Business Incubation for ICT and Software Industry: The case of Thailand Science Park Business Incubator

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Business incubation for ICT and Software Industry: The case study of Thailand Science Park Business Incubator

Author: Akeanong Jangbua, Dr. Barbara Igel
MBA Student (Management of Technology)
School of Management, Asian Institute of Technology

Abstract:

From various business incubator literatures, much attention has been devoted to the description in incubator facilities and its performance, while less attention has been focused on the incubatee and their needs. A case of Thailand Science Park Business Incubator is studied to identify needs of target clients, and to analyze the gaps between clients' needs and providing services. This research study gathers both qualitative and quantitative information. The qualitative aspect consists of information from descriptive interview with existing business incubators in Thailand. The quantitative aspect is comprised of the empirical data collected from questionnaire to entrepreneurs and startups in ICT and software business in term of ranking and assessing the facilities and services provided by business incubator. The providing services considering as input for incubation process are categorized into three main categories according to conceptual framework of the study. These are infrastructure and facilities services, business support services, and technology support services. The needs regarding incubator space and staying period are explored. Extents of needs for incubator services are investigated. The most two preference services found in this study are networking and marketing. It is also found that among various services in general business management, business negotiation technique is the most preference one. Options and measures to deliver such services are proposed.

1. Introduction

Science Park, Technology Centers, Innovation Centers and Incubation Center are instruments of economic development as well as instruments of technology transfer from science into economy also. Incubation Center is increasingly being used as a tool for promoting entrepreneurship, leading to new policies incentives. It is also the ideal startup situation for new technological oriented ventures, helping young enterprises to survive and grow during the startup period when they are most vulnerable. Business incubation center is a dynamic process of business enterprise development. It can support the enterprises by providing a proper ladder to technology-led start-up.

The science park concept in Thailand was approved by the cabinet in 1989. Thailand Science Park (TSP) founded and manages by the National Science and Technology Development Agency (NSTDA). TSP's mission is to create competitive advantages for Thailand's industries by raising the level of technology competency through R&D. Its main directions are focusing on ICT, biotechnology, metals and materials, energy, and clean technologies. The Park is 80 acres of size and houses the respective facilities in these fields, including several laboratories and research units, among them three national research centers from NSTDA (NECTEC, BIOTEC, and MTEC). TSP started the operation in April 2002 with 90,000 sqm utilization area consisting of various building including a Park Main Building with an Incubator Wing and further incubators are scheduled in future.

Completely different approaches tend to be associated with the incubator concept in different countries. For Thailand, main goal of Thailand Science Park Business Incubator (TSP BI) is to function as a technology incubator which incubates techno-businesses to accelerate the growth of knowledge-based industry in Thailand. NSTDA's visions regarding TSP BI for the next years are:

- Developing and promoting incubatees for technology clusters for food, automotive, and software industries
- Links between universities and research institutes to industries and firms
- Matching research demands and supplies
- Assistance in technology transfer
- Building public-private research network and research consortia, as well as local and international research alliances

Regarding to NSTDA's vision in promoting entrepreneurs in software industry, IT Building is being constructed in TSP to be the premise for ICT incubation center. The building is scheduled to be opened at the end of 2004. It has about 5,700 sqm utilization area consisting of small office space for incubatees and ICT training facilities. The providing services in the premise of NSTDA and TSP ICT incubator will be discussed in this study. Entrepreneurs' perspective regarding the needs for services from business incubator will be explored.

The rest of this paper is organized as follows: in section 2, present background of business incubator. A conceptual framework of study is proposed in section 3. Overview of Thailand ICT and software industry and existing business incubators are described in section 4. In section 5, entrepreneurs' needs for providing services incubation process are analyzed based on the proposed framework. Discussions from this study are described in section 6.

2. Background of business incubator

2.1 Definitions of Business Incubator

Business incubators, evolving in the early 1980s from experiences with other business development services, have the purpose of assisting the new venture creation process (Rice and Mathews, 1995). They provide affordable work space as well as shared facilities, and services such as counseling; training; information; and accessing to external networks for entrepreneurial groups. In its generic sense, the term 'business incubator' is often used to describe a wide range of organization that in one way or another help entrepreneurs develop their ideas from inception through to commercialization and the launching of a new enterprise.

However, among various definitions found in the literature there are common features of the business incubator, these are:

1. It is a business development process which helps to reduce the failure rate of early stage enterprise creation.
2. It fosters the growth of new enterprise through provision of a variety of business development services, as well as physical attributes (such as affordable space, shared office facilities and services) which necessary for early stage enterprises development.
3. It provides a conductive environment (such as networking, knowledge, and motivation) to new enterprise creation survival.
4. It leverages entrepreneurial talent to accelerate the development of new enterprise and thus speed up the commercialization of technology.

2.2 Incubator-incubation concept

Hackett and Dilts (2004) offer a formal definition of the incubator-incubation concept. They point out that when discuss about incubator it is not just an office building, infrastructure, shared-space office facility and mission statement. Rather, the incubator is also a network of individuals and organizations including the incubator manager and staff, incubator advisory board, incubate companies and employees, local universities and university community members, industry contacts, and professional services providers such as lawyers, consultants, marketing specialist, venture capitalists, and volunteers.

Research orientation regarding incubators-incubation concept by Hackett and Dilts (2004) present five key findings include:

