Key Issues in Information Systems Management: A Comparative Study of Academics and Practitioners in Thailand

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ABSTRACT

This study was designed to examine the information systems (IS) key issues in Thailand by comparing IS academics and practitioners within the country, and by comparing Thailand as a whole with other developed and developing countries. The economic development based on GDP per capita was used to classify the developed and developing countries. The Q-Sort method, a ranking technique, was used to rank the IS key issues. The data were collected through an Internet survey website. The findings show that the issue of building information technology (IT) infrastructure was projected to be the top issue over the next three to five years in Thailand. The importance ranking of IS key issues in Thailand was similar to the studies from developed countries but different than the studies from developing countries. There was a significant difference in the importance rankings of IS key issues between academics and practitioners in Thailand. However, they were in agreement on the first and second ranking IS key issues, which were building IT infrastructure and IS strategic planning, respectively.

KEYWORDS

Key Concerns, Top Issues, Comparison, Developing Countries, Practitioners and Academics

INTRODUCTION

In today's highly competitive global environment, information technology (IT) management plays an important role in business. Since diverse technologies change rapidly, the Information Systems (IS) community is facing many challenges. In order to understand the challenges facing them and prepare to manage the change, there is a need to understand the IS management issues that concern their peers. The results of IS key issues studies can help IS executives and managers to prepare and plan in advance instead of acting when things happen (Brancheau et al., 1996; Clark, 1992; Watson et al., 1997). Due to technology changes over time, new issues emerge quickly and are often missing from older studies. There is a need to identify these issues from time to time in order to address them properly. As a consequence, the studies on the key issues in IS management have been conducted every three or four

years over the past fifteen years in the United States and the similar studies have been duplicated in many countries around the globe (Brancheu, Janz & Wetherbe, 1996; Galliers, Merali & Spearing, 1994; Gottschalk, Watson & Christensen, 2000; Morgado, Reinhard & Watson, 1999; Pervan, 1996; Pollard & Hayne, 1996; Watson, Kelly, Galliers & Brancheau, 1997; Wrycza & Plata-Przechlewski, 1994).

PROBLEM BACKGROUND

Previous studies indicated that politics, law, culture, economics, technology infrastructure, and the availability of skilled personnel have greatly influenced the difference of key issues in IS management between developed and developing countries. While developed countries have systematically and periodically done research on the key issues in IS management, there has been only limited research on this topic in developing countries. The major concern expressed by several researchers who are familiar with the conditions in developing countries, has been that the organizations in developing countries may not be prepared for computerization and do not have carefully prepared plans for developing computerized information systems (Chandler & Holzer, 1983; Nils, Lin & Muntoro, 1998). In order to be prepared and plan for the rapid changes of technologies, studies on the key issues in IS management need to be conducted in developing countries. The result of this study will provide useful information for future planning by IS management

LITERATURE REVIEW

A key issue is an opportunity, threat, or problem associated with the effective use of IT in the organization and it is a critical success factor (Yang, 1996). The results of studies on key issues in information systems management represent the future trends and provide useful direction for the IS community in order to serve their organization efficiently and effectively. Based on the classification of key issues in information systems management by Niederman and Brancheau (1991), and key issues derived from the literature reviewed, this study developed a classification list of key issues in IS management in developed and developing countries.

Developed countries refer to the countries with advanced industrial market economics and the GDP per capita is greater than US$20,000. Based on the GDP per capita from The World Fact Book (CIA, 2001), six selected developed-country studies in key issues in information systems management, which include the United States, Hong Kong, the United Kingdom, Norway, Australia, and Canada are reviewed (Brancheau et al., 1996; Burn, Saxena, Ma & Cheung, 1992; Galliers et al., 1994; Gottschalk, Watson & Christensen, 2000; Pervan, 1996; Pollard & Hayne, 1996). Overall, the selection of the literature to use in comparisons with Thailand in the current research was based on factors that allowed them to be compared to each other and with Thailand: They all studied the importance of nearly the same IS key issues; some represented developing countries that are comparable to Thailand and finally some represented major developed countries.

