

---

# **MEASURING INNOVATION IN SOUTHEAST ASIA: TOWARDS AN INNOVATION-LED DEVELOPMENT PATH IN THE PHILIPPINES**

**By**

**Pun-Arj Chairatana, PhD**

**Bangkok**

**December 2010**

## TABLE OF CONTENTS

Acknowledgement .....	3
1. Introduction.....	4
2. Site Visits and Filippinnovation Forum .....	4
2.1 BACKGROUND .....	4
2.2 CEBU CITY.....	4
2.2.1 VISIT TO ASIA TOWN, AYALA ECONOMIC ZONE .....	4
2.2.2 COURTESY VISIT TO DOST REGION VII.....	5
2.2.3 Finding.....	5
2.3 DAVAO CITY .....	5
2.3.1 Attending TechBootCamp.....	5
2.3.2 Meeting with DOST Region XI and DOST Core Project Team .....	6
2.3.3 Finding.....	6
2.4 MANILA.....	6
2.4.1 Meeting with Quezon City Team .....	6
2.4.2 Filippinnovation Forum.....	7
2.4.3 Finding.....	7
3. The Art and Science of Innovation Surveys .....	8
3.1 Oslo Manual.....	8
3.2 Latin America’s Bogota Manual .....	9
4. Innovation survey in Southeast Asia .....	10
4.1 Indonesia .....	11
4.2 Malaysia.....	11
4.3 Singapore .....	11
4.4 Thailand .....	12
4.5 Vietnam .....	13
5. Implications for the Philippines.....	13
5.1 Types of innovation and innovators .....	13
5.2 Innovation activities.....	13
5.3 Methodology .....	14
5.4 Obstacle and Barrier to innovation.....	14
6. Conclusions.....	14
References.....	15
ANNEXES .....	16
Annex I: 3 <sup>rd</sup> Anniversary Celebration of the Filipinnovation: The National Innovation Strategy .....	17
Appendix II: Presentation for the 3 <sup>rd</sup> Celebration of Filippinnovation .....	18

## **ACKNOWLEDGEMENT**

We would like to acknowledge the contributions of Dr. Kittipong Promwong from Thailand, Dr. Than Ngoc Ca from Vietnam, and Mr. Simon Ellis of UNESCO who we have consulted in the preparation of this report and those who assisted with the survey of innovation performance measurement in developing countries.

# 1. INTRODUCTION

Innovation is a concept of various meaning. For some, it can be tangible or intangible, societal-based or business oriented, incremental or radical, inclusive or exclusive, aesthetic or technological, and etc. Towards an Innovation-led Development Path in the Philippines is project supported by the International Development Research Center (IDRC) of Canada, which aims to mainstream the innovation system approach into the center-stage of policy-making through the establishment of a systems-oriented, policy-relevant and internationally comparable innovation survey and indicator system in the Philippines.

The report fulfills the mandate of the International Development Research Center (IDRC) for the offer of consulting contract number 105177-002. It covers 3 items of TOR including, travel to the Philippines from 21 to 26 November 2010, to attend the Filippinnovation Forum and to undertake field trips in Cebu and Davao, conduct a survey of literature and assess experiences and practices of developing countries with special focus on those in Southeast Asia, and review and comments on the innovation survey questionnaire and instrument designed by the DOST project team based on existing international practices.

## 2. SITE VISITS AND FILIPPINNOVATION FORUM

### 2.1 BACKGROUND

Within this project, there are three selected sites for the pilot innovation survey, which are Luzon (Quezon City, PEZA at Cavite and Laguna), Visayas (Metro Cebu: Cities of Mandaue, Lapu-Lapu and Cebu), and Mindanao (Davao City). The survey covers on three selected industries, food manufacturing industry, electronics manufacturing industry, and information and communication technology (ICT) Industry. Total numbers of sample accumulate 500 firms in three sites.

The fact-finding-mission covers the three selected sites with aims to gain an insight on current situation of innovation activities and performance and also investigate the overall understanding and awareness of innovation survey in general. The information from the site visits and meeting is evaluated to strengthen the recommendation on questionnaire for innovation survey and future censuses in the Philippines.

The travel covers period between 21 and 26 November 2010. The consultant traveled from Bangkok to Manila on Sunday 20 November 2010 by Thai Airways International, flight TG 620 and changed to local flight operated by Philippine Airlines, flight PR 849 for Cebu Mactan International Airport.

### 2.2 CEBU CITY

On 22 November 2010, with DOST Region VII assistance, Eng. Edilberto Paradela, the project coordinator arranged site visits and meeting for Cebu. There is one site visit at Asia Town IT Park and half day meeting with the local team and the consultant at DOST Region VII Office.

#### 2.2.1 VISIT TO ASIA TOWN, AYALA ECONOMIC ZONE

In the morning, the consultant visits the Asia Town IT Park. The Park is owned by Ayala and embraces over 24 hectares of prime industrial land at the center of Cebu City. It is conceived as an integrated special economic zone and modern trading center, with PEZA privileges. There are around 12,000 jobs on Business Process Outsourcing (BPO) and related service-oriented industry. The Park brands itself as a green IT park that especially boasts of a constructed wetland system which treats sewage using natural means – plants and microorganisms. Mr. Dennis Wong from the International Pharmaceutical Incorporated which is local board for Metro Cebu LPSC brief the consultant on site on the innovation on waste treatment. This waste treatment process consumes zero power as the plant's root system acts as carriers for the microorganism, decomposing the organics in the wastewater and thereby cleaning this in a naturally sustainable cycle.

## **2.2.2 COURTESY VISIT TO DOST REGION VII**

In the afternoon, the consultant paid visit to DOST Region VII. There were arranged meeting to discuss about the pilot project between local team members, which composed of Engr. Rene Burt N. Llanto, Regional Director, DOST VII, Mr. Dennis Wong, the industrial representative, Engr. Edilberto Paradela, NSO representatives and the local consultant. The meeting was conducted from 14:00 – 17:00 PM.

## **2.2.3 FINDING**

- According to the meeting, the City of Cebu is the capital city of Cebu and the second city in the Philippines, the second most significant metropolitan center in the Philippines and known as the oldest city established by the Spaniards in the country. Cebuano have their dialect and language.
- Cebu is the second key domestic hub of the Philippines. The city is the Philippines' main domestic shipping port and is home to about 80% of the country's domestic shipping companies, while it also holds the second largest international flights in the country.
- The economy has been heavily relied on local overseas Chinese, especially on trade, agriculture (Mango) and services. Cebu is a significant center of commerce, trade and industry in the Visayas and Mindanao region.
- Cebu is favorite city for Korean to study English.
- DOST Region VII provides industrial standard testing on measurement, food safety, and packaging. There are furniture and ornament design center to support local industry.
- The city shares the second highest proportion of samples (129 samples) after Quezon City (172 samples).
- Food manufacturing industry in Cebu City tends to be Micro Enterprises and Small and Medium Enterprises (SMEs), while non-food industries are Multi-National Enterprises (MNCs)
- Business Process Outsourcing (BPO) activity is mainly focused on call center, which shares a high tendency towards incremental service innovation.
- Electronics and IT manufacturing firms dominate the sample sites, while BPO represents more than quarter of non-food industries sample group.
- NSO representatives reflected that there has no difficulty on understanding of questionnaires and definitions, while the local consultants presented some concern about the process of data collection.
- Tri-party of private, public RTOs and the city administration is formed, which is strength of the project.

## **2.3 DAVAO CITY**

On 23 November 2010, the consultant took Cebu Pacific, flight 5J 599 from Davao Mactan International Airport to Davao Francisco Bangoy International Airport. At the same day, the consultant took the Philippines Airlines, flight PR 814 to Manila.

### **2.3.1 ATTENDING TECHBOOTCAMP**

In the morning of 23 November 2010, the consultant was invited to attend the morning session on innovation and technologies business by Professor Gregory L. Tangonan, Executive Director for Congressional Commission on Science, Technology and Engineering (COMSTE) and Director of Ateneo Innovation Center in Quezon City.

Davao Open TechBootCamp is training program supported by the Ayala Foundation and co-organized by DOST. The training targets academe teams, R&D teams, professional teams and entrepreneurs involved in technology or technology enabled product services with special focus on the fields of ICT, biotechnology, life

science, green technology, sustainability, alternative energy, food science, technology and agriculture productivity and other emerging applied technologies. These three days training program was held at Hotel Elena, at Lanang, Davao.

### **2.3.2 MEETING WITH DOST REGION XI AND DOST CORE PROJECT TEAM**

In the afternoon, DOST Region XII arranged meeting between the consultant and the core project team. There were Dr. Anthony C. Sales, Regional Director of DOST XI, Mr. Bert Barriga, President of ICT Davao, the representatives from Davao city, Ms. Cynthia F. Abalos and DOST core project team to attend.

