A STUDY ON MANAGERS' PERCEPTION OF IS MANAGEMENT ISSUES IN CHINA

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ABSTRACT

China's acceptance to WTO has created abundant business opportunities for world community. A better understanding of current Information System (IS) management practices in China would be very beneficial for both Chinese firms and overseas businesses to improve their IS management and identify new business opportunities in China. This paper reports a survey of Chinese managers on their perceptions of key IS management issues. The study found that in general Chinese IT/IS managers' perceptions on most IS issues are lagging behind those of American counterparts, indicating a huge potential market for overseas' IT/IS management expertise. On the other hand, Chinese managers are catching up very quickly on some recent issues such as business telecommunication and wireless technologies. The study also identified different perceptions on IS issues among industries and geographical regions.

1. INTRODUCTION

Identification of key issues in information systems management has been an important research subject that interests many MIS researchers since mid-1980s. Several studies were conducted in the U.S. (for example, Dickson and Nechis, 1984; Deans et al, 1991; Niederman et al, 1991; Brancheau et al, 1996; Watson et al, 1996). Some recent studies have extended

their scope to include international dimension. Harrison and Farn (Harrison and Farn, 1990) conducted a study in Taiwan, Republic of China (ROC) with information management professionals as the subjects. They found substantial differences on the ratings of the issues between Taiwan, ROC and the U.S. They argued that the differences could be attributed to the time lag of technology, average firm size, and cultural factors. In a more recent study (1996), Watson and others (Watson et al, 1996) conducted a secondary data analysis based on eleven surveys in different countries/country-groups such as Australia, Hong Kong, India, Taiwan, UK, and the USA. As expected, they found differences in issue ratings. They tried to explain these differences from the following aspects: national culture, economic structure, political environment, and technological status.

China, the largest emerging market, however, has received relatively little research attention from IS researchers on the topic of key IS issues. China's information technology industry, together with its fast-growing economy, has enjoyed a dramatic growth in the past two decades, especially in the last ten years. The output of computer hardware industry grew 24.8 times from RMB (Chinese currency, about 1/8 of a US dollar) 5 billion in 1990 to RMB 124 billion in 1998 [25]. It is estimated that the GDP of information industries will be as high as RMB 6 trillion in 2010 [23]. As the economic reform continues, more and more Chinese businesses realize the crucial importance of modernizing their management information systems. The IT industry is getting increasing support from the government.

Given the fact that China has just become a member of World Trade Organization (WTO), a good understanding of the key information systems management issues in China would benefit not only domestic and foreign firms in China but also overseas businesses who are

interested in entering Chinese market. This study is designed to achieve such a goal. It is also our hope that the study will fill a blank in the international studies of key issues of IS management.

2. CHINESE CULTURAL AND ECONOMIC ENVIRONMENT AND ITS IMPACTS ON INFORMATION MANAGEMENT

The key issues of information systems management reflect the relationships among IT/IS, the mission, strategy, organizational structure, culture, and the business environment. China is a country with unique culture that evolved with the country's more than 4,000 years of recorded history. Hard work, modesty, harmony, respect of seniority, and respect of knowledge have been virtues passed down for thousands of years. Believing in the intrinsic harmony of heaven and human, and listening to one's intuition instead of endless pursuit of reasoning have been the major contents of the Chinese philosophy (Chan, 1973). At the same time, the Chinese society emphasizes collectivism with relatively large power distance among its members in the social or organizational hierarchy (Hofstede, 1991). These characteristics are more prominent in the less-developed Chinese northwest and southwest than the coastal east and southeast regions.

After the communist party leader Mao Zedong's death in 1976, Deng Xiaoping, a pragmatic leader, launched an economic reform to allow private businesses and foreign investments. After more than twenty years of reform, Chinese people's living standard, in general, has been greatly improved. However, the country is faced with a series of problems:

- unbalanced economic structure;

- inefficient and debt-ridden state-owned companies with tens of millions of surplus labors;
- overloaded infrastructure and deteriorating environment;
- disparity in income and prosperity among people and among geographical regions .

The cultural, social, and economic environments inevitably have impacts on information management. First, the traditional Chinese rely on intuition and enlightenment rather than detailed analyses based on “hard” data, which may de-emphasize the efforts on data collection, storage, and retrieval. Second, the debt-ridden state-owned companies are fighting for their financial solvency and do not have “spare efforts” to improve MIS performance. Third, service industry is relatively underdeveloped in China. IS consulting is only fledgling. Fourth, volatile external business environment makes it hard to make a relatively stable MIS strategy. Fifth, disparity among regions should also be reflected in the development level and maturity in IS management. Sixth, lack of advanced IT/IS management expertise. Finally, lack of understanding of the important roles that IT/IS applications play.

