The critical factors of success for information service industry in developing international market: Using analytic hierarchy process (AHP) approach

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ABSTRACT

In the past few years, due to changes in industry structure, market and the saturation of the domestic market, information service firms have started to develop the international market. Hence, to continue running their operations and maintain profitability, they should effectively control the related factors in the development of targeting a market. The purpose of this paper is to find the critical operational factors of the information service industry in developing the market and to provide a referential framework for operations in the information service industry. This research is firstly base on the business model discussed in relevant literature, using cross-case study to observe different domains for the operational strategies and critical factors of those top information service companies combined with thorough interviews with their top management executives, experts, and consultants. Finally, we concludes by proposing six elements of business model and 20 critical factors for using AHP method, and also calculates the quantitative weight of those elements and factors. We also take typical commercial software companies for examples to analyze their strategies of entering the international market.

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1. Introduction

According to Gartner Dataquest research, the total production value of the global information service industry market reached US$ 624.4 billion in 2005 and was up to US$ 672.4 billion in 2006. The largest market share is in North America (45.0%), followed by Western Europe (30.6%), with Japan coming next (15.0%), then all others in Asia (5.8%). Although Asia's market scale is smaller than other areas, their CAGR might grow to 11.91% in the future. In Taiwan, for example, the production value of the information service industry in 2006 was NT$239.5 billion, and is expected to reach NT$ 270 billion in 2007. The export value of Taiwan information service industry in 2006 was NT$ 31.3 billion, and it is expected to reach NT$ 40.0 billion in 2007 (2006, MOEA). It appears Taiwan's information service industry market is growing continuously.

Furthermore, since business operations change and move to other markets rapidly, internationalization is a common trend for information service firms, particularly in countries with a very limited domestic market, such as Taiwan and Finland. Therefore, in order to promote foreign target marketplaces (such as mainland China, Vietnam, Japan, Thailand, and the Middle East), several Taiwan firms have developed various applicative products, service models, innovations and alliance models. They have obtained considerable trading orders and produced contributions to the development of industry. In other words, since Taiwan stands in an advantageous position by its location right in Asia's major economic and trade area, it now needs to assess the current information service sectors in terms of various applicative domains of the industry and find optimal business models for entering the global market.

In addition, we found by reviewing the literature that Ojala and Tyrväinen (2006) and Rajala and Westerlund (2007) conducted relevant research on software industry business operations. As for the entry model of opening up the software market, Ojala and Tyrväinen (2006), used individual case studies to summarize and analyze the relationship between a business operation model and market entry model based on the operation model framework provided by Rajala, Rossi, and Tuunainen (2003). Ojala and Tyrväinen (2006), also based on Rajala's (2003) framework of fulfilling the requirements in internationalization, suggested to include the strategic technique of marketing regional or global products as the main point; most of the other studies also took Rajala's research as a reference. However, the operation model of software industry business provided by Rajala et al. (2003) includes four constructive elements: product strategy, distribution model, service establish model, and profit model that encourage research to focus more on respective business internal operations. Even though Rajala et al. (2003) has partially provided important operational factors, it is still insufficient in providing the factors for considering how to open international market, such as market segmentation and

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partnership. The key point of the business operation model is to consider both the relevant issues of internal and external operations for making profits on selling (Magretta, 2002). Therefore, it is imperative to do further study to provide more sufficient operational elements and critical factors as a reference for the industry while the status quo and requirements to open international market are getting more and more complicated.

Overall, the research on operational issues of information service industry to open international market is still at a primary stage and most relevant studies are more inclined toward qualitative approaches.

Based on the important literature stated above and our observations of the development of information service industry, this study aims to summarize the elements and related impact factors of operational strategies in information service industry to open international markets. In the meantime, in order to realize the weight among various elements and factors, this study calculates the results of the responds to the questionnaire, so as to obtain the weight distribution as well as order, then it uses this framework to analyze how the choice of a typical commercial application software product company impacted its investment project for the strategy of entering the target market.

2. Literature review

2.1. Business model

The critical success factors (CSF) are closely linked with the business model of enterprise or strategy (Leidecker & Bruno, 1984; Thomas, 1988). A correct business model always considers the factor of the critical success as the linchpin of business operation. The general definition of a business model for the overall industry can be described as "a path to a company's profitability" (Krishnamurthy, 2003). Magretta (2002) defined the general business model as "how a firm works, who its customers are, what the customer value, and how a firm makes money. The structure of a business model should include several elements of business strategies and aim at describing the framework of business as a manifestation derived from strategy (Rajala et al., 2003; Morris, Schindehutte, & Allen, 2005). Different companies handle different skeletons, and the elements of business models are defined differently by many researchers (Hedman & Kalling, 2003; Morris et al., 2005; Osterwalder, 2004; Rajala et al., 2003). To sum up these elements of business model expressed in different words are: value propositions, various assets and capabilities, and revenue logic. In addition, some of the studies (Morris et al., 2005; Osterwalder, 2004) emphasized the relationships with others as a key part of a business model.

Generally, software product has a characteristic which differs a great deal from those of a physical product (Rajala et al., 2003). Hoch, Roeding, Purkert, Lindner, and Müller (2000) has divided software firms into package mass-market firms, enterprise solution firms, and professional service firms, while software product programs include working solutions (in pre-sales) and services such as implementation, training, hosting and product upgrade. However, software implementation always combines with the service contents. So, the software industry is also called "information service industry" in some countries or enterprises. A digital product is generally expensive to produce, but very cheap to reproduce (Shapiro & Varian, 1999).

2.2. Internationalization

In recent years, information service firms who respond to the saturation in domestic markets and the tendency of internationalization have focused on their core competencies and operative strategies to keep their firm's survival. Obviously, the operative issues of internationalization are more complex than those of domestic markets, and these issues correlate closely to their business models. From reviewing the earlier literature, there are few research reports focused on identifying the critical factors for investors to successfully enter the international market. But many researchers studied different aspects on the influences of internationalization issues and highlighted some factors of operative strategy. These findings point to the need for customers' support or customization (Burgel & Murray, 2000; McNaughton, 1996), and intangible assets of the product would impact on internationalization of software companies (Brouthers & Van de Kruis, 1997). Bell (1995, 1997) discusses software firm's product offerings. Ojala and Tyrväinen (2006) based on the researches of Rajala et al. (2003) analyze the relation between software firm business operations and entry into the Japanese market. And he pointed out that product strategy is a key for software internationalization. Moreover, besides Ojala and Tyrväinen's (2006) research, there is other research that quotes the framework Rajala et al. (2003) proposed.

