

## 醫療產業服務創新關鍵成功因素之研究

### The Study of Services Innovation Key Success Factors in the Hospital Industry

蔡政宏<sup>a</sup> 李欣<sup>b</sup>

#### 摘要

醫療產業被認為是最能夠提供患者特殊醫藥、醫護人員與設備的健康照護機構。其足以提供獲利並滿足消費者的需求。醫療產業為了維護或改善其市場定位與商譽，同時也必須面對著相當大的競爭。因此，發展產品與服務的創新也就勢在必行。創新理念的相互模仿並不難，但必須考量許多特別目標市場的服務需求。服務創新則因為能協助公司定位、品牌識別與差異化而受到重視。

本研究目的在於探討醫療產業的服務創新關鍵成功因素，經由文獻整理找出第一層級的五大主要因素、與第二層級的 16 個因素。研究方法採用 AHP 層級分析法，試圖比較這些關鍵成功因素間的相對重要性。藉由層級分析法的問卷，訪問了 12 位專家與高涉入的醫療產業消費者。研究結果發現，影響服務創新五大主要因素中最重要的是服務流程，其次為技術，第三則為產品與服務。第二層級的 16 項因素中以服務流程中的服務效率對服務創新之影響效果最大。

**關鍵字：**服務創新、關鍵成功因素、層級分析法、醫療產業

#### ABSTRACT

The hospital industry is considered to be the most significant type of health care institution providing patient treatment with specialized medical and nursing staff and medical equipment. Because of its ability to provide revenue and satisfy the needs of the consumers. There is huge competition in the hospital industry so to be able to maintain or improve their market positions and reputations; they need to develop product and service innovations. It is not difficult to copy the innovation ideas from each other, but they have to think about the very special service for the special target market. The service innovation raises attention, helps positioning, brand recognition and differentiation. The purpose of this study aims to investigate the services innovation key success factors of the hospital industry. And further intends to find out the real factor of service innovation from the consumer that will make the hospital industry to be successful.

In this study, the researcher used the Analytical Hierarchy Process method to determine the most important factor of service innovation in the hospital industry and the comparisons of each factor. By using the data collected randomly from 12 participants include experts, and high involvement consumer via AHP questionnaire, findings indicate that the most important factor that greatly affects the hospital industry service innovation is the process through efficient service followed by the technology and product & service.

**Keywords :** Service innovation, Key successful factors, AHP, Hospital industry

#### 1. Introduction

Nowadays, the service sector is becoming increasingly important as a key driver in every business because of the increasing competition of globalization trend so, all the business, including hospital, has to develop the service a continuing

innovative environment in order to respond the competitive market of globalization and to improve service quality, since the people in these days always require to assure the quality of the product and service that they purchase. In the same way, as "Innovation" has also become a top priority of organization development. Global enterprise and

<sup>a</sup> 正修科技大學企業管理系副教授 Email: child@gcloudcsu.edu.tw

<sup>b</sup> 正修科技大學經營管理研究所 Email:phondpenc@gmail.com



government are gradually putting their concern on it. Changes in business often depend on services, the intensity of competition and technological change. For this reason, to the service, innovation is the key factor of acquiring the competitive advantage. Therefore, innovation is applying new knowledge to enhance the enterprise ability, and develop new products and new services to create business value (Porter, 1985). The objective of this study is to enable to determine the key factor of the various successful service innovation types and the factors of each type in the hospital industry. Therefore, to further prove the influence of each factor; the researcher categorized the data gathered from the respondents to be able to analyze the data efficiently. The structure in this study illustrates the Hierarchical factors to easily explain the main idea of the study. And, in order to probes, the factor that consumer requires the hospital industry to innovates in service.

