

## Factors that influence school organisational innovation in technical institutes and universities

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**ABSTRACT:** The purpose of this study is to explore the factors that influence organisational innovation in technical institutes and universities. In order to meet this purpose, the study conducted expert focus groups twice to identify seven facets of organisational innovation for technical institutes and universities. That is, leadership innovation, administration innovation, student affairs innovation, curriculum and instruction innovation, the teachers' professional development innovation, resource application innovation and campus innovation. Then, the study adopted the techniques of the Analytic Hierarchy Process (AHP) to solicit opinions from 25 experts through a questionnaire. The results show that *leadership innovation* is the most important item in the first hierarchies. In the second hierarchies, the *vision* is the most important item. According to these results, the major recommendation from this study is that the school's leaders, especially the president, need to delineate the school's organisation innovation vision and share these thoughts with staff in all faculties.

### INTRODUCTION

In recent years, due to the low birth rate in Taiwan, the number of school-aged population has declined significantly. Moreover, under current government policy, technical institutes and universities have a tendency to increase the number of departments and programs, or strive to upgrade the system. In 2008, there were 38 technical universities and 40 technical institutes in Taiwan. After Taiwan's entry into the World Trade Organization (WTO), foreign schools are also fighting for their market share. With the supply exceeding demand, schools are facing severe challenges.

Organisational climate influences the interaction among staff and students [1]. Moreover, it affects their support for schools and their commitment to accomplishing the schools' goals. Hanna indicated that innovation enhances the schools' organisational climate [2]. Sergiovanni suggested that in order to carry out educational reform, organisational learning should enhance innovation. This would encourage teachers to participate in innovation instruction in order to strengthen school effectiveness [3]. Daft and Becker pointed out that school innovation includes educational and administrative innovation (instruction and curriculum innovation and administration management innovation). The former refers to teachers, from the bottom to the top, enhancing educational performance by instruction and curriculum innovation. The latter refers to administration personnel, from top to bottom, influencing school organisational innovation by administrative management [4].

Currently, the theories of school organisational innovation tend to be based upon the theories of business organisational innovation. However, there are essential differences between schools and businesses. These include having different organisational goals and demands: having different organisational structures and ability to reform; having different organisational member relationships; having different decision-making models; and being affected by different internal and external factors. Thus, the leaders of technical institutes and universities should consider how to delve into the key factors of school organisational innovation in order to develop a suitable organisational innovation model to respond to external competitive pressure. This should be the key point of current organisational innovation in technical institutes and universities.

The purposes of this study are:

- to probe the factors that influence school organisational innovation of technical institutes and universities;
- to identify the relative weights associated with these factors.

### LITERATURE REVIEW

Meaning of Organisational Innovation

Schumpeter indicated that innovation means constructing a production function with a new mix of production factors [5]. Holt suggested that innovation aims to create or introduce useful things by knowledge or key information [6]. According to Betz and Frankle, to innovate is to modify or invent a new concept to meet current or future potential demands and to improve and develop the original function to reach commercialisation [7][8]. Gattiker indicated that innovation is the product or process upon the efforts of individuals, groups and organisations and activities. The process includes creating and adopting the knowledge and information related to new and useful things [9]. Innovation not only includes products, but also involves services and processes [10]. With regard to process, innovation is related to a series of business processes (new activities of the organisations in the process) [11].

Robbins indicated that organisational innovation could enhance certain products, process or services and further enhance organisational effectiveness. Innovation includes product innovation, production process technology innovation, structure innovation and management system innovation [12]. Hodge et al indicated that organisational innovation is the alternative for current situations. The effect on the plans is that it changes the organisational system, output and input relationship, technique or transfer process, organisational structure or design, collaboration, organisational personnel and roles, organisational culture and the situations experienced at different levels [13]. Thus, organisational innovation involves the reform of techniques, goals, personnel and culture.

According to Tsai, the theories of *organisational innovation* can be categorised as a process system, the proportion of innovation adoption, and classification theory [14]. Many scholars have defined organisational innovation and it has been suggested that in the past, studies tended to focus on technical innovation, instead of managerial innovation of companies [15][16]. Thus, organisational innovation can be defined as adopting new concepts or behaviour for the organisations and it can include new products, new services, new technology or a new managerial practice [15][17].