2.3. Business model's elements

Rajala et al. (2003) divides a firm's business model into product strategy, revenue logic, distribution model, and service and implementation model. The "product strategy" is a firm's product offering which has various types such as providing customers specific, highly standardized products. The "revenue logic" is the way a firm gains profits from selling products and services. Low reproductive costs and the intangible nature of software makes software firms set various pricing models, such as effort based prices, licensing, revenue sharing, and a mix of the above. The "distribution model" is the channel a firm uses to get its products and services to the customers. Such a model includes direct sales and in-direct sales. And the "services/implementation model described" here that relates to the product needs to be installed, implemented, maintained, and supported. Thus, the service and implementation model must be fulfilled by the work of a custom-specific system and the projects of client self-service integrated with the system.

However, the studies of Rajala et al. (2003) emphasized the intra-firm (single firm) business model, but are lacking in consideration of other issues for entering the global market. For example, the concern of market in different areas is different (such as partial region, cross region, global market). Ojala and Tyrväinen (2007) pointed out that the distance of culture, geography and market size are key influences in the target country. Winkler, Dibbern, and Heinzl (2008) explored the nature of cultural differences in offshore outsourcing and analyzed the relationship between those cultural differences and offshore outsourcing success. Concerning the service efficiency, Ganek and Kloeckner (2007) pointed that service excellence can only be achieved through effective and efficient service management. They exerted an IBM case study and pointed out that IBM brings together the capabilities of departments of hardware, software and consulting services to help customers design, build, deploy, and manage business services. Bieberstein, Bose, Walker, and Lynch (2005) proposed the Human Services Bus (HSB), a new organizational structure, which would optimize the workforce and streamlines cross-unit processes to leverage the new IT systems.

As regards to the knowledge of industrial domain, Rajala and Westerlund (2007) reported four operative types of knowledge-intensive service (KIS). Based on the research framework of Rajala et al. (2003), those researchers emphasized KIS as the competitive core the software industry might bear. Tiwana (2004) also pointed out that more higly integrating the knowledge of industrial domain with technical knowledge during the development process would increase the effectiveness of software development.

As to the strategies for establishing the partnership, the operation ranges from the sole ownership management, vertical conformity, and horizontal divide-work to the strategy alliance. The study of Coviello and Munro (1997) suggests that software firms use joint marketing or developmental agreements, joint ventures, sales offices, distributors, piggybacking, and direct sales to handle foreign customers. The studies of Bell (1995, 1997), revealed that software firms used direct sales through their own units, indirect export, agents, and distributors when they marketed and delivered their products to customers. Willcocks and Choi (1995) scrutinized three 'total' outsourcing cases and suggested defining the characteristics of an IT strategic alliance to include a high degree of IT interdependence in primary internal areas of the organizations involved as well as a significantly shared development and usage of IT, focusing on the external market-place and various activities.

There is other relevant research, such as that by Nambisan (2001) who suggested that IT companies should catch five key issues (intellectual property rights, product complementarily, returns from sales, abstracting knowledge, and connections with users) in marketing. As regards to the pricing of software, Jain and Kannan (2002) argue that a software firm can use time-connecting-base pricing, search-based pricing or subscription-fee pricing to sell their products.

To sum up, concerning developing the international market and carrying internationalization business, the information service firms should consider the distribution/channel, product strategy, service/implementation, and revenue logic. Besides, they also need to consider the characteristics of the target market, strategic cooperation, talented service people, fast duplication of product, etc. Moreover, they needs to realize thoroughly the developmental status quo of the information service industry. In order to completely find out the CSF of information service firms in developing international markets, we lists the overall important factors of business through symmetric procedure (Hofer & Schendel, 1978). Furthermore, this study uses objective analysis technology to calculate each weight of construct and CSF, ranking all of factors. Information service firms could plan their strategy for developing international markets in terms of these results.

3. Research methodology

According to the literature review, we found only a few of qualitative research reports related to the business model of information service industry. Hence, the issue is still in an exploratory and premature stage. Based on the preceding *literature* and *cross-case studies* (Gable, 1994; Yin, 1994), and also followed *Delphi survey* procedure, we deeply analyzed current business strategies in Taiwan and critical factors of success for Taiwan's current benchmark information service firms. According to these analyses and observations, we deeply interviewed the CEOs of information service firms, and experts and consultants in the field.

Furthermore, we found the structure of business models, critical factors of success, and its hierarchical structure frameworks through the *AHP approach*. Under this framework, we designed a nine point pair-wise comparative questionnaire and calculated data from completed questionnaires. Finally, we obtained the weight of each factor and then offer a referential framework for firms as they plan to enter the international market. At same time, we took a typical commercial software product from benchmark firms as an example to analyze the strategic decision-making for entering the Asian market.

3.1. Cross-case research and observation: current benchmark firms

In order to sufficiently realize important information of business operation constructs and critical factors in the service indus-

try, we reviewed prior literature, to collate several benchmark information service firms' operative strategies and critical factors by cross-case studies (these firms are joining the IT service project of government policy: "Best E-Services export of Taiwan", listed in Appendix A). In addition, we conducted over 200 deep interviews with the CEOs, experts and consultants beginning in May 25, 2008. The key issues as shown in Fig. 1. This procedure (Fig. 1) is the process to interviewed and collected information form cases.

Based on this interviewed and recorded procedure, we obtained a great much of value information of those cases, we induced "seven" critical factors of business of observation as follows (*italic word*):

(1) *When the advance of core competition is clearer and the technique of the products is more powerful*, it will be easier to promote global markets for those firms. For example, H company focused on the credit cycle in the security banking field. It had more than 200 percent sales growth in 2007 and the Credit Guard System was adopted by major financial companies in China.

(2) *The quality of the products and services influences the market response and market image. It also has a positive impact on international orders.* For example, F company introduced CCMI level 5 and it helped to enhance the orders for IT outsourcing from the finance industry.

(3) *Strategic alliance becomes a collaborative system for entering the global market. Mutual-support brings multi-effects for developing markets.* In most cases, companies which penetrate into the global market would have partners cooperating in a strategic alliance. "A" company used the method of partner cooperation which includes green supply chain, cash flow, KM, e-Learning, etc. It has had a positive impact on market share and operation income.

