The critical factors of research and innovation creation in public universities in Thailand

Boonsang Supapawawisit and Achara Chandrachai*

Technopreneurship and Innovation Management Program,
Graduate School,
Chulalongkorn University,
Bangkok, 10330, Thailand
Email: boonsaengs@outlook.com
Email: achandrachai@gmail.com
*Corresponding author

Natcha Thawesaengskulthai

Faculty of Engineering,
Chulalongkorn University,
Bangkok, 10330, Thailand
Email: natcha.t@chula.ac.th

Abstract: A university, which is the main form of higher education institution (HEI), aims to develop and promote education, generate academic excellence and transfer academic knowledge to solve social problems. To enhance the innovation creation in universities, the relevant factors that affect such creation should be investigated. Hence, this study aims to investigate the critical factors that affect research and innovation creation in public universities in Thailand. The relevant literature was reviewed and research was conducted using a qualitative research approach. Data were collected from in-depth interviews of 11 executives purposely selected from 8 frontier public universities in Thailand. The data were analysed using NVivo qualitative research software. Results revealed 15 critical factors in the following descending order: resource, goal, database and information technology, working environment, managerial process, policy, network, organisational structure, human resource management, government support, strategy, compensation, organisation culture, vision and leader factor. Moreover, results identified the issues that should be addressed.

Keywords: critical factors; research; innovation creation; public university.


Biographical notes: Boonsang Supapawawisit, BEng. (Industrial Engineering), Thammasat University, Thailand; MEng. (Industrial System Engineering), Asian Institute of Technology, Thailand; MBA (Business Administration), Chulalongkorn University, Thailand.
Achara Chandrachai is a Professor Emeritus Dr. at Account and Commerce Faculty and Technopreneurship and Innovation Management Program, Chulalongkorn University, Thailand. She has expertise in innovation management and business management, substantial business experience in global business and service operations. She is the author of more than 50 publications in the fields of business administration and management, innovation management and improvement initiatives.

Natcha Thawesaengskulthai is an Associate Professor and works in the position of Vice-rector at Chulalongkorn University and teaches in Faculty of Engineering at Industrial Engineering, Chulalongkorn University, Thailand. She has expertise in quality management, operations management, and innovation management and substantial industrial experience in manufacturing and service operations. She is the author of more than 40 publications in the fields of quality management, innovation management, quality engineering techniques, and improvement initiatives.

1 Introduction

In the 21st century, new economics is based on the knowledge economy and advancements in technology and innovation. Universities are major sources of learning, thereby enabling the generation of capable personnel that can serve the country. Moreover, universities develop and promote education, generate academic excellence and transfer academic knowledge to solve social problems. Given the advancements in technology on the global level, the education sector should accelerate its own development rate to draw alongside with the rapidly changing circumstances. To expedite extensive research and innovation, the government of Thailand has set a policy for the country’s 15-year long-term plan for higher education that encompasses 2008–2022. Two objectives of the policy are to extensively promote research in public universities and upgrade qualified universities to world-class learning institutions. Nevertheless, achieving the targets of the policy is still questionable. Various factors in planning and implementation should be judiciously considered for public universities in Thailand.

2 Literature review

The managerial factors in higher education institution (HEI) or university management have identified one of the interesting topics of discussion. Several critical factors were considered crucial. These internal and external factors include vision, strategy, organisational structure, supported information technology, organisation culture, reward system, creative climate, resources, stakeholders, national innovation systems (NIS), leader and key persons, skills and human resource management factors.

‘Vision’ of organisation constructs an innovative university (Desai et al., 2016). Good vision sets a guideline for organisation development, technology and roles of the organisation in the future. Shared vision leads to the employees’ intention to create innovation (Tidd, 2016). Innovation creation in Higher education helps in sustainable development in many ways (Musyarofah, 2013). ‘Goals’ are set in the organisation, team and individual levels in generating innovations. ‘Innovation strategy’ focuses on how
changes in the external environment affect institutions (Chaiprasit, 2010). Organisation alignment should be aligned with innovation strategy and execution of strategies. Accordingly, universities can use innovation at all levels (i.e., strategic, functional, and operational) to provide benefits to the entire value chain (Satpathy et al., 2015).

‘Organisational structure’ in the form of a cross-functional team is accepted to be substantially sensitive to change. Innovation team can be organised to promote the activities to be held as entrepreneurs do (McClure, 2016). ‘Managerial processes’ are vital to the creation of innovation because it has positive relationships with organisation performance (Ilker and Birdogan, 2011).