The studies showed that developed countries paid greater attention to strategic issues than to operational issues. Issues that were of major concern among IS executives in developed countries are: building IT infrastructure, IS architecture, telecommunication systems and network, and data resource issues. Some of these issues were ranked equal in importance in several studies that were completed in the same year. For instance, building IT infrastructure was ranked first in the United States, Australia, and Canada in studies conducted in the same year (see Table 1).

Developing countries are typically referred to as countries with a relatively low level of Gross Domestic Product (GDP) per capita, with an economy often focused on agricultural products, raw materials, handicraft and commodities. In this study, countries that have a GDP per capita less than US$20,000 are considered in this group. Ten selected studies of key issues in information systems management of the countries in this group, which include the Gulf Cooperation Council (GCC)[1], Taiwan, Slovenia, South Korea, Costa Rica, Guatemala, Brazil, India, Indonesia, and Poland are reviewed (Bradi, 1992; Chou & Jou, 1999; Dekleva & Zupancic, 1996; Kim & Kim, 1995; Mata & Fuerat, 1997; Morgado, Reinhard & Watson, 1999; Palvia & Palvia, 1992; Samik-Ibrahim, 2001; Wrycza & Plata-Przechlewski, 1994). Table 2 presents the ranking of key issues in information systems management in developing countries, which was derived from the reviewed literature. As the aggregate data show, developing countries paid higher attention to operational issues than to strategic issues. These issues are educating and training senior management, IS for competitive advantage, educating and training IS personnel, and data resources.

Due to the rapid change in information technologies and applications, qualified IS professionals have become a major issue among the IS community, especially in developing countries. The expectation gap between academic preparations and practitioner needs has been recognized as one of the problems. The IS education process has been criticized as incapable of producing qualified, employable IS professionals (Archer, 1983; Cardinali, 1988). Trauth et al. (1993) described that universities have been faulted for teaching obsolete technologies, and that changes in IT that brought some new concepts, such as end-user developed applications, off-the-self software, outsourcing, or increased use of the Internet, have created many new career paths yet to be filled by qualified IS staff. The curriculum gap, which is caused by differences in perspectives between academics and practitioners, might be a reason of insufficient preparation. Niederman and Brancheau (1991) described that academics and practitioners have disagreed over the importance of specific issues. For example, practitioners were more concerned with technical issues, while academics were more interested in managerial issues (Kim & Kim, 1999).

[1] The GCC is an agreement signed on May 26, 1981 between the six Arab monarchies of the Persian Gulf (Saudi Arabia, Bahrain, United Arab Emirates, Kuwait, Oman, and Qatar) to cooperate on their economic, political, cultural, and security issues.

Table 1. Median Ranks of Key Issues in Information Systems Management in Developed Countries

Rank	Key issues	UK '93	HK '93	USA '96	AU '96	CA '96	NO '00	Median Rank Developed countries
1	Educating/training IS personnel	-	1	-	-	-	-	1*
1	Building IT infrastructure	-	2	1	1	1	5	1*
3	Disaster recovery	-	-	-	3	-	-	3
4	IS architecture	4	-	4	11	7	4	4
5	Telecommunication system & network	-	9	5	2	3	21	5
6	Data resource	2	5	7	4	15	10	6
6	Ensuring quality with IS	-	4	-	17	2	8	6
8	Quality software development	5	10	6	21	4	7	6.5
9	IS organizational alignment	-	3	9	10	5	-	7
10	Educating/training senior management	8	-	-	7	-	-	7.5
11	IS human resource	-	1	8	20	12	6	8
11	IS for competitive advantage	7	8	17	8	8	2	8
13	Business process redesign	3	-	2	18	9	15	9
13	Strategic planning	1	-	10	9	11	1	9
15	Distributed system	-	-	3	22	10	-	10
16	IS effective measurement	9	-	11	13	13	11	11
17	Security & control	6	-	-	12	-	14	12
17	Organizational learning	10	-	14	5	14	-	12
19	IS role & contribution	11	-	13	14	18	-	13.5
20	Integrating technology	-	10	-	18	-	-	14
21	ESS/DSS	12	-	-	16	-	16	16
21	End-user computing	-	6	16	6	16	23	16
23	Collaborative Support Systems	-	-	11	25	22	9	16.5
24	Application portfolio	-	7	15	27	20	-	17.5
25	Multi-Vendor Open Systems	-	-	18	29	17	-	18
26	Educating/training users	-	-	-	-	19	-	19
27	EDI	-	-	19	24	24	3	21.5
28	Outsourcing	-	-	20	30	-	-	25**