(4) *Familiarity with global market scale, market culture, language and regional specialty and having good information of competitors are helpful in making investment decisions.* For example, A and F companies have had better business operating experiences on market factors (such as scale, culture, language) in the Chinese market than the Vietnam market.

(5) *The efficiency of the distributive strategy for developing the global market and the capability of cost management has a long-term impact on extending the market.* C company is able to spread into different regions because it developed a direct operation branch in the steel distribution industry.
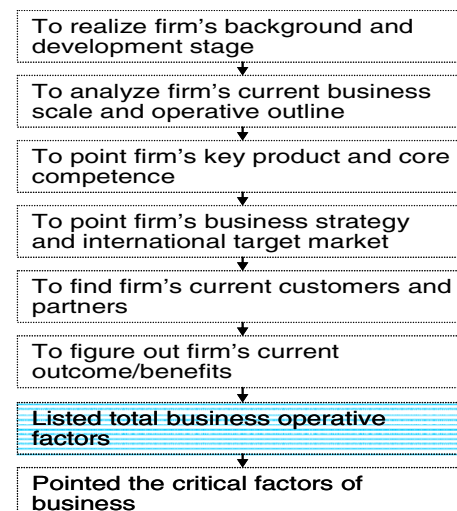

Fig. 1. The process for recording of benchmark firm's information.

(6) *Pricing models for products and service impacts profits greatly.* In general, different pricing models for different cases produce different results.

(7) *The knowledge and manpower for the product and service is one of the main pillars of globalization.* For example, A, C, E, and G companies have a devoted particular percentages of their personnel for global marketing.

3.2. AHP approach

3.2.1. An overview of the AHP

The purpose of this study is to offer a business model framework as a reference and mark out CSF for information service industry on entering the international market. It is typical of such an approach to have decision-making problems with multi-criteria and multi-attributes. One of the optimal approaches to solve such a problem is using analytic hierarchy process (AHP) (Saaty, 1994). AHP which is a qualitative and quantitative method, is a useful approach for evaluating the alternatives of complex multiple criteria involving subjective judgment, AHP is an especially symmetric way that could transform complex problems into simple hierarchic structure, such as project screening (Chin, Xu, Yang, & Lam, 2008), evaluation of knowledge management (Ngai & Chan, 2005), etc. A decision-maker should determine the weights by conducting pair-wise comparisons between various criteria. For these reasons, we propose to analyze the critical factors of success for developing international markets through the AHP approach. The main procedures of AHP are: (1) determine the objective and the attributes of evaluation; (2) develop hierarchical structure levels with goals, contracture, criteria and the alternatives; (2) find out the importance of different attributes with respect to the goals.

3.2.2. A hierarchic framework

According to AHP steps as above, we have firstly reviewed the literature in Section 2, and have collated several Taiwanese benchmark information service firms' operative strategies and critical factors by cross-case studies in Section 3.1. In addition, we visited eleven senior industrial experts and consultants through in-deep interview and the ministries of government in Taiwan. Finally, we obtain six major constructions form original 10 constructions, and obtain totally 20 criteria (form original 46 constructions) for information service industry in developing international market as listed in Table 1. Thus, these constructs and criteria had considerable degree of content validity. Based on these contents, we also listed the definition of CSF in Table 2.

Based on AHP process, we designed the hierarchic layer in Fig. 2. The first layer is the ultimate goal, the second layer is the construction and the third layer is the criteria (CSF). Under this framework,

we summarize 41 items by questionnaire and calculate each factor's weight by AHP software. Finally, I offer a referential framework for the information service companies to enter their target market. Besides these layers, whether or not to add the fourth layer, the layer of decision-making, would depend on the firm's business operative needs.

3.2.3. Pairwise comparison matrix

Further details for the AHP process are as follows (Saaty, 1994; Saaty & Vargas, 2000):

(1) Constructing a pair-wise comparison matrix with a scale of relative importance. An attribute compared with itself is always attributed to value 1, so all the main diagonal entries of the pair-wise comparison matrix are 1. Numbers 3, 5, 7, and 9 mean moderate importance, strong importance, 'very important', and 'absolutely important'; and 2, 4, 6, and 8 for compromise between 3, 5, 7, 9. If there are m attributes, then the pair-wise comparisons would yield a square matrix as matrix A:

$$A = [a_{ij}] = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1m} \\ a_{21} & 1 & \cdots & a_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & 1 \end{bmatrix} = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1m} \\ 1/a_{12} & 1 & \cdots & a_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ 1/a_{1m} & 1/a_{2m} & \cdots & 1 \end{bmatrix}$$

where $a_{ij} = 1$ and $a_{ji} = 1/a_{ij}$; $i, j = 1, 2, \ldots m$.

(2) Finding the relative normalized weight (w_j) of each attribute by calculating the geometric mean (GM) of the ith row normalizes the geometric means of rows in the comparison matrix. The geometric mean method of AHP is used to find out the relative normalized weights of the attributes because of its simplicity and ease to find out the maximum eigenvalue and reduce the inconsistency in judgments.

- Matrix A, the problem involves assigning a set of numerical weights w_1; $w_2, \ldots, w_m$ to the m criteria $a_1; a_2, \ldots, a_m$ that "reflects the recorded judgments".
- If A is a consistency matrix, then the relations between weights w_j and judgments a_{ij} would be simply given by $w_i/w_j = a_{ij}$ (for $i, j = 1, 2, \ldots, n$).

(3) Finding out the maximum eigenvalue "λmax" (Saaty, 1994).

(4) Calculating the consistency index as equation CI = $(\lambda$max $- m)/(m - 1)$. The smaller the value of CI, the smaller is the deviation from the consistency. The consistency in the judgments of relative importance of attributes reflects the cognition of the analyst.

(5) Obtaining the random index (RI) for the number of attributes used in decision-making.

Table 1
The reduced construct and criteria item of CSF.

