# Screening Model for Service Innovation Proposals – An Example of App Industry

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Abstract: Service industry has taken significant proportion of the GDP in developed countries and has increased to 60% to 70% over the past few decades. Application (App) is one of the best examples to demonstrate the economic changes from manufacturing to service economy and indicate the upcoming chances for service innovations. However, innovativeness does not always guarantee success; only ideas that fit into the company environment and market trend will have the chance to be successful. To meet the emerging needs for effective service idea evaluation tools, Innovative Idea Screening Model for Service (IISMS) is proposed in this study, consisting three major processes and four components. IISMS is established based on the essence of Innovative Idea Screening Model (IISM) and literature review comparing the difference between product and services.

***Key words: Service innovation, innovative idea, idea screening***

## 1. Introduction

The trend of world economy development has shifted from tangible to intangible. Companies no longer produce profits simply by selling products to consumers as the consumer's real demand is the improvement that comes along with the product; just like what P.F. Drucker said and quoted by S. Moritz (2005), " No consumer ever buys a product. Consumers buy what products provide." Originated from Shostack (1977), service and product can be seen as two ends of a spectrum, on which value propositions can be placed according to different composition ratio. Although the major value may fall on the service part, nevertheless, the intimacy makes it impossible for most services to deliver without physical products.

Applications or Apps are among the best examples to illustrate this shift; the applications originally operate on computers had not come to vigorous development until App Store raised the revolution in 2008. According to the report of Distimo.com, the revenues in the Apple App Store are $15 million USD on a typical day in November 2012 (Spriensma, 2012), indicating that App market is still growing rapidly. Cover story of the Bloomberg Businessweek had also pointed out "Early Days Apps will help determine technology's next big winners." However, within flourishing App industries, immature ideas were launched by individuals and enterprises, resulted in severe competition.

Service is not immune from high failure rate like physical product. Service innovation is just like product innovation; the potential and applicability of the idea are the only way to success. Company should always assess ideas that are worth developing, while, at the same time, consider the enterprise resources and market trend for

further evaluation and refinement, however, to date there are limited tools available to operate other than to build up a prototype and justify it subjectively.

Focusing on physical product innovations, Luh (2000) proposed the Innovative Idea Screening Model (IISM), which is a formative method. With questionnaire composed by main innovation factors and automatable calculation, idea assessment can be obtained simply, effectively and more objectively. Therefore, the main purpose of this research is to apply IISM to service ideas by adjusting the questionnaire to the viewpoint of service innovation and service quality, forming the Innovative Idea Screening Model for Service (IISMS). A data collection is further conducted within App industry for validation.

## 2. Literature Review

### 2.1 Service

Service is an activity or series of activities where a number of different types of resources are used to interact with a customer. Its production may or may not be tied to a physical product (Grönroos, 2000; Kotler, 2001). Service quality specialist Theodore Levitt (1972) even wrote that “There are no such things as service industries. There are only industries whose service components are greater or less than those of other industries. Everybody is in service.” Services vary from products in four major ways; they are intangibility, heterogeneity, inseparability, and perishability. Intangibility is in general the major difference between service and product, and it also fundamentally affects the way service is marketed (Shostack, 1977; Zeithaml, Parasuraman, & Berry, 1985).

Since service in essence lacks of tangible quality, and cannot be standardize nor been stored,service providers must tackle the conflicts within service heterogeneity and mass production. And due to the inseparability, or so-called simultaneous consumption, service result cannot be returned or undone. Service receiver therefore faces higher cognitive risk when deciding to purchase a service.

### 2.2 Service Innovation

Service innovation is a way of gaining competitive advantages. According to Porter (1999), to gain competitive advantages, companies should make strategy decision based on the analysis of industrial structure and research of competitors. Hence they can develop service proposals that are needed. Clarifying service categories may be helpful when selecting service proposals in accordance with the strategy.

The process through which organizations develop service innovations is called the New Service Development (NSD). It refers to the overall process of developing new service offerings (Johne & Storey, 1997; Johnson, Menor, Roth, & Chase, 2000). Cooper et al. (1994) define it as “the set of activities, actions, tasks, and evaluations that move a project from the idea stage through to launch”, including concept creation, analysis, detailed design, and launch (Cooper, Easingwood, Edgett, Kleinschmidt, & Storey, 1994; Zomerdijk & Voss, 2011). It should ensure that service is designed in accordance with the firm’s overall service strategy (Shostack & Kingman-Brundage, 1991; Zehrer, 2009).