Sources:

UK - United Kingdom	Galliers, Merali & Spearing (1994)
HK - Hong Kong	Burn, Saxena, Ma, Cheung (1992)
PO - Poland	Wrycza & Plata-Przechlewski (1994)
USA - United States	Brancheu et al. (1996)
AU - Australia	Pervan (1996)
CA - Canada	Pollard & Hayne (1996)
NO Norway	Gottschalk, Watson & Christensen (2000)

Note: * Rank 1 represents high priority issue for future development efforts among developed countries.

** Rank 25 represents issue of low priority relate to developed countries.

Table 2. Median Ranks of Key Issues in IS Management in Developing Countries

Rank	Key issues	IN '92	GCC '92	PO '94	KO '95	SO '96	CR '97	GU '97	BR '99	TW '99	ID '01	Median rank Developing countries
1	Educating/training senior management	4	3	-	-	4	-	-	-	2	-	3.5*
2	IS for competitive advantage	-	4	15	4	-	1	1	3	4	9	4
3	Educating/training IS personnel	6	3	-	-	2	5	4	10	-	-	4.5
4	Data resource	3	14	1	9	-	6	6	12	6	2	6
4	IS architecture	-	-	3	5	7	12	8	4	20	5	6
6	Security & control	9	2	6	-	-	7	1	11	-	-	6.5
7	Strategic planning	18	1	13	6	3	2	9	2	12	8	7
7	Educating/training users	-	3	-	-	6	8	14	18	1	-	7
9	Disaster recovery	-	-	12	-	-	3	1	14	-	-	7.5
10	Organizational learning	-	3	8	13	5	9	-	7	19	16	8.5
11	ESS/DSS	-	19	2	-	9	10	21	5	-	-	9.5
11	Telecommunication system & network	20	11	4	3	8	21	18	8	11	4	9.5
13	Building IT infrastructure	-	-	14	1	-	16	10	1	8	19	10
13	Quality software development	-	9	5	12	13	3	4	21	10	17	10
15	Standard and Control Mechanisms for IS activities	8	-	-	-	10	17	11	-	-	-	10.5
16	Business process redesign	-	-	-	2	-	-	-	16	18	6	11
16	IS human resource	2	13	7	11	-	14	12	9	14	1	11
18	Integrating technology	-	12	10	18	12	19	25	6	9	-	12
18	EDI	-	-	9	10	11	-	-	13	24	13	12
20	IS role & contribution	1	6	11	14	1	18	24	23	15	10	12.5
21	End-user computing	-	8	20	8	-	10	15	24	22	12	13.5
22	IS organizational alignment	13	5	17	16	22	15	27	22	5	18	16.5
23	Application portfolio	16	10	18	20	23	23	17	19	13	14	17.5
24	Collaborative Support Systems	-	-	-	18	-	-	-	-	23	11	18
25	IS effective measurement	15	7	22	19	19	20	20	-	17	3	19
26	Distributed system	-	-	23	7	-	26	29	17	21	15	21
27	Outsourcing	-	-	-	15	-	32	32	25	27	20	26
28	Multi-Vendor open system	-	-	-	17	-	27	30	-	26	7	26

Sources:
IN – India, Palvia & Palvia (1992) GCC - Gulf Cooperation Council, Bradi (1992)
KO - South Korea, Kim, H. & Kim, J (1995) SO – Slovenia, Dekleva & Zupancic (1996)
CR - Costa Rica, Mata & Fuerst (1997), GT – Guatemala, Mata & Fuerst (1997)
BR – Brazil, Morgado et al., (1999), TW – Taiwan, Chou & Jou (1999)
ID – Indonesia, Samik-Ibrahim (2001)
Note: * Rank 3.5 represent high priority issue for future development efforts among developing countries.

