Internationalisation Of Chinese Higher Education: Application Of Knowledge Management To Analysis Of Tsinghua University

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ABSTRACT:

Tsinghua University is one of China's most influential universities. This paper uses it as a case study of the reasons as to why it stands out in China in the process of internationalisation of higher education, by means of a knowledge management (KM) social-technical theory model. A literature study of this model, mainly based on the work of Lee and Choi (2003), can offer a holistic approach in describing organisational culture, structure, people and technical support as well as the relationship between each element and knowledge creation and internationalisation of higher education.

Keywords: *Knowledge management, Internationalisation of higher education, Tsinghua University, Case study*

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1. Introduction Of Social-Technical Theory Model

Contemporary society is evolving into a post industrial, knowledge-based society (Wang, Song & Kang 2006), in which knowledge management is being recognised as an important weapon for gaining and sustaining competitive advantage. Many companies are beginning to manage organisational knowledge (Lee & Choi 2003) to help them obtain this competitive advantage.

Lee and Choi (2003) see internationalisation as a knowledge creation process. Pan and Scarbrough (1998) took a socio-technical view to examine organisations from a social and technical perspective using structures of social-technical theory as shown in the table below:

Social perspective			Technical perspective
Culture (history, collaboration, trust, learning)	Structure (centralisation, formalisation)	People (T-shaped skills)	IT technology support

1.1. Organisational Culture

Long (1997) defines organisational culture as not only what knowledge is valued, but also what knowledge must be kept inside the organisation for sustained innovative

advantage. An appropriate culture should be established to encourage people to create and share knowledge within an organisation (Leonard-Barton 1995, Holsappie & Joshi 2001). Organisational culture is nurtured and shaped gradually over a period of time, reflected in terms of collaboration, trust and learning. Hurley and Hult (1998) state that people in a group actively help each other in their work so that a collaborative culture is cultivated, which affects knowledge creation through increasing knowledge exchange (Krogh 1998, Nahapiet & Ghoshal 1998). Nahapiet and Ghoshal (1998) further explain that people are more willing to participate in knowledge exchange when their relationships are high in trust. The increase in knowledge exchange brought on by mutual trust results in knowledge creation (Szuianski (1996). The element 'learning' is defined by Miller (1996) as the acquisition of new knowledge by people who are able and willing to apply that knowledge in making decisions or influencing others. For successful knowledge creation, organisations should develop a deeply ingrained learning culture (Quinn *et al.* 1996) and provide various learning means such as education, training, and mentoring (Swap *et al.* 2001). According to Lee and Choi (2003), these three culture-related elements take on positive relationships with knowledge creation.

1.2. Organisational Structure

Lee and Choi (2003) discuss two key structural factors viz centralisation and formalisation (Menon & Varadarajan 1992). They demonstrate that there is a negative relationship between centralisation and knowledge creation as a centralised structure hinders interdepartmental communication and frequent sharing of ideas (Woodman *et al.* 1993) due to time-consuming communication channels (Bennett & Gabriel 1999) and also causes distortion and 'discontinuousness' of ideas (Stonehouse & Pemberton 1999).

Formalisation refers to the degree to which decisions and working relationships are governed by formal rules, standard policies, and procedures (Lee & Choi 2003). Holsappie and Joshi (2001) and Rapert and Wren (1998) all emphasise that knowledge creation requires flexibility and less emphasis on work rules. Likewise, Jarvenpaa and Staples (2000) agree that a lack of formal structure tends to enable organisational members to communicate and interact with one another to create knowledge. Accordingly, there is a negative relationship between formalisation and knowledge creation process.

1.3. People: T-shaped Skills

Chase (1997) contends that people are at the heart of creating organisational knowledge. Therefore, managing people who are willing to create and share knowledge is important (0'Dell & Grayson 1999). Stonehouse and Pemberton (1999) also emphasise knowledge and competence can be acquired by admitting new people with desirable skills. Lee and Choi (2003) hypothesise that the relationship between the presence of the organisational members with T-shaped skills and knowledge creation process is positive because people with T-shaped skills are those with deep (the vertical part of 'T') and broad (horizontal part of 'T') skills and competence who are able to create new knowledge (Johannenssen *et al.* 1999). They can integrate

diverse knowledge assets and combine theoretical and practical knowledge (Leonard-Barton 1995).