Mr. Barriga, the President of ICT Davao accommodated the consultant and the DOST core project team to the Davao General Hospital where his company services the facility by developing a low-cost hospital management software.

### **2.3.3 FINDING**

- The City of Davao is the largest city on the island of Mindanao. It is the most important economy in the island and the third most important urban center in the Philippines.
- In recent years, Davao City has emerged as the business, investment and tourism hub for the entire southern Philippines.
- Large agricultural plantation and manufacturing activities are among the most important economic blood line of the region. Davao City largely contributed in making the Philippines as the world's top exporter of papaya, mangosteen, and flowers.
- Natural and eco-tourism increasingly important to economic growth in the region.
- DOST XII is considering appointing a local consultant from University of Philippines at Davao to analyze the result from the survey.
- Tri-party of private, public RTOs and the city administration is formed, which is strength of the project.
- It is noticeable that the representation of sample in Davao City is in the lowest of the group. There are only 45 firms within the sample site. These may reflect a limitation on innovation survey result interpretation.
- Also, distribution among SMEs and MNCs in Davao City is mainly concentrated to MCs and SMEs for all sectors, with a bit contrast to nature of economic structure of the islands.
- Software and BPO are considered as the fast growing sector for knowledge-intensive service in Davao. Animations and call centers are among focal sub-sector for non-food industries.
- The city is under a process of revitalization of the city in order to boost up service-oriented business and induce more foreign direct investment into the city.
- Service and food processing association in Davao are very active. December is chosen to be innovation month in Davao, many activities are initiated by local firm with some support from the city administration and DOST.

## **2.4 MANILA**

### **2.4.1 MEETING WITH QUEZON CITY TEAM**

In the afternoon of 24 November 2010, the Quezon City team arranged project meeting at Hotel Sulo, Quezon City between 14:00 – 17:00 PM. The consultant was invited to join for the dialogue and discussion. Main agendas for the meeting are the review of First meeting, overview of DOST NCR and Quezon City, analytical Framework for Innovation Study, two cases studies on bakery and ice cream and incubator at the Ateneo

Innovation Center, updating on innovation survey in Quezon City, and planning of committee meetings and project activities for January-June 2011.

There were Dr. Teresita C. Fortuna, Director of DOST NRC, Dr. Josef T. Yap, and Dr. Jose Ramon Albert from the Philippines Institute for Development Studies (PIDS) and Representatives from NSO and Quezon City to join the meeting.

On 25 November 2010, the consultant reviewed the finding from these three cities and prepare for speaking on Filippinnovation Forum.

#### **2.4.2 FILIPPINNOVATION FORUM**

On 26 November 2010, the consultant had meeting with CISASIA team, another project on city innovation supported by IDRC at De La Salle University. The detail of the meeting will be separately reported through CISASIA interim report.

In the afternoon, the consultant attended forum and delivered lecture remark under the topic of the City, Innovation, Survey, and System: Shifting Paradigm on Innovation Policy for Developing Countries.

#### **2.4.3 FINDING**

- Metro-Manila consists of 16 Cities and 1 municipality. Quezon City is the former capital (1948–1976) and the most populous city in the Philippines. The city is the public administrative center for the Philippines.
- According to scope of sample for the innovation survey, there are three areas within and around Metro Manila to be covered. There are Quezon City, and two PEZA in Cavite and Laguna.
- Tri-party of private, public RTOs and the city administration is formed, which is strength of the project.
- As Quezon hosts many leading national universities, the main campuses of two leading universities, the Ateneo de Manila University and the country's National University—the University of the Philippines Diliman—are located in the city, with other 63 colleges and universities.
- Quezon City is home to the Philippines' major broadcasting networks. Television companies such as TV5, ABS-CBN, GMA Network, UNTV, Net 25, GEM TV, NBN, RPN and IBC all have their headquarters in Quezon City.
- BPO activities are also increasingly important for service sector in Quezon City. Call centers dominate the non-food manufacturing industry.
- The city also enjoys the position of being large conglomerate proxy, the Quezon City authority shows strong intention for utilize result of this pilot in their city development planning.
- There are around 25% of enterprises registered in the city.
- Cavite and Laguna are southern neighboring province of Metro-Manila. Two PEZAs are selected as sample sites. The majorities of firms there are mainly FDI in IT manufacturing, especially from Japan.
- Both Quezon City and other two PEZA samples are mainly from non-food industries, which opposite to Davao and Cebu with majorities of firm are from food industry.
- Quezon City has good proportion of SMEs and MNCs representation on the sample sites for non-food industries, while food manufacturing tends to be MCs and SMEs, which is similar to Davao City and Cebu City.

### 3. THE ART AND SCIENCE OF INNOVATION SURVEYS

Innovation has been recognized among economic and social development debate as a crucial element in the process of industrialization and modernization for developing economies through the ability to introduce new technologies and organizations in a narrow sense. For those in the Developing World, major efforts on innovation are frequently represented by various activities range from a rapid imitation of new product and process to an adoption of new capital equipment and production technologies. In a broader context, innovation in developing economies embraces an industrial innovation from non-technological perspective, a territory which is waiting for academe and policy maker to discover.

Measuring innovation and mechanisms and techniques to create the comparability of innovativeness among different industries and countries are among the key issues for innovation-related policy implications. There has been an increasing attention on an application and adaptation of innovation surveys in developing and emerging economies by following or replicating the model first developed in Europe (Eurostat, 2008). Since the 1990s, the development of the Oslo Manual and Community Innovation Survey (CIS) which was developed in accord with the Oslo Manual have widely used and applied among developed and developing economies as guideline for the determination of widely applicable innovation indicators and a reliable tool for the measurement of these indicators. For developing countries, Bogota manual can be seen as the attempt among the follower to develop an appropriate measuring technique and scale to fit with their innovation system structure. Therefore, the presence of a reliable guideline for different levels of innovation systems is crucial.

#### 3.1 OSLO MANUAL

The first international experimental survey on innovation was guided by propositions of the Oslo Manual took place in the European countries. The European Community (EC), which is now the European Union (EU), incorporated with the EUROSTAT developed a standard questionnaire, so called the Community Innovation Survey (CIS), which is now on its fourth version, while the EUROSTAT, in collaboration with the Organization for Economic Cooperation and Development (OECD), has determined a core list of questions that permit comparable innovation analysis in Europe.

The basic problem of survey is the subjective nature of innovation, especially on the difficulties to measure an intangible or complex component, and a consequence of different activities which are difficult to summarize (Arundel et al, 1998). The Oslo Manual defines innovation in a broad sense as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (Oslo Manual, p.46). However its application in the CIS has generated criticisms since it takes innovation in a narrower sense which may cause a problem in the generation of indicators (Carvalho, 2006).

The first CIS using a common questionnaire was launched in 1991 and was carried out in 1992. A second version was started in 1997 and completed in 1999, and the third and fourth were launched in 2001 and 2006 respectively. In Turkey, innovation surveys were carried out by using these standard questionnaires with minor changes. In general, the early uses of the CIS among the OECD and non-OECD membered countries have been mainly face with:

- Restricted paradigm of innovation concept with narrow sense;
- The limitation of the innovation concept within technological, product, and process innovations (TPP);
- The limitation to accommodate key characteristics and development from different sectors (especially services and manufacturing);
- The complexity of analysis on the relations, linkages between agents, in other words, network effects on innovation system;



- The omission of unsuccessful cases; and
- The measurement of innovation in different factor condition, particularly in developing countries.

### 3.2 LATIN AMERICA'S BOGOTA MANUAL

The measurement of innovation in developing countries by purely adopting the Oslo Manual and CIS with some application can be painful experiences for those who want to analyze innovation in catching-up economies. The main reasons of such limitation are as follow:

- The economic structure of developing and less-developed countries are institutionalized and sat-up in different evolutionary paths from the developed ones
- These structural differences are also considered by some scholars when measuring the science and technology indicators in developing countries.
- There has been demand for some developing countries themselves on developing of the special techniques and questions to reflect unique characteristics of their economies and require special indicators to measure their innovativeness.
- When the main specificities of developing countries' innovative environments are carefully considered it can be realized that a special focus on innovation capabilities accumulated by firms and agents are needed
- Innovation activities in developing economies should be understood in a broader sense and the role of organizational and social innovations which is essential for the absorption of new technologies must be taken into consideration.

After the launching of the innovation surveys among the OECD and EU members, the developing countries followed course and application of the Oslo Manual, they came up with their own versions of innovation surveys. However seeing the results of the first few surveys, these countries felt the need to adapt their surveys to the context of their developing world (INTECH, 2004).