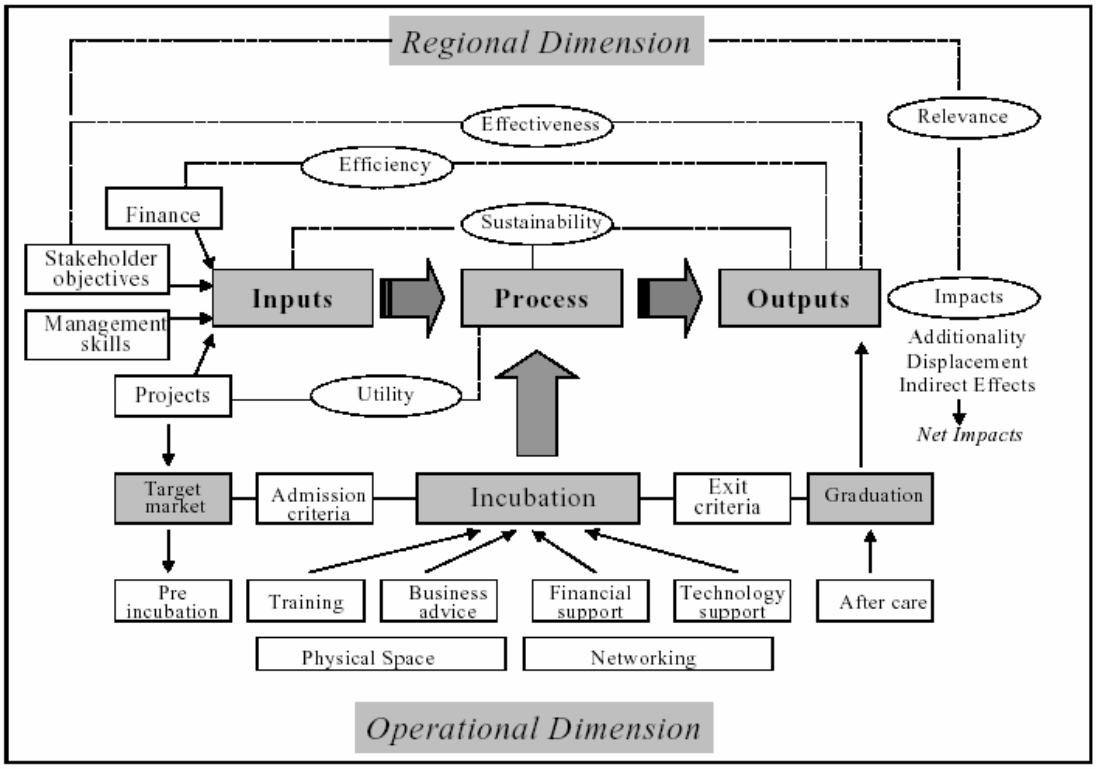
1. Incubators are a systematic approach to controlling resources and reducing cost during the early stages of a ventures development.
2. The incubator configuration must meet local needs and norms
3. The process by which the incubation system is managed and created is a collaborative effort between the incubator manager and the incubatees.
4. The time duration and intensity of incubator manager intervention, coupled with the breath, readiness and fit of the incubator manager incubatee dyad impact the success of the incubatee.
5. Network relationships and institutionalized knowledge transfers enhance the likelihood of incubation success.

2.3 Incubation process

Centre for Strategy & Evaluation Service (CSES), the European Commission has summarized on business incubator model that the way in which business incubators operate can be depicted in term of a simple input-output model:

Inputs – consist of the inputs made by stakeholders (e.g. providing finance), management resources, and projects put forward by entrepreneurs;
Processes – the various inputs are brought together in the business incubation process through the provision of incubator space and other services to companies;
Outputs – successful companies graduate with positive job and wealth creation impacts on local economies.

Figure 1: Incubation Process Input-Output Model



The incubation process itself typically brings together three categories of business support services – training, advice on business issues, financial support (either from an incubator's own sources or from external providers, i.e. financial institutions), and technology support. The provision of incubator units and networking (internally between tenants and externally with other organizations, e.g. universities, large companies) constitute the other basic features of the 'package'.

A key feature of incubators is the limited duration of assistance with exit criteria typically specifying that firms should 'graduate' after a fixed period of time (e.g. five years). Some firms will of course leave sooner if they grow rapidly and require more space than the incubator can provide. However, in many cases, contact will be retained with 'graduate' companies through the provision of after-care services and/or on-going networking.

2.4 Business incubators: functions, critical success factors, and best practices

Business incubator functions are grouped into four main areas (CESE 2002), i.e. incubator space; business support service; promotion and defining target market; and admission criteria, client management and exit rules. The nature of business incubator services and the way in which they are delivered will usually have an important influence on the success of client companies and hence on the successful performance of the incubator.

Although it is difficult to provide universal information on the title "What's successful business incubation," some key factors can be identified according to APEC Incubator Forum Summary (2003). These components are:

- Consensus building;
- Sound planning and mission statement, as well as clear metrics for success;
- An experienced and good management team;
- Explicit entrance and exit policies**;**
- Linkage and networking;
- Client-oriented and market-oriented services;
- Continuous evaluation.

From study of Joel Wiggins and David V. Gibson (2003), there are three components to business incubator best practices, i.e. the facilities, the types and qualities of services provided, and the operation and management of the incubation program.

For the facilities, it should provide flexible space so that an emerging company can expand within the facility during its period of incubation, as well as be able to accommodate new firms. The physical facilities should be designed to encourage interactions. Most incubators aim to provide space for at least 20 tenants and seek to provide a mix of office and workshop space to ensure that units of different sizes are available to suit tenants at different stages of growth, and common facilities such as meeting rooms, canteens, etc. A key performance indicator is the occupancy rate achieved by incubators. Typically incubators will seek to achieve rates of between 80% and 90% occupancy.

For the types and qualities of services provided, the studies of business incubator best practice suggested that services may includes, but are not limited to the followings:

- Pre-incubation and entrepreneurship training (e.g. business plan development, business management training, and presentation training)
- Business support services (e.g. on-site management, mentoring program, marketing assistance, intellectual property protection assistance, general legal assistance, networking, accounting and bookkeeping assistance)
- Financing start-ups and expansions (e.g. access to capital)
- Technology and innovation support, and technology commercialization assistance
- After care, outreach, networking, and virtual incubation services

For the operation and management of the incubation program, the literature suggested that business incubator should include the following components:

- Well-develop mission statement and goal
- Advisory board with representation from local government, state/local economic development official, local professional service provider network (including a general practice lawyer, patent attorney, accountant, and the investment

community), host institute, local entrepreneurial community, tech-commercialization specialist, and a graduate firm
- Careful selection of manager who have local knowledge, be motivated, able to multitask, and be a team player, among others assets
- Have entrance and exit criteria for client firms designed to lead the enterprise to self sufficiency
- Ongoing evaluation of incubator performance

2.5 Business incubators worldwide

According to a recent estimate (R. Lalkaka, 2001 and D. Lalkaka, 2003), there are now around 3,500 business incubators of various types world wide. Growth in number of incubators is rapid, especially in developing countries where the number of business incubators reached about 2,000. Of the world total number of about 3,500 incubators, roughly one-third each are in the U.S.A., the other industrial countries (in Europe, Australia, Japan, Canada) and the industrializing and restructuring countries. Number of incubators in Asia is now growing and the highest among all regions. But three-quarters are in only three countries – China, Korea, and Taiwan.