### School Organisational Innovation

Yan and Chang indicated that a school innovation operation means that in order to enhance educational performance, the schools create an organisational culture and environment for the members' creativity development [18]. They encourage and guide staff members to participate in innovation activities. Through knowledge system management and operation, the schools construct the creativity by systematic operational strategy to develop the dynamic process of sustainable operation [18]. Wu indicated that school organisational innovation leads to results in innovation opportunities and activities according to school vision and educational goals. By analysing the strengths, weaknesses, opportunities and threats of school organisations, it assesses the feasibility of innovation to enhance school operation [19].

Generally speaking, the better school organisational learning is, the better organisational innovation will be [20]. More resource connection would result in higher output of organisational innovation [21]. Many research projects have indicated that leadership influences organisational innovation Aragon-Corraet et al; Harbone and John; Hsiao et al; McDonough; Sethi [22-26]. Thus, proper transformational leadership from the president would lead to a higher level of school organisational innovation [27][28]. A higher level of school organisational innovation would enhance school effectiveness [29]. According to the researchers' views, school organisational innovation would be different. For instance, Daft and Becker divided school innovation into educational and administrative innovation [4]. Wu suggested that innovation operation includes concept, technique, product, service, process, activity environment and characteristic innovation [30]. Lee suggested that the four constructs of school organisational innovation are instructional behaviour, facility resource innovation, organisational climate innovation and administration innovation [31]. In other words, the schools encourage innovation by new instructional facilities and administration to enhance educational innovation and organisational innovation. They guide the teachers to instruct the students by using an innovative instructional approach and tool to enhance further school effectiveness. Hsiao et al constructed seven organisational innovation indices for junior colleges in Taiwan by innovation of leadership, administration, student affairs, curriculum and instruction, teachers' professional development, resource applications and campus [26].

Based on the above, this study suggests that organisational innovation of technical institutes and universities should be based on the organisational innovation climate. Extraordinary leadership, action research and knowledge management are reflected through school innovation effectiveness, specifically, the indices constructed by Hsiao et al [26].

### METHOD

This study conducted expert focus groups twice to identify the seven facets of school organisational innovation in technical institutes and universities identified above. Based on these seven facets, this study developed an Analytic Hierarchy Process (AHP) questionnaire. The AHP framework contains three levels: the goal level, the objective level and the attribute level. The goal level refers to organisational innovation in technical institutes and universities. The objective level consists of seven facets, including leadership innovation, administration innovation, student affairs innovation, curriculum and instruction innovation, the teachers' professional development innovation, resource application innovation and campus innovation. Finally, the attribute level includes the following: vision, school affairs development, participant decisions, organisational culture innovation,

administrative behaviour, job legitimacy, service quality, competition activity, creative club activity, consulting and guidance, curriculum innovation, teaching material innovation, instruction innovation, diverse evaluation, cross-subject learning, professional seminar, action research, employment of creative teachers, teacher development, certificate and employment, industrial-academic cooperation (training outside of campus), external (communities, alumni and firms) resource application, creative results (including patent), innovative campus construction and instructional facilities.

Forty people from the 2007 Ministry of Education Evaluation Commissioner of National Penghu University were selected to answer the AHP questionnaire in 2008, and 38 responded, a return rate of 95%. Based on a consistency test from Expert Choice 2000 software, 13 questionnaires with an overall inconsistency index of more than 0.1 were eliminated. Thus, there were 25 valid questionnaires, a valid return rate of 62.5%.

## RESULTS AND DISCUSSIONS

### Results at the Objective Level

After the calculation of AHP, the weight ratios of the three levels are shown in Figure 1. Weights for the seven facets of the objective level are shown in Table 1. Leadership innovation (26.73%) is the most important, followed by curriculum and instruction innovation (19.40%), teachers' professional development innovation (18.35%), resource application innovation (11.90%), administration innovation (8.85%), student affairs innovation (7.62%) and campus innovation (7.15%). The result is consistent with findings by Hsiao et al on school organisational innovation of junior colleges: leadership innovation (24.1%), curriculum and instruction innovation (21.2%), teachers' professional development innovation (17.9%), administration innovation (13.8%), student affairs innovation (9.3%), resource application innovation (6.9%) and campus innovation (6.8%) [26].