The attempt in devising indicators of technological innovation for developing countries and making innovation survey fit better with conditions of developing countries was carried out by Latin American scholars especially those belong to the Iberoamerican Network of Science and Technology Indicators (RICYT). the Bogota manual Bogota Manual for Standardization of Indicators of Technological Innovation in Latin American and Caribbean Countries was launched as an attempt to overcome the limitations of the Oslo Manual in 2001. Subsequently, this group of Latin America scholars (led by Lugones and Peirano) utilized the Bogota manual as a base, together with comments of researchers and practitioners with experiences in innovation surveys in developing countries, to develop an Annex of the Oslo Manual (2005) for Innovation Surveys in Developing Countries. The Bogota manual and the annex of the Oslo Manual emphasis four characteristics of the innovation process in developing countries:

- **Acquisition of embodied technology** (equipment) for both product and process innovation is a major component of innovation as high technology sector in latecomer economies is marginal. In developing countries which are more dependent on resource based low technology sectors, a broader innovation concept should be used in order to take the innovations carried out in low technology sectors into account.<sup>1</sup> A broader definition of innovation, which includes R&D efforts, and efforts regarding "design, installation of new machinery, industrial engineering, acquisition of embodied and disembodied technology, organizational modernization and marketing (Carvalho, 2006).

---

<sup>1</sup> Even though the Oslo Manual considers innovation in a broad sense, in the CIS it is limited with the product and process innovations. Hence, for the aim of measuring innovation in developing countries innovation concept should be used in a broader sense than it is used in developed countries.

- Innovations in the **agricultural sector** have high economic impact, due to its significant overall economic weight.
- **Organizational change** is extremely significant in the innovation process. Besides its direct impact on firm performance, it also contributes to the firm's preparation to absorb new technologies incorporated in machinery and other equipments (the most frequent type of innovation). Heterogeneity frequently prevails with regards to firms technological, organizational and managerial patterns, with 'high tech' firms coexisting with informal businesses (in many cases the majority), and with organizational structures not being professionalized enough, leaving much room for organizational change, often independent from product and process innovation processes.
- **Minor or incremental changes** can be the most frequent type of innovation activity in some developing countries, together with innovative applications of existing products or processes.

Apart from that, the intellectual capabilities of firms in developing countries are vital for the initiation of innovation, and yet difficult to gauge. To measure such capacity Lugano and Peirano (2004) and Carvalho (2006) suggest the use of ICT frequency. Even though this same concept and indicator is mentioned in the Oslo Manual, a question regarding this factor is not included in CIS. Also, the innovation surveys in the developing countries should have some questions regarding the activities of MNCs and their relationships with other agents. This is believed to add to the knowledge base as to how these countries can benefit more from their activities in their countries.

Currently Chile conducted 4 rounds of innovation surveys, while Argentina, Mexico, and Colombia finished their third round of innovation surveys. Brazil, Paraguay, and Peru conducted twice surveys in the past, while there is one survey for Ecuador, Cuba, Venezuela, and Trinidad and Tobago. In Africa the most active country for innovation survey is South Africa, there have been four rounds of surveys.

## 4. INNOVATION SURVEY IN SOUTHEAST ASIA

ASEAN (Association of Southeast Asian Nations) has shown an intention in developing its science, technology and innovation indicator system. One aim of the Hanoi Plan of Action, for example, is to establish a technology scan mechanism and institutionalize a system of science and technology indicators. In collaboration with Korea, ASEAN in 2004 initiated a project on 'Development of Technology Competitiveness Indicators'. However, the project did not aim to improve existing indicators or developing new ones but to produce a composite indicator derived from Hard Statistics Data from R&D Survey and Economic Series as well as Soft Data from Executive Opinion Survey (IMD's World Competitiveness Yearbook).

SEA-EU-NET, the project of the European Union (EU), and the UIS-UNESCO held meeting in Bangkok in 2008 in order to probe the possibility to develop regional STI statistics expert panel equivalent to National Expert on Science and Technology Indicator (NESTI) of the OECD. The project is set up to expand scientific collaboration between Europe and Southeast Asia in a more strategic and coherent manner. The project was launched in January 2008 and involves 16 key institutions from the two regions. It will adopt an evidence-based approach to increase the quality, quantity, profile and impact of Science and Technology (S&T) cooperation between the member countries of the ASEAN and the Member- and Associated States of the EU Seventh Framework Programme for Research and Technological Development (FP7). The report on status of Southeast Asia Science, Technology, and Innovation Statistics & Indicators was submitted to the second meeting in Bogor in order to follow up the possibility to establish such network.

In Asia, China just finished the first national innovation survey in 2006, and there will be the second round analysis within 2011. Japan conducted 3 rounds of surveys while South Korea and Taiwan finished their second round. In Southeast Asia, the most active countries for innovation survey are Malaysia and Thailand. There are four rounds of innovation survey in Malaysia, and three qualified rounds in Thailand. Indonesia conducted first innovation survey in the early 2000s, while Singapore has different version and methodology of

innovation measurement. Vietnam finished the first innovation survey in 2009 and is under process for new census development with the World Bank.

## **4.1 INDONESIA**

For almost two decades since the late 1970s, Indonesian S&T policy has been mainly focusing on S&T infrastructure development. This was indicated by rapid development of scientific infrastructure in the country. Indonesian Institute of Science (LIPI) is a non-departmental research institutes (NDRI), and officially was established in 1967, plays key roles on S&T statistics in Indonesia.

Indonesian Institute of Science (LIPI) is a non-departmental research institutes (NDRI), and officially was established in 1967, plays key roles on S&T statistics in Indonesia. Its history, however, can be traced back to the time when the Indonesian Council of Sciences (MIPI) was formed in 1956. LIPI itself was actually a merger of the MIPI with research Institutes under the Department of National Research. Since 1967, LIPI has been restructured twice, in 1986 and in 2001. There are 21 research centers and 20 Technical implementation unit within LIPI's structure.

Centre for Analysis of Science and Technology Development (PAPIPTEK) of LIPI provides S&T information and database system under the commitment to develop an effective S&T Indicators system. PAPIPTEK was established on January 13, 1986 by the President Decree No. 1, 1986 which was formed and merged from the Bureau of Coordination and Science Policy and R&D Management Project. Indonesia conducted the pilot innovation survey with a limited report in English.

## **4.2 MALAYSIA**

Malaysia has achieved remarkable socio-economic progress over the past four decades. From a mere primary producer of natural resources, the country has successfully effected a transition to an economy that is more knowledge-intensive and driven by innovation. Science, technology and innovation (STI) has the potential to contribute to the national development and its modernization. According to the countries' Vision 2020, the development of STI requires comprehensive and systematic information management system to ensure knowledge shared and utilised by the STI communities in Malaysia. Malaysian Science and Technology Information Centre (MASTIC) is the key statistical organization for STI statistics and indicators. It has been established in 1992 as the collecting and disseminating centre for strategic STI information in the country. MASTIC also provides access to STI information from various institutions and acting as a linking mechanism among the policy makers, fund providers, researchers/developers, the industries and end users.

Core activities of MASTIC is to collect and disseminate strategic information related to S&T activities, through supporting and providing the basis for decision-making, priority-setting, planning and implementing the nation's S&T policies, directing users to relevant information sources either within our own extensive information holdings or elsewhere, and acting as a linking mechanism between three major players in the Malaysian S&T system; the policy makers, research fund providers and the users and developers of research results. MASTIC is recognized as one of Southeast Asian leading S&T statistical organization. The agency is currently conducts the fifth round of innovation surveys in 2010.

## **4.3 SINGAPORE**

Singapore has experienced rapid economic and technological development since political independence in 1965, through foreign direct investment, leveraging foreign multi-national corporations (MNCs) to transfer and diffuse technology to local companies and employees. The country is considered as the most successful science, technology and innovation system in the region. The government has played a central role in this development, providing incentives for MNCs to locate in Singapore, developing relevant training programmes and institutions, providing the necessary infrastructure and setting an example by itself being a lead user of new technologies. However, this approach has also produced an imbalance in the NSI, with greater emphasis

on the adoption of advanced technologies at the expense of developing indigenous R&D and innovation capabilities. In Singapore, a major source of S&T statistics have been compiled from the R&D surveys. The National Survey of R&D in Singapore was conducted by the Singapore Science Council on a triennial basis from 1978 to 1987. Since 1990, it has been conducted and published annually by the Agency for Science, Technology and Research (A\*STAR) or formerly known as the National Science and Technology Board (NSTB). A\*STAR conducts and publishes the National Survey of R&D in Singapore annually. The National Survey of R&D in Singapore collects comprehensive data on Research and Development (R&D) activities in the private sector, higher education sector, government sector and the A\*STAR research institutes. There is no separate innovation indicator report for Singapore.