Thailand, in Southeast Asia, is classified as a developing country in this research due its GDP per capita of US$6,700 (CIA, 2001). Similar to other developing countries, IS professionals in Thailand are expected to place high importance on the issues of strategic planning and telecommunications and network systems, two of the top issues in Table 2 that are examined in all the reviewed literature in developing countries. Based on the research in Thailand by Pervan and Akaphant (1998), human resources and telecommunications and network systems are expected to be top issues. However, the key issues in information systems management in Thailand could be influenced by local conditions such as an economic crisis. For example, the Asia financial crisis of 1997 caused budget cutbacks in many sectors in Thailand; nevertheless, after the recession, the Thai government still continued to invest heavily in the development of a more sophisticated IT infrastructure, including the Government Information Network and Thailand Software Park projects (Phan, 1998). The IT market is also expected to be better than the other industries following the recession due to the fact that the economic recession has prompted most organizations to acquire IT-related technologies to cut costs and increase competitiveness. The computer service subsection was forecasted to rise by fourteen percent while the Internet market was expected to continue its rapid growth pattern (ATCI, 2001).

Research methodologies most often found in the previous studies were questionnaires using the Likert scale with Delphi method, structured interview, and follow-up interviews. The Delphi method, a group decision-making process, was particularly useful for assessing the judgment of a large, dispersed group of experts (Bass, 1983). The Delphi method rating technique typically starts with an opened-ended questionnaire that solicits opinions on the issue of the study. Succeeding rounds of study feed back the previous round's results so that participants can revise their judgments. Recent research on key issues in IS management in Brazil and Norway used the Q-sort method. The Q-sort method is a ranking technique where respondents are required to sort the statements supplied so that they fall into a predefined, usually approximately normal, distribution (Brown, 1980). Morgado et al. (1999) used the Q-sort method and the Interpretive Structural Modeling (SIM) workshop in the Brazil study. Gottschalk et al. (2000) used the Q-sort method in a Norway study. The problem with the Q-sort method has been low response rate; however, the Q-sort method is a subjective methodology with no requirement for high response rate (Brown, 1996).

PURPOSE OF THE STUDY

The purpose of this study is to examine key issues in IS management in Thailand over the next three to five years. The finding will look at the differences and similarities of the IS key issues ranking in Thailand by academic and practitioner perspectives. The specific purposes of this study are addressed in the following research questions:

- What IS management issues are expected to be the most important over the next three to five years in Thailand and thus most deserving of time and resource management?

- If there are any differences in the importance of IS key issues in Thailand between academics and practitioners, then what are those differences?
- Does the importance of IS key issues vary between academics and practitioners depending on organizational characteristics (type, size, and development stage) and respondent demographics (position, educational background, and years of experience in IS)?
- How do the IS key issues in Thailand compare with those previously reported in developing countries?
- How do the IS key issues in Thailand compare with those previously reported in developed countries?

It must be emphasized that all comparisons in this research between Thailand and other countries use data about the other countries from prior research.

DEFINITIONS

The following definitions clarify the use of key terms and provide a fundamental agreement about their meaning in relation to their particular use in this study.

IS Academics: IS academics refer to faculties who teach IS in colleges, universities, and other schools. The administrative staffers in academia such as the President, Vice President, and Dean or IS department head, who are involved in IS resource planning and curriculum development, are also considered in this group.

IS Practitioners: IS practitioners refer to IS executives and IS professionals in a variety of businesses, such as Chief Executive Officer (CEO), Chief Information Officer (CIO), Vice President of Information Technology, IS Director, and IS Manager who are responsible for IS management and planning.

IS Professional: An IS professional is an IS academic or IS practitioner.
Organizational Characteristics: In this study, organizational characteristics refer to type, size and growth stages. Organization type includes public, private, state enterprise, and other. Organization size was determined by the number of people who work in the IS department. Organization growth stage includes initial stage, expansion stage, control stage, and maturity stage.

Respondent Demographics: The respondent demographics include position, educational background, and years of experiences in IS. Academic IS positions include the President, Vice President, Dean, IS Department Head, and IS Faculties. Practitioner IS positions include Chief Executive Officer (CEO), Chief Information Officer (CIO), IS Director, and IS Manager.

RESEARCH DESIGN AND METHODOLOGY

Design

The overall design of this research consists of the following steps: (1) Review the literature of previous studies on IS management key issues in both developing and developed countries and summarize their findings; (2) Select IS key issues for this research from the summaries of the previous researches so that comparisons of the findings of this research and the previous researches can be made; (3) Examine and consider the analysis methods of the previous studies and select analysis methods for this study; (4) Design and administer an online, web-based, questionnaire to collect research data from Thailand; (5) Analyze the collected data and identify significant findings about IS management key issues in Thailand; (6) Compare the findings of this research with the summarized findings of the previous researches; (7) Draw final conclusions about IS management key issues in Thailand and how Thailand compares to other countries.