## 2. Literature Review

### 2.1 The definition of service

“Services are actually all those economic activities in which the primary output is neither a product nor a construction” (Quinn & Gagnon, 1986). “To produce a service is to organize a solution to a problem (a treatment, an operation) which does not principally involve supplying a good. It is to place a bundle of capabilities and competences (human, technological, organizational) at the disposal of a client and to organize a solution, which may be given to varying degrees of precision” (Gadrey, Gallouj, & Weinstein, 1995). The literature provides a huge variety of definitions for “services”. While some definitions highlight services as an activity or performance in order to solve a specific issue of the customer (Gronroos, 1990), Bell (1973) indicated: 「When the economy become more and more prosperous, perhaps people are gradually satisfied with the higher consumption of the product or the demand for material needs, and their living needs are more rich than ever, people will gradually transfer the consumption target to services.」 Hill (1977) defines the services means an economic unit change for the possessions or benefit in the consent of an individual economic entity. And it can also mean to be sold or activities, interests and satisfaction which support to the product sales. Those activities, interests and satisfaction are intangible in majority (Buell, 1984). Other describe services as bundle of competences that have to be delivered to reach customer satisfaction (Gadrey et al., 1995; DISR, 1999).

Services includes three important frames that are “activities”, “interaction”, and “solution” to

customer problem (Gronroos, 1990). This definition, therefore, is proper to all the service industry. Gronroos (1990, 2007) defines services as follows: “a service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between the customer and service employees, and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems”

### 2.2 The definition of innovation

Innovation involves the creation of a new product, service or process. Therefore, innovativeness or newness refers to the degree of familiarity organizations or users have with a product or service (de Brentani, U., 2001). The beginning of the process of transformation is called invention. It is used as an effective idea. “Invention is part of innovation or the innovation process.” (Otterbacher, 2008). Tidd (1997) had an idea that innovation came from the word ‘innovare’. It is a latin word, and the meaning is to create or make a something new. (Otterbacher, 2008). Schumpeter (1934) was one of the first researchers who developed the theory of innovation. He said that innovation was a new way of doing things or better/unique combinations of production factors (Otterbacher, 2008). As he wrote, innovation is making new opportunities for additional valued added, it does not involve just the typical product/process innovation of manufacturing but also the market, organisational and resource input innovations, too. (Martínez-Ros & Orfila-Sintes, 2009) As Drucker (1985) said, innovation should be looked at as an opportunity. The result of these opportunities is the creation of a new product or service or changing a previous one. Innovation cannot only be an idea/philosophy, but innovation can be thought about as a practice, a process or a product. The point is that the individual perceives the thing as something new. The individuals are very important in innovation, because they transform ‘a new problem-solving idea into an application.’ (Otterbacher, 2008) Sundbo (1997) deals with innovation in the service sector. He distinguished innovation and learning. He thought that innovation is not only an action, which is strategically re-created, but also a factor, that is identified by a greater jump in turn over or profit. (Martínez-Ros & Orfila-Sintes, 2009). Thus, “The service industry is highly heterogeneous and includes a great variety of interesting, complex and often highly innovative activities.” (Martínez-Ros & Orfila-Sintes, 2009). This is the reason why it is impossible to give a general account of services innovation. (Martínez-Ros & Orfila-Sintes, 2009). An innovation culture



is a multidimensional context which includes the intention to be innovative, the infrastructure to support innovation, operational level behaviours necessary to influence a market and value orientation, and the environment to implement innovation (Dobni, 2008).

### 2.3 Service innovation

Gallouj (2002) thought that the nature of service innovation is more social and organizational than in case of the manufacturing sector. Manufacturing innovation focuses on the technology. It is not typical in the service sector, which is based on R&D, because it is driven by practical experience (Sundbo, 1998). In addition, Sundbo (2001) also mentioned during his research that innovation activities are less structured than industrial innovation, and employees become more involved in the process (Mattson & Sundbo & Fussing–Jensen, 2005). It is also a method, a change of respond to external environment or the first action of influence environment of the organizational transformation (Daft, 1978). Sundbo (1998) had explored if the service will organize innovative activities. The results showed that the level and pattern of innovative activities are different, depending on the size of enterprise and the operating projects. Besides, the process of innovation is often a non-system search and learning process. However, innovation is totally different from the organizational learning. The current academic researches gradually turn the discussion of innovative process from production activities towards service activities. And the point of view of service innovation is majority from the technological innovation of manufacturing. At present, the research on the innovative type of service is mainly emphasize on the product innovation vs process innovation and management innovation vs the distinction of technological innovation (Patrick, 2004).