3. METHODOLOGY

The Sample

The study is a survey of 170 managers from industries and governmental/educational institutions in three provinces and an industrial city in China: Zhejiang and Jiangsu provinces in the Southeast, Shaanxi province in the Northwest, and Dalian city in the Northeast. Zhejiang and Jiangsu provinces are among the richest Chinese provinces, where agriculture is relatively developed, with beautiful natural and cultural sites for tourism. In the economic reform of past two decades, Zhejiang and Jiangsu have witnessed explosive development of township enterprises and private enterprises, with more and more foreign investments pouring in the region. There are also major state-owned companies in this area. The main manufacturing industries are household electronic appliances, textile, food processing, and machinery. Tourism is the major non-manufacturing industry. Shaanxi province is in Northwest China, which was the political and economic center of the country for centuries. The development of Shaanxi slowed down in the past several hundred years and is now one of the less developed regions in China. Since the establishment of the People's Republic in 1949, Shaanxi has been designated as one of the bases for heavy industries such as mechanical and chemical industries. Electronics, textile, and tourism are also major industries of the region. Dalian, in the Northeastern China, is a major port city with major industries such as shipbuilding, textile, mechanical, and petroleum processing, as well as tourism . The city attracts large foreign investments from Japan and Korea.

The choice of these three regions provides a good balance of different types of industries and ownership of the enterprises that one can find in China.

Data Collection

The subjects – managers from companies, colleges, and government departments – are asked to fill out our survey form (in Chinese), rating twenty issues related to information management on a one- to-ten scale, with one being “least important” and ten “the most important”. The subjects are asked to identify additional issues they perceived to be important. Survey forms were either mailed to the subjects or distributed to the subjects in a seminar. Two of the investigators gave seminars in Hangzhou and Xi’an, the capital cities of Zhejiang and Shaanxi provinces, respectively. The survey forms were filled out and collected in the seminars. Out of the 170 forms distributed/mailed, 134 were returned, with a response rate of 78.8%. Among the 134 forms returned, 111 are usable. Data processing is based on these forms.

Data Processing

The ratings are translated to rankings by calculating the mean rating of individual issues. The data processing is carried out from four dimensions: overall, region, industry, and ownership. While an overall study of the ratings of the issues is a standard practice in the key issues studies, we believe that the region, ownership, and type of industry of the subjects should reveal different perception or awareness of degree of importance for the same issue.

Region: different regions have different levels of economic development, infrastructure, education, and market development. These should be reflected on the relative importance of

MIS issues. We expect that the perceptions of eastern region managers are closer to those of their American counterparts due to its relatively more developed IT/IS industry and IT/IS applications than western region.

Industry: different industries have different intensity of new technology, different intensity of market competition, different level of education of their workers and managers, and different maturity level of management. These should also be reflected on the relative importance of MIS issues.

Ownership: companies of different ownership (state, private, joint-venture) have different business motivation, different decision making processes, different ways of allocating resources, and different accessibility to technology. These should be reflected in their perception of key MIS issues.

4. OVERALL RESULTS AND DISCUSSIONS

Table 1 shows the means, standard deviations, and rankings of the twenty IS management issues. The Chinese managers perceived "improving information security and control", "making effective use of the data resource", and "increasing understanding of IS role and contribution" as the three most important issues. They considered "developing EDI and distributed systems" as the least important to them. E-commerce, one of the hot issues in US today, was not identified as an important issue to Chinese manager. This may reflect the fact that e-commerce in China is still in its very early stage and has not become a management concern among most IT managers.

Table 1: Ranking and Rating of Key Issues					
		Rank	Rating		
Issue#	Issue		Mean	SD	Median
18	Information security/control	**1**	7.76	2.26	8
6	Effective use of data resource	**2**	7.44	2.25	8
11	Understanding IS roles	**3**	7.36	2.19	8
9	Improve IS strategic planning	**4**	7.32	2.38	8
13	Use IS for competitive advantage	**5**	7.27	2.39	8
1	Responsive IT infrastructure	**6**	7.23	2.37	7
4	Build communicat'n networks	**7**	7.04	2.39	7
14	Manage end-user computing	**8**	7.03	2.31	7
8	IS alignment with company	**9**	6.99	2.37	7
19	Facilitate/manage DSS/ESS	**10**	6.95	2.45	7
20	Productivity of maintenance	**11**	6.89	2.45	7
7	Develop IS human resources	**12**	6.87	2.53	7
15	End-user participation	**13**	6.78	2.31	7
12	Implement collaborative systems	**14**	6.77	2.1	7
2	Facilitate/manage BPR	**15**	6.74	2.38	7
16	Appl. development productivity	**16**	6.54	2.42	7
10	IS effectiveness measurement	**17**	6.28	2.2	7
5	Effectiveness of software develop.	**18**	6.27	2.34	6
3	Develop distributed systems	**19**	6.17	2.26	6
17	Develop/manage EDI	**20**	5.98	2.48	6

