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Sustainability Challenges of Triple Helix Implementation:

a Case Study of Khonkaen One Stop Services

Abstract

This article aims to look into sustainability challenges of a Triple-Helix based project in Thailand, namely *"Khonkaen One Stop Services".* The project is under the coordination between Thai Software Industry Promotion Agency (SIPA), Faculty of Informatics, Mahasarakham University, Khonkaen provincial authority and several small and medium software companies. The initiative has started from the mission of SIPA to promote software industry in the northeast of Thailand together with the mission of the Khonkaen provincial authority to extend the Information Communication Technology (ICT) usage to enhance citizen services and provincial administration tasks. To accomplish the objectives, Khonkaen province and SIPA have agreed to employ an ICT expert team from Faculty of Informatics Mahasarakham University to analyze and develop the core system. The know-how is then transferred to the regional software companies to learn and get extensive jobs from the local government sector. By applying the Triple Helix model of university-industry-government relations on the project, University, industry, government seem to coordinate successfully and fulfill their missions. However, after a few years later, the success has not anchored into the region. This paper is to investigate and analyze the sustainability challenges of the Triple Helix implementation using this project as a case study.

1. Introduction

The Triple Helix model refers to a knowledge transfer system using a relation between three major partners, namely academic, industry and government (Etzkowitz and Leydesdorff, 2000). The model focuses on the government role as a mediator for educational institutions and public and private agents, with regard to the overlay network of communications and expectations among these agents in the innovation system (Drejer and Jorgensen, 2005). The academic institutions can play a significant role in researching, developing a prototype, safeguarding, producing and distributing knowledge to the society.

A developing country like Thailand has faced a globalized competition and seriously needs to strengthen country's Research and Development (R&D). However, according to Worasinchai et al. (2010) and Yokakul and Zawdie (2009), Thailand still has low R&D budget especially in the SMEs sector. However, universities in Thailand are generally strong in R&D. Thai researchers in the past mainly conducted their research based on their expertise without the idea to commercialize the research outputs. The distribution of their R&D knowledge is in an untargeted way. Hence, most of the research is left on the shelf, and used merely for academic purpose.

"Khonkaen One Stop Services" (Puangpronpitag, 2009) is a Triple-Helix-based project under the coordination of four groups of partners: Thai Software Industry Promotion Agency (SIPA), Faculty of Informatics, Mahasarakham University, Khonkaen provincial authority and several software companies in Thailand. The project has launched in 2009. Summarily, "*Khonkaen One Stop Services*" has aimed at researching and developing a citizen service portal together with engine software to integrate several services from government units in Khonkaen province, then transferring the knowledge to software companies in the Northeast region of Thailand. This technique transfer would enhance the R&D abilities of software houses in the northeastern area of Thailand. After that, the utilization of Information Communication Technologies (ICT) for the provincial administration tasks and citizen services of the government would be extended. Finally, the project would stimulate the demand for software industry in the region, particularly from the government unit market.

A previous work (Puangpronpitag and Phonsiri 2012) has investigated the outcomes of the Khonkaen One Stop Services" project during 2009-2011. We have found the successful coordination between University, industry, government. All partners could fulfill their mission

In this work, we have investigated the sustainability of the success from the Khonkaen One Stop Services project. The methodology is analyzing the activity log of the project, interviewing related partners, surveying on the SME software houses during 2012-2013. We try to find out whether the success from the project has

anchored into the region. The investigation has enlisted challenges for the sustainability of triple helix model from this case.

2. Background

2.1 Economic Globalization and Thailand Research and Development

According to Joshi (2009), economic globalization refers to the growing interdependence of national economies across the world. It can be observed from a brisk increase in cross-country movement of goods, services, technologies and capital, causing economic integration between countries and finally leading to a single world market (Riley, 2005). This phenomenon can affect the country either positively or negatively. Similar to other developing countries, Thailand has been facing fierce global economic competition. So, the country must strengthen the country R&D to increase the values of its production and services. In particular, private companies/industries need to invest in in-house R&D to maintain competitiveness and sustainability. However, several studies (such as Yokakul and Zawdie (2009), Worasinchai et al. (2010)) have revealed that Thailand still has lower R&D budget than other countries. According to Worasinchai et al. (2010), the number of researchers in Thailand is very low (only 5.7 researchers for 10,000 people) compared to 44.8 in Korea and 70.2 in Japan. Especially, the SMEs sector in Thailand is generally quite weak in adjusting itself to advanced technologies. However, universities and research institutes in Thailand are generally strong in R&D and innovative creation. Hence, a possible solution would be R&D collaboration between Thai government, private sectors and universities.

