty avoidance is the extent to which members in a culture feel uncomfortable with uncertainty or unknown situations. In strong uncertainty avoidance societies there is fear in ambiguous situations and unfamiliar risks. By contrast, in weak uncertainty avoidance culture, people tend to accept ambiguous situations and take risks easily. Thai society is an uncertainty avoidance society (Hofstede, 1983).

Uncertainty environments, such as politic and economy, make Thai managers to seek their security. Developing an EIS could be an alternative if managers strongly believe that EIS can provide useful information for decision making. Development of an EIS in Bank B is an example in terms of providing a continuity of information during the transition to a new management team. EIS can ensure that a new management team can understand what have been done in the previous management team. EIS will be like the organisation memory. In case of the Transportation Company, high competition in the world market forces the top management to find a tool to help

them manage the business because its market focuses on international rather than the domestic market.

Thai managers are managing their business under volatile political environment since the Thai government can directly and indirectly intervene into the economy. In particular, top executives of state enterprises held their positions under pressure from politicians. Moreover under this situation, Thai executives prefer anecdotal information delivered from the Cabinet or Government agencies. These produce an extremely difficult systems development environment. Systems are likely to require fundamental revision and system development methods must be able to cope with rapid evolution at both the applications level and of functionality within applications. High on the uncertainty avoidance scale would indicate that Thai managers focus on a short-term and less strategic planning. This provides suggestions to the EIS development team that the features of EIS should enable executives to maintain a close watch on organisational performance (Carlsson et al., 1995).

3.4 Thai Language

Unlike other South East Asian countries such as Malaysia, Singapore and Hong Kong, which use English as an official language, Thai is the only official language in Thailand. Virtually all corporate and government data is kept in Thai text. The only exceptions are data collected for international organisations (eg UN) and where a company has a significant foreign share-holding or performs most of its work outside Thailand. The Transportation Company is the only such organisations in this study (Jirachiefpattana et al., 1996).

This dependence on the Thai language could be a major obstacle for EIS development as all major computer software is English-based. If an EIS software vendor wants to promote its product in Thailand, it must modify the software to manage data in Thai. Not many companies have developed Thai versions because of complicated structure of the language, the cost of development relative to the market size and the lack of any intellectual property law. At present most EIS data must be translated from Thai to English on input. This can reduce the currency of information; it definitely adds to costs and could be the reason that some organisations in this study used non-EIS specific software which was able to manage Thai characters and grammar (Jirachiefpattana et al., 1996).

By using non-EIS specific software, organisations lose the major benefit of EIS software, the ability to create multi-dimensional data bases that more accurately reflect the structure of the organisation than a relational data-base. The abilities to quickly consolidate data across time periods, business units and other data categories and to "drill down" through a data aggregation hierarchy are perhaps EIS's greatest contribution to information systems practice. The use of conventional software for language reasons means that organisations cannot exploit these processing features (Jirachiefpattana et al., 1996).

4. Conclusion and Implications

This paper has presented impacts of Thai culture on the EIS development and use in terms of power distance, collectivism, uncertain avoidance and Thai language. This culture influences the objective of EIS, the features of EIS, the structure of the EIS development team, the access of EIS developers, the environment of EIS development, the methods used for determining information requirements, using outsourcing services and ability to utilised EIS specific tools. Lack of Thai-based EIS specific tools indicates that Thailand requires its own research and development (R&D) programs, otherwise it will be difficult for Thai professionals to create an effective EIS.

The discussion in this paper focuses on a broad concept of Thai culture. However, it provides a

significant warning to Thai IS professionals to be aware of impacts of culture in the case of EIS. This paper also suggests that it would be interesting to do research in detail of what kind of Thai culture influences on what parts of the EIS development and on how Thai executives use information.