Comparison with Previous Studies

Table 2 shows a comparison of the rankings with previous survey results reported in Dickson and Nechis (1984, referred to as “US80” hereafter), Niederman and others (1991, “US90” hereafter), and Brancheau and others (1996, “US95” hereafter). From Table 2 we can see that some items received similar rankings between China and US (recent US surveys: 90-95), while some others are different.

Table 2: Comparison of Rankings				
Issue	**China**	**US 80**	**US 90**	**US 95**
Information security/control	**1**	14	19	-
Effective use of data resource	**2**	9	2	7
Understanding IS role	**3**	15	11	13
Improve IS strategic planning	**4**	1	3	10
Use IS for competitive advantage	**5**	-	8	17
Responsive IT infrastructure	**6**	-	6	1
Build communicat'n networks	**7**	13	10	5
Manage end-user computing	**8**	2	18	16
IS alignment with company	**9**	7	7	9
Facilitate/manage DSS/ESS	**10**	10	17	-
Productivity of maintenance	**11**	-	-	-
Develop IS human resources	**12**	8	4	8
End-user participation	**13**	-	-	-
Implement collaborative systems	**14**	-	-	11
Facilitate/manage BPR	**15**	-	-	2
Appl. development productivity	**16**	-	-	-
IS effectiveness measurement	**17**	5	16	11
Effectiveness of software develop.	**18**	-	-	6
Develop distributed systems	**19**	-	12	3
Develop/manage EDI	**20**	-	12	19

Similar rankings

(1). Effective use of data resource is ranked #2, the same as US90. It is a happy surprise to the authors, who suspected, before the data processing, that the Chinese might not have sufficient emphasis on data. It seems, now, that the Chinese companies are taking data resource management seriously. This may be attributed to the rapid move of the Chinese economy toward a free market economy in which people highly appreciate the value of data and information.

(2). Use IS for competitive advantage is ranked #5, similar to that of US90. This reflects that Chinese companies begin to realize the strategic roles of IS/IT, and want to use IS for achieving competitive advantage.

(3). Planning and managing communications networks receives a ranking of #7, close to that of US95 (#5), and relatively higher than those in US80 and US90 (13 and 10 respectively). On the awareness of the importance of networking, Chinese companies now are at the same level of US companies in mid 1990s. This should be attributed to the recent development of the Internet as well as business activities and strong media focus on the Internet. The Chinese is catching up in this new territory at a high speed [22], [23], [24].

(4). Aligning the IS organization within the enterprise is ranked #9, closely agreed with all the US studies.

Different rankings

(1). Information security and control is ranked number 1, as against #14 and #19 in US80 and US90, respectively. This could be attributed to the timing of the current study when stories of hacker and virus attacks are widely reported. It is a surprise that this issue was not included in US95. We expect that if it had been included in US95 there would have been a close similarity in ranking on this item between studies in the two countries.

(2). Understanding the roles of IS and its contributions is ranked #3, far more important to Chinese managers than their US counterparts. This may be attributed to the fact that China is still a “new comer” in IT business applications and an understanding of the roles and contributions of IT is perceived to be very important to them.

(3). Improve IS strategic planning takes a relatively high position of #4, which is different from US95 but largely agrees with the #1 and #3 rankings in US80 and US90, respectively. This may be explained by the lag between China and the US in IS/IT applications: the US companies had already passed this stage and concentrated on issues such as “responsive IT infrastructure” and “facilitating/managing business process reengineering (BPR)” (numbers 1 and 2 in US95).

(4). Managing end-user computing is ranked #8, lower than that in US80 but much higher than those in US90 and US95. This provides another example of Chinese lag in IS management.
(5). Facilitating and managing decision and executive support systems is ranked #10. This is the same as US80, and different from US90, which again shows the time lag China has.