Construct	Criteria (CSF)	Literature
Market segment	Cognition of regional culture, cognition of market scale, market's geographical position	• Winkler et al. (2008) and Ojala and Tyrväinen (2007)
Strategic alliance	Positioning the cooperative role, effects of partner supplement, the degree of cooperation	• Willcocks and Choi (1995), Ganek and Kloeckner (2007) and Coviello and Munro (1997)
Service/ implement model	Integrity of service mechanism, Talented person for internationalized service, Image and appraisal in the market, The depth of knowledge of industrial domain, Service pricing model	• Ganek and Kloeckner (2007), Bieberstein et al. (2005), Barcus and Montibeller (2008), Tiwana (2004), Rajala and Westerlund (2007), Nambisan (2001) and Rajala et al. (2003)
Competition of product	Function and R&D of product, quality and image of product, product's capacity in market, product pricing model	• Krishnan et al. (2000), Rajala et al. (2003), Krishnan et al. (2000), Rajala et al. (2003), Nambisan (2001) and Jain and Kannan (2002)
Distribution/channel model	Efficiency of distribution/channel model, distribution/channel cost controls, distribution/channel benefit assignment	• Bell (1995), Barcus and Montibeller (2008), Rajala et al. (2003), Coviello and Munro (1997) and Bell (1997)
Revenue efficiency	Strategy of revenue, rate of revenue and expenditure (or profit and loss)	• Rajala et al. (2003) and Ojala and Tyrväinen (2007)

Table 2
The definition of CSF.

Construct	Criteria (CSF)	Definition
Market segment	Cognition of regional culture	The business of an enterprise can be connected with target market's cultural levels, such as the habit, law, language, etc of the market
	Cognition of market scale	The enterprise could recognize the size and characteristics of target market and customer's information, so that it can find a niche in developing a target market
	Market's geographical position	The enterprise can realize the possibility for product or service output or the cost benefit in terms of long-term development in the target market, as well as the geographical characteristics of goal market
Strategic alliance	Positioning the cooperative role	The enterprise can clearly judge its own partner role in value chain position, so as to optimize the resources
	Effects of partner supplement	The scope and effect of strategic alliance with local or global partners
	The degree of cooperation	The degree of collaboration with partners to develop the goal market
Service/ implement model	Integrity of service mechanism	Having the rigorous service methodology and the flow mechanism (or reaching the level of international standard assessment to serve the goal market)
	Talented person for internationalized service	Have a reasonable proportion of talented people for service to facilitate the development in target market, and develop a swift talent training mechanism; it could also unite local talented persons of high quality in the target market
	Image and appraisal in the market	It includes the image and appraisal in the market before and after selling the products to the target market
	The depth of knowledge of industrial domain	The enterprises have a profound enough knowledge of the industry domain to implement the system, consulting, and training for target market customers
	Service pricing model	It means the best pricing model based on considering the relationship between service cost and profit (for example, service-contract pricing, partner, single times pricing pattern)
Competition of product	Function and R&D of product	The function of product can satisfy the demands of target market's customers, facilitate accelerating the innovation of a new product and its distribution to market, and understand the distinctions and competitiveness of the product compared with others in the target market
	Quality and image of product	The quality of product achieves the level of the target market's requests and gains a good image in the market
	Product's capacity in market	The strategic type of product can fulfill customers' needs in the target market (for example: customization, standardization, the local/regional or global characteristics, etc.), the product's duplicable degree and speed, the compatibility with other products
	Product pricing model	It can design a competitive product pricing model for the target market (for example authorized pricing pattern, special case contract pricing pattern, etc.)
Distribution/ channel model	Efficiency of distribution/channel model	The ability at dispatch, information feedback and promotion in target market, and the responsive efficiency of distributing pattern (for example, direct or indirect model)
	Distribution/channel cost controls	It concerns all cost-controls in distribution/channel
	Distribution/channel benefit assignment	The capability in hosting the power and allocating the profits in channel
Revenue efficiency	Strategy of revenue	The optimal solution of revenue under the consideration for best business strategy (for example, partition charge or other mixed pattern)
	Rate of revenue and expenditure (or profit and loss)	They include the operating abilities of AR realization rate, debt rate scale, fund preparation, cashable capacity, revenue, and outlay procedure in the target market

(6) Calculating the consistency ratio CR = CI/RI. Usually, a CR of 0.1 or less is considered as acceptable and reflects an informed judgment that could be attributed to the knowledge of the analyst.

3.3. Results

This research sent out 22 AHP questionnaires and all of the respondents (CEOs, experts and consultants, etc.) have been familiar with the domain of information service industry for over 10 years. Twenty people replied to the questionnaire which made the rate of returns and effectiveness as high as 90.09%. According to the data from the questionnaire, I figured out the weight of each item by AHP software (Choice-Maker 2002 and Microsoft excel 2007). After computing, I found that nearly all replies to the questionnaire reached a consistency ratio (i.e. CR = CI/RI, as described in Section 3.3) of less than 0.1, hence the decision maker's pair-wise comparison matrices are acceptable. I compute the weight as shown in Fig. 3. The overall weight of the construct and CSF, and its ranking is shown in Table 3. As the results in Table 3 and Fig. 3 show, the ranking of the weights of the constructs are: product competition (**0.212**), market segment (**0.19652**), service/implement model (**0.1318**), revenue efficiency (**0.0883**), strategy alliance (**0.0823**) and distribution/channel model (**0.0757**). These results manifest the most influential construct for the information service industry to develop international market is product competition, and the least influential is market segment. Among these constructs, there are three whose weights over **0.13**.

On the other hand, the constructs of the CSFs are: cognition of regional culture, cognition of market scale, market's geographical position, positioning the cooperative role, effects of partner supplement, the degree of cooperation, integrity of service mechanism, talented person for internationalized service, image and appraisal in the market, the depth of knowledge of industrial domain, service pricing model, function and R&D of product, quality and image of product, product's capacity in market, product pricing model, efficiency of distribution/channel model, distribution/channel cost controls, distribution/channel benefit assignment, strategy of revenue, rate of revenue and expenditure (or profit and loss). The top ten factors and their weights of global ranking are: cognition of market scale (**0.113**), product's capacity in the market (**0.103**), cognition of regional culture (**0.09**), strategy of revenue (**0.063**), quality and image of product (**0.061**), rate of revenue and expenditure (or profit and loss) (**0.053**), product pricing model (**0.048**), integrity of service mechanism (**0.048**) and market's geographical position (**0.045**). These results indicate that the factors are fully distributed over the product competition, market segment and market segments, and this distribution is more in accordance with constructs ranking results.

