December 2003

Key Information Systems Issues in China

Dong Li
Peking University

Qizhi Chen
Peking University

KEY INFORMATION SYSTEMS ISSUES IN CHINA

Dong Li
Guanghua School of Management
Peking University
lidong@gsm.pku.edu.cn

Qizhi Chen
Guanghua School of Management
Peking University
cqz@gsm.pku.edu.cn

Abstract

Along with the rapid development of information technologies MIS theories and academic studies are also growing. However, up to now, many MIS problems have remained unresolved and need to be researched further. It seems that there has not been a commonly accepted view about the future MIS research among current Chinese MIS researchers, but MIS key issues faced by China's corporations have become an important topic and are focused by many Chinese MIS researchers.

In order to find out the differences in perceptions of MIS key issues between academic scholars and corporation practitioners, we conducted two investigations for scholars and IT practitioners respectively. In this paper, we will describe the investigations and present the data analysis. We believe that our research findings are helpful for understanding the research questions mentioned above.

Keywords: Management information system, key issues, priorities

Introduction

After 1990's, along with the economics development, Chinese enterprises have taken attention to use information technology in enterprise management. Now the enterprise informationlization has become one of the most important problem that the CEOs, CIOs and other senior managers have to consider in their work. According to a report of State Economic and Trade Commission, it shows in last year, among 100 biggest IT invested enterprises, the average investment on IT had reached 1.2 million US dollars (10 million RMB).

On other hand, MIS theory itself is also continuously in developing. Up to now, the basic concept framework is still in vague and many problems in MIS academia are remained to be unsolved. It seems there is no a clear and unified perceptive vision about the future research in current Chinese MIS academia. As the theoretic research of MIS are closely related to many current practical problems, the MIS research issues have become an important topic. What key issues should be studied in high priority? How to make choice between technology and management aspects? Researchers who come from institutions and practitioners from enterprises may have different opinions. In which ways they are the same and in which ways they are different? This is an interesting question to MIS researchers.

MIS research issues have become academic concerns from 1980's. Using Delphi method, Dickson et al. (1984) surveyed some IT executives of enterprises of US manufacture, energy, service, education, transportation and government, and summarized the issues that widely concerned by them. This study was followed by the studies of Brancheau et al. (1987) and Neiderman et al. (1991). All the three studies used the Delphi survey approach. Whereas the first two studies ranked the information systems key issues, the third study asked the participants to rate rather than rank each issue. The respondents in all the studies were senior IS executives.

Our study can be seen as an extension of the above researches. We will address the following research questions: At the beginning of 21 century, are the results of previous western research significant in guiding the Chinese enterprise information system implementation? What are the key MIS issues facing the practitioners in enterprises and researchers in academic area? Are there differences in the importance of the issues between the two groups of people?

Based on these existed literatures and consider the new MIS developing trends, we drew up a list of MIS research issues. We conducted a survey in two groups of people. One group consisted of academic scholars and another formed by practitioners. Through the survey, we found that the key issues widely concerned by western MIS researchers were also accepted by Chinese researchers and practitioners. Furthermore, though a part of issues were concerned by both researchers and practitioners, for some issues, the scores given by two groups were different. As an approach, we discussed the possible reasons and did some hypotheses tests.