Methodology

The twenty-eight IS key issues considered in this research (see Table 2) were selected from issues in the literature review. The issues selected for this research appeared in nearly all of the previous research and ranked higher than issues that are were not considered. By choosing these twenty-eight IS key issues from those used in the literature, it is possible to make some comparisons between the findings of this research and the findings of the literature.

Although many studies on IS key issues used the Delphi method, this study followed Morgado, Reinhard & Watson (1999) and Gottschalk et al. (2000), the most recent study, by using the Q-sort method. The advantage of the Q-sort, a ranking technique, over Delphi, a rating technique, is that Q-sort requires simultaneous consideration and utilizes the same scale for all the issues. Previous research reported that the Q-sort method got a low response rate, but a high response rate is not required for the Q-sort method (Brown, 1996). An interactive online survey was used in this research in an attempt to obtain a higher response rate.

The survey was administered between August and November of 2001 using a custom-made online, web-based, three-tier (client-server-database) survey system written in HTML and Java. The survey system was run on a secured Linux server that was operated and administered by the researcher and located in Florida, USA. Using e-mail, telephone, and the web, Thai IS academics and practitioners were located and identified. Many participants were found through a network of friends and associates in Thailand who either personally knew the participants or was able to solicit potential participants from various universities and companies in Thailand. For each participant, an account was created on the survey system, which automatically sent them a customized e-mail invitation to participate at the survey website and it also provided them an automatically generated personal access code to the survey.

Participants at remote computers in Thailand logged into the Java applet client on the survey website which would make a connection back to a Java-based server at the survey website. All participants were Thai and were divided into academic and practitioner groups. The target sample was a total of 250 carefully selected Thai IS professionals, half academics and half practitioners. The Java survey applet asked multiple-choice demographic questions and then asked them to rank the twenty-eight IS key issues. The survey allowed the participant to interactively sort the issues and make changes before submitting the survey data to the server. Once submitted, the participant access code was invalidated so no other person could attempt to reuse it. The submitted survey data was automatically stored into records in a relational database on the server. All subsequent data and statistical processing was automated.

FINDINGS

One hundred and sixty-one subjects participated in this survey out of 250, representing a 64% response rate. There were 99 responses from IS practitioners and 62 responses from IS academics. Although it was reported in the previous study that the Q-sort method got a low response rate of 7.5% (Gottschalk et al., 2000), this study improved the response rate by using the interactive online survey over the Internet.

Mann-Whitney, Kendall's τ-b, and MANOVA tests were used to analyze data in this study. The statistical analyses support the following findings.

IS Key Issues in Thailand

The ranking of the top ten IS key issues are presented in Table 3. The data indicated that among the top ten issues, IS professionals in Thailand paid attention evenly to the strategic issues and operational issues. The following are the findings for each of the top ten issues of Table 3.

Table 3. Top Ten Key Issues in Information Systems Management: Thailand Study

M/T	P/C	I/E	Rank	Issue Name	Mean	Standard Deviation
T	C	I	1	Building IT infrastructure	1.47	1.85
M	P	E	2	IS strategic planning	1.09	1.75
M	C	I	3	IS human resource	.93	1.94
T	C	I	4	Quality of software development process	.66	1.82
T	C	E	5	Electronic data interchange	.53	1.89
M	C	E	6	IS Organizational Alignment	.44	1.60
M	C	E	7	Data resources	.39	1.80
T	C	I	8	IS disaster recovery	.31	1.78
T	C	E	9	Telecommunication and network systems	.27	1.82
T	P	I	10	IS architecture	.26	2.00

Note : M/T indicates management (M) or technology (T)
P/C indicates planning (P) or control (C)
I/E indicates internal (I) or external (E) to IS organization

Building IT Infrastructure

The issue of building IT infrastructure was projected to be the most important issue in Thailand over the next three to five years. Table 1 shows that this issue was also ranked number one in developed countries. In particular, it was the top issue in the United States, Australia, and Canada. Building IT infrastructure was defined in this research to mean networking, servers, databases, and other IS components that are necessary to use new technologies. The IS professional in Thailand feels that lack of necessary infrastructure limits the ability of IS to use new technology.