4. Case study

Based the researches in Section 3 and its framework, this study also takes a typical commercial software product from benchmark firms in Taiwan (The company "A", listed in Appendix A) to analyze the strategic decision-making for entering international market. In
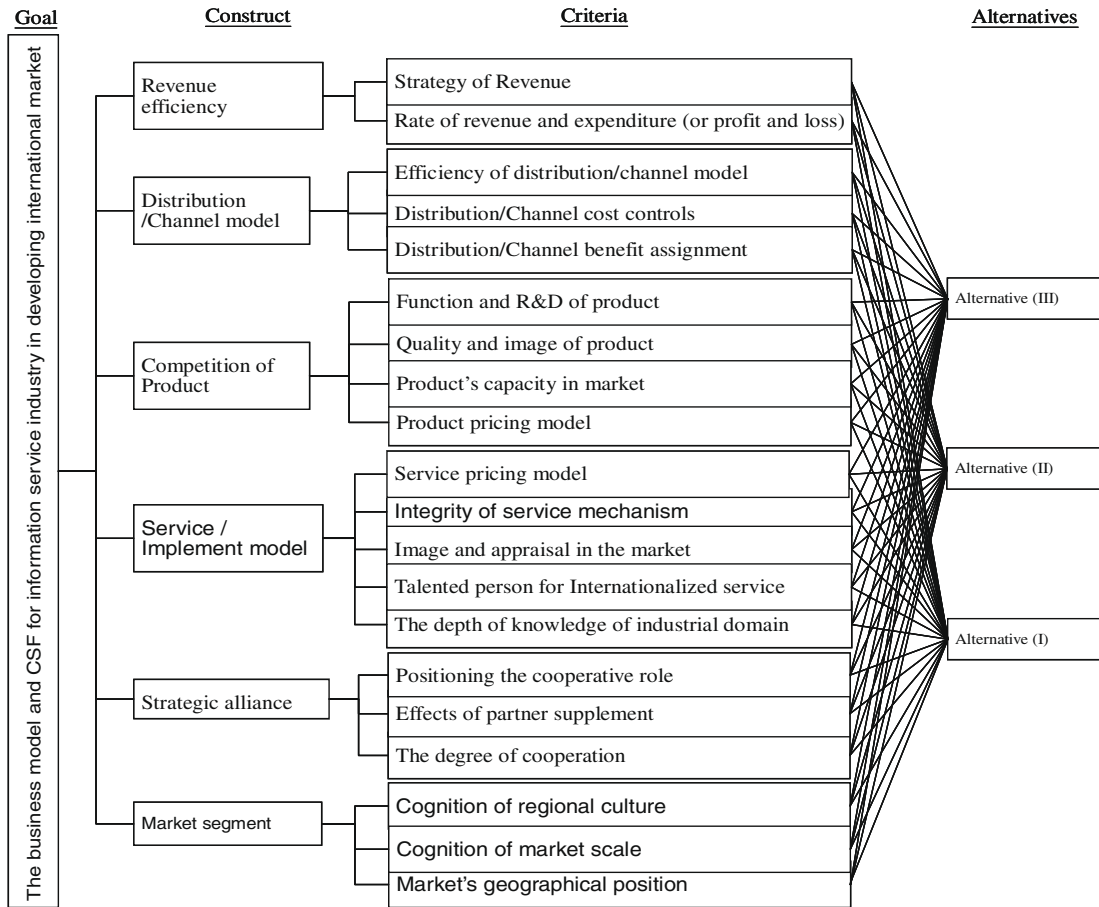
Goal | Construct | Criteria | Alternatives

Fig. 2. The hierarchic framework of business model and criteria (CSF) of information service industry for entering international market.
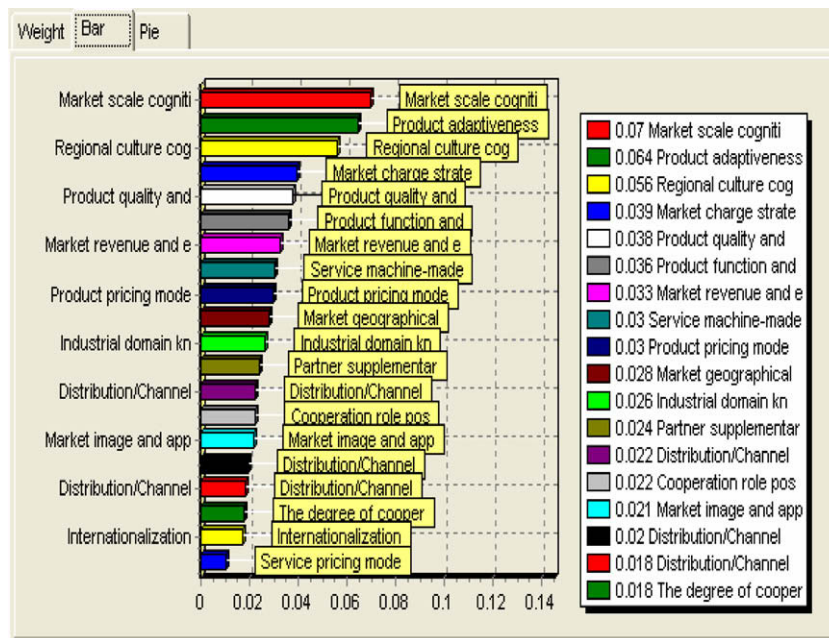

Fig. 3. The AHP weight of construct.

fact, a firm, seeking to enter a foreign market must make the important strategic decision of which mode to use to enter that market. We deeply interviewed the company "A" seven times, with their CEO, as followed the process in Fig. 1, begging May 25, 2008. The CEO pointed they will choose one of optimal decision- modes

of entering foreign markets among exporting, licensing, joint venture, and sole venture. He referred all of these modes involve resource-commitment, a particular mode be chosen initially is difficult to change without considerable loss of time and money. Therefore, regarding this case-study's key issue and also based on

Table 3
The AHP weight and ranking of construct and criteria.