Model and Method

Considering the actual status of China and the fast development of IT in recent years, and referring to the literature mentioned above, we address a survey list consisting of 33 issues which range from setting up internal IS to external information environment. The principal groups which may concern to these issues include managers, IS department members in a company, and the IT vendors outside enterprise. The respondents are classified into three hierarchies: strategy, manage and operation. The 33 issues are classified as managerial (13), technical (13) and hybrid (7) issues according to their properties. Managerial issues focus on problems of enterprise organizational behavior, strategy and environment and they are concerned mainly for the management and strategy layer. It is easy to identify technical issues but difficult for hybrid ones. We define hybrid issues by their technology contents, that is, people lack of IT technical knowledge will not be interested to these issues. The framework is shown in figure 1.
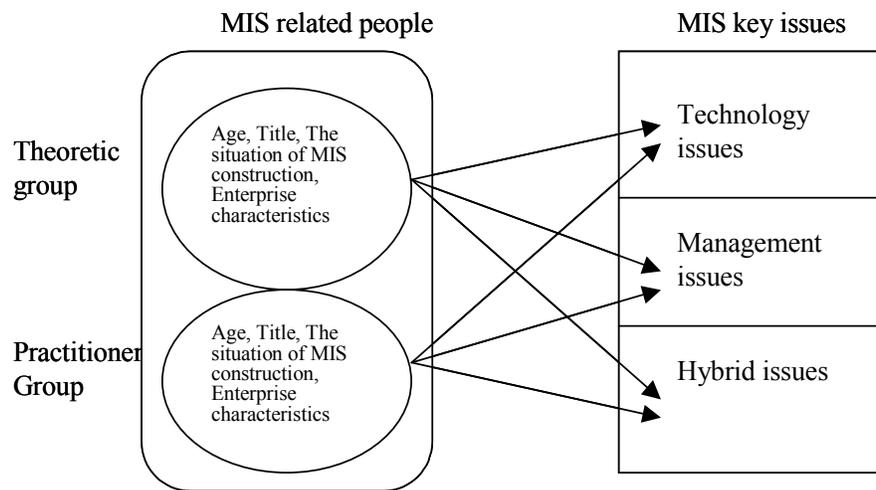

Figure 1. A Framework for this Research

At the end of 2002, we investigated two MIS relevant groups. The first survey was conducted among attendants of an annual national conference of enterprise information system construction. The respondents were asked to rate each of the issues on a scale from 1 to 5, where 5 indicated the most important issues(s) and 1 indicated the least important issue(s). The respondents were also requested to check their background, age, position and status of the enterprises (institutes) that they belonged to. Thirty-three responded in 60 questionnaires. A similar investigation was made on representatives from an annual conference of the Chinese Information Economics Association, most attendants come from universities and research institutes. This time we received eighteen questionnaires. There are two person in these questionnaires are not suitable for our purpose, therefore the data are eliminated. The rest data were classified as two groups, we will call the two groups as "Academic group" and "Practitioner group" respectively. By Fisher test ($\alpha = 0.05$) , there is no obvious difference in two group's distribution in age and title. The basic statistics of the respondents is shown in table 1.

Table 1. The Basic Statistics of the Respondents

Background	No. of respondents	Percent
Academic	17	33.33
Enterprise	32	62.75
Government	1	1.96
Other	1	1.96

Analysis for Issues' Importance

Firstly we look at the importance degree for the two groups. There are 5 issues recognized as important issues (Average is over 3.50) for the academic group. They are issue 17 (3.65), 18 (3.65), 2 (3.59), 28 ("3.59), 6 (3.53) rank descending. As a comparison, there are 7 important issues in practitioner group (Average is over 3.80). They are issues 2,5,4,6,3,16,1.

To find if there is significant difference between the two groups in evaluating these issues, we use ANOVA to test the average score for every pair. The issues with significant difference and the two means are listed in table 2. It should be noticed that for all of these issues, the practitioners group give higher evaluation than the academic group(Table 2).

Table 2. Issues with Significant Difference

No	Type	Average in A group	Average in P group
2	M	3.59	4.47
5	H	3.29	4.03
8	T	2.65	3.35
9	T	2.76	3.48
10	T	2.53	3.33
11	T	2.76	3.56
15	M	2.76	3.68
20	H	2.59	3.74
24	T	3.00	3.78

The issue with highest score in practitioner group is the issue 2 "The functions and responsibilities of enterprise top manager (CEO) in enterprise's informationlization" with values 4.47. It is significantly higher than the score in academy group (3.59), although in academy group it has been recognized as an important issue. This fact may indicate that the academy group is lack of experience for the importance of top managers in real information system implementation process. The similar pattern is shown on issue 5 "How to realize the internal integration of all kinds of management resources in an enterprise", the score of practitioner group is 4.03, not only the score much higher than academic group, but also the rank is advanced than latter (the former rank is 2, the latter is 11). It may indicate such a situation: many Chinese enterprises have gradually entered the "Integration Period" as Nolan mentioned, they are facing to a series of data island problems, so the integration has become the problem they focus to. However, for the academic researchers haven't the real application, they don't take this problem so seriously.