2.2 Triple Helix Model
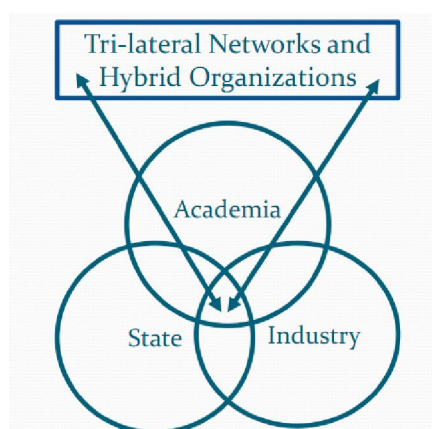
Figure 1: Tri-lateral Networks of Triple Helix Model

According to figure 1, the Triple Helix model refers to a knowledge transfer system using a relation between three major partners, namely academic, industry and government (Etzkowitz and Leydesdorff, 2000). The model emphasizes on the government role as a mediator for educational institutions and public and private agents, with regard to the overlay network of communications and expectations among these agents in the innovation system (Drejer and Jorgensen, 2005). Also, the academic institutions can play a significant role in researching, developing a prototype, safeguarding, producing and distributing knowledge to the society.

2.3 Khonkaen One Stop Services

"Khonkaen One Stop Services" (Puangpronpitag, 2009) is a project under the coordination of four groups of partners: Khonkaen provincial authority, Thai Software Industry Promotion Agency (SIPA), Faculty of Informatics, Mahasarakham University, and several software companies in Thailand. For the first partner, Khonkaen is the so-called capital of the northeastern region of Thailand. It has been specified by the Ministry of ICT to be developed as one of the ICT leading cities in Thailand. One of its strategies is to utilize the ICT to enhance the efficiency of administration tasks and citizen services. Furthermore, Khonkaen has targeted itself as a hub of Thailand northeastern software industries. It faces a challenge in finding a strong local software house to develop efficient ICT systems. For the second partner, SIPA is a Thai public organization, established since 2003. It is under the administrative supervision of the Ministry of Information and Communication Technology (ICT). SIPA acts as an agency to promote Thai software industry, focusing on supporting ICT investment and market opportunities, improving ICT human resource, boosting ICT research activities and developing measures to protect the Intellectual Property Rights (IPR) of software. Their goal is to enhance Thai software industry recognition both domestically and internationally. SIPA has a branch in Khonkaen. The purpose is to promote software industry in the northeastern area. SIPA Khonkaen has confronted the following challenges: (1) the regional software market is not very big; (2) the software houses in the region are mainly SMEs and lacking in R&D. For the third partner, Faculty of Informatics, Mahasarakham University is an ICT-focused academic institute, locating at a neighbored province of Khonkaen (Mahasarakham province). The main expertise of the faculty is ICT-related, in particular software development techniques. The faculty has several research teams with various ICT skills. Faculty of Informatics has played a significant role in researching & developing several innovative techniques in ICT. It strategies are adjusting their research direction to be matched with the regional requirements and commercializing its research output. Hence, the faculty has established a Business Intelligence Center (BIC) and a Community and Industry Interactive Center (CIIC) during the past six years. In addition, the institute had an interest to help the government units in promoting regional

software industry to be a market of their graduated students. So, their pundits would not need to immigrate into Bangkok for jobs. For the last partner of the project, small and medium software houses in Thai northeastern area have a limited budget to invest in in-house R&D to maintain their competitiveness. So, they mainly lag behind the technologies and cannot catch up with the new software development innovation. The northeastern regional software requirements and market also need to be expanded to drive the regional software industry.

The project has launched in 2009 by using the triple helix model as a base. The objectives are as the followings: (1) researching and developing a citizen service portal together with an engine software to integrate several services from government units in Khonkaen province, (2) transferring the knowledge to software companies in the Northeast region of Thailand, (3) extending the utilization of Information Communication Technologies (ICT) for the provincial administration tasks and citizen services of the government, (4) stimulating the demand for software industry in the region, particularly from the government unit market (G-market sector).

From the studies of the outcome of the project during 2009-2011 (Puangpronpitag and Phonsiri, 2012), the project has been very successful to coordinate between University, industry, government. SIPA successfully extended software markets in the northeastern region of Thailand. Khonkaen province had an initial online citizen service portal system to serve their citizen. The system had enhanced the service quality of physical citizen service counters of Khonkaen province. Khonkaen provincial authority had been awarded the outstanding citizen service from Thai prime minister in 2010. For faculty of Informatics, Mahasarakham University, they had successfully gained a research fund, and transfer the know-how to the private companies and government units. University could turn its innovation to a society serving product, instead of being abandoned on the shelf. The software companies in the region had also gained new technological knowledge and more jobs in the government market. The extended software industry helps create more ICT-related jobs in the region. This extended ICT regional industry is finally a job market for the ICT graduated students from the academic institute.

3. Research Methodology

In this work, we have investigated the sustainability of the success from the Khonkaen One Stop Services project. The methodology is analyzing the activity log of the project during 2012-2013, interviewing related partners, surveying on the participated SME software houses. We try to find out whether the success from the project has anchored into the region. The investigation has enlisted challenges for the sustainability of triple helix model from this case.