3. Research framework

From various business incubator literatures, much attention has been devoted to the description in incubator facilities and its performance, while less attention has been focused on the incubatee and their needs. Thus, objective of this research this research study, a case study of Thailand Science Park Business Incubator, is to identify needs of target clients, and to analyze the gaps between clients' needs and supply provided by Thailand Science Park Business Incubator. Questionnaire will be used to analyze the clients' needs and the interviews will be used to identify the services of the supply side as well as the influence of stakeholders for new venture creation in software industry.

3.1 Conceptual framework of the study

The conceptual framework, as shown in Figure 2, is adapted from the input-output model of the incubation process suggested by Lalkaka (2002), and the incubation process model by Hackett and Dilts (2004).

The upper part of the framework depict life cycle of the business incubation where incubator and incubatee interact. Mission and operation scheme of the incubator will be influenced from stakeholder objectives. Target clients with business proposal will be screened. The clients having promising business ideas and/or high potential of business growth will be selected into the incubation process. After certain period of intensive nurturing in the incubation process, viable new ventures have to graduate from the incubator according to the exit criteria. However, success and failure rate of the graduated venture depend both on effectiveness of the incubation process and others business circumstances where the new venture operate. It is also importance for the business incubator to provide aftercare services for the graduated venture and to monitor their business growth periodically. Consequently, these post-incubation activities will help to increase the survival rate of the start-up enterprise and create networking and linkages within the target industry.

The lower part of the framework deals with the providing services which considered as input for incubation process. These providing services are essential elements to increase chance for survival and to accelerate development of new ventures which considered as output of the incubation process. This research study will investigate into details of the providing services. Extents of needs for services from users' perspective will be explored. The issues to be emphasized in this framework are indicated by the dotted-line constructs.

As shown in the construct of providing services in Figure 2, details of the services for incubation process to be analyzed in this study are: (1) infrastructure and facilities which include office space, office facilities for each incubatee units, common used facilities among the incubate); (2) business support including six areas of support i.e. general business management, marketing, finance, human resource, networking, and product & service advice; (3) technology support where usage of laboratory facilities, technology transfer from R&D centers, technology transfer from universities, technology transfer between companies, technical training in special topics are included.

3.2 Methodology

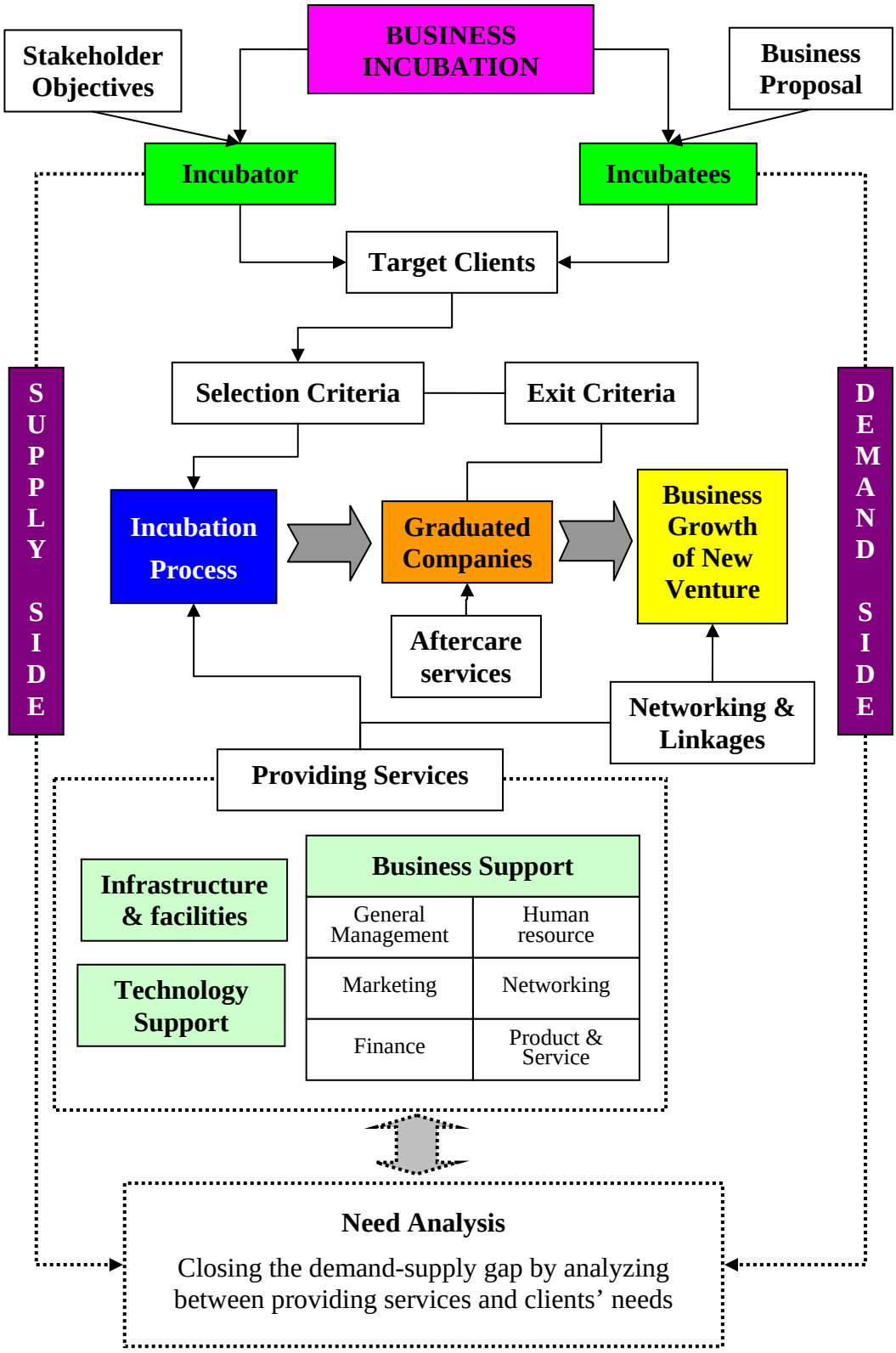
This research study will gather both qualitative and quantitative information. The qualitative aspect consists of descriptive interviews with public organizations that provide business incubation to software firms, and the ones that provide strategic planning for software industry promotion, as well as a private business incubator. Experts' opinions who are involved in the business incubation process are also collected.