Although this paper does not actually provide all the following implications for consideration before organisations make a commitment to the EIS development, they could be useful for Thai IS professionals to some extent. These implications are presented as follows:

- EIS should not be created if the executives do not want to be involved. Lack of user involvement is a serious problem and will lead to an unsuccessful system. Users should be genuinely involved in development especially in requirements specification. If this problem cannot be overcome for EIS implementation, then there is little benefit in pursuing the development. However, EIS is not the only information systems approach to supporting management activities. If EIS is inappropriate then the decision support systems (DSS) approach may have merits. In DSS the focus is normally on supporting one manager to perform one task. The systems are much smaller and user involvement is often easier to achieve. It may also be a much easier technology and methods to transfer especially in terms of staff training. DSS is a much cheaper and less risky management support strategy than EIS. It may be more successful.
- An evolutionary development approach should be used. An EIS is likely to be more successful if an evolutionary development approach is used. In such a volatile environment traditional operational development approaches are not relevant. Further, they are antithetical to system success.
- EIS should be focused on monitoring functions of the organisation if the organisation is surrounded by relatively volatile political environment and a greater degree of both direct and indirect government intervention in an economy such as Thailand. This atmosphere produces much more uncertain and complex environment for EIS development. A result of this environment suggests that executives strongly focus on very short term planning. The greater the rate of political change, the greater is the need for anecdotal information by executives. Thus, it is difficult for EIS to serve this need. Developing an EIS for monitoring functions of business of the organisation is more relevant.
- EIS should support information requirements at the organisational level and individual level. Focusing on only common information can cause serious problems in the long term as individual executive users have their own preferred information sources and presentations.
- Technology transfer from outsourcing vendors is required. The experiences of using the outsourcing approach from two Thai organisations showed that there was no transfer of skills and knowledge to the host organisations. This causes a serious problem on providing on-going support and system development. The system would have been more successful if a transfer of skill had been part of the contract.
- Organisations should use local consultants. EIS development should be performed by local information systems professionals who understand the local management culture and customs if an organisation decided to outsource the development or exploit EIS expertise from consultant companies.
- A full-featured EIS development tool for Thai language should be developed. By using a specific EIS software, organisations gain the major benefit of OLAP technology, for example the ability to create multi-dimensional databases that more accurately reflect the structure of the organisation than a relational database, ability to quickly consolidate data across periods of time, business units and others, and drill down capability. The use of conventional software is difficult to support these processing features.
- Education programs for management and IS staff should be arranged. The program for management should include the role of EIS in managerial work, the role of management in

the EIS development, and factors affecting the success of the system. The IS professionals not only need to develop an understanding of the nature of managerial work and human decision making, but also need to have foundations of the methodologies, tools and techniques which can be applied to the nature of the organisation, the nature of the decisions and the individual decisions.

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Appendix— Case Descriptions

Case 1: The Transportation Company

The "Transportation Company" is a state enterprise which employs almost 20 000 staff. In its 1994 annual report, profits before tax were US\$168.49 million. Its stated strategies for maintaining its market share and profitability are total quality, cost advantage and external competence. The Transportation Company aims to support these strategies with motivated and unified staff, financial strength, strong information systems and a simplified fleet.

Developing an EIS was part of the overall Management Information Systems Plan. The objective of the EIS is to provide top executives with rich management information to monitor organisational activities, and to provide support for planning and decision making. The EIS project was initiated by the President of the company in January 1994 immediately after he was appointed. The non-information system executive sponsors were the Vice President of Corporate Planning and the Vice President of Accounting.

The EIS development commenced without formal cost-benefit analysis and was approved by the Executive Management Committee. The initial cost of hardware, software and personnel in the EIS development were US\$130,370, \$92,592 and \$74,074 respectively. The company spends around US\$74,000 annually for maintenance and operation of the system. The technical environment is client/server in nature with Pilot's Lightship as the main software.

Currently, the implemented EIS is the first production version and covers production, finance and accounting, marketing, and human resources. Its general features include key indicator tracking, exception reporting and drill down. The information is presented in tabular, graphic, and text formats on request. The EIS also provides personal tools to support executive work including e-mail, diary, calculator, and staff directory. The first version was delivered within 12 months and comprised 181 screens. Fifteen senior executives, including the CEO, were the initial users. The EIS is considered successful by both developers and users.

Case 2: Bank A

"Bank A" is a major commercial bank with 12,000 employees and significant state share-holding. Net profit was US\$119 million for the first half of 1994. The bank has 331 branches in Thailand and 6 branches abroad. The Bank aims to expand its branch network, both within Thailand and throughout the Asian region.

The EIS project was initiated by the President and Chief Executive Officer in 1992. Instead of receiving hard copy management reports, he wanted an interactive system which could provide both an overview of the bank and detailed information about the performance of the branches. The executive sponsor was the Executive Vice President, Technology Group. The EIS project was approved by the Board of Directors. No formal cost-benefit analysis was performed.