The activity logs from the following services are analyzed:

(1) Hits on the web refer to the number of hits (web browsing) to the Khonkaen One Stop main web page.

(2) Hits on the web services refer to the number of access to web service functions. These functions have been designed to support to automatic integration of data between sub-systems.

(3) The number of usages of the following services

    a. *General Information* refers to the service that provides any general information, news about the Khonkaen provincial authority

    b. Air flight Information refers to the service that provides the time of air flight at the Khonkaen airport.

    c. Tourism information refers to the service that provides the Khonkaen tourism information.

    d. Facilities refer to the service to request electricity, water and telephone in Khonkaen.

    e. Employee system refers the service to support employers in coordinate the labor processes with the Khonkaen provincial authority.

    f. Others refer to all other services in the "Khonkaen One Stop Services" system

4. Findings and Discussions

4.1 System Log Analysis

From the activity log analysis (shown in Table 1), we have found that the system has dramatically decreased for some services, particularly Facilities and Employee system. The further investigation by the interview has revealed that the related staffs who agree to work on both services have stopped doing their jobs on this system. They have been forced to use the new systems from their head quarter in Bangkok. The electricity authority of Thailand, the water authority of Thailand and Telephone of Thailand (TOT) have developed their own systems. The new systems are integrated well within their organization for the whole country of Thailand. Yet, the systems do not be integrated at all with each other and other systems at the

provincial level. The employee system has also the same problem. The provincial system has been ignored and has no support from the labour authority of Thailand. Their staffs at Khonkaen provincial level have evaculated to their head-quarter new system. Only general information, tourism information and air flight information services are still workable.

Table 1: activity log of "Khonkaen One Stop Services"

	Hits		The number of hits for each service					
	Web	Web Services	General Information	Air flight Information	Tourism Information	Facilities	Employee system	others
Jan-12	1184	20	39	50	15	60	110	1053
Feb-12	1096	5	28	28	8	42	83	970
Mar-12	1233	5	71	38	19	62	93	1092
Apr-12	887	4	30	33	2	42	49	791
May-12	1164	2	46	48	10	65	56	1022
Jun-12	1380	2	207	26	11	63	61	1289
Jul-12	1635	1	464	31	9	53	49	1506
Aug-12	2090	1	748	42	13	69	66	2004
Sep-12	2198	0	914	37	13	52	86	1925
Oct-12	1783	2	806	39	14	67	57	1540
Nov-12	2103	6	962	57	16	51	74	1935
Dec-12	2063	2	688	39	21	43	69	1881
Jan-13	2621	5	901	58	15	58	105	2319
Feb-13	2044	1	712	45	11	43	60	1854
Mar-13	2417	0	135	11	6	13	16	363
Apr-13	2144	0	230	20	23	0	0	325
May-13	2033	0	251	23	15	0	0	236

4.2 The Findings from Interview and Observation

We have also interviewed related partners SIPA, Khonkaen provincial authority, Khonkaen citizen, participated software houses, developed team from Faculty of Informatics, Mahasarakham University to find out more details. It can be summarized as follows:

- SIPA has no further project and funding to drive forward and extend the success of this project. In fact, they are still interested in extending this project to other provinces. Yet, they have also found out that the continual support/coordination from other government units and provincial authorities for the integration purposes is a very big challenge.

- Khonkaen provincial authority has a problem with infrastructure support and the coordination of other government units to work on the provincial system. So, extending the system from the project

infrastructure may not be a promising idea to extend their citizen services. So, there are very few budget to employ software houses to their G-market.

- Several Khonkaen citizens are confused with the "Facilities" and "Employee system" services in the Khonkaen One Stop Services portal. They have tried to use the services but there is no respond from the provincial authorities. They start to understand that www.khonkaenonestop.org is only for Public Relation (PR) tasks of Khonkaen provincial authorities.

- Participated software houses are grateful to the Web Services Development techniques, transferred from the University. However, there are not many jobs on IT development from Khonkaen provincial authority and other nearby provincial authorities for them. They have actually expected far more IT development projects after the launch of "Khonkaen One Stop Services" project.

- The developed team from Faculty of Informatics, Mahasarakham University have no more research funding to extend this project. However, they are still supporting Khonkaen provincial authority to maintain the system for free. They also help host the server in their faculty data centre since the Khonkaen provincial authority has not yet had their own proper data centre to put the server of this project after 4 years.

4.3 Reflection

At the end, we have found the problem of continual support to extend the project success. Several parts of Khonkaen One Stop Services system have been left unused. Several services have been frozen. The infrastructure supports have been cut out. Knowledge transfers and collaboration between of the three or four helices are loosening. These problems can make the project unsustainable in the long run. The sustainability challenges of the Triple Helix model are still huge. the need of more collaboration between government units and the continual support in terms of policy and finance may be the first approach required to sustain such a project.

Acknowledgements

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