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Managing and Using Information Systems in a Chinese Teaching-led University in the Transition from Elite to Mass Higher Education

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ABSTRACT

Management of information systems in Chinese higher education context is under-researched. This paper provides the background of Chinese universities in transition from elite to mass higher education and a review and interpretation of literature on MIS and MIS integrating in higher education context. It emphasizes the application of the information systems strategy triangle in higher education institutions. It aims to explore management of information systems supporting management and strategic decision making in universities. Research results indicate that managing and using information systems in Chinese universities are technology-focused and at preliminary stage. There are real deficiencies in the realization of the case university's information strategy. Based on the interpretation of the literature and the analysis of the situation of the case university, the author suggests that only based upon a much fuller and more precise understanding of the complex and multi-faceted needs of all users in all functional areas of the university, can information systems be developed which are truly responsive and which function to meet overall university objectives. The author also suggests that there is little room for complacency about current information strategy in Chinese higher education institutions, if the case university may be regarded as not unique.

1. INTRODUCATION

Higher education is facing unprecedented challenges in the past decades, arising from the convergent impacts of globalization, the increasing importance of knowledge as a main driver of growth, and the information and communication revolution. Chinese higher education has been expanding and developing very quickly during the past two decades. According to Martin Trow's (1973) taxonomy, Chinese higher education is in the transition from elite to mass higher education with about 19 per cent of age participation rate in 2004. Universities are facing complex and challenging pressures and opportunities. They must ensure the efficient use of the limited resources and, at the same time, find ways of guaranteeing the long-term effectiveness of the university management, in which they are supposed to do more with less. Information systems have become one of the most appreciated and most scrutinized investments in higher education institutions. Laudon and Laudon (2002) claim that managers cannot ignore information systems because they play such a critical role in contemporary organizations (p. 15). Managers are no longer able to afford the luxury of abdicating participation in information systems decisions. Managers who choose to do so risk having their business decisions compromised…. Managers who let someone else make decisions about their information systems are letting someone else make decisions about the foundation of their business (Pearlson, 2004: ix). To achieve the successful transition from elite to mass higher education, Chinese universities should emphasize and attach importance to the managing and using information systems in their management. The paper provides a review and interpretation of MIS literature in general as well as its application in university context to identify the importance of managing and using information systems in universities. It presents the context of management information systems in the transition from elite to mass higher education in China specializing in the analysis of higher educational policy, the university strategy and information systems strategy. Qualitative empirical inquiry is applied in this research focusing on interviews, document analysis and personal observation. The paper takes Guangdong University of Foreign Studies (GDUFS), a Chinese

teaching-led university, as a case study to investigate its' information systems strategy and implementation of information systems in decision making, teaching, learning, research and management.

2. LITERATURE REVIEW

2.1 Management of information systems

Raggad (1997) cites McLeod (1989) on the taxonomy of IS, which evolved through several epochs known by their areas of concentration aiming at specific conceptual resources as employed by various levels of management in their decision processes. The conceptual resources that have been identified with the IS epochs are data, information, decision support, productivity, and knowledge (Mcleod, 1989). Cats-Baril and Thompson (1997) define information system as an integrated, computer-user system for providing undistorted information to support the operations, management, and decision-making functions of an organization. It is composed of a purpose, people, procedures, information, and information technology. The purpose should be specified as a measurable objective. People are the users of the system, and they interact with IT using procedures. Information may include data and information in the form of text, graphics, sound, and images. Information technology encompasses hardware and software and communication technology. Information systems are the resource of power in today's knowledge-driven or information society. The rapid advances in the speed and capacity of computing devices, coupled with the pervasiveness of the Internet, digital storage, wireless and portable devices, and multimedia content, is making major changes in the way we live and work (McNurlin and Sprague, 2002). According to McNurlin and Sprague, managing and operating information technology for its use in managing and operating organizations has been a "field of practice" for some 40 years. First known as business data processing and later as management information systems, the field is now called information systems (IS), as it combines the technologies, people, processes and organizational mechanisms for improving organizational performance. McNurlin and Sprague believe that the mission of information systems is to improve the performance of people in organizations through the use of information technology. The ultimate

objective is performance improvement, the focus is the people who make up the organization and the resource for this improvement is IT, which include computers, software, information, and communication technologies. Laudon and Laudon (2002) point out that information systems are socio-technical systems:

> Though they are composed of machines, devices, and "hard" physical technology, they require substantial social, organizational, and intellectual investments to make them work properly. Information systems are driving both daily operations and organizational strategy. Powerful computers, software, and networks have helped organizations become more flexible, eliminate layers of management, separate work from location, and restructure work flow, giving new powers both to line workers and management (Laudon and Laudon, 2002).