#### **4.4 THAILAND**

In the past, National Science Technology and Innovation Policy Committee (NSTIC) appointed Subcommittee on Science and Technology Indicators (SSTI) to be responsible for development S&T indicators and database in Thailand. SSTI main tasks include identifying the important S&T statistics, designating and harmonizing roles of related organizations in collecting S&T statistics at national level, developing practical methodologies based on international standards for collecting statistics on S&T and reporting S&T status to NSTIC and general public.

SSTI is chaired by the Secretary General of the National Statistical Office (TNSO). Its members composed of nineteen representatives from both public and private sectors. NSTIC and the NSO serve as the secretariat for SSTI. The structure of SSTI's members can be categorized into three groups; including a group of expert, a group of representative from key ministries, and a group of representatives from other key organizations. Each organization's representative is assigned by SSTI to collect S&T statistics related to their mission and forward the statistics to the secretariat team (NSTIC and NSO). The secretariat has the role to analyze and compile all these statistics into annual reports called Thailand Science and Technology Profile (TSTP) (Figure 2). TSTP not only reports on S&T status but also on direction of S&T development to NSTIC.

NSTIC distributes TSTPs to various organizations including government agencies, private companies and universities as well as individuals who are interested in this area. Electronic copies of TSTP are also posted on NSTIC website, <http://www.nstic.or.th/nstc> for unrestricted downloading.

The first three assessment of the innovative capabilities and innovation characteristics of firms in Thailand, R&D and Community Innovation Surveys have been carried out by the National Science and Technology Development Agency (NSTDA) since the year 1999. R&D surveys were carried out every year but the innovation surveys were done only in the year 1999 and 2001 and 2003. The survey in 1999 was the first of its kind in Thailand and it covered both R&D and other technological innovation activities only in the manufacturing sector. The second survey, in year 2002, added service sector in order to gain a better understanding of the nature and differences of R&D and innovation activities in both manufacturing and services. The survey adopted definitions and methodologies used by OECD (namely, Frascati Manual (1993) and Oslo Manual (1997)) and other countries in Asia (namely Singapore, Malaysia, Japan, Taiwan and Korea) to meet international standard.

OECD's definition and classification stated in Oslo manual have been adopted in the new survey and the questionnaire of Communication Innovation Survey (CIS) will also be used as a guideline in designing the questions. Questions regarding innovation activities will constitute one main section of the R&D survey questionnaires. Initially, this project is planned to conduct in 2009, but the task for STI surveys in Thailand has been transferred to National Science, Technology, and Innovation Policy Committee Office (STI). STI is under process of analysis of the result from the fourth round of national innovation survey, which had been conducted between 2009 and 2010.

## 4.5 VIETNAM

Under Ministry of Science and Technology, the first pilot innovation survey in Vietnam was conducted by the Department of the International Cooperation of the Ministry of Science and Technology in 2009. It covers 500 firms from 4 sectors, which are agriculture, food-related industry, electronics, and manufacturing in 4 major cities of Hanoi, Ho Chi Minh City, Danang, and Bin Duong. The questionnaire design was based on the combination of Franscati and Oslo Manual. The department also manages the Innovation Partnership Programme (IPP) supported by the Government of Finland, which part of mandate is to enhance Vietnamese capacity building of universities, companies, government agencies and other players in the national innovation system.

There are other two organizations involved in the survey, National Institute for Science, Technology Policy and Strategy Studies (NISTPASS) is the research organization of Ministry of Science and Technology. NISTPASS conduct policy research in science, technology, and innovation including developing the methodology and technique regarding to the survey. National Center for Science and Technology Information (NACESTI) acts as S&T archivist and agency for science and technology statistics collection of the MOST. Currently, NACESTI is under process of developing project with the World Bank to conduct new round of national innovation survey.

## 5. IMPLICATIONS FOR THE PHILIPPINES

The questionnaire of the pilot project aim to investigate i) profile of establishments, ii) innovation activity, iii) wider forms of innovation, iv) effects of innovation, v) constrain on innovation, vi) innovation-related policies. By adjusting and applying Oslo Manual and CIS for this questionnaire, the consultant categorizes comment and recommendation into 4 areas:

### 5.1 TYPES OF INNOVATION AND INNOVATORS

- The Philippines questionnaire covers four different types of innovation, namely product, process, organizational and marketing. While covering the product and process innovations in detail, the survey has an updated section on the organizational and marketing innovations, which will be a benefit for innovation assessment in broader perspective.
- The lack of detailed and diverse inquiry on organizational and marketing innovations hinders data collection on nontechnological innovations, as such section 12 on questionnaire require the analyst who understand technology and innovation management in micro-level.
- On section 6, ongoing or abandoned product and process innovation activities, the actors of innovation activities need to be investigated considering the degree and form of innovation activities as it various from sector to sector. The effects of externalities, firm potentials and market failure should also taking into account.
- Section 6 many need to include service and potential or project in a pipe-line into question number 6A and 6B.

### 5.2 INNOVATION ACTIVITIES

- Section 7, innovation activities and expenditures, the questionnaire provide well-covered on conventional innovation activities. For developing economies, there should be an integration of question on the use of ICTs as an essential item. For example, the activities on back office activities that support core processes and yet are invisible to the third parties is strongly advised by the manual. (Oslo Manual 2005:143).
- Among other specific innovation activities that is listed as essential to be collected are “Industrial design” and “Engineering activities”. Instead of asking on an acquisition of design, the questionnaire

should investigate the in-house design activities along-side with the external inquiry, in addition to question on section 13, marketing innovation.

### **5.3 METHODOLOGY**

- Currently the Oslo manual suggests use of a separate question on each type of innovation as far as appropriability is concerned. However, the standard survey questionnaire does not differentiate between the types of innovation. As opposed to the Manual, the survey does not include an ordinal scale that can be used to rank the different appropriability methods that are used.
- The Philippines survey has a question covering the different methods of appropriability: patents, registration of design, trademarks, and copyrights. For developing economies, the exclusion of these items may seriously hinder the information collected on the means of appropriability. Given the fact that the majorities of firms in these catching-up economies are MCs and SMEs, the costs of patent application could prove to be too high for most to incur. Thus they may rely on other methods listed in the manual.
- However, asking firm on their “confidentiality agreements and trade secrecy”, “secrecy that is not covered by legal agreements”, and “lead time advantage over competitors” methods which recommended by the Manual, are considered as negative points for Asian style survey, but on another hand, these particular activities influence latecomer innovation activities. Site visits or group interview may shed a light on these hinder activities.

### **5.4 OBSTACLE AND BARRIER TO INNOVATION**

- Section 10, factors hampering innovation activities, or barriers to innovation, the survey adopted three elements under the Oslo Manual style, which lists five main categories of factors hampering innovation namely, cost, knowledge, market, institutional, and other factors, and comes up with reasons not to innovate.
- However the survey excludes the institutional category. Since the institutional factors hampering innovation include highly significant issues such as the lack of infrastructure, poor IPR, regulations, standards and taxing, the exclusion of this category hinders the viability of the survey for the Philippines, where these factors are of utmost importance.
- As studying obstacles to innovation is the starting point for policy makers to promote innovation, this section deserves extra attention for DOST, currently deemed as a weak innovation system in Southeast Asia.

## **6. CONCLUSIONS**

- City level innovation system might fit with the Filipinovation way than exercising centralized NIS policy. Each cities share similarity and differences:
  - Sectoral differences, with unique degree of innovation activities
  - BPO is booming, but how the Filipinovation will nurture and create value for future of such service oriented activities still require more afford to strategize the particular KIBS sector.
- Intermediary agent role of DOST on city innovation system can be mastered through an analysis and policy development from this pilot project.
- City innovation survey already included the city halls and private sectors for high involvement on CIS process since beginning.
- City level innovation survey and decentralization of innovation system require an enabling environment for knowledge sharing and learning (the sixth generation of innovation management).

## REFERENCES

- Behan, B., Dayer E., Findk, D., and Tandogan, S. (2009) Comments and Critics on Discrepancies between the Oslo Manual and Community Innovation Surveys in Developed and Developing Countries, TEKPOL Working Paper Series 09/02; Ankara, Turkey.
- Bogliacino, F., Perani, M., Pianta, M, and Supino, S. (2009) Innovation in Developing Countries: The Evidence from Innovation Surveys, Paper for the FIRB Conference on Research and Entrepreneurship in the Knowledge-Based Economy, Bocconi University; Milan, Italy, 7-8 September 2009.
- Chairatana, P.-A., Rojphongkasem, S. (2008) State of the Art on Science and Technology Indicators in Southeast Asia: Delineating Statistical Capabilities for Dynamic Co-operation: Paris.
- Eurostat (2008) Science, technology and innovation in Europe, 2008 edition; Luxembourg, European Commission.
- Intarakumnerd, P., et. al., 2002. 'National Innovation System in Less Successful Developing Countries: the Case of Thailand,' Research Policy, 31, 1445-1457.
- Lugones, G. (2006 ) The Bogota Manual: Standardising Innovation Indicators for Latin America and the Caribbean, in Blankley W., Scerri, Molotja, N. and Saloojee, I. (eds.) Measuring Innovation in OECD and non-OECD Countries, HSRC Press; Cape Town, South Africa.
- Lugones, G., and Peirano, F. (2004) Proposal for an Annex to the Oslo Manual as a Guide for Innovation Surveys in Less Developed Countries Non-Member of the OECD, Researchers of Centro REDES.
- OECD, 1997, Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data, Paris
- RICYT, 2001. Bogota Manual for Standardisation of Indicators of Technological Innovation in Latin American and Caribbean Countries. [http://www.ricyt.org/interior/diffusion/pubs/bogota/bogota\\_eng.pdf](http://www.ricyt.org/interior/diffusion/pubs/bogota/bogota_eng.pdf).