Constructs	Weights	Ranking	Criteria (CSF)	Weights (global)	Ranking (local)	Ranking (global)
Market segment	0.1952	**2**	Cognition of regional culture	0.090	2	**3**
			Cognition of market scale	0.113	**1**	**1**
			Market's geographical position	0.045	3	**10**
Strategic alliance	0.0823	**5**	Positioning the cooperative role	0.035	2	14
			Effects of partner supplement	0.039	**1**	12
			The degree of cooperation	0.029	3	18
Service/Implement model	0.1318	**3**	Integrity of service mechanism	0.048	**1**	**9**
			Talented person for Internationalized service	0.027	4	19
			Image and appraisal in the market	0.034	3	15
			The depth of knowledge of industrial domain	0.042	2	11
			Service pricing model	0.016	5	20
Competition of Product	0.212	**1**	Function and R&D of product	0.058	3	**6**
			Quality and image of product	0.061	2	**5**
			Product's capacity in market	0.103	**1**	**2**
			Product pricing model	0.048	4	**8**
Distribution/Channel model	0.0757	**6**	Efficiency of distribution/channel model	0.035	1	13
			Distribution/channel cost controls	0.032	2	16
			Distribution/channel benefit assignment	0.029	3	17
Revenue efficiency	0.0883	**4**	Strategy of revenue	0.063	1	**4**
			Rate of revenue and expenditure (or profit and loss)	0.053	2	**7**

framework proposed as above in Section 3, to find the optimal mode to enter the market by AHP approach. Therefore, "A" company can consider choosing "joint venture," "subsidiary company," or "dealer" strategy to enter the Asian market.

4.1. Business operation constructs transformation

4.1.1. Background

Company "A" having been founded in 1982. It is entering its 26th year of operation. Company A's staff has grown from 3 employees to 2200. Besides the original Taipei office (now the company headquarters), they now has five other offices. A new headquarters building in Taipei was formally opened in January 2002. Annual R&D spending is equivalent to 5–10% of operating revenue. More than 20% of their staff fall under the category of key management team members. It is constantly developing e-enablement range, providing customers with total solutions from ERP through to ERPII. In 2002 they established a digital management systems Ltd in China. as a joint venture with Digital China. The new company will focus on developing the China market, with 25 offices such in Shanghai, Guangzhou and Beijin up to the present; this digital management systems Ltd. currently has 1000 employees. For providing enterprises the 24 h real-time service in 2004, they have reorganized its service facilities to create an e-Service Platform, the first new internet service module for software field. In 2004 they were awarded a e-Learning Industry Pro-

motion and Development Plan for Excellence in" Annual Learning Net Bounty" by Industrial Development Bureau Ministry of Economic Affairs, Taiwan. In 2005 they were awarded an industrial digital divide reduction plan for the first of achievement comments in" Small and Medium Enterprise Digitization Teams Sub events Plan ". In 2007 they attained CMMI Level 3 (Capability Maturity Model Integration) certification, and awarded the "Rank 8 of Top 50 Corporate Citizens CSR for Medium-sized Enterprise" from the Common Wealth Magazine.

4.1.2. Business developing stage

The "A" company focuses on ERP system development in many industry domains. The development of their business model is shown in Fig. 4. The core IT service solution of "A" company is "advanced ERP system" which includes using ERP to integrate information in the enterprise, while adding in a range of additional applications such as business intelligence (BI), production design management (PDM), knowledge management (KM), etc. Their product development strategy stage divides into "the starts stage", "the mature stage", and "the extended stage" as shown in Fig. 4. "A" company has better IT service experiences in Taiwan, and it provides a successful model to enter the Vienna market.

Therefore, in order to develop in the target markets of Southeastern Asia and Mainland China, it builds a strategic alliance that combines its core IT solution with its partners' service solutions as shown in Fig. 5. Altogether, the revenue scale of the company

was increased from NT$ 4.5 hundred million in 2005 to NT$30.5 hundred million in 2007. Evidently, the firms of "A" company were quite developed in the foreign market. Based on the business data of "A" company, we analyzed the variation (as drawn in Table 4) of six constructs at the beginning of the study through "radar" as shown in Fig. 6. According to literature and Table 1, we can divide each construct into five intervals in Table 4, for example, the "market-segment" is classed with partial region, regional, cross region, multi-region and global region. The radar charts show that the six business constructs of "A" company have achieved positive growth. The market segment, strategy partner and distribution have especially grown from 2005 to 2007. This trend demonstrates that the "A" company focused more on the international market. Therefore, when Asia gradually becomes a very competitive market, it should inspect these important constructs and influential factors. In other words, in order to choose the right mode for entering the target market, the firms of "A" company should not only be well-informed about these constructive variables, but also should analyze each CSF to be affective in decision-making for target market.

4.2. Business strategic alternative

Nowadays, according to the case study in Section 4.1, "A" company will enter the target market. Coviello and Munro (1997) pointed software firms use joint marketing, joint ventures, sales offices, distributors, piggybacking, and direct sales to handle foreign customers. Bell (1995, 1997) revealed software firms use direct sales through their own units, indirect export, agents, and distributors when they enter the target market. On "A" company's consideration, they will decide to select one of three general entry-modes: joint venture, dealer, or subsidiary company. According to AHP approach, we can express the four layers of hierarchic structure as shown in Fig. 7. After calculating by AHP method with CEOs of "A" company, the scores of each item are as follows: *joint venture model* **0.3783**, *dealer model* **0.2393** and *subsidiary model* **0.3824**.

Obviously, the score of the subsidiary model is very close to that of the joint venture model alternative. Such a result shows that the optimal alternative "A" company should choose to enter Asian markets is "subsidiary model". This result demonstration, "A" com-
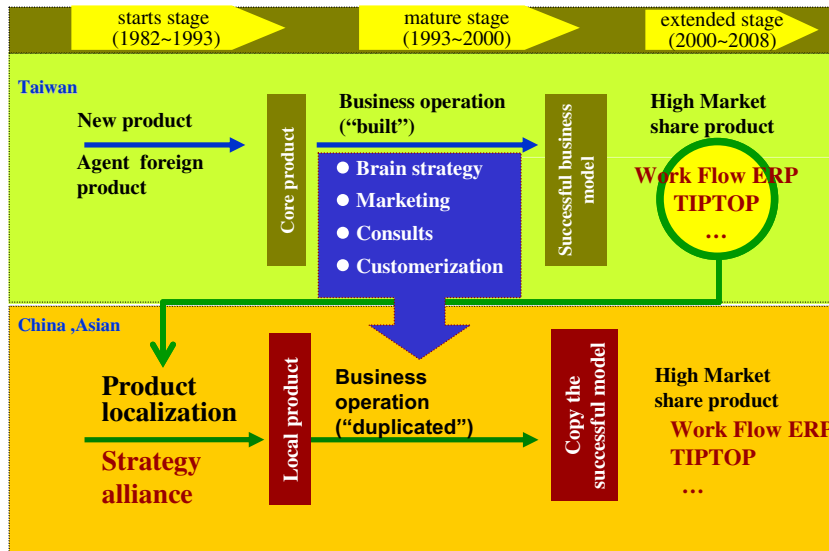