IS Strategic Planning

IS strategic planning was projected to be the second most important. This issue is about aligning the IS plan with the strategic plan to help achieve organizational goals. This issue complements building IT infrastructure.

IS Human Resources

IS Human Resources was ranked third most important. Current and future shortages of qualified information systems personnel threaten the organization's ability to make effective use of IT. Career paths need to be clarified and the emphasis needs to be put on developing business skills as was new IT skills.

Quality of Software Development Process

The issue of quality software development processes was ranked number four in Thailand. More effective software tools and techniques are needed to improve the development of software and satisfy the system demands of users. Software must be developed faster and perform properly. In Thailand, there is a need for more skilled systems analysts and project managers who understand the systems development lifecycle and quality control techniques.

Electronic Data Interchange

EDI was ranked number five in this research. EDI involves exchanging inter-organization data in a predefined format through telecommunications systems, such as for e-commerce with consumers and business-to-business (B2B) transactions. The importance of this issue to IS professionals shows that they feel the need to automate the communications with customers and business partners in order to compete in the international business environment.

IS Organizational Alignment

IS organizational alignment was ranked number six. The IS organizational alignment issue is about the placement of IS in the organizational hierarchy of the enterprise. The alignment of IS in the organization is reflected by who represents IS at the highest executive level. IS resources need to be aligned with the enterprise structure, making proper use of centralized, decentralized, and distributed IT.

Data Resources

The data resources issue was ranked number seven. In general, an organization's data resources are growing in size, complexity, and value. IS must be able to manage the data resources so that they can be accessed and utilized appropriately. The importance of this issue indicates that Thai IS professionals feel that there will be a great demand for better data storage systems and database management systems in the next three to five years.

IS Disaster Recovery

IS disaster recovery was ranked number eight. It is being realized that risks are increasing daily from the potential loss of business due to a disaster. Risks become greater as enterprise applications grow and become more integrated. Effective recovery plans must be in place and tested regularly to ensure losses are minimized.

Telecommunication and Network Systems

Telecommunication and network systems were ranked number nine. Telecommunications networks have become a major resource in the competitive world. Using IS for competitive advantage depends heavily on telecommunications networks both internal and external to the organization. It is a challenge to keep telecommunications and network systems updated to meet demand along with changes in technology. This issue is complementary to the issue of IS infrastructure, which was the number one issue.

IS Architecture

IS architecture was ranked number ten. IS architecture is an analysis of the requirements and design of the overall IS of an organization and it supports all of the above top ten issues. IS architecture is needed to identify the major information categories used within an enterprise and their relationships to business processes. It is also needed to guide applications development and facilitate the integration and sharing of data.

Differences Between Academics and Practitioners in Thailand on IS Key Issues

IS academics and practitioners in Thailand had a good agreement over the top two issues, which were building IT infrastructure and IS strategic planning (see Table 4). However, Wilkes' Lambda test [$F(14, 146) = 1.918, p = 0.029$] showed that there was a significant difference in ranking of IS key issues in Thailand between academics and practitioners. This statistical difference is supported by the observation that in Table 4, academics and practitioners only agreed in the ranking of the top two issues; the ranking of every one of the other eight issues is different between the two groups. This finding supports the literature view, that there is continuing difference between academics and practitioners on IS key issues.

Table 4. Top Ten Key Issues in Information Systems Management Ranked by Academics and Practitioners in Thailand

Key issues	Academics Ranks	Mean	Practitioners Ranks	Mean
Building IT infrastructure	1	.97	1	1.78
IS strategic planning	2	.79	2	1.27
Electronic data interchange (EDI)	3	.74	6	.40
Quality of software development process	4	.73	5	.62
IS human resource	5	.71	3	1.06
IS disaster recovery	6	.66	12	.09
Telecommunication and network systems	7	.48	11	.13
Business process redesign	8	.43	14	-.03
Data resources	9	.42	7	.37
Outsourcing	10	.23	17	-.19
Key issues	Practitioners Ranks	Mean	Academics Ranks	Mean
Building IT infrastructure	1	1.78	1	0.97
IS strategic planning	2	1.27	2	0.79
IS human resource	3	1.06	5	0.71
IS organizational alignment	4	0.65	13	0.11
Quality of software development process	5	0.62	4	0.73
Electronic data interchange (EDI)	6	0.4	3	0.74
Data resources	7	0.37	9	0.42
IS architecture	8	0.3	12	0.18
Standard and control mechanisms for IS activities	8	0.3	17	-0.1
Collaborative support systems	10	0.22	11	0.19