## **ANNEXES**



# FILIPINNOVATION FORUM

## **Towards an Innovation-led Development Path in the Philippines**

A Project of  
The Department of Science and Technology  
and  
The International Development Research Centre (IDRC)

### **P R O G R A M**

1:00 – 1:30 PM	Registration
1:30 – 2:00 PM	Welcome Remarks Introduction of Speakers <b>Prof. Fortunato T. De La Peña</b> Undersecretary for Scientific and Technological Services, Department of Science and Technology (DOST)
1:45 PM - 2:00 PM	Key Message: A Call for Innovation <b>Mr. Jesus V. Varela</b> Philippines Chamber of Commerce and Industry
2:00 PM – 2:30 PM	Using Innovation to Grow <b>Engr. Ramon I. Castillo</b>
2:30 PM – 3:00 PM	Towards an Innovation-led Development Path in the Philippines <b>Dr. Jose Ramon G. Albert</b> Philippine Institute for Development Studies (PIDS)
3:00 PM – 3:30 PM	Resource Speakers: City, Innovation, Survey, and System: Shifting Paradigm on Innovation Policy for Developing Countries <b>Dr. Pun-arj Chairatana</b> IDRC Consultant
3:30 PM – 4:00 PM	Open Forum

## **APPENDIX II: PRESENTATION FOR THE 3<sup>RD</sup> CELEBRATION OF FILIPPINNOVATION**



# **CITY, INNOVATION, SURVEY, AN SYSTEM**

---

**Shifting Paradigm on Innovation Policy for  
Developing Countries**

**By Dr. Pun-Arj Chairatana**

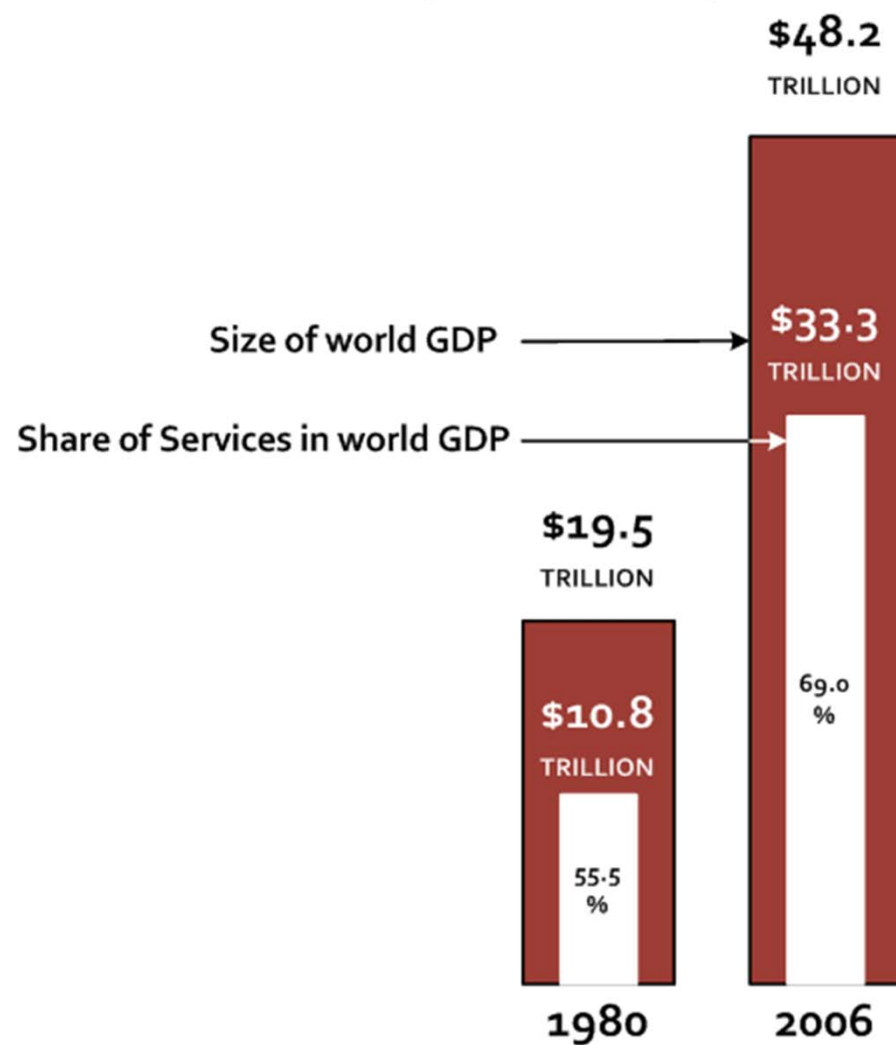
Managing Director: Noviscape Consulting Group

26 November 2010: Hotel Intercontinental Manila, the Philippines

# Contents

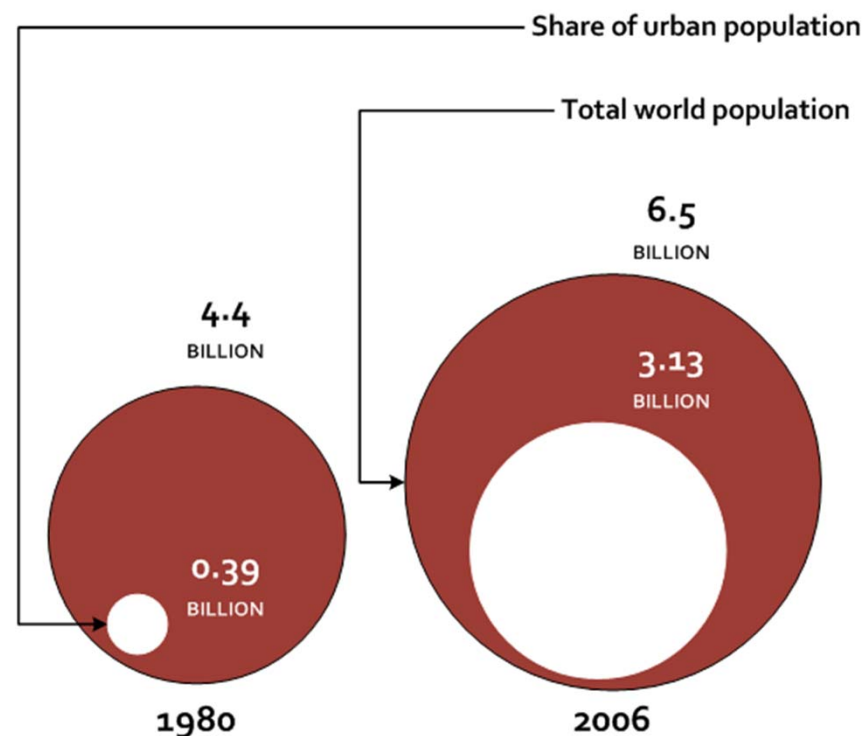
- Concetualising new approach of innovation system
- City innovation System in Chiang Mai
- Preliminary Finding from Triangular Islands of Innovation in the Philippines

**Figure 1: Service Sector and Economic Growth (1980 – 2006)**



Source: The World Bank database

**Figure 4: World Population & Urbanisation (1980 – 2006)**



Source: The World Bank database

# Converging City, Foresight, and Innovation: Thailand Experience

- **2006: Coining City Foresight framework**
  - Location: The 1400 Years old town: Two municipalities along River Ping. Lampoon., Northern Thailand
- **2009: Developing City Innovation Concept and City Innovation System:**
  - Locations: Six Mega cities in SE including , Bangkok,, Singapore, Ho Chi Minh City, Kuala Lumpur, Jakarta, and Manila. (Project supported by IDRC)
- **2010: Merging City Foresight to City Innovation**
  - Scenario building: Six Mega cities in SE including , Bangkok,, Singapore, Ho Chi Minh City, Kuala Lumpur, Jakarta, and Manila. (Project supported by IDRC)