1.4. IT Technology Support

Many researchers such as Gottschalk (2000), Gupta and Govindarajan (2000) have found that IT is a crucial element for knowledge creation. IT infrastructure has an impact on knowledge within organisations. Roberts (2000) contends IT assists the knowledge creation process through rapid collection, storage, and exchange of knowledge on a large scale. Gold (2001) agrees that a well-developed technology integrates fragmented flows of knowledge, which eliminates barriers to communication among departments in organisation and facilitates the transfer of explicit knowledge (Raven & Prasser 1996, Riggins & Rhee, 1999, Scott 1998). Accordingly, Lee and Choi (2003) conclude a positive relationship between IT support and knowledge creation process.

2. A Case Study Of Tsinghua University

The social-technical model will be employed here to analyse the capabilities of one of the top universities in China namely Tsinghua University, with regard to the process of its own internationalisation of higher education. A large amount of the University Web-based information will be used.

2.1. Cultural Perspective (History, Collaboration, Trust, Learning)

First culture is used as a tool with respect to such influencing elements as history, collaboration, trust, learning to learn about Tsinghua University as follows:

Historically, Tsinghua University, originally Tsinghua Imperial College, was established in 1911 using reparation money from the United States (Tsinghua Imperial College 1911). The faculty members for sciences were recruited by the YMCA (the Young Men's Christian Association) from the United States and its graduates transferred directly to American schools as juniors upon graduation (U.S. Congress 1908). So from the very beginning, Tsinghua was intended to be an international establishment, entrusted with the task of fostering the ‘future leaders of China’ by equipping students with both western knowledge and Chinese traditional culture (Tsinghua Imperial College 1911). This initial mandate has been realised in the post-Mao period as more than 300 high-level local and central government positions have been taken up by Tsinghua alumni, including Hu Jintao, who currently serves as the General Party Secretary of the CPC’s Central Committee and President of PRC and Xi Jinping, Chairman of the PRC.

Tsinghua’s motto of ‘self-discipline and social commitment’ and its educational philosophy to ‘train students with integrity’ embody Tsinghua organisational culture, which is to shoulder great responsibility for educating high level talented students, accomplishing sophisticated scientific research and technological development and promoting national economic construction (Tsinghua University 2001a).

Owing to its rich legacy and 98-year history of excellence, it has gained enormous trust and high expectations from the whole nation (Tsinghua University 2001a). Today, most national and international rankings place Tsinghua as one of the best universities in China. It is through the high trust and expectations that the University has enjoyed rich government funding and policy support with the overall objective to build itself into a world-class university (Tsinghua University 2001b).

Tsinghua, reputed as 'China's MIT', affiliates with higher education in the US, enjoys great academic prestige for its success in importing western science and technology (mainly from the US) and adapts it to meet domestic economic needs (Wang 2002).

Tsinghua has been very active in pushing itself to take the leading role in the process of internationalisation of higher education (Pan 2006). In 2000, Tsinghua sent a delegation including the vice-president and 12 other senior staff to visit prestigious US universities. This was the first time in the history of socialist China's higher education that a university had sent senior staff to learn about institutional policy-making from western universities (Pan 2006). In September 2001, Tsinghua established the Department of Industrial Engineering and appointed an American engineer and scientist, Gavriel Salverndy, as head of department. This was the first time that any Chinese university had appointed a non-Chinese person to a leadership position (Pan 2006).

Altbach and Davis (1999) assert that equipping students with transnational skills, such as international language proficiency (generally in English) is one of the new higher education imperatives. For a long time, English, as a dominant international language, has been an obstacle for the Chinese higher education to participate in international academic activities. In order to circulate research and gain reputation in the international academic community, in the 1990s, Tsinghua started to emphasise the importance of equipping its students and faculty with transnational competence in English proficiency and it has really made significant efforts in creating an English environment (Pan 2006). This includes adopting English as the medium of instruction and the use of English-version textbooks and teaching materials is encouraged. By 2001, Tsinghua has established English as the main medium of instruction in 57 out of 1440 courses (Tsinghua University 2001a). For example, Tsinghua MBA programme is linked with the University of Pennsylvania's Wharton MBA programme. All courses adopted English versions of textbooks and were taught in English (Zhao 2001).

