

*The Factors of Research and Innovation Management Using Electronic Supply Chain
for Thai Higher Education Institutions*

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Abstract

The purpose of the research study was to study the factors of research and Innovation management by using electronic supply chain for Thai higher education institutions. The research procedures consisted of three Steps : 1) study of the document and related research to create a conceptual framework , 2) study research and innovation management of Thai Higher education institute by in-depth Interview 5 out of 19 Executives of university research offices. Stratified Random Sampling was used as a sampling plan together with semi-structured interviews questionnaire, and 3) do an in-depth interview of 15 professionals in three areas, research and innovation management in the university, supply chain management and electronic, and information technology management. Purposive sampling was used as a sampling plan together with semi-structured interviews questionnaire. According to the research study we found that there were six factors of research and innovation management using electronic supply chain for Thai higher education : 1) supplied input for research and innovation, 2) research and innovation management in the university, 3) research and innovation distribution, 4) customers benefit from research and innovation , 5) the main activities of the research and innovation supply chain, and 6) electronic supporting system . All factors will lead to the development of research and innovation management using electronic supply chain model for Thai higher education institutions.

Keywords: Electronic Supply Chain, Research and Innovation, Higher Education

INTRODUCTION

Higher education institutions have 4 main duties and responsibilities: managing the quality of teaching, promoting doing research, providing academic services for community, and maintaining and promoting cultural values. These are the most important for developing country if they are conducted efficiently and effectively. Research and innovation by According to the Office for National Education Standards (ONESQA,2009) and Quality Assessment and the Office of the Higher Education Commission (OHEC,2011) in System approach show in Fig 1

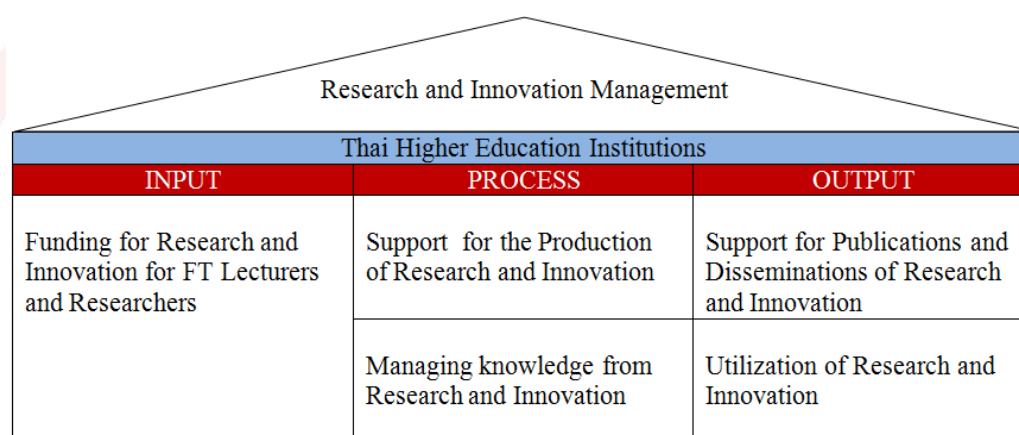


Fig 1. Research and Innovation Management in the University

According to the Office for National Education Standards and Quality Assessment, the universities in Thailand may be divided into two groups, depending on their teaching and learning systems and student admission. These two groups are close universities or universities with the limit of student numbers and open universities or universities with the unlimited of student numbers. The universities may also be divided into four groups, according to the missions emphasized. The first group includes institutions that emphasize producing graduates to have academic excellence and the best researches that are useful. The second group includes institutions that emphasize producing the great majority of undergraduates and some higher degrees of graduates of some fields and providing academic services for the public. The third group includes institutions that emphasize producing graduates and maintaining and promoting arts and culture. These institutions emphasize the great majority of undergraduates and some higher degrees of graduates of some fields in order to apply the knowledge to develop the standard of arts and culture as well as contribute the knowledge and wisdom to the public. The fourth group includes the institutions that emphasize producing graduates. These institutions emphasize giving instruction to undergraduates to have academic excellence and vocational skills. 15 higher education institutions in the third group which emphasize producing graduates with academic excellence and maintaining and promoting arts and culture, nine state universities and six private universities, were assessed for the third time by the Office for National Education Standards and Quality Assessment, which is the organization outside the institutions. The results of assessment concerning research works and innovations were as follows: (ONESQA, Executive Summary.2006-2010) only one institution was at a very good level, five institutions were at a good level, and eight institutions were at a fair level. The results overall indicated that research works and innovations of higher education institutions were not at a standard level of education standards and quality assessment. One of the most successful business administration