# 2006 \* Lampoon City Foresight

## The First City Foresight in Thailand



**Scenario 1: A Bitter Prosperity**

**Scenario 2: Global Village Lampoon**

**Scenario 3: International Lampoon**

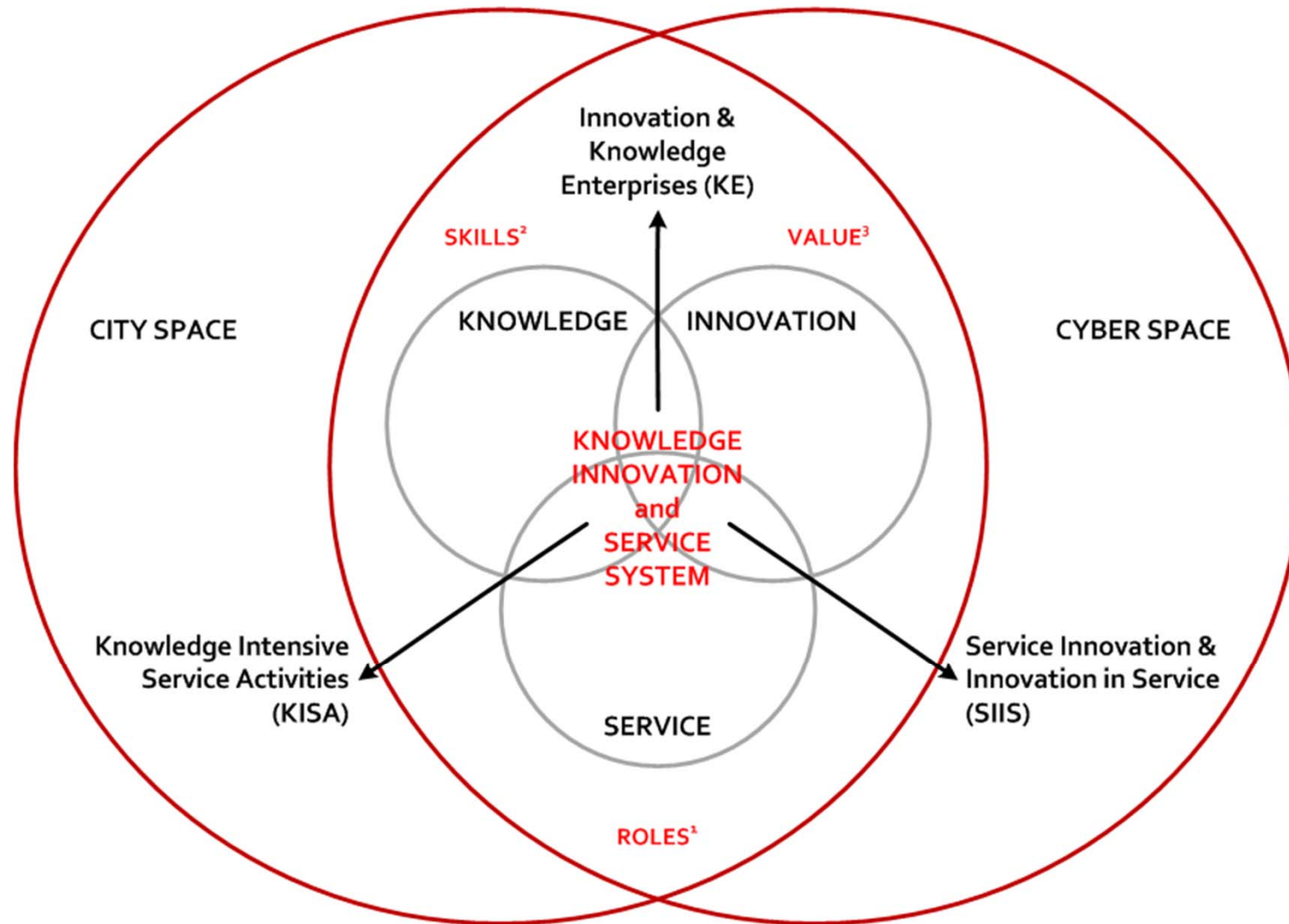
**Scenario 4: Lampoon Green Knowledge Town**







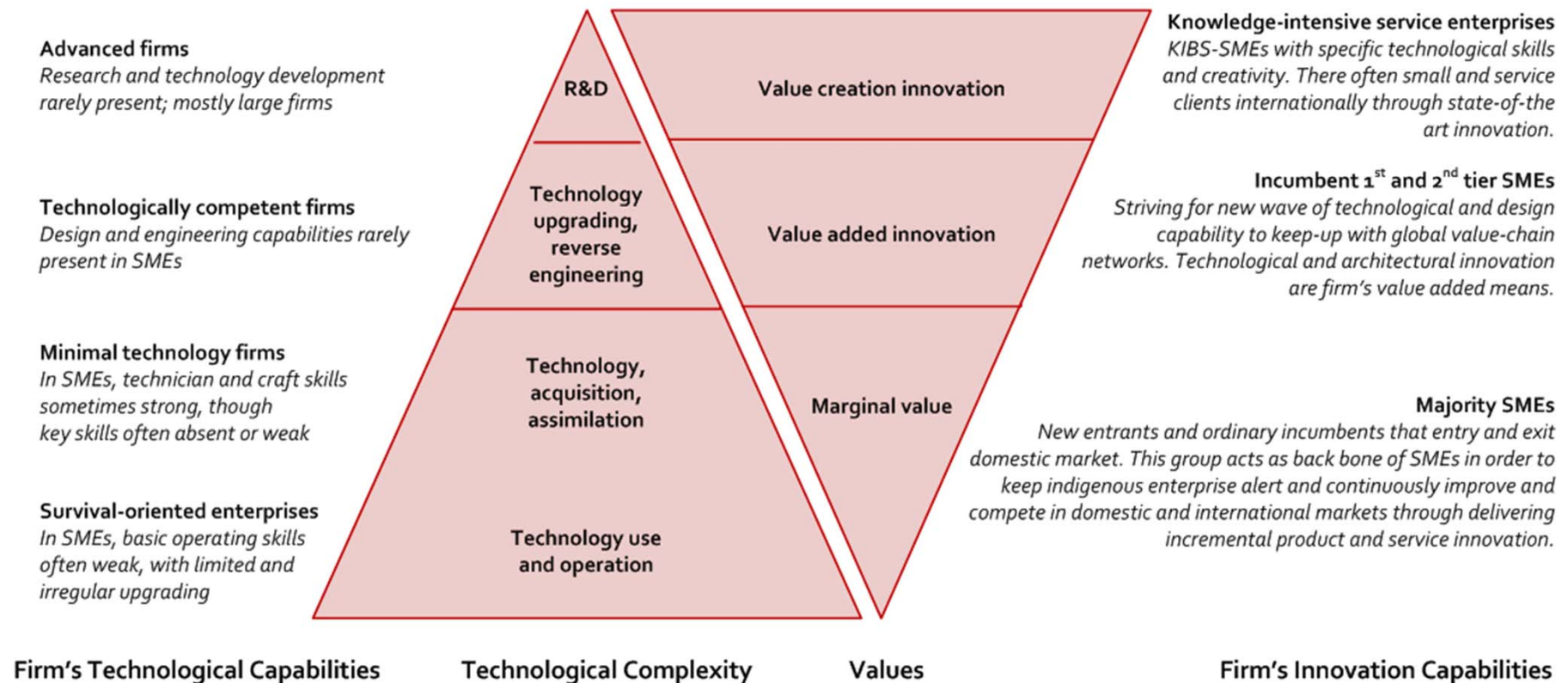
Figure 9: Knowledge, Innovation, and Service Innovation Framework



1. Evolving economic roles of service sector.
2. Service skills.
3. Value from service innovation and innovation in service.