According to Pearlson (2004), IS play three important roles in management processes: 1) they enable the collection of information that may not be collectable other ways; 2) they speed the flow of information from where it is generated to where its is needed; 3) they facilitate the analysis of information in ways that may not be possible otherwise. She further suggests that managers must learn what to expect from the information systems so that they can plan and implement business strategy accordingly. She implies that a manager can expect six core activities: anticipating new technologies, participating in setting and implementing strategic goals, innovating current processes, managing supplier relationships, establishing architecture platforms and standards, and managing human resources.

2.2 Managing and using information systems in higher education context

Certain questions have become standard in discussion of the incorporation of information systems into higher education. Such as: 1) When is technology-aided instruction more effective than existing teaching models? 2) Why should faculty devote extra time and effort to developing technology-based instructional methods if promotion and tenure is determined primarily by research? 3) Where will a cash-strapped institution find the resources to provide enough technical support to

faculty who want to adopt new methods and create new teaching materials? 4) What IT competencies do students need to participate fully in the university educational experience? It is essential to clarify these questions to make full use of IS in higher education institutions. Lucey (1995) argues the significance of management information in the university context: management information is data converted to information that allows managers at all levels in all functions to make timely and effective decisions for planning, directing, and controlling the activities for which they are responsible. Hawkins (2000) predicts that the most important technological change will be the development of systems that combine video, audio, and computer technologies into "appliances" characterized by radically new and improved human interfaces. Sederburg (2002) claims that the explosive growth of information technology provides colleges and universities administrations with significant challenges. He argues that although software, hardware, and support issues are significant, more critical is the question of how a college or university can use the Internet most effectively. New information and communication technologies, and above all the Internet, hold out many promises for higher education institutions in terms of flexibility, efficiency, quality and access. Curry (2002) believes that knowing people and their organizational cultures is necessary condition for successful using and implementing information systems in universities. For him processes and technology are not enough, people are preeminent. Technology, policy, management and people should be integrated in managing and using information systems in universities. Decker and Neas (2003) argue that for administrators such as information technology directors and chief information officers (CIOs), the challenge of forever changing management information systems in universities are daunting. Anyway, Jackson (2004) emphasizes that information technology can help – is helping – universities to streamline, to enhance efficiency and effectiveness, to ease compliance with governmental requirements, and further communication between and among academic, students leaders, governments, and the wider world. But Greenberg (2004) points out that substantial numbers of academics fail to see the global significance of information technology. Heterick (2004) suggests that in stead of being caught up by

railing, writhing band recrimination directed against technology and against future, people in higher education should focus on reducing, wrestling and reengineering—reducing the cost of education, wrestling with the thorny problems of learning quality and reengineering our processes to reduce costs, increase access, and improve quality. Keiser (2004) emphasizes that higher education leadership must meet five challenges practicing a collegial approach to working smarter, not harder through the effective use of information technology:

> First, they must demonstrate to faculty that higher education institutions face more intense challenges and competition than at any other time in their history. Second, they must communicate the intent for the campuses to engage collegially in improving their positions in the education marketplace and for faculty to play the central role in that improvement processes. Third, they must convince faculty that efforts to improve do not include replacing them with technology-delivered teaching, research, or service. Fourth, they must recognize that for educational improvement to occur, it must be driven by those faculties – in the system, campus, college, school, and department – who accept the scholarship of teaching and learning and the information technology to apply it. And finally, they must insist that the institution's mission be focused in purpose and that its reward system reflect new approaches to achieving that purpose (Keiser, 2004).

3. POLICIES, UNIVERSITY ORGANIZATION STRATEGY AND IS STRATEGY

Information technology is important in the development of higher education; however, it is not the determining factor. Rather it is the educational policy and the efficient management and implementation of the technology that are more essential. As Hawkins (2000) indicates that technology is dramatically transforming the nature of higher education, yet the changes that have occurred in higher education have little to do directly with the technology itself. The transformation is being driven instead by the new opportunities and means of doing business provided by the communication media and the ubiquity of the technology. According to Scott et al (2004), the

university itself is increasingly being influenced by policy-driven interventions of the state, the new forms of communication. Rapid development information technology is causing fundamental change in higher education. Based on Pearlson's (2004) information systems strategy triangle framework, the relationship among government educational policies, university strategy and information systems strategy is examined to identify the importance of information systems in the transition of Chinese higher education from elite to mass system. According to Pearlson, successful organizations have an overriding strategy that drives both organizational strategy and IS strategy. Successful organizations have these three strategies in balance. This model suggests that IS strategy can itself affect and is affected by changes in organizational strategies. So in order to perpetuate the balance needed for successful operation, changes in the IS strategy must be accompanied by change in both the organizational and overall business strategy. According to Ragu-Nathan et al. (2001), there is strong support in the IS literature for the need to align organizational strategy with IS strategy in order to assimilate IS resources to advance organizational goals. Similarly, government educational laws and policies, university strategy and information systems strategy are interrelated. To succeed in the expansion of Chinese higher education and the transition from elite to mass higher education, the three elements must be kept in balance.