In addition, it has preferential policies for hiring teachers with strong English backgrounds. By 2004, Tsinghua hired 159 full time instructors who held doctoral and master's degrees, mainly from English-speaking countries, and 17 chair professors from the US and Europe (Tsinghua University 2004). To improve teachers' English proficiency, Tsinghua sends teachers to upgrade their qualifications in Western countries. In 2004 alone, 3490 Tsinghua teachers – 44.6% of 7872 total staff – went abroad for upgrading, compared to 1805 between 1978 and 1999 (Tsinghua University 2004).

In 2007 Tsinghua officially launched the joint Post-Master and Master Degree Programmes in International Energy Management / Environmental Management in

cooperation with the École des Mines de ParisTech (EMP), and the Institute National des Sciences Appliquées de Lyon (Tsingua News 2009). The first group of international students, who completed the programmes, were conferred their degrees at the École des Mines de ParisTech (EMP) on February 20, 2009. Recently, Tsinghua has become the first Chinese university to offer a Master of Laws programme in American law, through a cooperative venture with the Temple University Beasley School of Law (Tsingua News 2009). The university is a member of LAOTSE (Links to Asia by Organizing Traineeship and Student Exchange), an international network of leading universities in Europe and Asia. LAOTSE partners arrange exchange programs for students and senior lecturers, as well as organise an annual summer school. Each year, the University celebrates the Intellectual Property Summer Institute in cooperation with Franklin Pierce Law Centre of Concord, New Hampshire (Tsinghua News 2009). Tsinghua University now runs university-level exchange agreements with more than 170 universities in 32 countries, with more than 300 student-exchange and faculty-exchange programs, over thirty of which are student exchange programs with world-class universities (Tsinghua News 2009). Tsinghua also enhances overseas scientific and research cooperation**.** In 2007, Tsinghua signed 580 agreements and contracts for international scientific and technological R&D projects. In addition, 32 joint research institutes were co-established with overseas partners (Tsinghua News 2009).

On the other hand, Tsinghua has also become an attractive destination for international students. The numbers of international postgraduates, exchange students, and students from abroad has been increasing steadily. In 2007, 434 international students enrolled in Tsinghua degree programs, including 219 undergraduates, 180 masters, and 35 doctoral students. Another 958 international students participated in non-degree programs. In the fall of 2007, there were 2,204 international students from 87 countries studying at Tsinghua (Tsinghua News 2009).

Moreover, Tsinghua organises international activities and events like Berkeley Week at Tsinghua and Tokyo Week at Tsinghua with the purpose of promoting continued friendly academic links and collaboration between the universities, sharing resources in science, engineering, the humanities and social sciences of both sides during the course of pursuing and creating excellence in higher education and exploring mutually beneficial collaborative opportunities for the future (Tsinghua News 2009).

Tsinghua also hosts international conferences or seminars. In 2007, the University hosted 71 international and regional academic conferences with a total of more than 11,000 representatives. Altogether, more than 6,000 overseas academics attended the meetings (Tsinghua News 2009).

Tsinghua has a reputation for having some of the most world-distinguished guest speakers, with public figures such as Bill Clinton, Tony Blair, Henry Kissinger, Carlos Ghosn, Hank Paulson etc, as guest speakers at the university. According to Tsinghua News and Events (2009), the speakers who visited Tsinghua and delivered their speeches only in March can be listed in the form of a table below.