Idea screening and concept development at fuzzy-front end is fundamental to overall NSD project. As the major objective in the design stage, designers should prioritize service concepts according to organizational goals and take consumer evaluation into account for further refinement (Alam, 2006; Froehle & Roth, 2007; Young, 2008). However, service companies are often reported to have an unsophisticated or haphazard NSD process, and

fewer service firms make use of the formal Stage-Gate type system compared to manufacturing firms (Zomerdijk & Voss, 2011).

### 2.3 Innovative Ideas Screening Model

Considering producers and users as different adopters for ideas in abstract and concretized form, Luh (2000) proposed an Innovative Idea Screening Model (IISM). Adopting Stage-gate system, scoring method and Bass diffusion model, IISM provides assessing and forecasting function for product ideas where the accuracy is above 80% (Zheng, 2005). IISM can be divided into three steps and four components which would be explained below.

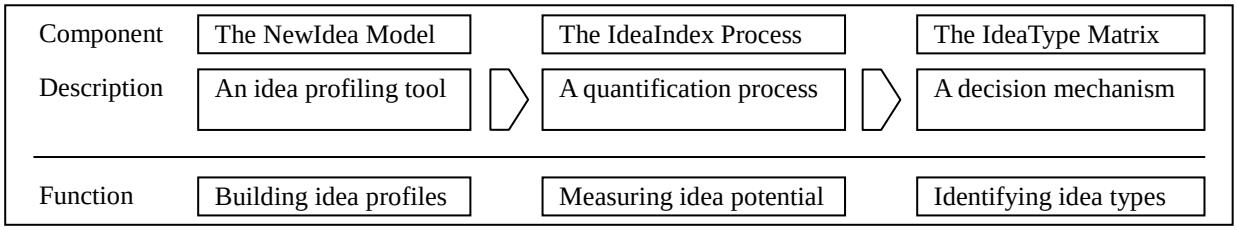


Figure.1 Steps and Components of IISM

(1) Building idea profiles: The NewIdea Model is a typical checklist scoring model. It functions to interpret descriptive new project ideas into standardized idea profile format which contains sixteen questions or screening criteria derived from product diffusion factors, eight for producer concerns and eight for user concerns (Luh & Wu, 2009). An idea profile is generated after finishing the NewIdea Model, which consists of a product profile (Pr[IP]) and a user profile (Ur[IP]). The profile can be illustrated by Pr[IP]= [A1, B2, C3, D4, E5, F4, G3, O2 ] and Ur[IP]= [H5, I4, J3, K2, L1, M2, N3, P4 ] as examples.

Table 1. Innovation Attributes, Evaluative Criteria and Weight Sets for Early Diffusion Phases

| Key factors categories | Innovation attributes | Evaluative Criteria | | | | |
|---|---|---|---|---|---|---|
| | | Producer's concerns | Weight sets | | | User's concerns |
| | | | Innovators | Early adopters | Early majority | |
| Capability | Compatibility | F. Production basis | 0.0714 | 0.1500 | 0.2501 | J. Need status |
| | Complexity | A. System change | 0.0714 | 0.1000 | 0.0833 | K. Behavioral change |
| | Communicability | D. Product newness | 0.0714 | 0.1000 | 0.0833 | N. Adopter status |
| | Relative advantage | O. Producer benefit | 0.5002 | 0.2000 | 0.0833 | P. User benefit |
| Speed | Price | G. Distribution channel | 0.0714 | 0.1000 | 0.0833 | I. Merchandise status |
| | Perceived risk | E. Design specification | 0.0714 | 0.1000 | 0.0833 | M. Product wholeness |
| | Usefulness | C. Product advancement | 0.0714 | 0.1500 | 0.2501 | L. Use status |
| | Infrastructure availability | B. Technology status | 0.0714 | 0.1000 | 0.0833 | H. Competition status |
| | | Total | 1.0000 | 1.0000 | 1.0000 | Total |

(2) Measuring idea potential: In the IdeaIndex Process, qualitative idea profiles are translated into quantitative representations and their success potentials are measured. It can be divided into two major steps. First, to translate idea profiles (Pr[IP] and Ur[IP]) into quantitative representations. Pr[IP] and Ur[IP] were multiplied by weighted matrix derived from key innovation factors and different adopter type (see Table 1)

according to different diffusion phases, generating weighted idea profiles (Pw[IP] and Uw[IP]). Second, "Initial Adoptability Index (IAI)" and "Average Diffusibility Index (ADI)" were suggested to interpret idea profiles into meaningful success potential indexes. Idea success potential distribution (Sw[IP]) can be achieved by dividing Pw[IP] with Uw[IP], and is composed of Sin[IP], Sea[IP] and Sem[IP] which represent success potential at different diffusion phases. Sw[IP] arranged in order of time index becomes the Successful Linear Regression(SLR[IP]), which can lead to Initial Adoptability Index (IAI) and Average Diffusibility Index (ADI). The former indicates an idea potential for short-term success, and the latter shows an idea overall success potential for long-term success.