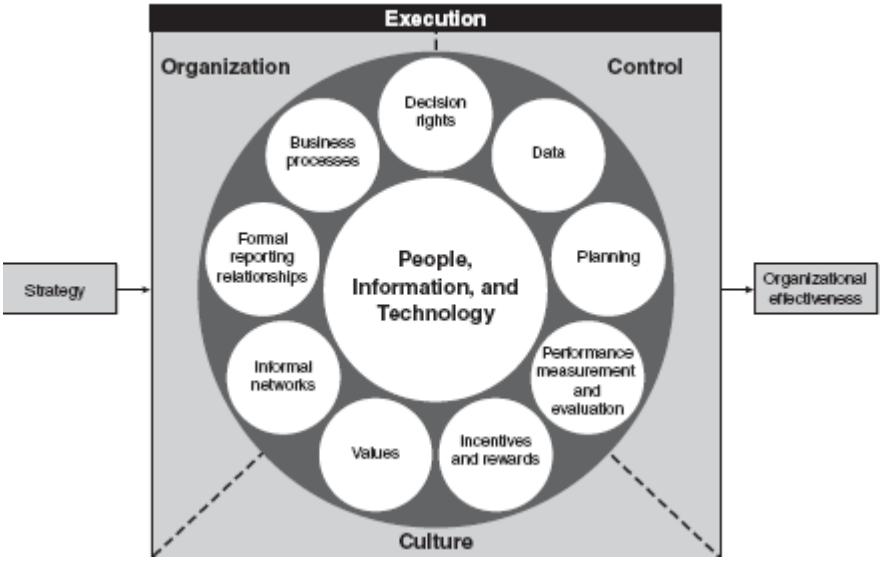
3.1 Chinese higher education laws and policies

In the last two decades, aware of development opportunities brought about in the era of knowledge and information technology, Chinese government has formulated the concept of "*Human Resources Are the No.1 Resources"* and the strategy of "*Revitalizing the Nation by Developing Science, Technology and Education"* and is forcefully advocating idea and system innovations in higher education in order to promote the rapid development of higher education. All these government endeavors aim to meet the challenges within the context of economic globalization and the rapid development of science and technology. To quicken the process of transition from elite to mass system of higher education, Chinese government successively issued a series of laws and regulations and documents, e.g. "*China's Higher Education Reform*

and Development Outline" (1993), "*Higher Education Law of the People's Republic of China"* (1998), "*Action Scheme for Invigorating Education Towards the 21st Century"* (1998), *"Criterions for Educational Management Information Systems" (2002). "Management Measures for Internet Information Service" (2003)* etc. The government is thoroughly implementing the strategy of giving priority to the development of education, using the developmental experiences of international higher education for reference, deepening higher education's reform in system and accelerating the developmental pace of higher education. In May 1999, an important decision was made to expand further the enrolment scale in higher education. The gross enrolment rate of higher education is over 19% in 2004. China begins to step into the threshold of mass higher education. China has become the largest country surpassing America in world higher education. Such developmental pace is unprecedented.

3.2 University organization strategies

According to Hanna (2003), the capacity of people and organizations to use technological developments wisely, effectively, and efficiently has emerged as a critical societal concern. People and nations are relying on universities to help shape a positive future. So higher education institutions need to transform their structures, missions, processes, and programs in order to both more flexible and more responsive to changing societal needs. University must answer the question: how will the university organize in order to achieve its goals and implement educational polices to satisfy the changing societal need? University strategy must complement education policy. The framework, developed by Cash et al. (1994) in *Building the Information Age Organization*, suggests that the successful execution of an organizational strategy compromises the best combination of organizational, control, and cultural variables. Organizational variables include decision rights, business processes, formal reporting relationship and informal networks. Control variables include the availability of data, the nature and quality of planning and the effectiveness of performance measurement and evaluation systems and incentives to good work. Cultural variables comprise the values of the organization.



Source: Cash, Eccles, Nohria, and Nolan, *Building the Information Age Organization* (Homewood, IL: Richard D. Irwin, 1994).