The quantitative aspect is comprised of the empirical data collected from questionnaire to entrepreneurs in software business in term of ranking and assessing the facilities and services provided by the incubator. Respondents for the quantitative part are prospect clients of Software Park Incubator Center for 2004, prospect clients of Thailand Science Park Business Incubator, participants of training in "Techno-Business Start-up Program 2004"

The questionnaire was designed into three main parts. The first part was design to collect data of the respondents in order to understand their characteristic and investigate their pattern of needs for the providing services. The second part was designed to explore the respondents' needs about the providing infrastructure and facilities, where extents of needs to use facilities were rated. In the third part, respondents were asked to rate the extent of their needs in 29 services items under business support and technology support, as shown in the construct of providing services in the study framework. In each item, respondents were asked to rate the extents of their need for business incubator services using a four-level scale (0=no need; 1=very little; 2=some extent; 3=great extent).

The supply and demand sides of the providing services for the incubation process will be analyzed to close the demand-supply gap. The qualitative data will be used to analyze the supply side of the business incubation, whereas the quantitative data will be used to represent the needs of entrepreneurs from the demand side. Service package for incubation process will also be proposed for Thailand Science Park Business Incubator.

Figure 2: Conceptual framework of the study



4. Overview: Thai Software Industry and Business Incubators

4.1 Thailand ICT and software industry

4.1.1 ICT market and industry

Thailand's IT market is steadily expanding, with state agencies, state enterprises, and the industrial sector representing major customers. Thai ICT market can look forward to estimated growth of 11.8% in 2004, with total spending predicted to grow to 89.10 billion Baht. ICT market in 2003 was 79.7 billion Baht, up 8.6% from 2002.[1]

4.1.2 Software industry

The software market is expected to grow by approximately 23 percent. Most of the software is imported, as Thai software industry is still in an infancy stage. However, there are also many opportunities for local software developers to leverage multinational finished product that may be imported into the country. These would include localization, customization (supply chain/enterprise resource planning, customer management), and integration (e-commerce delivery systems with back office operation).

There are many SME manufacturers that will make buying decisions on ERP this year as a lot of the issues were resolved with our trading partners (like the EU). Government will implement more programs to encourage SMEs to use more IT. This includes tax incentives and could involve working with the software industry to give away some free or very low cost business software that is developed by Thais.

There will be outsourcing opportunities from overseas in the areas of content development like animation and other web content. Some talented-software companies will try and expand our offshore customer base in the US, EU and Japan. Although this will be high growth, the base is small yet and we will need a lot more IT resources created with the help of government. There also will be more application and content developed for mobile networks.

E-government programs such as e-finance (budgeting), e-education (Ednet) and other ministry-specific decision support systems should be implemented this year now that we have the ICT ministry and the new NITC pushing hard for the PM. With all economic and consumer indicators are better this year than last year, the private and government sectors are recovering and have more confidence that things are getting better.

However, most of the software is imported, as Thai software industry is still in an infancy stage. This is due to shortage of ICT human resource as well as the problem of the software piracy. However, successful software companies are not selling just software; they bundle software services with the developed software systems.

As a result of the government's support for the use of ICT within the public sector, the demand for IT professional services is expected to increase. Consequently, this will lead to a significant growth in the software industry, training, IT professional services and system maintenance.

[1] Source: "Thailand ICT Market outlook 2004" data from ATCI, and ATSI

4.1.3 ICT human resource

The most important factor that will enable ICT to drive economic and social development in the desired direction is the development of the quantity and quality of ICT personnel. Not only must there be sufficient numbers of skilled personnel, they must also be prepared to act as part of a global drive toward technology development. Furthermore, they must be able to apply this technology appropriately to the type of society in which they are operating. However, the rapid strides currently being made in IT have forced many countries to make urgent adjustments simply to keep up. This has led to an intense demand for IT personnel, both in terms of numbers and in terms of skills, with demand way outstripping supply. The inability to keep pace with these rapid changes will lead to loss of competitiveness and will have a negative impact on current and future economic and social-development projects.

According to the study done by NECTEC and Thammasat University, the demand for ICT personnel in year 2003 is estimated to be 106,992. However, problems remain in terms of the quality of the personnel. Specifically, there is a strong need for personnel with skills that matches the industry's demand.

4.2 Software business incubator in Thailand

The first incubation center in Thailand was established in the year 1999 at Songkla province by Department of Industrial Promotion (DIP), Ministry of Industry. In 2002, DIP established another six incubation centers across the country. Among the six incubation centers, incubation center at Software Park Thailand is only one incubation center for computer software and IT.

4.2.1 Software Park Thailand Incubation Center

Software Park Thailand, a government agency under National Science and Technology Development Agency (NSTDA), was established to stimulate the development of Thai software industry. Incubation center is considered as an integral part of Software Park's mission to provide the most enabling environment that meet the needs of software entrepreneurs. Facilities provide for each incubatee include work station (~3-4 sqm.), computer, telephone, internet access. Shared facilities include printer, scanner, fax machine, copy machine, cabinet and locker, meeting room and seminar room. The incubation center is opened 24 hours while incubation center staffs are available to provide services from 9 am to 6 pm., Monday to Friday. Full occupancy of the incubation center is 30 incubatees. Software Park Thailand Incubation Center has three staffs, one senior staff as incubator manager, and the other two junior staffs are assistance to the manager.

Apart from the physical facilities, the incubation center also provides advice and mentoring service regarding marketing, business operation and management. There are several seminars and training programs organized periodically to develop incubatees' business skills. The incubatees are regularly supplied with useful information related to software business and industry. The incubation center also provides incubatees networking and linkages to venture capital and other source of funding and investment.

Software entrepreneurs and software enterprises with age of less than two years having business plan proposal and at least 40% of investment capital are eligible candidates for the incubation center. Selected entrepreneurs/enterprises are required to install Baht 20,000 as guarantee amount. After completion of the incubation period, it will be returned to graduate who follow the rules and regulation of the incubation center. The period of incubation is one year. However, extension of the staying period (up to one more year) can be discussed depend on incubatees performance and stage of business development.