(3) Identifying idea types: The IdeaType Matrix functions to identify the ideas worthy of further development. It is a plane composed by IAI and ADI indexes, where thresholds were empirically established based on existed projects. Theoretically, the plane is divided into four categories with different characteristics, and ideas fall into one of the four "idea type" based on their IAI and ADI measures.

(4) Forecasting the new product: IdeaType Matrix can also be functioned to forecast future profitability of new ideas. Based on the data of existed projects, ideas can be grouped based on different level of producer benefit (question O). Regression line of each group can be built and compared to target idea, showing possible situation of target idea in the future. The profitability of target idea is estimated with "Om Point", which refer to the middle point between the IAI and ADI values of an idea with a criteria status of IAI(O5), ADI(O5) and IAI(O1), ADI(O1).

## 3. Innovative Ideas Screening Model for Service

Adhering to the structure of IISM, Innovative Ideas Screening Model for Service (IISMS) is constructed by integrating service success factors and service quality concept into idea profiling model. Different concerns and situations corresponding to innovation attributes are discussed and adjusted to fit in with service industry.

Table 2. Innovation Attributes, Evaluative Criteria and Weight Sets for Early Diffusion Phases

| Key factors categories | Innovation attributes | Evaluative Criteria | | | | |
|---|---|---|---|---|---|---|
| | | Provider's concerns | Weight sets | | | Receiver's concerns |
| | | | Innovators | Early adopters | Early majority | |
| Capability | Compatibility | ***F. Service delivery*** | 0.0714 | 0.1500 | 0.2501 | J. Need status |
| | Complexity | A. System change | 0.0714 | 0.1000 | 0.0833 | K. Behavioral change |
| | Communicability | *D. Service newness* | 0.0714 | 0.1000 | 0.0833 | ***N. Capacity flexibility*** |
| | Relative advantage | O. Producer benefit | 0.5002 | 0.2000 | 0.0833 | P. User benefit |
| Speed | Price | G. Distribution channel | 0.0714 | 0.1000 | 0.0833 | *I. Service positioning* |
| | Perceived risk | E. Design specification | 0.0714 | 0.1000 | 0.0833 | ***M. Cognitive risk*** |
| | Usefulness | *C. Process advancement* | 0.0714 | 0.1500 | 0.2501 | ***L. Use status*** |
| | Infrastructure availability | ***B. Technology status*** | 0.0714 | 0.1000 | 0.0833 | ***H. Competition status*** |
| | | Total | 1.0000 | 1.0000 | 1.0000 | Total |

Conventional producer and user become provider and receiver in service industry, bringing up the fundamental differences. Except for some minor description changes (question D, I, C), major discussion and adjustments are made considering the service/product distinction shown below (question ***B***, ***F***, ***H***, ***L***, ***M***, and ***N***):

(1) Question F: Compatibility represents the required degree of change in organizational behavior for an innovation. The more a service innovation fits in with company's existing service, means that there are more mature service delivery channels and a higher integrity for relative supporting systems.

(2) Question B: To achieve an innovative proposal requires the coordination between system, facilities, and employees. Taking Apps as an example, factors that are affecting App services include facilities such as smart phone and server; operating systems and other software; employees' sophistication about techniques. Therefore, Infrastructure availability can be classified according to technology status of system or facilities and employees' masterfulness for related techniques.

(3) Question N: From customers perspective, the communication and diffusion of a new service depends more on personal experience and evaluation on service quality. Since every company should maintain the best quality they can offer, the one with larger service capacity (serving more people in one time unit) tends to be more successful. However, service capacity is limited due to restraint of nature resources, since the standard of being large or small is dependent on industry sectors. Therefore, we can only estimate the customers' willingness to share a service by considering the flexibility of its service capacity.

Flexibility of service capacity can be divided into five degrees in accordance with level of consumer involvement and service process types. Theoretically, the more involvement from the consumers will reduce the investment required for the company. Hence, services that process with information should have the best flexibility rather than service that processes with people or goods.

(4) Question M: Cognitive risk comes from purchases with insufficient satisfaction or when the consumer realized the possible negative outcomes from their behavior; it is closely associated with service bundle integrity. The cognitive risk tends to be higher once a customer invests more time or energy on achieving service value. Since a single service can only deliver partial value, service packages are usually needed in order to fulfill consumer demands. Therefore, service integrity in total value delivery process or its position in service bundle tends to be especially important.