‘Supported information technology’ leads to the competitive capability of any organisation (Cláudia and Mário, 2017). Innovation is created from the appropriate information technology, particularly in the service sectors (Pinho and Franco, 2017). ‘Supported communication system’ is important in the vertical and horizontal directions. Open communication allows the team to make the correct decision (Chutiwong and Kerdsri, 2011). Especially, there are continuous efforts to adopt and expand the implementation and integration of information technologies in teaching and learning (Alrawi and Jaber, 2008).

‘Organisation culture’ is the value system that is explicitly and implicitly expressed in an organisation. This culture should allow employees to think, take risks, open their minds and accept failure. However, such culture should be open for creating new values, accepting a variety of ideas, learning from others and daring to be different (Johannessen, 2009). ‘Creative climate’ is important to motivate entrepreneurship and cultures to generate innovation (Tidd, 2016). In addition, internationalisation of education curriculum allows the cross-cultural circumstances that lead to take advantages of the diversity of human resources (Wamboye et al., 2014).

A university cannot become innovative without sufficient ‘resources support’ or personnel, time, information and budget. The investment made in higher education in the countries helps in accelerating rate of research and development (Jarecki, 2008). ‘Stakeholders’, particularly customer-focused ones, lead to innovation and are supported by demand-led theories. A university’s alliances are crucial in knowledge transfer between the university and industry. Organisational attributes may affect the relationship between the university and industry knowledge transfer (UIKT) and alliance performance (Anatan, 2013). Institutions should have a ‘motivation and reward system’ by offering various forms of rewards to serve the varied needs of different innovators, such as monetary rewards, career incentives, social rewards and intrinsic rewards (Chaiprasit, 2010).

National innovation system (NIS) was conceptualised to protect new industries, technology, skills and implementation of research and innovations on the national level. NIS focuses on the infrastructure of knowledge linkages (Johannessen, 2009). The evidence suggests that quantitative results from the commercialisation of universities are affected by intellectual property rights (IPRs) policy. The implementation of a few policies, such as the Bayh-Dole Act model, was significant to the commercialisation of university inventions. Currently, institutional intellectual property ownership policy tends to produce numerous new licenses and patents for universities (Tantiyaswasdikul, 2013). The national education policy also plays an important role in empowering the citizen. This policy suggests that education has been regarded as an important mechanism in the
development of any country because an educated citizenry provides the needed manpower, technical skills and knowledge for the country’s economic development (Mallari and Santiago, 2016). Moreover, the national education policy helps in gender equality and alleviation of poverty (Maity, 2014).

A ‘good leader’ should be innovative and exhibit transformational leadership. Such leader should push to build organisation culture. Leadership is the most important factor to build innovative universities. The leader may give a vision that leads to inspiration and should encourage all staff members to propose new ideas. The leadership and managerial capabilities to face the challenges of running the operations of universities lead to the extensive success of institutions (Mallari and Santiago, 2016; Desai et al., 2016). A ‘key person’ has knowledge, communication skills, interpersonal skills, powers, influence and internal and external networks in the organisation. The key person acts as a gatekeeper of an organisation (Tidd, 2016). Five roles are fulfilled by executive and managerial administrators in facilitating academic capitalism: building infrastructure, creating new programs, cultivating donors and raising funds, setting a vision around entrepreneurship and changing policies (McClure, 2016). The personality traits (conscientiousness and openness) of managerial personnel, such as the chief information officer (CIO), in the type of strategy adopted by HEIs for innovative usage of information technology (IT) influences the type of strategy for IT innovation (Pinho and Franco, 2017).

‘Human resources’ are innovation creators. Training on creativity and entrepreneurship can lead to innovation creation. Human resource management system affects individual innovation creation (Chaiprasit, 2010). Hence, being people-driven is important to build an innovative organisation (Chutiwong and Kerdsri, 2011). The ‘skills’ of problem identification and innovation creating are important in creating innovation for two reasons:
- to identify the problem and search for new ideas
- search and spread information or technology (Johannessen, 2009).

The adaptability and diffusion of innovation is an extensive process that requires people, activities, formats and structures to adapt to new things. Educational reform and pedagogical and technological innovations are interrelated (Sidorkin and Warford, 2017).