In April 2002, there were 20 incubatees selected into the incubation center. After the incubation period, 12 incubatees succeeded in product development and reach commercialization stage. They were surviving and growing profitably as they left the incubation center. For year 2003, there were 30 incubatees selected into the incubation center. The survival rate of year 2003 incubatees is expected at 70%. In year 2004, there were about 80 applicants for the incubation units. Only 20 applicants will be selected as in-wall incubatees since there are about 8-9 incubatees from year 2003 which have been extended their period of stay for six more months. These incubatees are surviving and growing and are on the path toward profitability.

4.2.2 Thai Incubator Dot Com

Thai Incubator Dot Com, only one private incubator, invests in and incubates IT startups. The company was founded by Mr. Narong Intanate, a well respected IT entrepreneur who founded The Value Systems, a leading IT distributor in Thailand. Thai Incubator Dot Com's management team has extensive experience and contacts in numerous Internet-related industries as well as expertise in a variety of critical functions, such as: fund raising, finance, accounting, marketing, human resource, and IT. The company’s expertise, network, and experience will significantly assist a startup to grow rapidly and succeed in the marketplace. Thai Incubator Dot Com specifically interested in working with start-ups in e-commerce, mobile application/service, package software development, and security related.

Thai Incubator Dot Com has invested in 8 companies with total investment amount of about Bath 40 million. The incubation period is normally up to two years. Thai Incubator Dot Com will take their exit from the incubatee company at year five. At present, in-wall incubated companies are as follows:

- Urgento Software - saving co-operative software developer
- NTN Solution - customized software developer
- GamEd Software - online investment game developer
- ThaiMapGuide - Internet map solution provider
- ExamCybernet - on-line testing software developer
- ThaiVenture Dot Com - IT and economic information provider

Two companies already graduated from the incubation premise. They are considered as out-wall incubatees which Thai Incubator Dot Com still incubate and hold its share.

An in-wall incubatee receives about 20 sqm of office space. In addition, Thai Incubator Dot Com provides back office supports such as accounting personnel, tax services, IT support personnel. At initial phase of, renting fee will be charged at minimal amount or will not be charged at all. Amount of renting fee will increase as the incubated company start to sell its first product. The incubated companies are required to report their monthly cash flow to Thai Incubator Dot Com.

Thai Incubator Dot Com has three staffs with background in finance to closely mentor the six incubated companies. For marketing advice, it use the expertise of VNET Venture Capital which is major shareholder of Thai Incubator Dot Com. Currently, Thai Incubator Dot Com is slowing down the investment in IT startups. However, it will continue to nurture the six existing in-wall incubatees until graduation, i.e. incubated companies start to make profit and grow. Rather than incubate and invest in IT startups companies, Thai Incubator Dot Com and VNET Venture Capital prefer to invest in later stage of enterprise development which requires less mentoring services.

4.2.3 Software Park Khon Kaen

A new software park project has been proposed to be launched in the Khon Kaen province, which will feature a training centre for wireless applications and Java programming, a mobile testing centre and an incubator centre. The E-Saan Software Park is a joint initiative of the Swedish Thai Chamber of Commerce and Khon Kaen University, and has the support of the National economic and Social Development Board, Software Park Thailand, Commercial Bank Club and the Industry Federation of Khon Kaen. Once established, the software park will have three departments, namely technology transfer, administration and business development. To be managed by the ICT Ministry, the E-Saan Software Park is hoped to serve as a growth platform for local software developers.

4.2.4 Thailand Science Park and Computer Clustering Promotion Program

Thailand Science Park currently accommodates 26 local and overseas companies as tenants. Among these tenants, 16 companies were incubated in the following fields of technology: ICT: 6; new materials: 6; agro-food: 2; pharmaceuticals: 1; biotechnology & life science: 1.

In TSP, NSTDA provides modern infrastructure including building automation system, internet network system, telecommunication system, video conference system, exhibition area, and training center. NSTDA also offers private sectors state-of-the-art laboratories, tools, and equipments to conduct research and development. In addition, there are several support services for SME currently operated by NSTDA which include: Industrial Technology Assistance Program (ITAP) which source local and international experts to investigate and solve technical problem for firms, assist SME to search for and acquire appropriate technology, promote the use of quality system in SME; Intellectual Property Services Program (IPS) which assist in filing patents, and provide IP consultancy services to both public and private sectors; Company Directed Technology Development Program (CD) which provide financial assistance in the form of soft loans and grants to promote innovation in private sector; NSTDA Investment Center (NIC) which promote private sector investment in science and technology by co-investing in form of joint venture enterprises.

In October 2003, the Computer Clustering Promotion Program (CCPP) is established as a part of TSP to play a role relating to ICT and software. It is there to support the tenants and non-tenants as well as incubatees to build their computer technology development capacity and contribute to their competitiveness. Its activities are split into two main services.

The first group of activities includes: (1) technology transfer activities including state-of-the art computer technology transfer; (2) consultation and application development services; (3) software engineering and software architecture curriculum development; (4) technology expert data bank; (5) Business development consultation and ICT strategic management services; and (6) seminar and forums on state-of-the-art computer technologies. The second group of activities includes consultation and application development services including project development consultation, application development, and technical support.

At present, one of the CCPP focused activity is state-of-the art computer technology transfer by providing intensive training in "Enterprise Software Engineering and Architecture" (ESEA). It is six months training program. It is the CCPP's objective to produce skilled professional to serve demand of ICT and software industry. To achieve this objective, the CCPP has signed MOU (memorandum of understanding) for collaborative activities and technology transfer with many other academic institutes and the private sector. Besides the ESEA training program, the CCPP will also provide other training programs including "Wireless Technology and Embedded System Software", "Multimedia, Animation and Virtual Reality Technology", "Artificial Intelligence Technology", and "Training the Trainers for Software Engineering".

One distinguished aspect of the CCPP's training programs is that it is able to pull in several ICT and software projects from its consultation services to trainees. The trainees will work closely with their trainers on the assigned projects. Thus, they will have opportunities to gain both theoretical knowledge and practical experience from case study of ICT and software projects both from private and public sectors. After training program completion, it is assured that the trainees are capable to apply appropriate technology for the type of work they operate enabling them to compete for projects in both local and international market.