(5) Question L: Use status describes the importance of new service usefulness to potential consumer. Although the satisfying outcome is necessary to achieve good service quality, customer cognitions in service processes is even more important for total quality since process is at the service core. Therefore, usefulness can be divided into five levels considering the delightfulness received during service processes, and consumer subjective significance of service outcome.

(6) Question H: The main difference between physical products and intangible services in competition status is that there are rarely two identical services, because they are facing challenges from other services, sometimes even from tangible products. There are two major strategies that can be adopted to achieve competitive advantage according to Porter (1999); most of the company takes hybrid but have their direction bear in mind. Among the two, sticking to cost leadership is meaningless and even harmful in service industry due to the possible result of low service quality (Fitzsimmons & Fitzsimmons, 2009; Grönroos, 2003); differentiation is therefore became the only option for services companies. On the other hand, the

overall entrance barrier of service industry is relatively low because service innovation is hard to be protected by pattern, and further increases the influence of brand identity. Competitive service with higher difference means fewer substitutes, so the competition status of service industry can be divided into five degrees considering existence of substitutes and the standing of brand identity.

## 5. Research design

Three hypotheses are made to see if the effectiveness of IISM is inherited:

A. IISMS is able to distinguish between successful and unsuccessful samples.

B. App is the combination of mobile phone (conventional manufacturing) and software (innovative services). The index threshold for App industry should be in between.

According to the procedure adjusted by Zheng (2005), the interviewers together with senior project managers of the target company should adjust the questions of idea profiling questionnaire into meaningful descriptions to the interviewees, so they can answer the questions easily and correctly. There are two types of samples required, both successful and unsuccessful App. Majority of the data samples are provided by App company, the rest are collected through ranking mechanism and customer ratings or reviews on App Store. Questionnaire on receiver's concern is filled by consumers that purchased or used the targeted App or similar one; focus groups were constructed to have a better understanding of the sample in case there is no sufficient information. The result of questionnaires are collected and calculated, forming the IAI and ADI value of each sample.

### 5.1 Result analysis

17 successful and 16 unsuccessful Apps are selected in this study. Two senior project managers are interviewed and there are no apparent problems in descriptions. 25 consumers are interviewed and 100 questionnaires on receiver's concern are collected effectively. Distribution of App samples is consistent with literature; the scatter chart is as below.

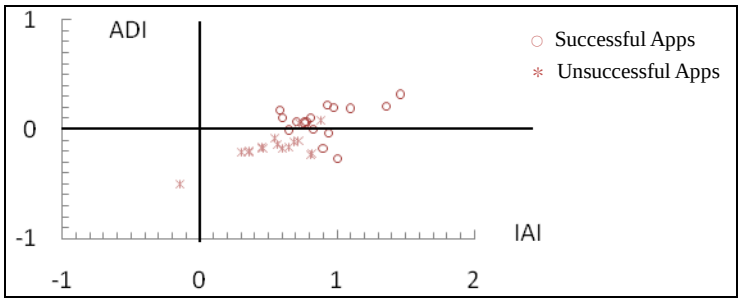


Figure.3 Scatter chart of App samples

For hypothesis A, T-test method is adopted to see if IISMS is able to distinguish between successful and unsuccessful samples. Null and alternative hypothesis are set as below ($\alpha$=0.05).

IAI dimension: H0: There is no difference. H1: There is a significant difference.

ADI dimension: H0: There is no difference. H1: There is a significant difference.

Table 3. T-test result

| Dimension | Sample | Average | Standard Deviation | P-value |
|---|---|---|---|---|
| IAI | Successful Apps | 0.890 | 0.235 | 0.0004 |
| | Unsuccessful Apps | 0.549 | 0.247 | |
| ADI | Successful Apps | 0.075 | 0.141 | 0.0000 |
| | Unsuccessful Apps | -0.160 | 0.126 | |

The p-value of IAI dimension is 0.0004, smaller than 0.05, which indicates the alternative hypothesis (H1) is accepted. The p-value of ADI is 0.0000, smaller than 0.05, which indicates the alternative hypothesis (H1) is accepted. The result indicates a significant difference of both IAI and ADI dimensions; meaning the NewIdea Model questionnaire adjusted in IISMS is able to distinguish between successful and unsuccessful Apps.

For hypothesis B. Thresholds of App industry are established by definition of "The Average minus Standard deviation (Luh, 2000)". The threshold on IAI dimension is 0.655 (=0.890-0.235). The threshold on ADI dimension is -0.066 (=0.075-0.141); right in the range of more innovative industry (0.634, 0.0094) and conventional industry (0.734, -0.134), hypothesis B is supported.