Hanna (2003) suggests eleven strategic challenges for universities to take into consideration: 1) removing boundaries; 2) establishing interdisciplinary programs; 3) supporting entrepreneurial efforts and technology; 4) redesigning and personalizing student support services; 5) emphasizing connected and lifelong learning; 6) investing in technologically competent faculty; 7) building strategic alliances with others; 8) incorporating learning technologies into strategic thinking; 9) measuring program quality; 10) achieving institutional advantage and 11) evolving college/university culture. The key factors of these 11 strategic challenges are demand and need of people and society. To achieve the demand and need, information systems strategy is essential.

3.3 Information systems strategy

Information systems strategy is the plan an organization uses in providing information services. It allows an organization to implement its strategy and help determine an organization's capabilities. When IS support organizational goals, the organization appears to be working well. IS strategy can itself affect and is affected by changes in an organization's operation and organizational strategies. Organizational strategy and information strategy must complement each other. They must be designed so that they support, rather than hinder each other. If a decision is made to change one corner of

the triangle, it is necessary to evaluate the other two corners to ensure that balance is preserved. Changing policies without thinking through the effects on the organizational and IS strategies will cause the organizations to struggle until balance is restored. Likewise, changing IS or the organization alone will cause an imbalance. Moreton (1995) suggests people in organizations need development in four skill areas to implement information systems strategy:

1) *Collaborative working,* which requires the integration of IS staff with business staff for applications development; 2) *The application of organization and job design principles,* which involve specification of the human computer interface and socio-technical systems, development of job enrichment programs, and opportunities for adaptive learning through job experience; 3) *Change management,* which requires an understanding of social processes in organizations. Systems staff need to be adept at handling the 'political' climate in which these changes will be introduced. 4) *Building adaptable systems,* which permit a continuous evaluation of needs.

Petersen (2004) points out that universities often engage in strategy development to come into compliance with external mandates such as new governmental laws and regulations. According to him, a framework that considers law, values, ethics, and morality, combined with a process that is inclusive and comprehensive, affords universities the greatest chance of developing IS Strategies that will achieve the purpose for which they are intended.

4. RESEARCH METHOD

The research takes the form of an empirical qualitative method. It specifies interpretive case study research as the main instrument. The case study research is particularly well suited to IS research, since the object of the discipline is the study of information systems in organizations and 'interest has shifted to organizational rather than technical issues' (Myers and Avison, 2002). The data collection procedures used

are: (1) an individual taped in-depth intensive interviewing (approximately sixty minutes in length) with the president, two of the vice presidents and seven of the middle managers in GDUFS and a written account by each participant of their understanding of managing and using information systems in the university in the transition from elite to mass higher education; Open-ended interviews on some teaching staff, IT professionals and some of the students are conducted; (2) Study of the documents on implementing and operating information systems in the university; (3) the researcher's participation in and observation of the management of information systems in the university (the researcher worked in the university as a middle manager for several years).

5. MANAGEMENT OF INFORMATION SYSTEMS IN GDUFS, A CASE STUDY

Guangdong University of Foreign Studies (GDUFS) set up in 1995. In the past ten years, it has experienced fundamental change within the landscape of transition from elite to mass system of higher education in China. There were less than 5000 students in 1995, and the number of students expands to more than 20,000 in 2005 and will expands to about 30,000 in 2010 according to government requirement. Government provides only 60 per cent of the expenses of the university. The unit cost of student has been dropping from 18000 RMB per student a year in early 1980s to less than 5000 RMB per student a year in 2004. The university is struggling to maintain the teaching quality with limited resources. To survive, the university tries to evolve new ways of being (more agile, responsive, entrepreneurial, collaborative). The strategic vision is to change the university from an elite teaching-led into a mass university strong both in teaching and research achieving successful transition from elite to mass higher education. The university has developed its strategy (mission) for managing the strategic change from elite to mass higher education:

> We shall carry on our tradition of propagating truths and serving society and manage change with the times— deepening the reform, exploring new ways of operation, and striving to meet the needs of our country's socio-economic

development. We shall consciously follow the law of higher education and make greater efforts in conducting scientific research. We shall make the establishment of new disciplines our first priority and further improve the performance of our teachers and students. And by bringing the teachers' leading role and the students' creative spirit into full play, we aim at turning out young talents who live up to our mission "Moral integrity, exemplary behavior, and conversance with both Eastern and Western learning", and are capable of competing and cooperating in the international arena. We shall do our utmost to become a trailblazer in the internationalization of higher education and make our contributions to the development of the country's higher education and to the rejuvenation of our great nation (Mission statements of GDUFS, 2004).