Besides this, being as state-of-the art training center in computer technology, the CCPP will be considered as one of ICT and software human resource center of the country where it assemble highly skilled professional in these field. The CCPP can act as middle man among these professionals and large companies as well as government agency. Linking up talents and entrepreneurs to various development projects will help to promote development of ICT and software industry of the country and to facilitate new venture creation.

As new IT building of Thailand Science Park will start its operation end of this year, the building will house business incubator units (ranging from small area of 12 sqm to such large area of 160 sqm), training center for state-of-the art computer technology, and R&D infrastructure and facilities necessary for computer technology field. This is considered as the "hard" part. The "soft" part is the providing services including NSTDA's support services for private sector, the CCPP's activities and services. Putting the "hard" and "soft" parts together, the TSP intend to provide inductive ambient as a center for entrepreneurs in electronic and computers, information technology and software, wireless telecommunication technology and data center. It is designed specially to foster creation of new enterprise in high end market of Thailand ICT and software industry and assist them to survive in early stage of their enterprise development. It also intends to cluster talents and skilled personnel from the training programs in order to increase competency of Thailand ICT industry, to reduce number of imported products, and to compete at international level.

5. Exploring the needs and supply of business incubator for software enterprises

5.1 Respondents' profiles

Among forty-one respondents, it is founded that 42% of them are age between 25 to 30 years; 56% possess graduate degree; and 34% have work experience between 2-5 years. There were 34% of respondents who are software package developers, and 21 % who operate software customization. For the production stage, there were about 40% of the respondents in software development stage.

5.2 Needs for incubator space

Among all respondents, 59% of them expressed that they want to use the facilities and office space in business incubator. However, the others 41% who do not intend to stay in business incubator premise indicated that they still want to receive supportive services and advices provided for start-up enterprise. Thus, the first group of respondents can be called in-wall incubatees, where as the latter one can be called out-wall incubatees.

Regarding to amount of space needed at initial phase, the result as shown that 33% of those who want to use the space in the incubator require 30-50 sqm, while 29% and 25% require 10-30 sqm and 5-10 sqm respectively. Only 8% said that they require 50-70 sqm, and only 4% said that they want more than 70 sqm at their first move-in. For the period of stay, 33% of respondents expect to stay for 1.5-2 years, 29% and 25% of them expect to stay for 1-1.5 year and for 9-12 months respectively. Only 13% of them expect to stay for more than two years.

5.3 Needs for incubator facilities

Among the 24 respondents who want to use the space and facilities provided by incubator, the highest average means value of the needs is in internet access (M = 2.96, $s.d.$ = 0.20). The second and third ranked are telephone (M = 2.71, $s.d.$ = .75) and meeting room (M = 2.42, $s.d.$= .45). In addition, they also mention about other offices supplies and common facilities required. These include shared printer, leased computer, server, over-head projector, electronic board, video conference, wireless LAN, security guard, separate air-condition switch for each office space, vending machine, and shower room. Furthermore, common space dedicated for advertisement of incubatees' business is also required.

5.4 Needs for incubator services

5.4.1 The needs across all respondents

From the questionnaire, the extents of needs for each service item (See Appendix A) are averaged into score of needs for each service group. Group means of needs for each service group are calculated. Among the means of each service group, it indicates that the first two services that the respondents need at most are marketing (M = 2.72, $s.d.$ = .49) and networking (M = 2.72, $s.d.$ = .39). By exploring into the needs for service items in general business management (Service A), the extent of need for business negotiation techniques is the one having highest score ($M = 2.73$, $s.d. = .63$), whereas the extent of need for mentoring service has the second highest score ($M = 2.56$, $s.d.$ 1.39). Somehow, the result shows that the extent of needs for technology transfer is ranked at the sixth place (M = 2.09, $s.d.$ = .72) among seven service groups.

5.4.2 The needs based on different characteristic of respondents

In order to investigate and better understand the needs of the prospect incubatees, analysis of variance was performed, at significant level of 90% i.e. $p < .10$, on the group means of extent of needs for each service group based on different characteristics of respondents, which are classified as: age of new venture; years of work experience; management experience; type product & service; stage of software production; and in-wall vs. out-wall prospect

As reported in Table 1, based on age of the new venture (0-1 year, 1-2 years, and >2 years), there were significant differences in the extents of need for service in finance (Service C), help to recruit human resource (Service D), advice on product & service (Service G), and assistance in technology transfer (Service H). Classification based on working experience, Table 2 presents significant differences in the extents of needs for service in general business management (Service A), and marketing advice as well as market research (Service B).

In Table 3 and Table 4, based on management experience of the respondents, and based on types of product and service, the result indicate that there are no significant difference in extents of needs among the respondents for all group of service except in general business management service (Service A). While Table 5 shows that among respondents in different stage of software production, there are significant differences in extents of needs in general business management (Service A), and advice on product and service (Service G). Table 6 presents that there is no significant difference in extent of needs for services in all groups of services between in-wall and out-wall prospect incubatees.

Table A summarizes that significant difference in extents of needs are differ according to various characteristics of the prospect incubatees. It is found that all respondents, regardless of their characteristics, expressed no significant differences in the needs for networking (Service E). As mentioned that the average mean of needs for networking services is the highest one among other services. This can be implied that, they all expect to receive networking and linkages with potential customers, larger companies, with other entrepreneurs from the business incubation process.

Table A: Summary of significant different in extent of need giving by characteristics of incubatee

Services	Age of new venture	Years of working experience	Management experience	Product and service type	Stage of software production	In-wall and out-wall prospect
Service A		•	•	•	•	
Service B		•				
Service C	•					
Service D	•					
Service E						
Service G	•					•
Service H	•					

From this study, networking can be considered as one of critical factor determines the performance and effectiveness of the TSP business incubator as it is the most desirable service. It is also essential for the incubator to understand different pattern of need giving by differences characteristics of target clients in order to delivery appropriate service packages which match the needs pattern for effectiveness of incubation process. Understanding the clients better will help close the supply and demand gap between the service provider and the incubatees.