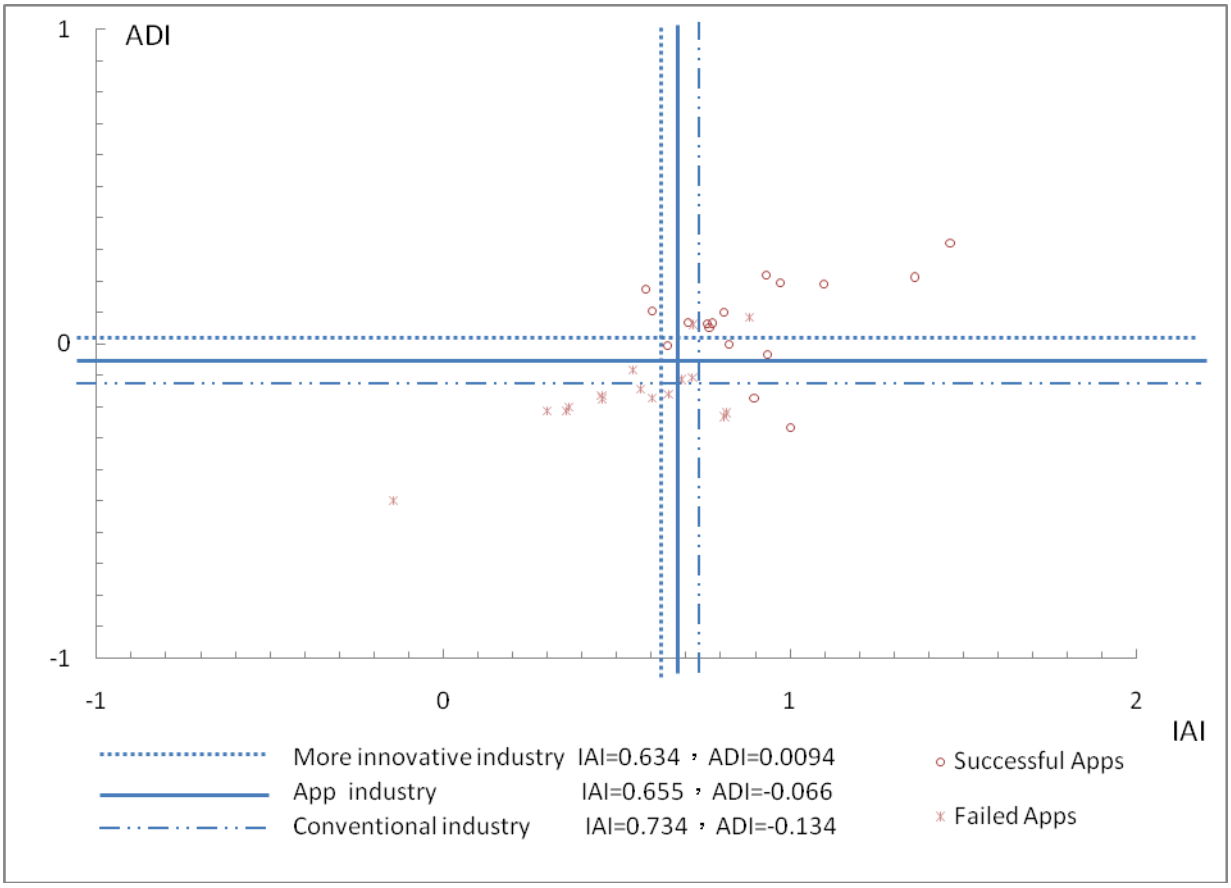


Figure.4 Thresholds of App industry, conventional industry and more innovative industry

## 6. Conclusion

From the discussion above, the following conclusion can be drawn:

(1) Product design methods can be applied to service design as widely acknowledged. IISM as evaluation method for physical product ideas and its potential in selecting service innovation ideas is well demonstrated.

(2) Product design methods should be adjusted in different aspects to various degree due to the differences between product and services. The adjustments of IISM on Compatibility, Communicability, Price, Perceived risk, Usefulness and Infrastructure availability in this study is proved to be effective.

(3) Inheriting the procedures of IISM, IISMS is a feasible and effective tool for the analysis of the App industry. The threshold established (0.655, -0.066) can provide references to the App industry.

(4) Major upgrade on app should be considered as a different idea, and treated individually in IISM/IISMS processes. However, it cannot be achieved in this study due to the lack of comprehensive data of cost benefit analysis from the current company. Nevertheless, the use of focus group quickly enhances participants' understanding of the apps and tends to have positive effect on the accuracy of idea evaluation.

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