The biggest differences between academics and practitioners are in regard to the issues of outsourcing and IS organizational alignment. Academics give outsourcing the rank of ten, while practitioners give it the rank of seventeen. Practitioners give IS organizational alignment the rank of four, while academics give it the rank of thirteen. The top ten ranks according to practitioners are perhaps more relevant since practitioners represent the real-world needs of IS. In general, academics should try to match the top ten IS issues of practitioners so that graduates are better prepared for real-world IS.

Other significant differences between academics and practitioners are for the additional cases where a top ten issue for one group is not a top ten issue for the other group. For example, among the top ten issues of practitioners, the following issues are not also top ten issues of academics: IS architecture, standard and control mechanisms for IS activities, and collaborative support systems. Among the top ten issues of academics, the following are not also top ten issues of practitioners: IS disaster recovery, telecommunications and network systems, and business process redesign.

Influence of Demographics on IS Key Issues in Thailand

The results of the MANOVA tests showed that the organizational characteristics of organization size [$F(81,354) = 1.381$, $p = 0.026$], development stage [$F(81,354) = 1.440$, $p = 0.014$], and the combination of organization type and development stage [$F(54,236) = 1.660$, $p = 0.006$] had a statistically significant impact on the rankings of IS key issues in Thailand.

In terms of respondent demographics, only the combination of respondent's educational background and years of experience in IS [$F(189,779) = 1.305$, $p = 0.008$] had a statistically significant impact on the rankings of IS key issues in Thailand.

Comparison Between Thailand and Developing Countries on IS Key Issues

A comparison of the ranking of IS key issues between Thailand and developed and developing countries is provided in Table 5. In comparison between Thailand and the developing countries, Kendall's τ-b ($\tau_b = 0.043$) showed that there was a significant difference between them on the ranking of IS key issues.

Table 5. Comparison of Top Ten IS Key Issues Ranks between Thailand and Developed and Developing Countries

Thailand	Developed Countries	Developing Countries	Key issues
1	1	13	Building IT infrastructure
2	13	7	IS strategic planning
3	11	16	IS human resource
4	8	13	Quality of software development process
5	27	18	Electronic data interchange (EDI)
6	9	22	IS organizational alignment
7	6	4	Data resources
8	N/A	9	IS disaster recovery
9	5	11	Telecommunication and network systems
10	4	4	IS architecture

Of the top ten IS issues in Thailand, only four of them were also in the top ten in developing countries. Three of the top ten IS issues in Thailand were not even close to being in the top ten in the developing countries: IS human resources was ranked 3rd for Thailand and ranked 16th for developing countries; Electronic data interchange (EDI) was 5th in Thailand but 18th for developing countries; IS organizational alignment was 6th in Thailand and 22nd for developing countries.

Although Thailand was considered a developing country in this research, it was significantly different from developing countries at least in terms of the IS issues.

Comparison Between Thailand and Developed Countries on IS Key Issues

In comparison between Thailand and the developed countries, Kendall's τ-b *(τ_b = 0.337)* showed that they were similar on the ranking of IS key issues. Of the top ten issues in Thailand, six of them were also top ten issues in developed countries. Building IT infrastructure was the number one issue in Thailand and also for the developed countries. Only one of the top ten IS issues in Thailand was not even close to being in the top ten in the developed countries; Electronic data interchange (EDI) was 5th in Thailand but 27th for developed countries.

Although Thailand was considered a developing country in this research, it was significantly similar to developed countries at least in terms of the IS issues.