Speakers	Subjects	Dates
Nobel laureate economist Joseph E. Stiglitz (Columbia University US)	The Economic Crisis and the Global Economy: Lessons for Economic Theory and Policy	20 March 2009.
former British Prime Minister Tony Blair	A Global Deal in Climate Change: the Role of Business and New Technologies	24 March 2009
Cambridge University Vice Chancellor Alison Richard visited Tsinghua	Enhancing Tsinghua and Cambridge University cooperative programmes in low carbon energy and student exchanges	26 March 2009
The 2002 Nobel Prize winner in Physiology or Medicine Professor John E. Sulston (Manchester University UK)	Who Owns Science?- focused on ethics and innovation as important areas for scientific research	30 March 2009

Through all the international collaboration and communication, Tsinghua has been learning and developing. In order to become a world-class university, Tsinghua regards the reform of teaching content, system and methodology as a constant process. It has made further innovations in academic disciplines, teaching, research, faculty construction, and reform of administrative practices and procedures (Pan 2007). It has shaped steadily the organisation of its disciplines, improved the quality of its teaching, achieved enhancement in its scientific research and faculty development, and increased its social impact, encouraged and inspired by the expectations and trust of the whole nation.

Based on the above analysis from cultural perspective with regards to such influencing factors as history, collaboration, trust, learning, the hypothesis is that Tsinghua organisational culture stimulates creativity and innovation in the process of internationalisation of higher education.

2.2. Structural Perspective (Centralisation, Formalisation)

In the modern Western university system, the concept of university autonomy emphasises 'the power of a university or college to govern itself without outside controls' (Berdahl *et al.* 1971). Autonomy, along with academic freedom, is defined as intrinsic to the nature of the university, and a precondition if a university is to best fulfil its role and responsibilities toward society (Thorens1993). The intertwining of academia and officialdom, however, implies external political influence being brought to bear on education (Pan 2007). A great deal of research has addressed diverse aspects of the relationship between academia and officialdom, including, for example, the use of the educational system as a channel for the socialisation and circulation of elites (Putnam 1976; Clark 1984), the development of school networks by political elites for recruitment purposes (Wilkinson, 1964; Marceau, 1989), the involvement of political forces in the appointment and promotion of professors (de Moor, 1993), and the political alliance between the university leadership and government officials, including alumni in powerful governmental positions (Bain 2003, Ordorika 2003).

Unlike the Western university structure or system, still influenced by the traditional feudalist ideology all the Chinese state universities are and take on a centralised and formalised structure or system, under the leadership of CPC (Communist Party of China). The Party Committee Office headed by the Party Committee Secretary and the

President Office headed by the university President form a parallel management system, controlling schools and departments. The value of university autonomy, based on Western university tradition, is not an appropriate basis for interpreting university-state relations in China (Pan 2007). Chinese higher education institutions are not separate from the state, but are an integrated part of the national modernisation project. The state controls the university through its control over the university leaderships' careers (Gao 1992). As Hayhoe (1996) suggested 'Traditional Chinese scholarly institutions had neither autonomy nor academic freedom, and there was no institution in Chinese tradition that could be called a university.' Because of the national significance of Tsinghua, the Chinese government kept it under close supervision by appointing a trusted ally as its president (Pan 2006). The linkage between scholars and government officials is still strong. Wang (2001) states that in 1978, the power to appoint the presidents of both Tsinghua and Peking universities was moved from the MOE to a higher level, the State Council, while the Central Committee of the CPC has the final approval. The ranks of the two universities' presidents were equal to that of the deputy minister of the State Council. Successful candidates must hold Chinese nationality and CPC membership. Chinese state control over the appointment and promotion of Tsinghua President has given Tsinghua a leading role in Chinese higher education, serving China's economic modernisation and politico-cultural identity (Pan 2007).

This centralised and formalised structure or system normally has a large size, many layers and narrow spans of control. Most important decisions tend to be taken by senior management with little flexibility (Robbins & Coulter 2004). This organisational structure can be bureaucratic and respond slowly to changing environment within which the organisation operates. Communication across various sections can be poor. Applying the social-technical model, this structure hinders interdepartmental communication and frequent sharing of ideas (Woodman *et al.* 1993). Therefore, it can be a negative barrier for internationalisation of higher education.

However, Pan (2007) argues that, despite unavoidable political influence on the University, the political affiliations between the Tsinghua leadership and government officials have been an important factor in helping Tsinghua to gain some university autonomy. On the one hand, this relationship inevitably invites the state's political influence on the University. On the other hand, scholars' holding government office help release the University from the constraints of the state's policies in certain circumstances, so that the University can obtain more resources and opportunities to pursue its own goals of development within both the domestic and international higher education community.