The strategy emphasizes continuity between tradition and strategic change. It is important to change with times bearing in mind the valuable tradition. In order to achieve the strategic change from an elite teaching-led university to a mass university strong both in teaching and research, greater efforts in conducting scientific research is emphasized. Being fully aware of its weakness in comprehensiveness, the university prioritizes the establishment of new disciplines as well as the performance improvement of teaching and learning. It also emphasizes the importance to internationalization. The strategy is future-oriented, which is based on scrutiny of internal and external analysis of the university. But it is obvious that management of information systems is obscure in the university strategy.

The president of the university emphasizes the importance of managing and using information systems in his speeches envisioning new information infrastructure to provide the means for the university to build a new kind of knowledge-centered organization, to facilitate the university's ability to adapt quickly to a changing environment, to provide information that will allow the university to measure its performance within the context of its strategic priorities. However, up to now, there is no holistic IS strategy to actualize and implement the president' s envision on MIS in

the university. Most of the respondents do not know IS very well. There is a management information center in the university. But the aim of the center is simplified into developing and building digital campus for the university. IT professionals charged with selecting hardware and software, developing new systems, or maintaining current technology find that the hard work they have done goes unnoticed or unappreciated. There is some flavor of MIS in the decision-making process, but it seems that the decision makers are not ready for integrating MIS in the strategic plan of the university. Some systems such as Executive Support System (ESS), Office Automation Systems (OAS), and Students Management Systems (SMS) are in the process of developing, but they are still compartmentalized. As different systems serve variety of functions, it is very challenging and costly to integrate different systems into holistic university level. There are less than 2000 computers in the university. Students can have access to Internet using the computers, but there are always more students with not enough computers. Most of the classrooms are equipped with computers and PowerPoint projectors. Teachers are asked to use technical equipments to improve the teaching quality. Students and teachers still can't have access to databases and electronic journals in the library and there is still no distance education available. Perhaps the most compelling issues to emerge revolve around lack of direction and understanding of information strategy, lack of clearly articulated responsibility for information management. In short, the existing IS in the university is still technology-focused and at the preliminary stage.

There are some common reasons for the existing problems in managing and using IS in the university: 1) Resource scarcity and limited funding: according to the decision makers, the university can't afford huge system investments and long development time. So there are no strategic objectives for IS. 2) Lack of top management involvement and constant support. 3) Fragmental projects: there is no holistic consideration when developing a project. 4) There is poor IS awareness among strategic level and management level. 5) Poor estimates or weak definitions of requirements from the senor managers and middle managers at the project planning stage contribute to the deficiency of project development. To change the unfavourable

situation, first of all, the senior leaders must have credibility with IT and consider IS strategically. It is comparable in importance to other key strategic issues such as finance, government relations and fund-raising where final responsibility must rest with the senior leaders. Ward and Hawkins (2003) summarize the lessons of some universities presidents in IS suggesting that the costs are too high, the risks are too great, and opportunities are too significant for the president to simply delegate to others such as faculty committees or chief information officers…. Leadership on technology issues must come from the president and the provost, with the encouragement and support of the governing board. Instead of thinking information systems as a cost centre that competes with other functions and units within the institution, a president is well advised to focus on the extent to which the investment in technology furthers both subunit and institutional goals (Ward and Hawkins 2003). Second, chief information officers should always be involved in the issues of assessment, just as the technological infrastructure should always meet the requirements of users. Users need reliable equipment and software, regular system checks and maintenance, adequate training, and strong support. CIO and IT leaders need consistent interaction with, and support from, the institutional leaders (Higdon, 2002).

6. CONCLUDING THOUGHTS

Managing and using information systems is essential in the successful management of mass higher education in contemporary learning society. No university can afford ignoring the function of IS nowadays. Universities in developed countries have been benefiting from IS, whereas in China, despite of the government's adherence to IT, universities, especially teaching-led universities, are lacking of direction and understanding of information strategy, lacking of clearly articulated responsibility for information management. By examining the case university, it is suggested that senior leaders of the university must have credibility with IT and take MIS strategically and chief information officers should always be involved in the issues of assessment, just as the technological infrastructure should always meet the requirements of users. Having the latest technology is of no value unless people use it, therefore, training and

development of staff in strengthening IS awareness and using them is important. A single integrated system with the flexibility to cater for individual requirements would appear to be a high priority. Based on the interpretation of the literature and the analysis of the situation of the case university, the author suggests that only based upon a much fuller and more precise understanding of the complex and multi-faceted needs of all users in all functional areas of the university, can information systems be developed which are truly responsive and which function to meet overall university objectives. The author also suggests that there is little room for complacency about current information systems in Chinese higher education institutions, if the case university may be regarded as not unique.

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