methods is a supply chain or a supply chain consists of all stages involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves (Chopra, Sunil, and Peter Meindl, 2001). The researcher had the idea of using business administration method in developing research works and innovations in higher education institutions to have both connection and cooperation so that the research works and innovations could be supplied to those who need on time. The researcher would use electronics system available at present to support producing research and innovations more effectively.

RESEARCH OBJECTIVE

The main objective of this research study was to study the factors of research and Innovation management by using electronic supply chain for Thai higher education institutions.

RESEARCH METHODOLOGY

This research was divided into 3 parts: (1) the study of documents and research works, (2) the in-depth interview with the administrators of research and development departments, and (3) the in-depth interview with the specialists in 3 areas: supply chain, electronics and technology information, and research and innovations.

Part 1: This part was the study of documents, texts, and research works, both in Thailand and in foreign countries, concerning the electronics supply chain for research and innovations in Thai higher education institutions and the standards and quality assessment of the Office for National Education Standards and Quality Assessment.

Part 2: This part dealt with the in-depth interview with the administrators of research and development departments of five higher education institutions. The samplings used in this study were divided into 2 groups: 9 state higher education institutions and 6 private higher education institutions. The samples of these 2 groups of higher education institutions were selected by means of stratified random sampling (Johnnie Daniel, 2011). The ratio of 5 higher education institutions was 3:2:3 state higher education institutions chosen were Bansomdejchaopraya Rajabhat University, Phranakhon Rajabhat University, Valaya Alongkorn Rajabhat University, and 2 private higher education institutions chosen were Pathumthani University and Southeast Bangkok College. The format used to collect the data in an interview was a half-structured form and it was checked for the correctness of the data collected by the advisor (Namon Jeerungsuwan, 2015).

Part 3: This part dealt with the in-depth interview with 15 specialists in 3 areas: that is, 5 specialists in supply chain, 5 specialists in electronics and technology information, and 5 specialists in research and innovations. The sampling used for the study was a purposive sampling (Johnnie Daniel, 2011). The format used to collect the data in an interview was a half-structured form and it was checked for the correctness by the advisor (Namon Jeerungsuwan, 2015). The interviewing was recorded.

RESULTS

A Comparative concept of Supply Chain Management and research and innovation management

SCM Concept	Research and Innovation in Higher Education Institutions Concept
1. Suppliers	1. Supplied Input
2. Manufacturer	2. University (Research and Development Institution)
3. Distribution	3. Conferencing ,Journal and Innovation center
4. Customers	4. Organizations or individuals to apply the knowledge from research to both directly and indirectly.

Tables : 1 A Comparative concept of Supply Chain Management and research and innovation management concept

Factor	Interviewer Elements	1	2	3	4	5	6	7	8	9	Recommendations
1. Supplied Input	Man	ü	ü	ü	ü	ü	ü	ü	ü	ü	This domain of creative and research management will help to support the creative and research works in the university. The outcomes quality of the creativities and researches depend on the input quality of the information to the system.
	Money	ü	ü	ü	ü	ü	ü	ü	ü	ü	
	Material	ü	û	û	ü	ü	ü	ü	ü	ü	
	Methodology	ü	û	û	û	ü	ü	û	ü	ü	
2.University	Dimension of the structure within the University.	ü	û	û	ü	ü	ü	ü	ü	ü	This domain of creative and research management acts as a creativities and researches manufacturer. For the knowledge synthesis, university should has good planning in creativities and research development to answer the
	Dimension of research and innovation management	ü	ü	ü	ü	ü	ü	ü	ü	ü	