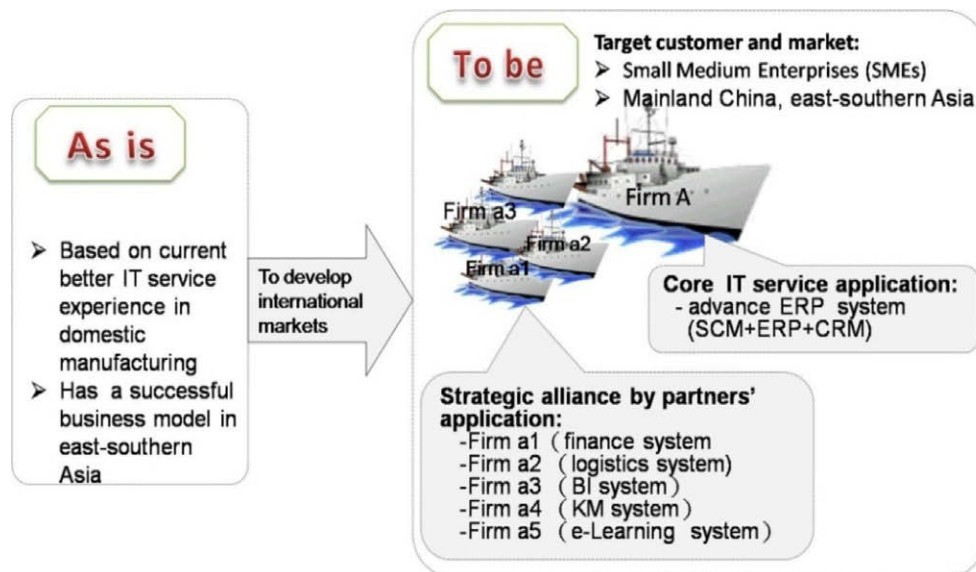**Fig. 4.** The "A" company's product development strategy.

Fig. 5. The development of business model (group A).

Table 4
The position of each element ("A" company focus on "Location 3 and 4" during the variation of running business).

| Elements	Location				
	1	2	3	4	5
Market segment	Partial region	Regional	Cross region	Multi-region	Global region
Strategic alliance	Low-alliance	–	Middle-alliance	–	High-alliance
Service/Implement model	IT-consulting and customer-specific	System Integration projects	Software-development	Online-service	Standardized
Product strategy	Customer-specific	Product platform	Uniform core product	Modular product family	Standardized
Distribution/channel model	Direct contract with customers	Reseller or agent model	Republisher/ OEM model	Distributor or dealer model	Decentralized/ transactional
Revenue efficiency	Effort-,cost- or value-based pricing	License scales	Revenue sharing	Hybrid models	Media model
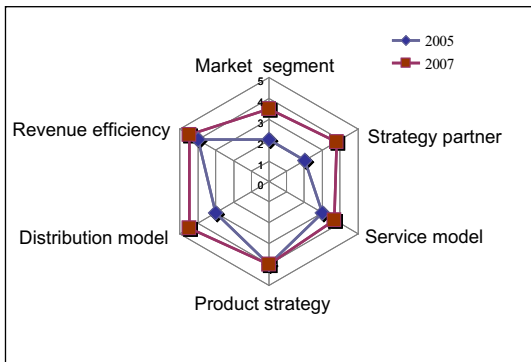
Fig. 6. The business focus of "A" company.

pany has adopted joint "venture model" or "dealer model" to develop Chinese and Vietnamese market, has been familiar with the international target market in "market segment", "service/ implement model", "distribution/channel model" and "revenue efficiency model". In other word, "A" company has more confidence and ability to open new market in the world. Therefore, if they decide to adopt the "subsidiary model" is supposed to be the suitable way.

5. Summary and conclusions

This paper is based on the literature of professors, the observations of industry, cross-case studies, and the interviews of CEOs. Using AHP hierarchy framework, we proposed six business operative elements for developing international goal market, including market segment, strategy partner, service/implementation,
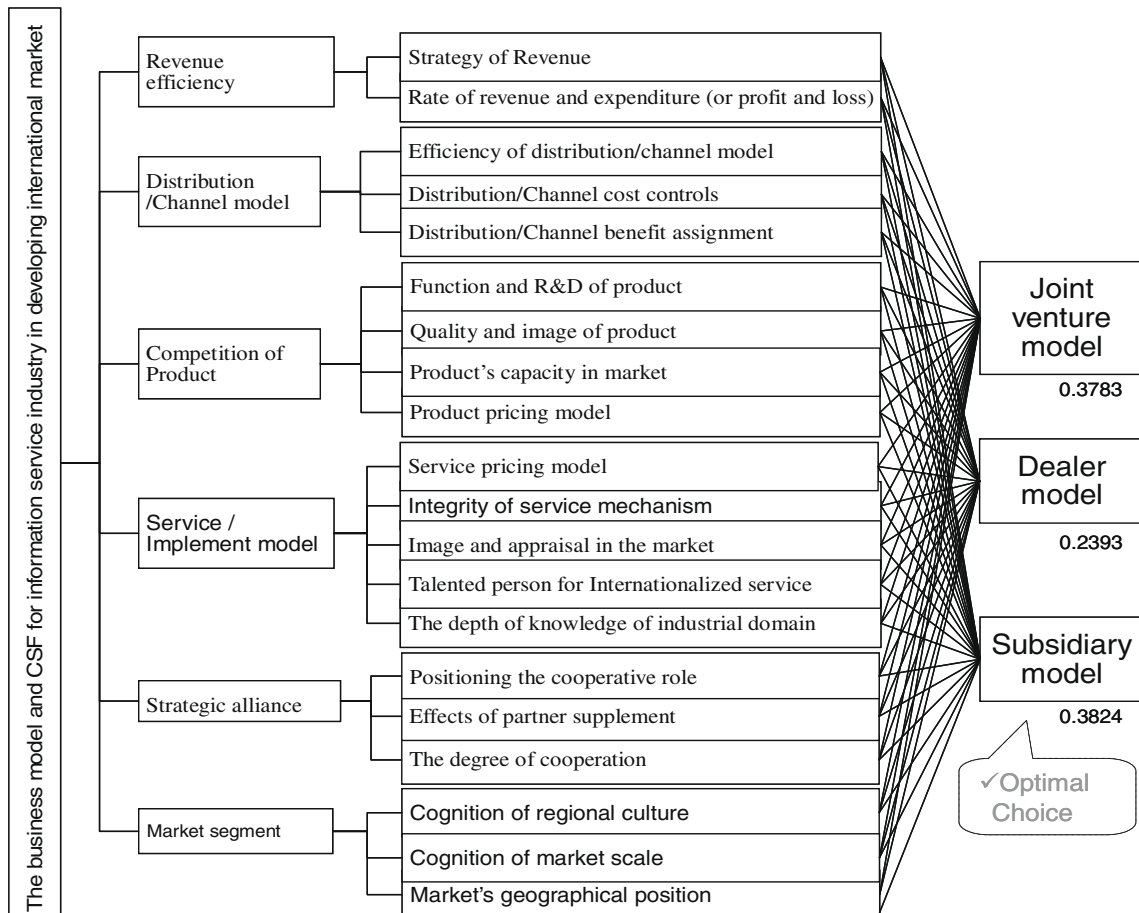