Research Question: What are the critical factors for innovation creation in public universities in Thailand?

3 Research methodology

The qualitative research method was implemented for this study. The list of factors that affect innovation creation and management was reviewed. An interview script prepared for semi-structured, in-depth interviews was the main instrument for data collection. The sample group comprised professors who in charge of management in public universities in Thailand. Data collection results were analysed using NVivo software, which is an effective qualitative research tool.
Data collection for this research was conducted using in-depth interviews. The interview protocol was developed from the literature review. The participants comprised 11 interviewees: one rector, five deputy rectors, one strategic committee member, two deputy deans and two faculty heads (see Table 1). Although the sample may be small, the interviewees are ideally qualified representatives of the population. These respondents are the most influential executives who actually practised the managerial process of innovation creation in their respective universities. Moreover, the interviewees selected covered a majority of the top and leading public universities in Thailand. Hence, this small sample is better than that collected through random sampling, which may result in irrelevant answers in the interviews. The interview lasted approximately 1.5 hours for each interviewee. The interview data were recorded and transcribed.

Table 1  Characteristics of the sample group

<table>
<thead>
<tr>
<th>No.</th>
<th>Full name</th>
<th>University name</th>
<th>Abbreviation</th>
<th>No.</th>
<th>Characteristics of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CU</td>
<td>Chulalongkorn University</td>
<td>CU</td>
<td>1</td>
<td>Deputy rector for research and development</td>
</tr>
<tr>
<td>2</td>
<td>MU</td>
<td>Mahidol University</td>
<td>MU</td>
<td>2</td>
<td>Strategic committee member</td>
</tr>
<tr>
<td>3</td>
<td>KU</td>
<td>Kasetsart University</td>
<td>KU</td>
<td>3</td>
<td>Deputy rector for research. Director of technology and innovation institute</td>
</tr>
<tr>
<td>4</td>
<td>KKU</td>
<td>Khonkaen University</td>
<td>KKU</td>
<td>4</td>
<td>Head of Faculty of Science</td>
</tr>
<tr>
<td>5</td>
<td>CMU</td>
<td>Chiangmai University</td>
<td>CMU</td>
<td>5</td>
<td>Head of Faculty of Science</td>
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<tr>
<td>6</td>
<td>TU</td>
<td>Thammasat University</td>
<td>TU</td>
<td>6</td>
<td>Deputy rector for research</td>
</tr>
<tr>
<td>7</td>
<td>KMUTT</td>
<td>King Mongkut University of Technology Thonburi</td>
<td>KMUTT</td>
<td>7</td>
<td>Deputy rector for academic</td>
</tr>
<tr>
<td>8</td>
<td>SUT</td>
<td>Suranaree University of Technology</td>
<td>SUT</td>
<td>8</td>
<td>Deputy Dean of Graduate School of Management and Innovation – research section</td>
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<tr>
<td>9</td>
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<td>9</td>
<td>Deputy Dean of Graduate School of Management and Innovation – research section</td>
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<td>10</td>
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<td>10</td>
<td>Deputy Dean of Graduate School of Management and Innovation – organisation development section</td>
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Findings: The interviewees mentioned 15 critical factors. Figure 1 shows these factors arranged from the most to the least average frequencies of times mentioned by the interviewees. Each factor is explained and discussed as follows.

Resource factor: This factor was the most critical factor concerned. The interviewees indicated that a substantial budget allocated will result in extensive research and innovation outputs. Thus, the substantial budget is continuously required. Presently, research budgets are irregular and allocations for budgeting are still facing challenges. Given the limited allocation of funding to many faculties within a university, the budget is insufficient to pursue even basic research projects.
Goal factor: Too many goals were set differently and periodically. For example, several universities set challenging goals by aiming to be a world-class university (WCU) but faced several problems.

Database and IT factor: Information database should be upgraded to a considerably high level in all faculties. Currently, only a few facilities are upgraded to the gigabyte level. Moreover, a national management information system is needed. National statistic records are still dispersed.

Working environment factor: Professors experienced excessive workload in terms of teaching and administrative tasks. New researchers are distracted from conducting research. Accordingly, cooperation between universities and industries is extensively required. Most private companies want a successful output within a short term, which did not correspond to the nature of conducting research.

Managerial process factor: Mechanisms among faculties were constrained. Faculties should be cooperative to expand the research scope. The support system was not sufficiently prepared. The process of conducting research was under administrative regulation.