	within the university.									users' benefits at the right time.
3. The distribution center of research and innovations	The Conference	ü	ü	ü	ü	ü	ü	ü	ü	Other than organize academic conferences and publish the creativities and researches, the creativity and research center should distribute its works to the interested parties.
	The Journal	ü	ü	ü	ü	ü	ü	ü	ü	
	The Innovation Center	ü	ü	ü	ü	ü	ü	ü	ü	
4. Customer benefits of the research and innovations	The Public	ü	ü	ü	ü	ü	ü	ü	ü	Research users sometimes mean the university whose creativity and researches were produced.
	The Policy	ü	ü	ü	ü	ü	ü	ü	ü	
	The Commercial	ü	ü	ü	ü	ü	ü	ü	ü	
	Indirect innovation	ü	ü	ü	ü	ü	ü	ü	ü	
	The Academic	ü	ü	ü	ü	ü	ü	ü	ü	
5. The main activities of the Research and Innovation supply chain	The Procurement	ü	û	û	ü	ü	ü	ü	ü	Supply-chained management actually is the procedure to develop a sequencing for all the operations from upstream to downstream to deliver the value for the customers. University Supply-chained management should has a good planning and collaboration among all the activities in supply-chained.
	The Warehousing	ü	ü	ü	ü	ü	ü	ü	ü	
	The Distribution	ü	ü	ü	ü	ü	ü	ü	ü	
	The Transportation	ü	ü	ü	ü	ü	ü	ü	ü	
6. Electronic supporting system	e-Procurement	ü	û	ü	ü	ü	ü	ü	ü	Technology selected should be appropriated for the university ecology.
	e-Data and	ü	ü	ü	ü	ü	ü	ü	ü	

	Warehousing										Cost concerning also be concentrate, both for the software and hardware. The emphasis must be the connectivity between all members in supply-chained to share and use the information.
	e-Distribution	ü	ü	ü	ü	ü	ü	ü	ü	ü	
	e-Transportation	ü	ü	ü	ü	ü	ü	ü	ü	ü	

The experts' opinions on the factors of research and innovation management in Thai higher education institution using electronic supply

Agree ☐ Disagree ☒

Tables : 2 Factors of research and innovation management in Thai higher education institution using electronic supply

According from Table 2 leads Factors of research and innovation management in Thai higher education institution using electronic supply, the study was found that there were 6 suitable factors for research and innovations in Thai higher education institutions:

1. Supplied Input for Research and Innovation (raw materials)

Raw materials include 4 M'S: man, money, materials, methodology (Habib, M,2010)

1) Man refers to researchers, people helping research works, research advisors, and specialists., 2) Money refers to the fund resources for research promotion, both inside the institutions and outside the institutions such as National Research Council., 3) Materials refers to any materials used for conducting research works such as computer, hardware, software., and 4) Methodology refers to knowledge for use in research, such as internal and external resources for research.

2. Research and innovation management in Thai higher education institutions

Research and innovation management in Thai higher education institutions includes 2 dimensions: (Duangdean Phutayanant, Teravuti Boonyasopon and Pairote Stirayakorn, 2011)

(1) duties and responsibilities in the institutions include setting structure, philosophy, vision, mission, and objectives, (2) research and innovations in Thai higher education institutions include providing funds for research, improving research and innovations, managing research and innovations, publishing and contributing research and innovations, and applying the research and innovations in developing organizations. In order to fulfill the research and innovations in Thai higher education institutions, there should be four important steps: (1) planning (2) doing (3) checking (4) assessment (PDCA).

1. Planning (P) refers to setting strategy, policy, and the plan, both long plan and short plan for developing research works., 2. Doing (D) refers to starting doing research according to the plan set, promoting researchers, providing research lab., 3. Checking (C) refers following up the completeness and correctness of the research

and innovations., and 4. Assessment (A) refers to the evaluation of standards and quality of the research and innovations in 3 steps: (1) first step (2) middle step (3) last step.

First step dealt with preparing manuals or research methods, planning research development according to the policy of the institutions.

Middle step dealt with the following up and the budget management, and supporting researchers.

Last step dealt with the budget, progress of research project, presentation of research works, the assessment of the standards and quality of research, and applying the research works in teaching and learning and in developing communities.

3. The distribution center of research and innovations
This factor includes the distribution of research and innovations in national conference, in international conference, in national journals, in international journals, and in innovations centers of provinces, country and ASEAN countries.