5. ANALYSES BY REGIONS, INDUSTRIES, AND TYPES OF OWNERSHIPS

In order to measure the difference of rankings by different regions/industries/ownerships, we borrowed the concept of coefficient of variation (CV, CV = standard deviation/mean). The reasoning is that if the rankings are very different, the standard deviation of the rankings would be large; at the same time, a difference of, say, two positions in ranking at the "more important end" (numbers 1, 2, 3) would be more significant than the same difference (of two positions) at the "less important end" (18, 19, 20). Therefore, the coefficient of variation serves well the purpose of measuring the difference on the ranking from different regions/industries/ownerships.

Table 3 shows the coefficient of variation by regions, industries, and types of ownership. The larger the CV of the ranking on an issue, the more dispersed the rankings are among the groups in this dimension. Using CV = 0.5 as the cut-off point, we identify the "most **dis**agreed on" issues in each dimension by marking the **CV value in bold**. For example, the CV of rankings on "info security" in the dimension "region" is 1.4, which is greater than the "threshold" of 0.5. Examining the rankings of this issue by the three regions, we can see the rankings are 1, 1, and 14, respectively, showing a great difference among the three regions. On the other hand, the CV of rankings on "understanding IS roles" in the dimension

"ownership" is 0, which means there is no difference between the two types of ownerships on the ranking of this issue. Examining the rankings of this issue by the two ownership types, we can see the rankings are 3 and 3 respectively, showing no difference between the two.

The following observations are made from Table 3:
(1). most of the differences in rankings are on issues that are relatively important;
(2). different industries have the most differences, and those differences concentrate more on important (higher-ranked) issues;
(3). the dimension "ownership" has the least number of large differences. This suggests that there is not a substantial difference between companies of different ownerships. We further calculate the correlation of the ratings of state-owned companies and other types of companies, and obtain a correlation coefficient of 0.7, which further supports the observation of similarity of rankings by companies of different ownerships.

Table 3: Agreements of Ranking by Regions, Industries, and Ownership

		Ranking														
No.	**Issue**		**Region**				**Industry**							**Ownership**		
		All	SE	NW	NE	CV	Manu	Srvc	Trade	Utility	Fin	Gov/Ed	CV	State	Other	CV
18	Info security	**1**	1	1	14	**1.4**	1	1	1	1	2	10	**1.4**	1	6	**1**
6	use of data resource	**2**	3	5	1	**0.7**	7	5	6	4	5	1	0.4	4	2	0.5
11	Understand IS role	**3**	5	4	6	0.2	3	7	9	2	10	6	**0.5**	3	3	0
9	IS strategic planning	**4**	2	14	4	**1**	4	12	4	9	4	3	**0.6**	2	12	**1**
13	IS for compet. Adv	**5**	4	6	17	**0.8**	5	11	2	5	11	7	**0.5**	6	1	**1**
1	IT infrastructure	**6**	6	11	11	0.3	2	19	12	6	3	8	**0.8**	5	4	0.2
4	Commun. network	**7**	7	12	5	**0.5**	10	13	7	7	1	12	**0.5**	7	8	0.1
14	End-user computing	**8**	8	9	9	0.1	9	6	5	14	8	16	**0.5**	8	7	0.1
8	IS alignment	**9**	10	10	2	**0.6**	8	14	13	11	7	4	0.4	11	5	**0.5**
19	DSS/ESS	**10**	12	2	18	**0.8**	13	4	3	3	18	14	**0.7**	9	9	0
20	Maintenance	**11**	15	3	7	**0.7**	15	2	11	12	9	9	**0.5**	10	11	0.1
7	IS human resources	**12**	14	7	8	0.4	12	10	16	8	13	2	**0.5**	13	10	0.2
15	End-user participation	**13**	11	16	13	0.2	11	8	10	10	17	18	0.3	14	14	0
12	Collaborative systems	**14**	13	13	12	0	14	9	8	13	14	11	0.2	12	15	0.2
2	Manage BPR	**15**	9	18	3	**0.8**	6	20	14	19	16	13	0.3	15	13	0.1
16	Develop. productivity	**16**	18	8	10	0.4	17	3	17	16	12	15	0.4	16	18	0.1
10	IS measurement	**17**	17	17	19	0.1	18	15	18	20	15	5	0.4	17	17	0
5	Software develop.	**18**	19	15	16	0.1	19	16	20	18	6	17	0.3	20	16	0.2
3	Distributed systems	**19**	16	20	15	0.2	16	17	19	17	19	19	0.1	18	19	0
17	Develop/manage EDI	**20**	20	19	20	0	20	18	15	15	20	20	0.1	19	20	0

Region

The managers in Northwest region perceived the importance of IS issues differently from the managers from the Eastern regions. For example, "Effective use of data resource" is ranked number 5 by the northwest, as compared with 1 and 3 by the southeast and the northeast. "Improving IS strategic planning" and "Planning and managing communications networks" are ranked #14, #12, respectively by the northwest region, substantially lower than the

rankings of the other two regions. These differences may reflect the lag by the northwest region in IS management.