2.3. People Perspective: T-Shaped Skills

Tsinghua has a very strong body of staff. It has many famous professors, including 48 members of the Academy of Science of China and the Academy of Engineering of China. At present, more than 1,000 professors and more than 1,700 associate professors work for Tsinghua. Since 1985, more than 1,000 post-doctoral fellows have worked for Tsinghua. At present, there are more than 400 post-doctoral fellows. The

post-doctoral researchers have made great contributions to scientific research and education at Tsinghua (Tsinghua University 2001b). In order to build up a first-class teaching staff, the University initiated chair professorships in an effort to invite internationally renowned professors and scholars to join its academic team (Tsinghua News 2001). In 2007, six Nobel laureates visited Tsinghua and the university hosted a total of 907 overseas scientists and scholars. Twenty-nine world-renowned scholars received honorary academic titles from Tsinghua (Tsinghua News 2009).It is hoped that this measure will speed up the development of related fields of studies and further the cooperation between Tsinghua and other internationally renowned universities in the world.

It is the high trust and expectations that convince many excellent students to make Tsinghua the first choice for their studies. Every year the majority of candidates scoring the highest in the National Entrance Exams choose Tsinghua. More than 50% of the No.1 and top-ten high-school graduates (science and engineering oriented) of all Chinese provinces are admitted to Tsinghua. The table below shows top-ten high school graduates of all provinces enrolled into Tsinghua from 1996 to 2003 (Tsinghua University 2003).

Year	No.1-ranked students in the National College Entrance Examination in 30 provinces	Top ten students in the National College Entrance Examination in 30 provinces
1996	27	182
1997	24	157
1998	41	190
1999	38	196
2000	39	226
2001	31	214
2002	28	218
2003	28	215

In 2003 alone, 215 out of 300 students who scored in the top 10 in the 30 tested provinces and regions chose Tsinghua and 28 first-ranked students in the National College Entrance Examination in 22 provinces chose and joined Tsinghua. Of the top ten students in the National College Entrance Examination in each province (except Tibet), 72% were also admitted by Tsinghua. The majority of selected students are national scholars and among the brightest high school graduates in the country (Tsinghua University 2003a).

The recent two years of enrolment of the top national undergraduate students is recorded as below (Tsinghua University 2009):

year	2008	2009
%	70%	70%

	33 provincial No1s in Science 7 provincial No1s in Arts	210 top 10 students from 30 provinces in Science 50 top 10 students in Arts

Admissions to its graduate schools are also selective by any measure. For instance, only 16% of MBA applicants are admitted; making admissions more competitive than MIT's MBA at 20% (Tsinghua University 2003b). Both Tsinghua undergraduate and graduate schools have been recognised nationally, ranking first in the National Evaluation of Graduate Schools. The University has now over 25,900 students, including 13,100 undergraduates and 12,800 graduate students. As one of China's most renowned universities, Tsinghua has become an important institution for fostering talent and scientific research. Among over 120,000 alumni who have graduated from Tsinghua since its founding are many outstanding scholars, eminent entrepreneurs and great statesmen remembered and respected by their fellow Chinese citizens (Tsinghua News 2009).

As mentioned above, Tsinghua alumni have held more than 300 high-level local and central government positions (Pan 2007) including Hu Jintao, the curernt President of PRC and Xi Jinping, the current Chairman of PRC.

It can be concluded, from people's perspective, that Tsinghua has outstanding human resources which are very influential and conducive to its internationalisation of higher education.

2.4. IT Technology Perspective

The mastery of information and communication technologies is regarded as one of the new higher education imperatives (Altbach & Davis1999). As with other universities in many countries, Tsinghua has promoted the use of information and communication technology (ICT). In 1994, the Ministry of Education asked Tsinghua and nine other universities collaborated to develop the China Educational and Research Network (CERNET), which aimed to construct an information network linking educational institutes nationwide. In conducting this project, Tsinghua benefited by developing its own on-campus network, equipping former lecture rooms with multimedia facilities and linking them to the Internet through the Campus Information Net (CIN) (Wang 2001). Tsinghua reinforced ICT-related courses in the curricula, by establishing more than 60 ICT-related courses and requiring all the first-year undergraduates to take a compulsory ICT-related course (Department of Computer and Science and Technology 2001). ICT is widely used in administration, teaching and campus life (Wang 2001). In the 1990's, the Library made substantial progress in automation and networking. An advanced and fairly complete information infrastructure has been formed. The CD ROM network also has been created to provide students and faculty with the literature and information searching services via the campus network. In recent years, an increasing number of electronic resources and virtual resources have been made available in the Library or online. These form an information system that is open, multi-level, efficient and service-oriented. The system supports the University's goal of becoming a world-class university. The library holds a rich collection of books and journals amounting to 3,923,000 volumes, which cover a broad range of subjects