CONCLUSION

The Top Ten Issues in Thailand

IT infrastructure was projected to be the top issue over the next three to five years in Thailand. The other top ten issues in Thailand were (in rank order): IS strategic planning, IS human resources, quality of software development process, electronic data interchange, IS organizational alignment, data resources, IS disaster recovery, telecommunications and network systems, and IS architecture. Most of these issues can be called strategic issues, which are similar to developed countries' issues.

Differences Between Academics and Practitioners

Academics and practitioners in Thailand differ significantly - conflicting on eight of the top ten issues. This is consistent with studies conducted in the United States (Ball & Harris, 1982; Farhoomand, 1987; Trauth et al., 1993). Practitioners agree, but academics disagree that the following four issues should be in the top ten: IS organizational alignment, IS architecture, standard and control mechanisms for IS activities (SCMISA), and collaborative support systems. Academics agree, but practitioners disagree that the following four issues should be in the top ten: IS disaster recovery, telecommunication and network systems, business process redesign, and outsourcing (see Table 4).

Four of these eight conflicts did not make it into the overall top ten. The conclusion is that Thai IS academics and practitioners disagree most about the importance of the following four issues: SCMISA, collaborative support systems, business process redesign, and outsourcing.

SCMISA and collaborative support systems are the issues selected by practitioners, so they are likely to be more important from a business or a near-term perspective. SCMISA involves setting and enforcing standards and controls on IS activities to improve quality, safety, or other considerations. Collaborative support systems

facilitate teams of individuals that need to work together to complete projects or business processes. Academics in Thailand should try to understand why practitioners feel these two issues are so important.

However, practitioners should not overlook the importance of the two academic issues (as they are likely to be more long-term and sustained issues): business process redesign (BPR) and outsourcing. BPR involves analyzing and modeling the current business processes and then looking at how to redesign the model for improvements and implementation. BPR has received more attention in recent years since the introduction and acceptance of Internet technologies. Outsourcing has increased in demand due to the advantage of decreasing operation costs in IS organizations.

Thailand Compared to Other Countries

One may argue that the ranking of IS key issues in developing countries tends to lag behind those in the developed countries. However, the difference appears to have decreased in the case of Thailand. The IS development stages in developing countries might have caught up with developed countries. Our study shows that the ranking of IS key issues in Thailand was similar to the studies from developed countries but different than the studies from developing countries. This result may be due to the fact that the comparisons were done between studies performed during different time frames and there still might be a lag.

One other difference unique to Thailand was observed. EDI was not a top ten issue in developed or developing countries, but it was in Thailand. A partial explanation again may be the timing of this study compared to other studies.

IMPLICATIONS

Building IT infrastructure was the number one issue. This implies that the demand for and sales of IT infrastructure technology should be high in Thailand over the next three to five years. The high importance of IS human resources implies that the job market for qualified IS professionals in Thailand should be strong in the next three to five years. Thai colleges and universities would do well by preparing to produce more IS graduates to the meet demand. There may also be more opportunities for foreign IS professionals to work in Thailand.

The high importance of the quality of software development process implies that Thai IS professionals are dissatisfied with the quality of software developed by their organizations. This also implies that the demand of qualified systems analysts, project managers, software engineers, and programmers will be strong in the next three to five years. The issue of IS human resources complements this issue in this respect.

The importance of EDI suggests the need to establish networking and telecommunications systems among organizations. The issue of networking and telecommunications was also in the top ten issues for Thailand. EDI and networking

require IS infrastructure, which was number one IS issue. All of these issues together imply that computer-assisted communication with customers and business partners is recognized as very important to Thai IS professionals.

The differences in the ranking of IS issues between Thai IS academics and practitioners implies that academics do not focus enough importance on the issues of standard and control mechanisms for IS activities (SCMISA) and collaborative support systems, two issues of concern to practitioners. Academics have a significantly greater concern than practitioners for the issues of business process redesign and outsourcing. The underlying reasons may have to do with the short-term/long-term and business/intellectual perspectives of the two groups and may require further inquiry.

This research found that Thailand is similar to developed countries in terms of IS issues. However, when considering the difference between the time periods of data collection of this research and the time periods of the previously conducted developed country studies, there is an implication that Thailand follows behind developed countries on many of the IS key issues. While identification of the key issues is itself a worthwhile endeavor, it may be fruitful to investigate the underlying reasons for the nature of the issues and identify the trends in issue evolution over time.

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