Industry

(1) Information security is ranked #1 by almost all industries (#2 by finance) except in government and education where it is ranked #10. It is understandable that education institutions do not emphasize much on information security; but it is a little bit surprising to find that governmental departments in China do not pay sufficient attention to this issue.
(2) Companies in service industry rank IS strategic planning #12, substantially lower than the most other industries. This reflects the lower development level of Chinese service industry in general. The service industry also ranks “building communications network” at a low rank of 13.
(3) Using IS for competitive advantage is ranked #11 by service industry and finance industry. But this should be understood from the background knowledge of these two industries. While service industry is relatively less developed and possibly not seeing the importance of competitive advantage of IS, the finance industry, being pioneers in IT/IS applications in China, could very well have passed the stage of simply using IS for competitive advantage, and be looking further at other more recent issues. This analysis is supported by the financial industry’s ranking of “building communications network” as the number one issue.
(4) Building a responsive IT infrastructure is ranked #19 by service industry, which could be explained with similar reasons as (2) and (3). Ironically, companies that do not see the importance of this issue are those who need to address this issue the most. At the same time, we observe that the trade industry also ranked this issue fairly low (#12), which we suspect

would change greatly in the wake of the recent intensive business and media attention on e-commerce: if the trade industry wants to be a major player in e-commerce, no matter B-2-B or B-2-C, it must increase its investment in building a responsive IT infrastructure.

(5) Developing IS human resources is ranked mostly beyond the tenth position (number 8 in utilities industry), except in government/education where it is ranked number 2. Given the fact that IS/IT related education/training is still developing in China, while the need for IS/IT personnel is exploding, the shortage of well-trained IS/IT professionals will soon be felt and soon become a major concern for Chinese companies.

Ownership

We have found no substantial difference between companies of different types of ownership. It suggests that companies of different types of ownerships are not very different in their perception and belief in information systems management. However, there are still a few issues on which state-owned companies differ from non-state owned businesses. These issues and their rankings are listed in the following table:

	Ranking			
Issue	All	State	Other	CV
Information security/control	**1**	1	6	**1.01**
Improve IS strategic planning	**4**	2	12	**1.01**
Use IS for competitive advantage	**5**	6	1	**1.01**

The ranking difference on IS for competitive advantage can be explained by the different attitudes toward competition held by state-owned and non-state owned companies: the state-owned companies are not so keen on active engagement in market competition, an "inertia" rooted back to the years under centrally-planned economy, while the companies of other

ownerships (collective, joint-venture, and private) are more active players in market competition. On the issues of "security/control" and "strategic planning", state-owned companies place greater emphasis on information security/control and strategic planning than private companies do. This is due to the same historical reasons mentioned above. State-owned companies are accustomed to doing business according to plans. They tend to tightly control information rather than sharing it with their business partners. Therefore, they tend to have more emphasis on planning and security control.

6. SUMMARY AND FUTURE RESEARCH

This study investigates key issues in information systems management perceived by Chinese managers. The study results show that in general, Chinese IT managers perceived information security control, effective use of data resources, understanding IT/IS roles, and IS strategic planning as the most important issues. These issues are typical ones for IT/IS managers in an early stage of IT/IS adoption in their businesses. Therefore, China is still a large potential market for overseas IT/IS management expertise. At the same time, the study shows that Chinese companies, while relatively behind developed countries on the more "traditional" IS issues, are catching up on several new issues such as business data communications.

The study shows different perceptions on the issues between managers from different regions, reflecting the different levels of IT/IS development among regions. Northwest region seems to be the least developed region in terms of IS/IT application and IS management. More investments and advanced management skills are needed to speed up its improvement in IS management. The study also shows that Chinese service industry remains to be the area that

could benefit the most from overseas' management skills. Training of IT/IS management personnel stands out to be one of the big challenges facing Chinese firms.

Future studies should identify the factors influencing the relative importance of the IS issues and investigate the relationships among the perception of key IS issues, the practice of IS management, and the level of success of the companies. IS management solutions may be developed based on the results of these suggested studies.

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