Policy factor: Policies must be simultaneously formulated by top-down policy and responsive bottom-up arrangement. Policy setting should become interdisciplinary and lead the direction of research to be clear and focused.

Network factor: University collaboration is required to generate numerous researchers. University–government–industry (U-G-I) collaboration was existent. The faculties that had been well operated generally came from science facilities. Social sciences faculties still needed to adjust their mindset. The personal network seemed important.

Organisational structure factor: Universities had numerous faculties. However, universities lacked special organisational structure assigned for managing research and innovation, thereby leading to separate and inefficient research. The organisational structure should be set for interdisciplinary faculties.

Human resource management factor: Research assistants remained scarce. The use of laboratories was faced with maintenance issues. The budget was sufficient for purchasing but insufficient for maintenance. Much of the equipment was not completely utilised and eventually became outdated and obsolete. Researchers had to be trained. Only 25%–30% of the instructors have published their research.

Government support factor: The R&D budget of Thailand was limited at 0.25% of GDP compared with those of neighbouring countries, such as Malaysia (0.63%) and China (1%). Moreover, numerous universities have been established in Thailand, with the current number at 149 universities, excluding the 30 Rajamangala Universities of Technology. Educational quality assurance is still a problem and innovation creation rarely occurred.

Strategy factor: The strategies of the universities were not sufficiently focused. The strategy to facilitate research administrative processes was troublesome. New strategic projects should be introduced to solve the problems, such as how to immediately introduce new instructors to the research system and how to develop the
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potential of new instructors and train research conduction skills. To expedite the publication process within the university, a project proposal to support research conduction was routinely implemented.

12 **Compensation factor**: Most reward motivations were driven at the faculty level. Compensation rates are paid differently among the universities in Thailand. The motivation for a researcher is different based on the policies of their respective universities. Monetary compensation cannot attract a sufficient number of talented personnel.

13 **Organisation culture factor**: This factor is concerned with wrong concepts related to research of the private sector in Thailand. The Thai private sector was frequently concerned with the cost of conducting research and expected only positive results. Negative results or failures were unacceptable. Most private firms frequently used research services overseas instead of those provided by local researchers.

14 **Vision factor**: Vision for research had been set but the implementation remained unclear. A vision was important to create a support system for research and should be set clearly on the faculty level rather than merely on the university level.

15 **Leader factor**: The leader should comprehensively know the research norms. Leaders govern for a term that may be interrupted in a few research projects. Top executives are typically changed periodically. Accordingly, a few studies may be delayed during the transition period of the management board. Only research projects in process remained in progress.

**Figure 1** Important factors mentioned by the interviewees (see online version for colours)

<table>
<thead>
<tr>
<th>Average frequencies of times mentioned to the specific factors</th>
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<tbody>
<tr>
<td>(Times/person)</td>
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<tr>
<td>Project process</td>
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<tr>
<td>Policy</td>
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<tr>
<td>Network</td>
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<td>Organization structure</td>
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<td>Human resource management</td>
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<td>Strategy</td>
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<td>Key market</td>
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<td>Compensation</td>
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<td>Culture</td>
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<td>Vision</td>
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<td>Leader</td>
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<td>Stakeholders</td>
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**Conclusion**: The results revealed 15 critical factors that affect the innovation creation of public universities in Thailand in the following descending order: (1) resource, (2) goal, (3) database and IT, (4) working environment, (5) managerial process, (6) policy, (7) network, (8) organisational structure, (9) human resource management, (10) government support, (11) strategy, (12) compensation, (13) organisation culture, (14) vision and (15) leader factor.
Lessons learned and issues for further research: The factors that have been determined to influence innovation creation in public universities in Thailand indicate that management and operation are faced with problems. Hence, we learned the factors that are considered important. Moreover, the findings reveal the issues that should be addressed. To improve the aforementioned factors and produce numerous productive research and innovation creation outputs, future research should investigate the factors involved in managerial processes. Future studies can design the most appropriate managerial processes to realise the most effective method to handle the problems determined. The succeeding research should develop a new managerial process cycle to solve the issues identified. Moreover, technological tools for managing all functions in such managerial cycle is an interesting topic to develop in the future.

Limitations: Various aspects on many factors have been discovered in the course of conducting this study. A variety of categories of universities had different objectives, goals, roles and strategies. The results of this study may reflect only the public universities in the context of Thailand.

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References