# Capabilities by Type of Firms

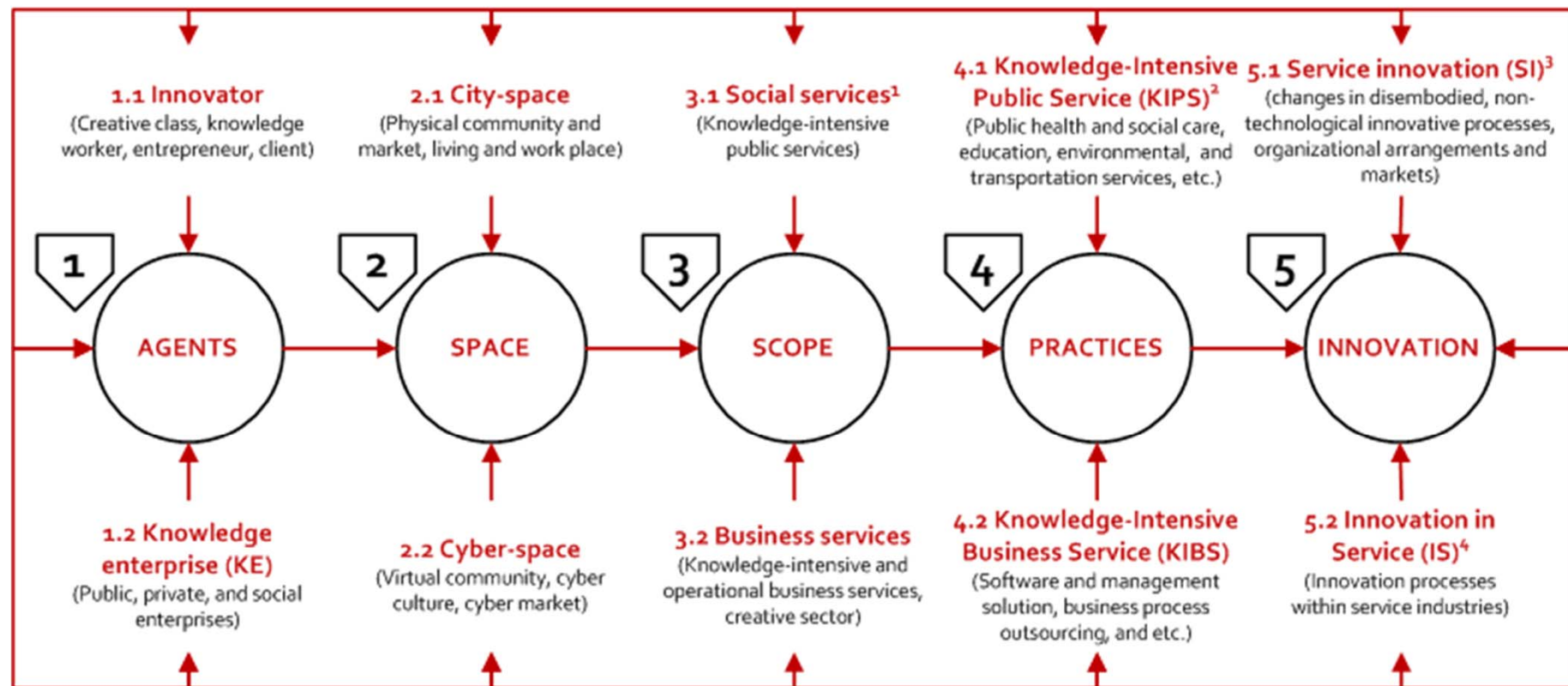
Figure 3: Capabilities by Type of Firms



Source: Adapted from Intarakumnerd, Chairatana, and Tangchitpiboon (2002, 1445–1457).

# Framework for KISS

Figure 2: Framework for Knowledge, Innovation, and Service System (KISS)





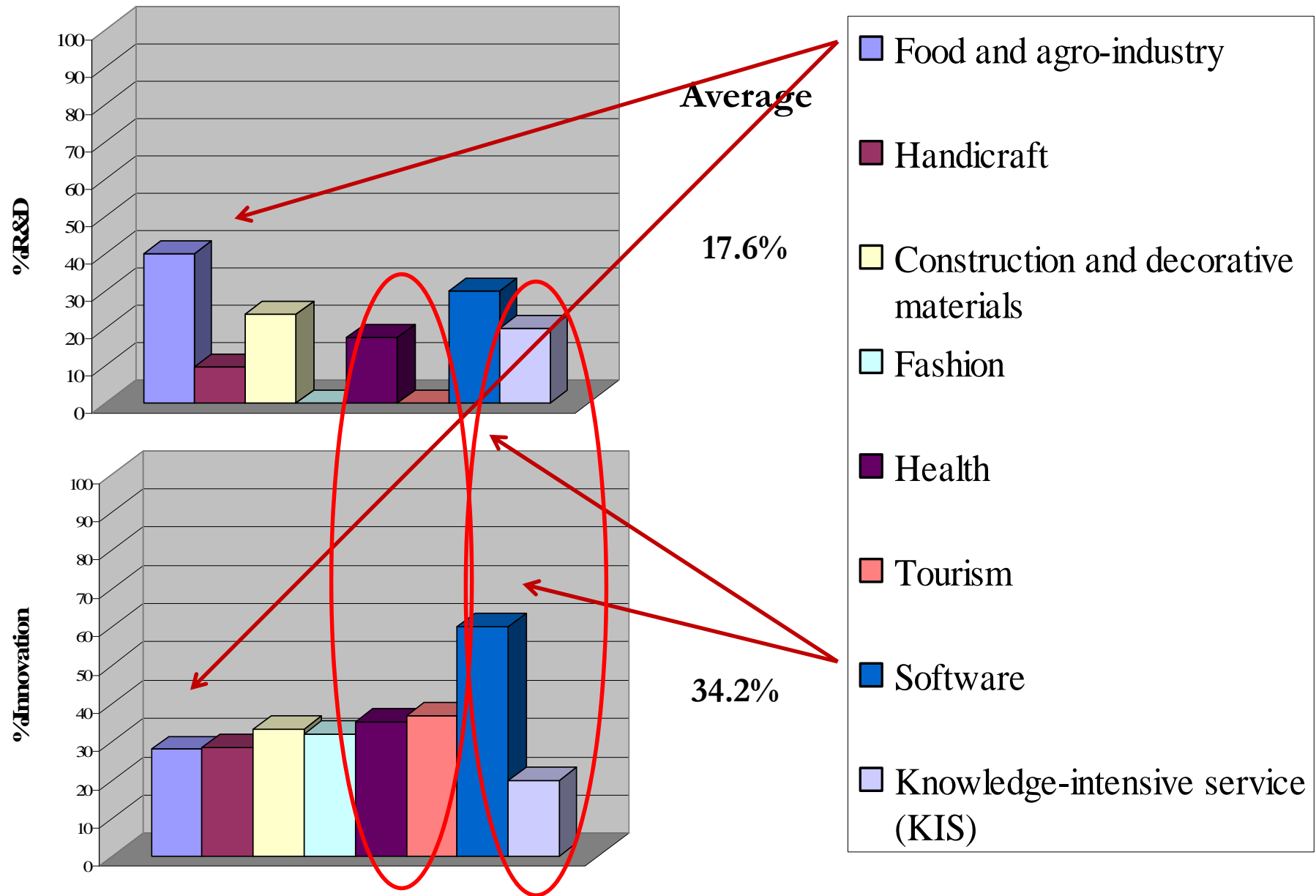




# Response Rates

Sectors	Population	Sampling Size	Returned	Responded Rate (%)
Food and agro-industry	488	74	25	33.78
Handicraft	370	61	21	34.43
Construction and decorative materials	294	60	21	35.00
Fashion	460	137	25	18.25
Health	152	21	17	80.95
Tourism	533	68	30	44.12
Software	90	30	10	33.33
Knowledge-intensive service (KIS)	72	19	10	52.63
Total	2,459	470	159	33.83









# Roles of Local Universities

- **Seven universities**

- High level of mismatches between the knowledge being developed from the universities and the requirement from the user.
- University-Industry collaboration is relatively weak, mostly in a form of information and technical services.

# **Roles of Local Public Research Institutes**

- **NSTDA Northern Network (NSTDA NN) has been established for decade.**
  - Local firms using NSTDA's services are quite limited (less than 30% of surveyed firms).
  - Some successful R&D and innovation projects were financed by NSTDA Northern Network.
- **Northern Science Park under TISTR was approved by the Cabinet since early 2000s has not fully operated.**
  - 40% of surveyed firms acknowledge the existence of Northern Science Park

# Roles of Local Financial Institutes

- **136 commercial bank branches located in Chiang Mai**
  - However, they contributed very little to R&D and innovation activities of surveyed firms
- **Venture capital development is in very early stage here.**
  - Firms using VC finance are only 5% and 2% in industry and service sector respectively (which is comparable to national level).

# Roles of Provincial Business Organizations

- **Federal of Thai Industry (Chiang Mai Chapter) is very active in promoting concept of innovation among its members.**
  - Under FTI, Research and Development Innovation Service Center (R&DISC) with 23 local partners has been formed. It is lack of enough full-time and budget.
  - From the survey, only 20-30% of firms used R&DISC's services including its support for market introduction of innovation (e.g. innovation fairs).

## **Role of Provincial & Local Governments/Provincial Branches of Central Government**

- **Support for innovation from local administration and provincial government (CEO governor) is not so sufficient.**
  - There are some indirect budgetary supports for some promotion of innovation projects.
- **Northern SMEs Promotion Center under Department of Industrial Promotion has been established.**
  - Surveyed firms usage of its service is relatively high (compared to those provided by universities, public research institutes and business associations).