The EIS was developed on an existing IBM mainframe and personal computer network using the Personnel Assistance Systems (PAS) software package and general purpose software such as COBOL. Existing hardware and software was used because the developers were both comfortable and experienced in the use of the technology. The first EIS application, finance, was delivered within eight months and was based on existing reports; it comprised 10 screens. The initial users were three Senior Vice Presidents. The number of screens and executive users has increased to 80 and 18, respectively. The completed system provides support for finance, personnel and marketing.

The design of the personnel and other EIS applications are totally different. The personnel application was developed on a personal computer using the PAS software package. This allowed the analyst/programmers to develop "user friendly" interfaces. The other applications were written in COBOL and have a non-graphical interface.

Bank A's EIS project can be regarded as relatively unsuccessful. The poor user interface of most applications has led to a low usage rate among executives. The system has not been updated due to internal regulatory constraints and an inflexible technical architecture.

Case 3: Bank B

The third case, "Bank B" is a leading commercial bank in the South East Asian region. The bank employs 25,000 employees and according to its 1993 annual report, profit after tax was US\$556 million. The Bank operates 427 branches: 407 domestic and 20 foreign. The board and senior management of the bank is dominated by one family. Prior to the development of the EIS, Bank B had attempted to use information technology to support management. This proto-EIS involved the creation and transmission of daily trial balance sheets to Head Office, in order to provide both operational units and senior management with detailed accounting information and the overall status of all branches on the next working day.

The EIS development project commenced in September 1991 under the sponsorship of a Senior Executive Vice President. The aim of the EIS was to provide information to top executives to help them make better and faster decisions. Moreover, the Bank also wished to provide a continuity of information during the transition to a new management team. The project proceeded without cost-benefit analysis and the approximate initial cost of hardware, software and personnel was US\$300,000, \$100,000 and \$200,000, respectively. Annually, the Bank spends about US\$60,000 for maintenance and operation of the system. The technical environment was client/server with high-end Apple Macintosh computers used at the executive workstations. The data-base product 4th Dimension was the primary development tool.

The first EIS was delivered after 12 months and comprised 60 screens. The current EIS supports 15 senior executives and their staff and covers the marketing, finance and personnel areas. The system comprises three main functions: executive summary reports, business performance analysis, and support tools. The information is presented in tables, graphics, and text. Colour is used to highlight information and to produce attractive screens.

The EIS of Bank B can be considered to be a relative failure. According to anecdotal evidence the system has not been used by executives for some time. Executives continue to receive verbal reports on business unit performance from their support staff each morning. The EIS was largely developed by a foreign-based consulting firm and a foreign project manager who did not adapt their design strategies to Asian

management styles.

Case 4: The Energy Company

The final case, the "Energy Company" is a state enterprise whose mission is to create a fully integrated business to support the energy, and therefore economic, stability of the country. The main business units are downstream oil, natural gas, central services and petrochemical. In 1993 the organisation generated a net profit of US\$309 million on income of \$3.43 billion.

The Energy Company's EIS has evolved to its third version. The first version was created in 1986 on the initiative of the Head of the Information Systems Department at Head Office. He hoped that senior executives could receive information faster if management reports were provided electronically. His concept was approved by senior management. The Head of Information Systems also acted as the project manager while the Deputy Governor, Policy and Planning, was the executive sponsor. The first version comprised 12 screens and was used by 16 senior executives. It was developed on networked personal computers using the C language.

The second version of the EIS commenced in 1990 due to significant changes in the business of the corporation. This version was not based on the first EIS; it was a new development using a client/server architecture, programmed in Visual Basic and a relational database management system, INGRES. Currently, 16 executives use the second version of the EIS while the third version is being developed.

The current, second version of the EIS has two major modules: applications and office automation. The EIS provides information related to the petroleum business, personnel, subsidiaries and joint ventures. It covers the marketing, finance, manufacturing, personnel and distribution departments. Management information is presented as exception reports in the forms of text, graphs and tables. These reports were designed by the staff of the IS Department and they are not customisable. When they want to retrieve information, executives click the icon which represents the required report. The other module of the system, office automation, includes word processing, e-mail, and electronic scheduling.

This EIS can be regarded as a qualified success. The third version of the system is under-development and the previous versions have been used by executives and their staff. There is some anecdotal evidence that the project has been dominated by the information systems department and that the system requirements and designs have not been determined or confirmed the executive users.



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