Fig. 7. The AHP result of decision-making's (company "A").

Appendix A. Summary of Taiwan benchmark information service firms

Case	Number of employees	The plan of entering international market (briefs)	–Customer type –Target market	–Number of partner (service contents)
A	2200	1. To integrate their partners' IT service product and deliver their advanced ERP applicative contents to the international market. 2. They will build a cyclic scheme for duplicating ERP for Mainland China market and deliver the product with Chinese local software channel. 3. Based on the current single sell point in Vietnam, they will extent the Asian market by various channels.	–Manufacturing (SME) –Mainland China, East-Southern Asia	5 (GSCM, Logistics, e-invoice, KM, e-Learning)
B	414	1. Building up the enterprise common usage component database. 2. To extract these components through business process management(BPM) 3. Building up optimal global logistics of information system.	–TFT-LCD, traditional manufacture-Government	5 (HR, Web report, ERP, PLM, e-Learning)
C	290	1. Based on the business service for China Steel Corporation (CSC), the know-how and brain image of steel industrial domain, they will profoundly fulfill steel supply-chain customers in China and East-Southern Asia. 2. Building a total steel ERP solution for Mainland China and east-southern Asia (Malaysia) markets.	–Steel-Mainland China, east-southern Asia (Malaysia)	4 (KM, marketing partner, marketing system, search engine, finance service)
D	226	1. Based on excellent experience, such as in management of factories and expert system platform, to build a total solution for international customers.	–Petroleum and chemical, steel, semiconductor-Mainland China	4 (Network communication solution, KM, expert system platform, machine automation solution)
E	515	1. To link the leaders of Taiwan financial and security industries and integrate current mature production. 2. To build a total solution of credit cycle in the security of bank filed. 3. To enhance their capability in globalized marketing.	–Bank and securities-Mainland China, east-southern Asia	4 (Data mining, domain know-how, consultant, e-learning)
F	1017	1. F company is a large enterprise integrated with tax system for over 30 years in Taiwan. 2. They will plan to export these products and successful experiences (like e-government) to the target markets in Asia, Middle East and Europe.	–ICT,SI, Government, traffic-Asia, Middle East, Europe	3 (PKI,KM, search engine)
G	1700	1. G company is a provider of professional "technology services, system integration services, and outsourcing services", they delivers comprehensive IT applications and infrastructural solutions with the capabilities of international project management and software development. 2. Initially they focused on the financial industry during the first decade. 3. They will expand its competent footprint to telecommunication, manufacturing and logistics sectors, and overseas markets.	–Bank and securities, financial, manufacturing and logistics, –Mainland China, east-southern Asia	4 (SI, KM,CRM,BI)
H	295	1. H company focused on upgrading from magnetic credit cards to chip cards for credit card organizations (VISA, MasterCard and JCB), and developing common platform/outsourcing platforms with supply-chain partners. 2. Furthermore, they allied with international VISA/Master Card organizations and local channels to develop target market.	–Bank and clearing, 7–11 retailer, Expense finance -Thai, Hong Kong, mainland China	3 (SI, reader card machine, card)

Note: These benchmark firms are joining the IT service project of government policy: "Best E-Services export of Taiwan", Taiwan, Industrial Development Bureau, Ministry of Economic Affairs (MOEAIDB), and other information listed in website: http://www.ciup.org.tw/4_Tech_service/namelist.asp.

product competition, distribution/channel model and revenue efficiency. After exploring by analytic hierarchy process (AHP) method, we extract each construct's proportional distinction: *product competition* (**0.212**), *market segment* (**0.19652**), *service/*

implement model (**0.1318**), revenue efficiency (**0.0883**), strategic alliance (**0.0823**) and distribution/channel model (**0.0757**). According to this result, the most effective factor is product competition, and the least effective factor is the distribution/channel model.

In addition, we also extracted 20 critical factors in the following order: cognition of market scale, product's capacity in market, cognition of regional culture, strategy of revenue, quality and image of product, function and R&D of product, the ratio of revenue and expenditure (or profit and loss), product pricing model, integrity of service mechanism, market's geographical position, the depth of knowledge of industrial domain, effect of partner supplement, efficiency of distribution/channel model, positioning of cooperative role, image and appraisal in the market, distribution/channel cost controls, distribution/channel benefit assignment, the degree of cooperation, talented person of internationalized service, and service pricing model.

In appraising the investment plan for entering the international market, we also take a firm as a typical type of commercial software product to analyze the strategic decision-making for entering the Asian market. Using AHP approach, we obtain the proportional distinction of each investment plan as follows: *the joint venture model* **0.3783**, *the dealer model* **0.2393** and *the subsidiary model* **0.3824**. Therefore, this study suggests "A" company to choose the subsidiary model to enter the Asian market.

For the future, we hope there will be more sound research exploring this issue and suggest a focus on correlative research such as excogitating the types of information service industries (like service type or project type) or the domain of IT application (like health and communication).

Acknowledgements

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