It should be noticed that the issue 17 "How to evaluate the benefit of the information system" with highest score (3.65) in academic group only get the rank 26 in practitioner group (3.19). This result shows the different interesting in two groups. Though the cost-benefit evaluation for information system caused big interesting for academic group, but the enterprises often deal with the problem in a more practical manner. The similar thing happened in issue 18 and issue 28.

Some issues are taken important in both groups, such as issues 6 "how to use the existing data sources of enterprises more effectively". It shows that problems of data sources have been taken seriously by enterprises. In the last decade, many Chinese enterprises had brought amount of computers in their business and produced a mass of data, but how to use these data effectively is a complex problem and many enterprises are facing the related problems such as "data island". It is expected that the information economics researchers are interesting to the data resource issue.

The issues are depreciated by two groups are some common properties: issue 33: "develop and manage EDI and EXTRANET" get low score in two groups. It tell us that EDI and EXTRANET are not widely adopted in most of enterprises, so the collaborative business are not taken seriously by them. The similar pattern is shown in issue 25: "Object Oriented programming or developing technology such as JAVA, CORBA, and J2EE". This issue had mean 2.56 for academy and 2.79 for practitioner. This demonstrates that the importance of concrete techniques declines along with the continuous renovation in software technology. Now let's look at the categories of issues and the mean scores of each category in each group. The summary is listed in Table 3.

Table 3. The Mean Score of Every Category

Category	Mean in academy group	Mean in practitioner group
Managerial	3.27	3.53
Hybrid	2.57	2.66
Technological	2.13	2.24

We conducted one-way analysis of variance to check the significances of the differences in the mean scores of three categories ($\alpha = 0.05$). And we found that significant differences existed between each pair of categories for each group. Managerial issues got highest mean score while technological issues were of least importance. hybrid issues lie in the middle.

Some Hypothesis Test

Enterprise Informationlization concerns the collaboration of companies in different industries, for their interest, they often stand on opposite positions. For example, a company in IT industry is an information system vendor, and the customer is often no IT background. The question is: for the companies in different industry, are there any obvious differences for the research issues they concerned?

We classified the response by IT industry and non-IT industry, and did a hypothesis test for these two groups. The result shows that there is no significant difference between the average scores of IT and non-IT enterprises.

To understanding if the IT companies and the non-IT companies have difference in recognition to every issue, we use ANOVA to test the following hypotheses:

   [H1]: Issue I has different average scores for IT companies and non-IT companies, i=1,……,33.

The test shows there are four issues that have different average scores. See table 4. It shows that IT-companies give much higher scores than the non-IT companies.

Table 4. The Issues with Difference by Industry

No	IT company	Non-IT company
Q10	4.25	3.19
Q15	4.5	3.6
Q22	3.75	2.89
Q29	4.25	3.3

The second question is: are the average scores influenced by the current situation of the enterprises' information system construction? We use the similar method to test following hypothesis:

   [H2]: Current enterprises' information system situation has effect on the average scores of the issue i ,i=1,……,33

The result shows there are 6 issues influenced by current enterprise information system. (see table 5), the others are not influenced by this factor.

Table 5. Issues that Are Influenced by IS Situation

No	Only has basic use	Functional use IS	Has Enterprise IS
Q7	4.25	3.13	3.4
Q8	4.5	3.0	4.0
Q11	4.5	3.3	4.0
Q13	4.0	3.3	4.0
Q14	4.25	2.9	4.5
Q24	4.75	3.48	4.4

This result shows that for some issues their importance are time-varying.

The last question is: Are the scores affected by the background (age, title) of the respondents? We tested the following hypotheses:

[H3]: There exists age effect on the score of issue i, i=1,……,33.
[H4]: There exists title effect on the score of issue i, i=1,……,33.

The results show that for practitioner group, the background of respondents do not affect the scores. For academic group, the age effect does not exist. But title of the respondents do have effect on the scores of two issues: issue 21 and issue 31. The respondents with senior title have significant higher scores than the people with middle-rank title.

