Shaping universities as learning organisations in Taiwan: a comparative study on comprehensive and technology universities

Hsiow-Ling Hsieh

I-Shou University
Kaohsiung, Taiwan

ABSTRACT: Based on knowledge management and organisational knowledge institutionalisation, the study described in this article aims to explore the key elements for formulating learning organisations by comparing comprehensive universities with technology universities/colleges. The study involved conducting questionnaire surveys using stratified sampling of universities/colleges in Taiwan. After statistical analysis of the valid samples, the study revealed that different kinds of universities showed diversity on knowledge management and Senge's five disciplines, as well as the learning organisation concept proposed by Senge. Moreover, both knowledge management and organisational knowledge institutionalisation had significantly positive relation with learning organisation. The study found the key influential factors are not quite the same for different institutions in a comparison of comprehensive and technology universities/colleges. Although the three key elements of constructing learning organisation were alike, their explanation power and importance differ from each other.

INTRODUCTION

The 21st Century is an era for developing the knowledge economy. Knowledge has become the core resource of any society. Therefore, the enterprise increases the promotion of knowledge management activities, such as the acquisition, storage, sharing and application of knowledge. As a consequence, knowledge management has spurred organisations forward to restructure and innovate [1]. With regard to the field of technology education, how does knowledge management play its role in higher education? It is a major issue that needs much more consideration.

Ye stated that knowledge management should coordinate with organisational learning to coordinate activities or tasks for staff growth [2]. Benner and Tushman also suggested that knowledge management activities should go through two kinds of managerial processes: exploration and exploitation mechanisms [3]. This process is called *organisational knowledge institutionalisation*. Therefore, while investigating knowledge management, this study sought a deeper discussion on organisational knowledge institutionalisation in order to understand its relationships and impacts.

Chang noted that schools belong to nutritive organisations that are characterised with stability and conservation. In addition, schools are knowledge organisations, emphasising educators' professional autonomy [4]. Ever since Senge launched his book *The Fifth Discipline: the Art and Practice of the Learning Organization* in 1990, the concept of the learning organisation has become a prime issue for enterprises, as well as academics [5]. In Taiwan, the environment of higher education has recently changed quite quickly. The Ministry of Education has urged that junior colleges improve their teaching facilities, enrich the faculty and upgrade into institutions of technology. Additionally, institutions of technology are also encouraged to convert into

universities of science and technology. In such an arduous environment, how can technology universities/colleges survive and deliver their core capabilities to compete with traditional comprehensive universities? In the face of such a tough task, it is important to study the concept of the learning organisation with the five disciplines mentioned by Senge [5]. Hence, this study especially focuses on comparing these two kinds of universities and identifying the relationships concerning knowledge management, organisational knowledge institutionalisation and learning organisations. Based on the findings, the study offers the different types of universities the best method to efficiently develop into learning organisations.

LITERATURE REVIEW

The Learning Organisation

The concept of the learning organisation is extensively in favour, and can be attributed to Senge's popular work, *The Fifth Discipline* [5]. Galer and Kees identified the learning organisation as an organisation that can push its staff to learning and make good use of learning outcomes [6]. By accelerating knowledge, an organisation can allow its staff to better understand themselves and the circumstances around them. Garvin pointed out that a learning organisation is good at creating, capturing and transferring knowledge [7]. It modifies actions to reflect new knowledge and insights, ie members of a learning organisation have a strong willingness to deepen and increase the course of their learning. Wu defined a learning organisation as an organisation that, through all kinds of efficient means and concrete measures, cultivates its members in life-long learning, encourages personal potentiality, accommodates changes and develops continuously [8].

The five disciplines, as proposed by Senge, are systems thinking (ST), personal mastery (PM), improving mental

models (IMM), building a shared vision (BSV) and team learning (TLe) [5]. These five disciplines construct the notions of the learning organisation. It is hoped that, in the process of building shared vision, team learning and system thinking, the organisation can leads its members to master themselves and change their mental models. In the face of fast changing external circumstance, the organisation can maintain its operations with elasticity [4]. Judging from the meaning of learning organisation, it can be concluded that the five disciplines are critical to the development of the learning organisation. These provide indicators of becoming a learning organisation [9][10]. Although these five disciplines develop respectively, each discipline is indispensable to forming a learning organisation. The current study applied the internal meaning of the theory, taking these five disciplines as testable targets to examine to what extent they have been achieved at schools.