6. Discussion

This study provides an empirical study regarding the needs of prospect clients of software business incubator in providing services i.e. infrastructure and facilities, business support (include general business management, marketing, financial, human resource, networking, product and service advice, and technology support (include laboratory equipments and technology transfer from technology resource centers).

Comparing between the two exiting incubators in the field of ICT and software, Software Park Thailand Incubation Center and Thai Incubator Dot Com, the first one provides small workstation which can accommodate one person per an incubated firm whereas the latter one provides the space where suitable for startup enterprise having 2-3 personnel. In term of period of stay, Software Park Thailand Incubation Center allows one year staying period with six months extension for exceptional case. Thai Incubator Dot Com allows maximum of two years for in-wall incubatees.

However, it is important to note differences in stakeholders' objectives and target clients of the two incubators. Clients of Software Park Thailand Incubation Center, a non-profit incubator, are still in infancy state and the incubator is there to help them get start in software business as early as possible, i.e. with in one year. Whereas clients of Thai Incubator Dot, a for-profit incubator, seem to be more mutual and established enterprises which are expected to have high potential to survive, grow, and make profit to pay back to the investor in the near future. Thus, for the most efficient performance of TSP IT building, information regarding age and development stage of enterprises of prospect clients will help in preparing different or flexible space for variety of clients' characteristic.

The best practice regarding incubator space/number of tenants suggests that a range between 2,000 sqm to 4,000 sqm space is needed to accommodate 20-30 companies in order to achieve economies of scale, however depending on the type of incubator. For the period of stay depend, the best practice suggests a benchmark of 3 years.

According to the services provided by the two existing incubators, Thai Incubator Dot Com mentors its incubated enterprises very closely in marketing and finance, and provides linkages to various prospect customers. Software Park Thailand Incubator Center tends to emphasis more on providing training programs in business management the incubatees. Networking and linkage are also provided through meeting events with venture capitals, and show case of the incubatees in exhibition and trade fair. However, from the interview with the incubator manager, incubatees express that more assistance in term of marketing is needed.

Based on the finding in this study regarding the business support services from the incubator, networking is the most preference services. For entrepreneurs and startups enterprise, it is considered as applicable marketing tool and good channel to customers and resources. Thus, it is recommended for TSP that there should be options or measures put forward to deliver network service to better serve the clients at their needs. It should be ensured that both formal and informal network of institutions (business communities, related associations, advisory board, government agencies, universities, research centers, banks, accountants, and lawyers) are in place and really function as one of driven mechanisms in incubation process. A kind of forum or club should be established as a platform for networking. Regularly events to network the incubatees with customers and suppliers, as well as with financial resources are recommended. Ambient in the incubator itself should encourage networking among incubatees to exchange their ideas and knowledge as well as to jointly work together to achieve a specific objective. Monthly informal talk among incubatees can be organized by the incubator to stimulate the linkage among incubatees. This talk can also be used as a hearing platform for the services performance of the incubator.

According to the finding across all respondents, marketing services is another most preference service. It is, therefore, suggested that TSP should recruit incubator management team members who possess strong knowledge in marketing and capable to provide on-site guidance. Market research in ICT and software industry should be conducted to provide specific market information as well as industry and technology trend to the incubated firms. It is important information for doing business. It can be done in-house or by outsourcing.

Regarding general business management services, it is found that among nine service items, business negotiation technique is the most preference. Negotiation skill can be learnt and put into practice. It is structure process. Understand how it all works and practice, then the tasks can be easy. TSP may consider to organizer in-depth, result-oriented and highly-customized workshop to build up and strengthen negotiation skill. A simulation or negotiation game can also fasten learning process.

For technology support services, i.e. access to laboratory and testing equipments and technology transfer, it is found that there is less preference across all respondents for this services. However, when taking into account the age of new venture, there are significant differences in the extent of needs for this service. Thus, it is suggested that a survey should be conducted emphasis only on this issue. Survey questions may include what special equipment required, what kinds of technology really need to be transferred, and what specific technology trainings are needed.

The study also takes into account different characteristics of respondents (i.e. age of the new venture, year of work experience, management experience, type of product and service, stage of software production, and in-wall and out-wall prospect) as variables to the providing services. It is found that variety of the characteristics come into play on the extent of needs for service. Thus, to match the need and providing service, it is essential for TSP to understand its clients' characteristics and their pattern of needs. This will also increase performance of the incubator itself.

Thus, for TSP to effectively operate IT building as a center for entrepreneurs and startups in ICT and software enterprises, pool of resources and good incubator management team are required. It is quite confidence that TSP will be able to provide all necessity elements for the "hard" part of the building. For the "soft" part, TSP can rely on the expertise of CCPP in

providing state-of-the-art computer technology skills and knowledge to nurture entrepreneurs and startups. However, the way to deliver and quality of business support services are critical issues for TSP in running ICT and software business incubator. A strong incubator management team has to be carefully recruited to execute the incubation process. The entrance criteria and exit policy need to be explicitly set as it is preliminary determination of incubator performance.

It is important to note that the results of this study should be examined within the context of the limitation of the research study. Firstly, it is quite difficult to tap the entrepreneurs and talents who have not been in contact with services providers such as Software Park Thailand, NECTEC, and TSP itself. Secondly respondents are small in number which in certain ways may present a different point from target clients of TSP and the CCPP. Despite these limitations, the study provides preliminary evidence on the needs for incubator providing services, and can be useful for TSP in preparation of service package for business incubator.

In addition, for the years to come, study of economic impact of TSP business incubator and the CCPP for ICT and software industry are recommended. TSP incubator performance evaluation, benchmarking, and clients' need assessment are also suggested for further research study. For broader scheme of the country, as a number of business incubators both for general industry and for specific industry (such as ICT and software) already exists and more to come in the near future, a study of national business incubation system is another interesting issue to investigate proper mechanisms to promote creation and growth of new venture in Thailand.