Discussion

Based on the above analysis, some points are discussed below. Because this is a pilot research, the survey sample size was not big enough, so we can't reach the conclusion about current Chinese enterprise IS situation. However, in a sense it has presented some initial research findings that may be interesting to Chinese MIS academic researchers and practitioners, and it also provides some insights to our future research.

To prepare the questionnaire, we consider what key issues should be taken in. The major of key issues is taken from previous scholar's research results, a small part is proposed by us. These key issues are accepted by most of people we investigated and there are almost no "unimportant" issues. It shows such previous theoretic results are still importance to current MIS research and practice.

Another notable thing is the same incline between MIS academic researchers and practitioners. Managerial issues and hybrid issues are recognized as more important than technology issues. But for some issues, the scores of two groups are obvious different, Why there are some issues caused high interesting to academic researcher but not caused the practitioners' interesting? We proposed some explanation to the phenomenon, but to give an in-depth reason may need more investigation.

At last, we should notice that most of managerial issues are lacking of empirical research findings in current Chinese MIS research field. We have pointed out that these non-technology issues should be researched with high priority(Li & Dong 2000). We hope that more theoretical and empirical research in this area will be conducted by Chinese MIS researchers in the near future.

References

Brancheau J.C., Janz, B.D., Wetherbe, J.C.: Key Issues in information Systems Management: 1994-95 SIM Delphi Results, MIS Quarterly(20:2), June 1996, pp.225-242
Dickson, G.W., Loithoisor, R.L., Wetherbe, J.C. and Nechis, M.: Key Information Systems Issues for the 1980's, MIS Quarterly(8:3), September 1984, pp.135-159
Dong Li and Xiaoying Dong: Recognize the non-technology aspects in constructing enterprise Information Systems, Computer system applications, September 2000, pp.4-6
Niederman, F., Brancheau, J.C., Wetherbe, J.C.: Information Systems Management Issues for the 1990s, MIS Quarterly(15:4), December 1991, pp.475-500

Appendix.   The Key Issue List

	Issues	A	P
Q1	How to sustain the advantage of IT application in organization	3.47	3.80
Q2	The functions and responsibilities of enterprise top manager (CEO) in enterprise's informationlization	3.59	4.47
Q3	How to acquire and represent the end user's requirements	3.47	3.84
Q4	Using information technology for competitive advantage	3.47	3.93
Q5	How to realize the internal integration of all kinds of management resources in an enterprise	3.29	4.03
Q6	how to use the existing data sources of enterprises more effectively	3.53	3.84
Q7	To spread IT application knowledge and skills in company	3.06	3.31
Q8	Building a responsive IT infrastructure	2.65	3.35
Q9	How to design software interfaces for better integration of applications	2.76	3.48
Q10	Improving the effectiveness of management software development	2.53	3.33
Q11	Planning and managing communication networks	2.76	3.56
Q12	Improve IS strategic planning	3.18	3.67
Q13	Effective communication between enterprise and ERP vendor	3.00	3.45
Q14	Recruiting and developing IS human resources	3.12	3.31
Q15	Increasing understanding IS role and contribution	2.76	3.68
Q16	Aligning the IS organization within the enterprise	3.18	3.81
Q17	How to evaluate the benefit of the information system	3.65	3.19
Q18	Business process reengineering	3.65	3.57
Q19	Using IS to facilitate organizational learning	3.12	3.52
Q20	How to implement IS successfully, to avoid failure	2.59	3.74
Q21	Developing and Managing distributed IS	2.76	3.00
Q22	Facilitating and managing end-user computing	2.76	3.00
Q23	Implementing and managing collaborative business system	3.24	3.37
Q24	Improving information security and control	3.00	3.78
Q25	Object Oriented programming or developing technology such as JAVA, CORBA, and J2EE	2.59	2.87
Q26	Planning and integrating open system	3.29	3.00
Q27	IT outsourcing	3.06	2.88
Q28	Using e-commerce in enterprise business	3.59	3.13
Q29	The structure function and implementation process of ERP system	3.18	3.43
Q30	Using IT in marketing to managing customer relationship	3.35	3.35
Q31	The function, structure and the use of DSS in enterprise	3.47	3.55
Q32	Information policy and information ethics	3.24	3.26
Q33	Develop and manage EDI and EXTRANET	3.00	2.65