Knowledge Management

Knowledge management is the process of *knowledge chains*, which involves becoming conscious of information and confirmed skills, as well as the application of new technological skills [11]. Wang noted that knowledge management can be characterised twofold, namely: individual members have knowledge power and have know-how ability; and the objective is to increase organisational productivity and innovation [12].

As for the dimensions of knowledge management, although many scholars have proposed different perspective, this study has adopted Davenport and Prusak's viewpoint. They classified the procedure of knowledge management into knowledge acquisition, knowledge storage, knowledge sharing and knowledge application. These are elaborated on as follows:

- *Knowledge acquisition (KAc)*: Lu pointed out that knowledge acquisition is the beginning for the organisation to learn and acquire experience [13]. However, knowledge capture take place in the first stage of knowledge transfer, when knowledge comes from outside the organisation [14]. Of course, knowledge can be derived internally by way of continuous search or from managerial experience.
- *Knowledge storage (KSt)*: After capturing knowledge, it is important to store the specific knowledge, becoming part of *organisational memory* [15]. Davenport and Prusak stated that the way to deal with organisational knowledge is mainly by transferring knowledge into a more easily read format [1]. This is somewhat supported by the tools of hardware and software [14][16].
- *Knowledge sharing (KSh)*: According to Nonaka and Takeuchi, there are two kinds of knowledge: explicit knowledge and tacit knowledge [17]. The vital task of knowledge management is to interact explicit knowledge with tacit knowledge, and to share with each other efficiently. Such sharing will continuously hand down intelligent capital, making organisational knowledge accumulate forever [18][19].
- *Knowledge application (KAp)*: The purpose of capturing knowledge lies in knowledge application. This involves not just knowledge storage and sharing, but also making organisational members identify with the knowledge; they then begin to utilise the knowledge, the first successful step to transferring knowledge [20]. The next step is to create knowledge, thereby developing more efficient knowledge for the organisation. Hence, knowledge application and innovation are not only vital for the organisation and individual to keep up with competition

and generate higher performance, but is also the focal point for organisational knowledge management.

Organisational Knowledge Institutionalisation

According to Benner and Tushman's research, while knowledge capture and application affect organisational performance, it also means that the organisation is situated between innovation and stability as a *trade off*. The organisation can offer a mechanism to keep stability, which is the so-called *organisational knowledge institutionalisation* [3].

Two essential tasks for an organisational mechanism for a learning organisation, according to Robbins, involve setting up a learning strategy and rebuilding the organisational structure [21]. In addition, culture is the characterisation of organisational freedom. Organisations should put efforts into building and reinforcing a knowledge management strategy, improving knowledge flow and integrating innovation. In order to implement successfully such a strategy, it is necessary to set up a *continuous learning culture*. This kind of supportive leaning culture advances organisational development [9][22]. Hsieh, Su and Liu have also urged that organisational leadership be taken into consideration when talking about organisational knowledge institutionalisation [23].

To sum up, given the related concepts from the authors mentioned above, the study reorganised the skeleton of organisational knowledge institutionalisation as developing operational strategies, organic structure, knowledge-friendly culture and transformational leadership.

METHODOLOGY

According to the results of the literature review, the researchers built a framework for shaping universities into learning organisations, as shown in Figure 1.
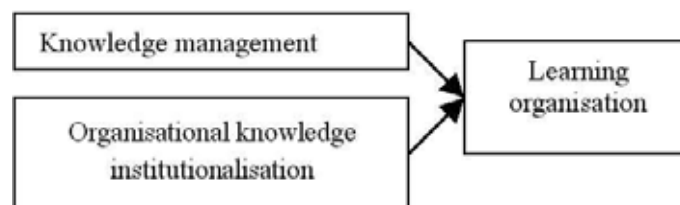

Figure 1: The research framework.