4. Customer benefits of the research and innovations
The research results may be used in 5 ways: 1) The research results may be used in improving the public such as in improving the quality of life, economy, democracy, arts and culture, sufficient economy., 2) The research results may be used in setting policy such as establishing law or regulations in organizations, both state and private sectors., 3) The research results may be used in economy such as producing goods or giving services., 4) The research results may be used in creative works such as entertainments, sports. , and 5) The research results may be used in improving the academic work such as teaching and learning.

5. The main activities of the Research and Innovation supply chain consists of 4 main 1) the utilities procurement and human resource recruitment., 2) Creativities and Researches gathering and inventory management in the university., 3)Creativities and researches distribute to the public awareness network such as academic international conference and journal., and Transfer creativity and research knowledge to the target groups for their benefits at the right time.

6. Electronic supporting system
Electronics are used to support supply chain for research and innovations. This factor includes 4 systems: (1) e-procurement such as purchasing materials, goods; recruitment of personnel, advisors, and specialists; (2) e-data and warehouse research such as collecting data concerning research works of research center in the institutions, checking the number of research and innovations; (3) e-distribution of research such as academic conference concerning research and innovations, publishing of research and innovations; (4) e-transportation of research such as sending of research and innovations to the people who wish to use the results of research in developing their organizations. and The four major supply chain drivers with electronic support system (Michael Hugos, 2005) show in Fig.2

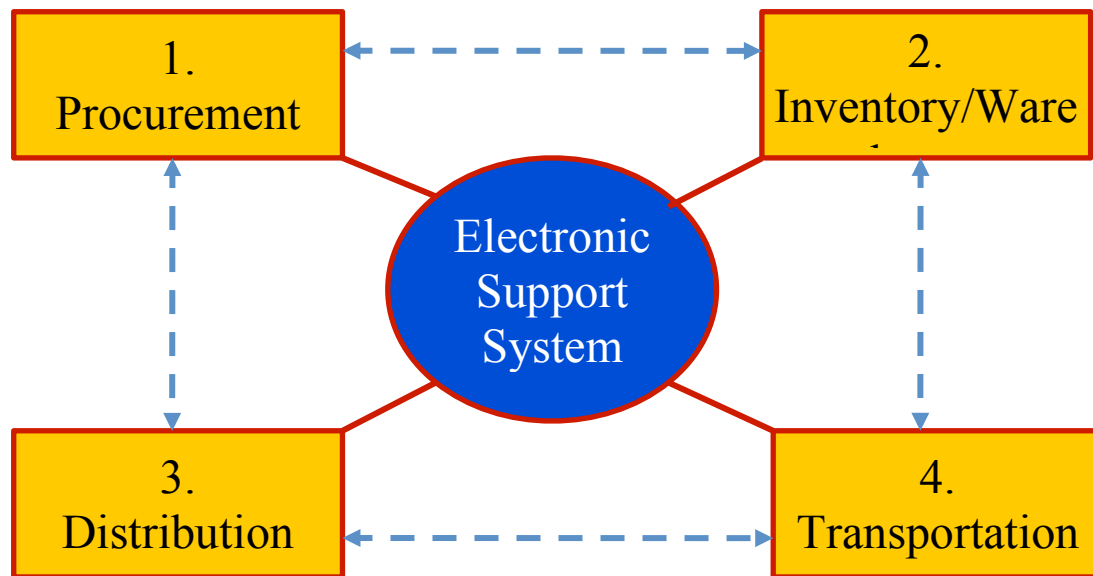


Fig.2 The four major supply chain drivers with electronic support system

Information is the basis upon which to make decisions regarding the other four supply chain drivers. It is the connection between all of the activities and operations in a supply chain. To the extent that this connection is a strong one, (i.e., the data is accurate, timely, and complete), Information is used for two purposes in any supply chain of Research and Innovation Can be Evaluate in 2 Aspects:

1. Coordinating daily activities related to the functioning of the other four supply chain drivers: procurement; inventory; Distribution; and transportation.
2. Forecasting and planning to anticipate and meet future demands.

DISCUSSION

From the results of research concerning electronics supply chain for research and innovations in Thai higher education institutions, it was found that there were 6 factors that were suitable for supply chain and relevant to the education standards and quality assessment by the specialists, inside and outside the institutions. The specialist agreed that the cooperation among the offices outside the universities about the research and innovations were at the good level. All factors will lead to the development of research and innovation management using electronic supply chain model for Thai higher education institutions.

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