The result indicates that in technical institutes and universities, leadership innovation is also the key factor for organisational innovation. It is consistent with much research that has suggested that leadership is the key to organisational success [22-26]. All organisations should plan future developments and vision through leadership. Chuang emphasised the importance of leaders, change agents and idea champions on organisational innovation [17]. Ko and Wu suggested that proper transformational leadership by the president would lead to a higher level of school organisational innovation [27][28]. Thus, the president and supervisors should encourage the school members to construct the atmosphere of school organisational innovation through leadership innovation to enhance organisational innovation.

Moreover, another factor relating to organisational innovation that needs to be described is curriculum and instruction innovation. Lee indicated that curriculum and instruction innovation would result in the development of talent through innovative capacities [32]. According to Daft and Becker's research, talent cultivation performance should be enhanced through curriculum and instruction innovation to enhance school innovation effectiveness [4].

### Results at the Attribute Level

After calculation, as shown in Figure 1, the order of the weights at the attribute level is: vision (relative weight is  $0.2675 \times 0.3917 = 10.47\%$ ), participant leadership (relative weight is  $0.2673 \times 0.3197 = 8.54\%$ ), school affair development (relative weight is  $0.2673 \times 0.2887 = 7.72\%$ ), teacher development (relative weight is  $0.1835 \times 0.3162 = 5.80\%$ ) and curriculum innovation (relative weight is  $0.1940 \times 0.2679 = 5.20\%$ ).

The order is slightly different from that suggested by Hsiao et al on junior colleges [26]. Their results indicated vision (11.8%), instruction innovation (7.18%), teacher development (7.03%), school affair development (7.01%) and curriculum innovation (5.72%) [31]. However, vision is still the highest. It demonstrates that for technical institutes, universities and junior colleges, the construction of school vision is the most important factor in school organisational innovation.

The finding shows that school vision constructed by the leaders and academic staff is the key factor influencing organisational innovation at technical institutes and universities. Chang and Wu indicated that the schools not only should develop characteristics and accomplish educational goals, but should also develop a vision for sustainable development [33]. Chou also suggested that when developing an innovative operation, schools should have a definite focus and construct an innovation blueprint and vision to encourage staff to improve the future of the schools [34].

With regard to participant leadership, the research of Montes et al demonstrated that supervisors who adopted participant leadership in Spain would stimulate their firms' organisational innovation performance [35]. Thus, when the president and supervisors of technical institutes and universities can adopt participant decisions and when leaders set goals by using managerial techniques, they are more likely to enhance school organisational innovation effectiveness through members' participation and communication.