Sample

The study utilised a stratified sampling method. The samples were divided into public comprehensive universities, private technology universities, public colleges and private institutes of technology. The study identified 256 valid samples from distributing 840 questionnaires to universities/colleges in Taiwan. The valid return rate was 30.47%. Chi-squared analysis was used to test the difference between the population and samples, yielding $\chi^2(0.05, 3)=7.851$, which showed the construction of the samples to be quite similar to the population.

Instrument

The instrument of the study is a self-developed questionnaire. The questionnaire includes four parts: the *knowledge management scale*, the *organisational knowledge institutional-isation scale*, the *learning organisation scale*, and *personal basic background*. Testing the reliability of the three scales

indicated that the Cronbach's alpha coefficient ranged from 0.812 to 0.934. The factor loadings of the scales were all above 0.50. According to Nunnally's statement, the instrument is equipped with high reliability and validity.

RESULTS AND DISCUSSION

On the whole, all types of universities/colleges have better performance on knowledge acquisition and knowledge storage than on knowledge sharing and knowledge application. In general, public schools' knowledge management is superior to private schools. In comparing the four different types of universities, a significant difference was found regarding knowledge acquisition ($F=3.225$, $p<0.05$). Further analysis using Scheffe's method revealed that public comprehensive universities were significantly stronger than private institutes of technology regarding knowledge acquisition (see Table 1).

Table 1: Difference on knowledge management.

Factor	Mean				F-value	Scheffe
	(1)	(2)	(3)	(4)		
KAc	4.333	4.263	4.259	4.077	3.225*	(1)>(4)
KSt	4.044	4.016	4.126	3.961	0.827	
KSh	3.769	3.683	3.741	3.593	1.064	
KAp	3.918	3.865	3.956	3.754	1.289	
KM	16.104	15.820	16.082	15.433	2.179	

*$p<0.01$

Note: (1) public comprehensive universities; (2) private technology universities; (3) public college; (4) private institutes of technology

Concerning organisational knowledge institutionalisation, the results are no different for these four kinds of universities, no matter the individual factors, such as developing strategies, organic structure, friendly culture, transformational leadership or the overall dimension. The means ranged from 3.484 to 3.983, which indicated that all of the schools had moderate performance on organisational knowledge institutionalisation.

Regarding the learning organisation aspect, the statistics revealed no difference in the four kinds of universities. However, a significant difference was found in building shared vision (BSV) ($F=3.919$, $p<0.05$). Public comprehensive universities built shared visions much better than private technology universities (see Table 2).

Table 2: Differences in learning organisation aspects.

Factor	Mean				F-value	Scheffe
	(1)	(2)	(3)	(4)		
ST	3.728	3.640	3.691	3.678	0.435	
PM	4.056	4.118	4.102	3.902	2.338	
IMM	3.337	3.319	3.400	3.485	1.989	
BSV	3.772	3.497	3.499	3.633	3.919*	(1)>(2)
TLE	3.729	3.508	3.684	3.653	2.598	
LO	18.639	18.080	18.382	18.403	1.243	

*$p<0.01$

Note: (1) public comprehensive universities; (2) private technology universities; (3) public college; (4) private institutes of technology

Correlation Analysis

The study adopted the Pearson's product-moment correlation to explore the relationship between knowledge management, organisational knowledge institutionalisation and learning organisation. The results indicated that the correlations for all dimensions, organisational knowledge institutionalisation and learning organisation were very high ($p<0.001$). In addition, the correlations between knowledge management and learning organisation were positive. Except for knowledge acquisition and improving mental models, the correlation between knowledge management and learning organisation achieved over 0.112 ($p<0.05$) (see Table 3).

Table 3: The correlation between knowledge management, organisational knowledge institutionalisation and learning organisation.