including the humanities, social sciences and management, but mainly focuses on natural science, and engineering and technology. The library has a comprehensive operating system with a variety of sources: students may find information through the online database and the network resources. Tsinghua virtual library is a network of information databases on internet sources related to the University, including material on organizations, institutions, electronic journals, well-known scholars, computer software, and academic information in university-related fields. The library has exchanged academic information and knowledge with more than 200 universities and research institutes abroad.

Tsinghua has a significant research base for National Computer Network Technology:

- China Education and Research Network (CERNET) Centre
- Computer Network Technology Research Centre of MOE
- National Natural Science Foundation of China Network (NSFCNET) Centre
- China Advanced Info-Optical Network Centre (CAINONET) of Ministry of Science and Technology
- China Exchange Point of Next-generation Internet DRAGONTAP
- Core Network of China Next Generation Internet Demonstration Project CNGI , CERNET2 Network Centre
- Tsinghua-Lucent United Laboratory for Network Technology

Tsinghua campus network (TUNET) has become one of the most advanced campus network in the world and CERNET is the largest national academic network in the world. CERNET cooperates closely with the next generation Internet organizations of North America, Europe and Asia-Pacific region. There are regular academic exchange meetings at least once a year between CERNET and its partners, held locally and abroad in turn, including Chinese and American Networking Symposium(CANS), Chinese European Networking Symposium in EC-Bridge Project, Asia-Pacific Advanced Network conferences and CN-KR joint workshops (Tsinghua University 2009).

Tsinghua also has an Electronic Teaching Centre which was launched in early1978. The Electronic Teaching Centre provides support for Tsinghua academic activities. The main task of the centre is to build a modern teaching environment, and manage and develop the related technology research. The centre is in charge of the Tsinghua Distance Education Channel. Tsinghua Cable Television Net, the Modern Education Technology Research Institute, the Audio-video Teaching Material Production and Press, the Faculty Rest Net Site, and Tsinghua Hua Sheng Audio and Video Technology Developing Company.
In September 2000, the Tsinghua Online Classroom was established. It is now the teaching and administration platform of distance education, taking full advantage of the network to develop the online educational programs. It offers series of courses in

different majors for master's degrees, and for bachelor's degrees for those students who are junior college graduates. To date, about 50 online courses have been developed. The students in the distance education program can register, select courses, ask questions, download course materials and hand in homework through the Classroom. Through combining the Internet, satellite digital net and CATV, the division of distance education has established 114 off-campus teaching centres in 31 provinces, municipalities, and autonomous regions in the country. Currently there are more than 10,000 students registered.

Tsinghua School of Continuing Education was established in 1985. It is responsible for continuing education, distance education, and adult education. In 1999, the Ministry of Education approved Tsinghua out of a group of three universities as the pilot school for modern distance education. The divisions under the school are of distance education, vocational education and training, international cooperation for training, adult education, and business development. Wang (2001) reports Tsinghua developed about 100 distance education courses. In addition Tsinghua has some 87 labs and nine factories are used for teaching and research.

Tsinghua IT infrastructure and technical strength are phenomenal. This greatly supports its knowledge sharing and creation in the process of internationalisation of higher education.

3. Conclusion

The work has conducted the social-technical theory model by using culture, structure, people and technology as tools to analyse what Tsinghua University is like in these aspects. As a result, despite Chinese-characteristic bureaucratic structure and political control and influence, all the facts show that Tsinghua, as one of the best universities in China, has very strong infrastructure in terms of its personnel, English proficiency and technology, which presents intensely positive relationships with the internationalisation of higher education.

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