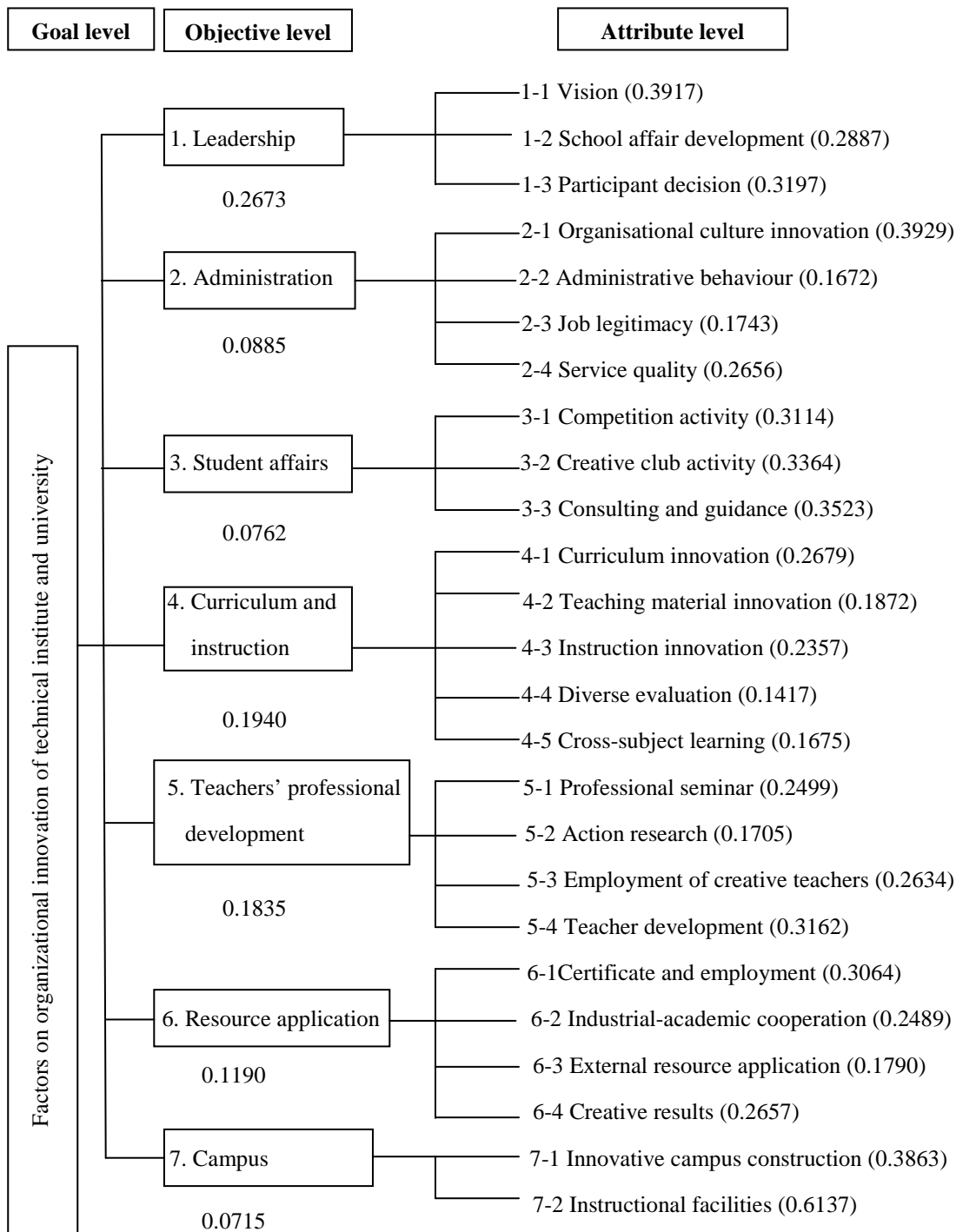


Figure 1: The weight ratios of different levels.

Table 1: The weight ratios of objective level.

Facets	Weight	Order
Leadership innovation	0.2673	1
Curriculum and instruction innovation	0.1940	2
Teachers' professional development innovation	0.1835	3
Resource application innovation	0.1190	4
Administration innovation	0.0885	5
Student affairs innovation	0.0762	6
Campus innovation	0.0715	7

## CONCLUSIONS

This study identifies seven facets of school organisational innovation. That is, leadership innovation, administration innovation, student affairs innovation, curriculum and instruction innovation, the teachers' professional development innovation, resource application innovation and campus innovation. According to the Analytic Hierarchy Process, at the objective level, leadership innovation is the highest, followed by curriculum and instruction and teachers' professional development.

At the attribute level, vision is the highest, followed by participant decision, school affairs development, teachers' development and curriculum innovation. These five attributes represent 37.71% of school organisational innovation. It demonstrates that they are the key factors of school organisational innovation of technical institutes and universities.

## RECOMMENDATIONS

Following on from the conclusions, this study proposes the following recommendations:

The findings demonstrate that the key factors of organisational innovation of technical institutes and universities are leadership innovation and curriculum, and instruction innovation. It is, therefore, suggested that the president and supervisors must encourage staff to construct a school organisational innovation climate through leadership innovation. The government should also establish the measures and policies to encourage curriculum and instruction innovation in technical institutes and universities to enhance school organisational innovation effectiveness.

The order of the factors at the attribute level is vision, participant decision, school affair development, teachers' development and curriculum innovation. Thus, to enhance organisational innovation effectiveness, the president and supervisors of technical institutes and universities should construct the school vision, develop school affairs by participant decisions and emphasise teachers' development and curriculum innovation to enhance school organisational innovation effectiveness.

Future studies could compare the factors of organisational innovation in vocational schools, and compare the findings of this study and Hsiao et al on junior colleges [26]. The key factors can be generalised to be applicable to organisational innovation in the Taiwanese technical education system.

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