	ST	PM	IMM	BSV	TLE	LO
KAc	0.193***	0.381***	0.094	0.225***	0.143**	0.267***
KSt	0.146**	0.372***	0.142**	0.219***	0.112*	0.246***
KSh	0.198***	0.329***	0.224***	0.276***	0.238***	0.329***
KAp	0.264***	0.385***	0.191***	0.283***	0.202***	0.340***
KM	0.264***	0.490***	0.211***	0.331***	0.227***	0.338***
DS	0.642***	0.434***	0.299***	0.622***	0.505***	0.655***
OS	0.600***	0.385***	0.366***	0.628***	0.603***	0.673***
FC	0.634***	0.478***	0.270***	0.664***	0.588***	0.698***
TL	0.481***	0.348***	0.205***	0.574***	0.593***	0.582***
OKI	0.713***	0.484***	0.354***	0.764***	0.718***	0.794***

*$p<0.05$; **$p<0.01$; ***$p<0.001$

Comparative Analysis of Multiple Stepwise Regressions

Samples were selected from comprehensive universities to analyse how learning organisations develop. Table 4 shows the multiple regression analysis. Only organisational knowledge institutionalisation influential factors were found to influence the learning organisation. The major reasons were friendly culture (FC), organic structure (OS), developing strategy (DS) and transformational leadership (TL), in that order. These four factors explained 59.9% of the variation.

As for technology universities/colleges, the main reasons were somewhat different from comprehensive universities. Table 5 shows that organisational knowledge institutionalisation and knowledge management were influential for learning organisations. The major reasons were friendly culture (FC), developing strategy (DS), transformational leadership (TL) and knowledge application (KAp), respectively. These four factors accounted for 70.1% of the variation.

CONCLUSIONS

The study found that public schools' knowledge management is superior to private schools'. A comparison of these four types of universities detected a significant difference on knowledge acquisition. It revealed that public comprehensive universities were significantly stronger than private institutes of technology regarding knowledge acquisition. An examination of learning organisations showed a significant difference in building shared vision. Public comprehensive universities built shared visions much better than private technology universities.

In exploring the relationship between knowledge management, organisational knowledge institutionalisation and learning organisation, it was found that the correlations of all dimensions organisational knowledge institutionalisation and learning organisation were very high. Additionally, the correlations between knowledge management and learning organisation were positive. Except for knowledge acquisition and improving

mental models, the correlation between knowledge management and learning organisation was statistically significant.

Judging from the multiple regression analysis, friendly culture, organic structure, developing strategy and transformational leadership were the major factors for comprehensive universities successfully transforming into learning organisations. On the other hand, the influential factors for technology universities/colleges were friendly culture, developing strategy, transformational leadership and knowledge application. To sum up, the authors concluded that the major influential factors were different and the explanation powers were not the same. This means that the goal of shaping a school as a learning organisation is identical. Comprehensive universities and technology universities/colleges should make different efforts in order to put it into practice. The study offered the best solution.

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Table 4: Multiple regression analysis of learning organisation-comprehensive universities.

	B	Std. Err	Beta	t	R	R^2	R^2 Change	F Change
(Constant)	5.608	0.758		7.401				
FC	1.024	0.240	0.276	4.275	0.662	0.438	0.438	148.074***
OS	1.170	0.217	0.317	5.392	0.736	0.542	0.105	111.854***
DS	0.790	0.211	0.224	3.739	0.764	0.584	0.042	88.086***
TL	0.405	0.154	0.147	2.634	0.774	0.599	0.015	69.886***

Table 5: Multiple regression analysis of learning organisation- technology universities/colleges.

	B	Std. Err	Beta	t	R	R^2	R^2 Change	F Change
(Constant)	2.079	0.920		2.258				
FC	1.528	0.256	0.359	5.978	0.743	0.552	0.552	208.327***
DS	1.289	0.245	0.292	5.249	0.798	0.637	0.085	147.255***
TL	0.811	0.170	0.251	4.762	0.825	0.681	0.044	118.820***
KAp	0.692	0.209	0.155	3.308	0.837	0.701	0.020	97.154***