# State of Innovation and Innovation Examples in Food and agro-industry Sector

Category	Example of Innovation
Product	<ul style="list-style-type: none"><li>■ Introducing natural-look product to the market</li><li>■ Variety through different form and flavour</li><li>■ Improve packaging for longer product shelve life</li></ul>
Process	<ul style="list-style-type: none"><li>■ Generating a new line of product (ice cream) in milk factory by using of new machine to increase productivity</li></ul>

**Conclusion:** *Incremental innovation in both product & process*



# State of Innovation and Innovation Examples in Handicraft Sector

Category	Example of Innovation
Product	<ul style="list-style-type: none"><li>■ Adding more variety of flowers for new product</li><li>■ New products for multipurpose function and using</li></ul>
Process	<ul style="list-style-type: none"><li>■ Using Clean Technology to improve productivity and reduce cost</li><li>■ Using work study to improve productivity in handicraft production</li></ul>

**Conclusion:** *Incremental innovation in both product & process*



# State of Innovation and Innovation Examples in Fashion sector

Category	Example of Innovation
Product	<ul style="list-style-type: none"><li>■ New mixture of cotton, linen, wool and silk in order to generate new type of product</li><li>■ Applying local knowledge into new styles of fabric and garment</li></ul>
Process	<ul style="list-style-type: none"><li>■ New dyeing process</li><li>■ Applications of preventive maintenance, line balancing and inventory control</li></ul>

**Conclusion:** *Incremental innovation in both product & process*



# State of Innovation and Innovation Examples in Tourism sector

Category	Example of Innovation
Service	<ul style="list-style-type: none"><li>■ Applying ICT to improve service quality</li><li>■ New package tours and services based on local culture</li><li>■ Using Internet for expanding market channel</li><li>■ Applying accounting software in order to reduce waiting time</li></ul>

**Conclusion:** *Incremental innovation in service*





# State of Innovation and Innovation Examples in Software sector

Category	Example of Innovation
Service	<ul style="list-style-type: none"><li>■ Application of Active to deliver new solutions</li><li>■ Design new software program base on CRM technique to analyze customer satisfaction</li><li>■ Mobile phone games with multiplayer</li><li>■ Implementation of Application software for other business such as e-tourism, e-commerce, etc.</li><li>■ New software for facility control</li></ul>

**Conclusion:** *Incremental innovation in service*

# Knowledge Intensive Service (KIS)

The sector mainly comprises two sub-sectors: business and design consulting. It provides supporting services for firms in several sectors.

It has a close connection with academics in universities and research institutes. It can contribute to the formation of a network of innovative firms in several sectors and emergence of future high-technology-based and creative firms spun off from universities and research institute, i.e., 'Innovation cluster'.

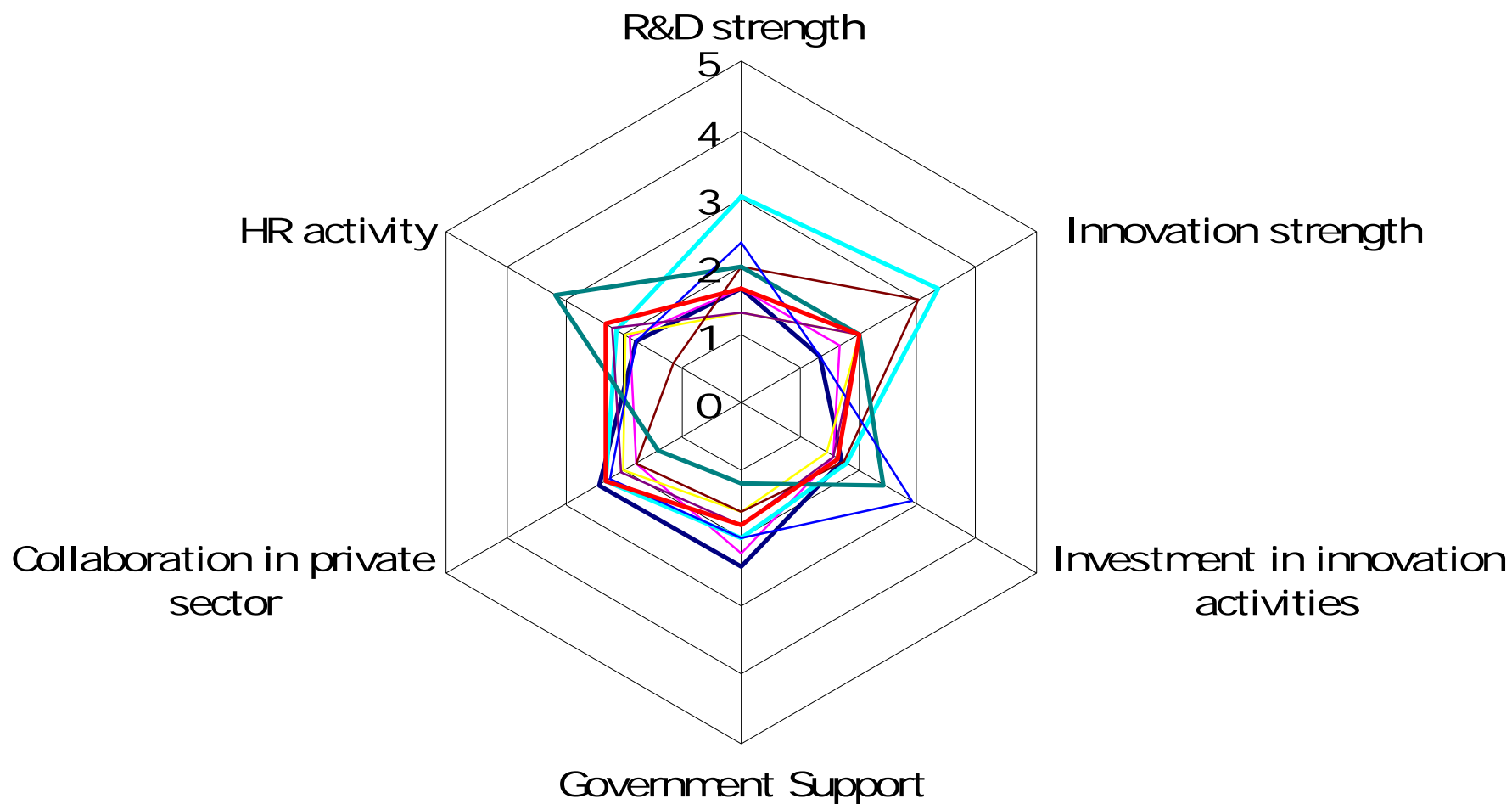
**Cores have been formed in some sub-sectors such as private universities and architecture consulting firms (e.g Lanna Architecture Association).**

At present, small number of private firms. Most of them are small but knowledge-intensive companies which is a nature of this sector. However, number of firms have a potential to grow as a result of expected closer collaboration between universities/research institutes and private sector, as new policies like technology and business licensing offices and incubators in universities and research institutes have been strongly promoted.

# State of Innovation and Innovation Examples in Knowledge Intensive Service (KIS) sector

Category	Example of Innovation
Service	<ul style="list-style-type: none"><li>■ <b>English courses for e-mail communication and spa business</b></li><li>■ First VDO Learning Colour multimedia in the world</li><li>■ Create new presentation technique by concert event</li></ul>

**Conclusion:** *Incremental innovation in service*



Food and Agro-Industry Sub-sector

Fashion Sector

Tourism Sector

KIS Sector

Average

Handicraft Sector

Construction and Decorative Material Sector

Software Sector

Health Sector

# Chiang Mai Innovation System

Overall innovation performance Chiang Mai is not so impressive. HR activities and private sector collaboration, albeit weak, is stronger than other aspects.

This is not so surprising, as the innovation system is relatively weak and fragmented, that is, actors have rather low capabilities and linkages between them are weak or, in some cases, non-existent.

However, there are sectoral differences. Construction and decorative materials have more innovation and R&D much higher than average. KIS sector has much more readiness in HR. Health sector has relatively higher investment in innovation activities. Though having higher government support, food sector performance is lower than average.

# Preliminary Finding from Triangular Islands of Innovation in the Philippines

- City level innovation system might fitted with the Filipinovation way than exercising centralized NIS policy.
- City innovation survey already included the city halls and private sectors for high involvement on CIS process since beginning.
- Each cities share similarity and differences:
  - Sectoral differences, with unique degree of innovation activities
  - BPO is booming, but how the Filipinovation will nurture and create value for future of such service oriented activities still require more afford to strategise the particular KIBS sector.
- Intermediary agent role of DOST on city innovation system can be mastered through an analysis and policy development from this pilot project.
- City level innovation survey and decentralisation of innovation system require an enabling environment for knowledge sharing and learning (the sixth generation of innovation management)



# THANK YOU

---

Q&A