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Appendix A

Service Groups		Rank	Group Mean	S.D.
Service A: Business management in general		5	2.22	0.63
A_01	Startup strategy			
A_02	Business plan development			
A_03	Business skills devlopment			
A_04	Company formation			
A_05	Accounting			
A_06	Financial management			
A_07	Legal issues			
A_08	Business negotiation technique			
A_22	Mentoring			
A_09	Other support services needs			
Service B: Marketing		1	2.72	0.49
B_10	Marketing advice			
B_11	Market research advice			
Service C: Finance		4	2.33	0.66
C_12	Financial issues			
C_13	Provide contact to funding resource			
C_14	Help to raise fund from bank loan			
C_15	Help to raise fund from grants or seed money			
C_16	Help to raise fund from VC			
Service D: Human resource		7	1.72	0.01
D_17	Help to recruit operational staff			
D_18	Help to recruit professional management			
Service E: Networking		1	2.72	0.39
E_19	Networking with other entrepreneurs			
E_20	Networking with potential customers			
E_21	Networking with large companies			
Service G: Product and services		3	2.49	0.68
G_23	Advice on new products/services development			
G_24	Advice on product implementation			
Service H: Technology transfer		6	2.09	0.72
H_25	Access to special laboratory			
H_26	Technology transfer from R&D centers			
H_27	Technology transfer from universities			
H_28	Technology transfer among companies			
H_29	Technical training in special topic			

Appendix B

Table 1: Service group means and ANOVA results from respondents' profile classified according to age of the new venture

Service Group	Age of the new venture			*F*	*p*
	0-1 year (n = 12)	1-2 years (n = 10)	> 2 years (n = 8)		
Service A	2.41	2.06	2.06	1.011	0.377
Service B	2.75	2.70	2.81	0.143	0.868
Service C	2.55	1.90	2.38	2.622	0.091 *
Service D	1.63	1.40	2.25	2.771	0.080 *
Service E	2.67	2.73	2.88	0.681	0.514
Service G	2.75	2.15	1.48	2.555	0.096 *
Service H	2.10	2.69	2.60	8.217	0.002 *

Table 2: Service group means and ANOVA results from respondents' profile classified according to years of working experience

Service Group	Years of working experience		*F*	*p*
	less than 5 years (n = 20)	equal or more than 5 years (n = 21)		
Service A	2.44	2.02	5.100	.030 *
Service B	2.85	2.60	2.927	.095 *
Service C	2.35	2.31	.029	.866
Service D	1.68	1.76	.116	.735
Service E	2.70	2.75	.137	.713
Service G	2.48	2.50	.013	.909
Service H	2.07	2.10	.023	.808

Table 3: Service group means and ANOVA results from respondents' profile classified according to management experience

Service Group	Management experience				*F*	*p*
	no experience (n = 14)	< 2 years (n = 14)	2-3 years (n = 5)	> 3 years (n = 5)		
Service A	2.57	2.09	2.14	1.88	2.558	.071 *
Service B	2.86	2.71	2.70	2.70	.362	.781
Service C	2.47	2.21	2.68	2.00	1.269	.300
Service D	1.89	1.54	2.00	1.80	.625	.604
Service E	2.74	2.69	3.00	2.73	.807	.499
Service G	2.61	2.21	2.70	2.80	1.380	.266
Service H	2.23	1.79	2.48	2.36	1.729	.179

Table 4: Service group means and ANOVA results from respondents' profile classified according to product and service types

Service Group	Product and service types								*F*	*p*
	Type 1 (n=13)	Type 2 (n=8)	Type 3 (n=8)	Type 4 (n=2)	Type 5 (n=2)	Type 6 (n=1)	Type 7 (n=2)	Type 8 (n=2)		
Service A	2.36	1.83	2.38	2.85	1.05	2.00	2.55	2.30	2.402	.045 *
Service B	2.54	2.50	2.94	3.00	2.50	3.00	3.00	3.00	1.047	.420
Service C	2.60	1.83	2.10	2.90	2.60	2.40	2.70	2.80	1.704	.146
Service D	1.81	1.38	1.88	2.50	0.50	3.00	1.25	2.25	2.005	.088
Service E	2.69	2.54	2.83	3.00	3.00	3.00	2.83	3.00	.980	.464
Service G	2.30	2.69	2.50	3.00	1.50	2.50	2.75	2.50	.960	.478
Service H	1.81	2.00	2.53	2.50	1.40	1.80	2.60	2.40	1.285	.291

Note: Type1: Software package development
Type2: Software customization
Type3: Others
Type4: Software package & customization
Type5: Software customization & subcontract
Type6: Software customization & others
Type7: Software package development & customized & subcontract
Type8: Software package development & customized & subcontract & others

Table 5: Service group means and ANOVA results from respondents' profile classified according to stage of software production

Service Group	Stage of software production									*F*	*p*
	Type 1 (n=2)	Type 2 (n=15)	Type 3 (n=3)	Type 4 (n=6)	Type 5 (n=3)	Type 6 (n=1)	Type 7 (n=2)	Type 8 (n=4)	Type 9 (n=2)		
Service A	2.45	2.13	2.33	2.33	2.40	0.00	2.40	2.33	2.30	2.015	.080 *
Service B	3.00	2.60	2.50	2.92	2.83	2.00	2.75	2.63	3.00	0.690	.697
Service C	1.90	2.36	2.13	2.07	2.60	3.00	2.10	2.75	2.80	0.706	.684
Service D	1.25	1.77	2.17	1.58	1.33	0.00	1.75	2.13	2.25	1.078	.405
Service E	2.83	2.73	2.44	2.72	2.78	3.00	2.50	3.00	3.00	0.795	.611
Service G	3.00	2.37	2.83	2.66	2.16	0.00	2.50	2.75	2.50	2.872	.018 *
Service H	1.60	2.16	2.33	2.30	1.60	0.80	1.40	2.45	2.40	1.211	.327

Note: Type1: Software design
Type2: Software development
Type3: System integrator
Type4: Others
Type5: Software design & development
Tyep6: Software development & System integrate
Type7: System integrate & others
Type8: Software design & development, and system integrate
Type9: Software design & development, system integrate, and other

Table 6: Service group means and ANOVA results from respondents' profile classified according to out-wall and in-wall prospect

Service Group	Prospect incubatees		*F*	*p*
	Out-wall (n = 17)	in-wall (n = 24)		
Service A	2.31	2.17	.485	.490
Service B	2.68	2.75	.222	.640
Service C	2.19	2.43	1.367	.249
Service D	1.94	1.56	2.262	.141
Service E	2.67	2.76	.601	.443
Service G	2.62	2.40	1.046	.313
Service H	1.95	2.18	1.012	.321