### 2.4 The important factors of service innovation

Steve Jobs stated on various occasions that customer participation is not essential to the design of innovations as “a lot of times people don’t know what they want until you show it to them” (Isaacson, 2011). It is important to classify innovation into typologies as the factors that influence these different types of innovations might differ (Freeman, 1994). Base on the market environment has changed, constant development of technique results in easy access information, increased knowledge and fast communication possibilities “In the words of the Boston Consultancy Group consultants, most firms in the global economy are now forced to compete with everyone, from everywhere, for everything”

(Dervitsiotis, 2010). The reasons for developing new services could also relate to reducing obsolescence, responding to competition, having spare capacity, change of seasonal effects and risk reduction (Cowell, 1988). Corporate and brand image are more important for new service introductions (Easingwood, 1991). Services should therefore have a lower risk profile than products. Calculating the cost and profitability of new services is challenging as the cost of shared delivery systems and the cannibalization impact of new services is difficult to assess (Easingwood, 1991).

## 3. Research Methodology

In order to study the important of service innovation key success factor in the hospital industry, the study used the AHP method to support this study that will provide additional valued information to excellent service innovation.

### 3.1 Definition of AHP

Analytical Hierarchy Process (AHP) is one of the various approaches used to determine the relative importance of a set of activities or criteria. (Wind and Saaty, 1980). The Analytical Hierarchy Process (AHP) includes both the rating and comparison methods the rationality requires developing a reliable hierarchic structure or feedback network that includes criteria of various types of influence, and decision alternatives to determine the best choice (Saaty, 1994). It is also one of Multi Criteria decision making method that was originally developed by Prof. Thomas L. Saaty. It’s a method to derive ration scales from paired comparisons. AHP allow some small inconsistency in judgment because human is not always consistent.

### 3.2 How to structure a Hierarchy in AHP

In constructing the method of Analytical Hierarchy Process, the researcher examines the process on how the pairwise comparison judgments occur based from the expert’s decision. In AHP, a problem is structured as a hierarchy followed by a process of prioritization and because of that the design of the hierarchy must be considered to be followed. First, identify the overall goal. Then, identify the sub goals of the overall goal. Third, identify the criteria that must be satisfied to fulfill the sub goals of the overall goal. Fourth, identify sub criteria under each criterion. Fifth, identify the actors involved. Sixth, identify the actors’ goals. Next is to identify the actors’ policies. Eight, identify options or outcomes. Then, for yes-no decisions, take the most preferred outcome and compare the benefits and



costs of making the decision with those of not making it. Lastly, do a benefit/cost analysis using marginal values. According to Vassou et al. (2006), the first step in the AHP is the decomposition of the problem into a decision hierarchy. Then establish priorities among the elements in the hierarchy by making pair wise comparisons of the criteria and alternatives. Lastly, is using Saaty's (1980) predefines one-to-nine ratio scale.

### 3.4 Pair wise Comparison

The AHP employs an underlying scale with values from 1 to 9 to rate the relative preferences for two criteria. The pair wise comparisons in a judgment matrix are considered to be adequate if the corresponding consistency ratio (CR) is less than 10% (Saaty, 1980). The consistency ratio is the measurement of the consistency of pair wise comparison judgments.

### 3.5 Hypothesis and the purpose of AHP

The purpose of AHP is about breaking a problem down and then aggregating the solutions of all the sub problems into a conclusion. It facilitates decision making by organizing perceptions, feelings, judgments, and memories into a framework that exhibits the forces are arranged from the more general and less controllable to the specific and controllable (Saaty, 1994). The AHP is based on the innate human ability to make judgments or a decision on the questions in this process which will affect the factors in this study. It provides such framework to make effective decisions on complex issues by simplifying and expediting the respondent's natural decision making process.

### 3.6 Research Structure

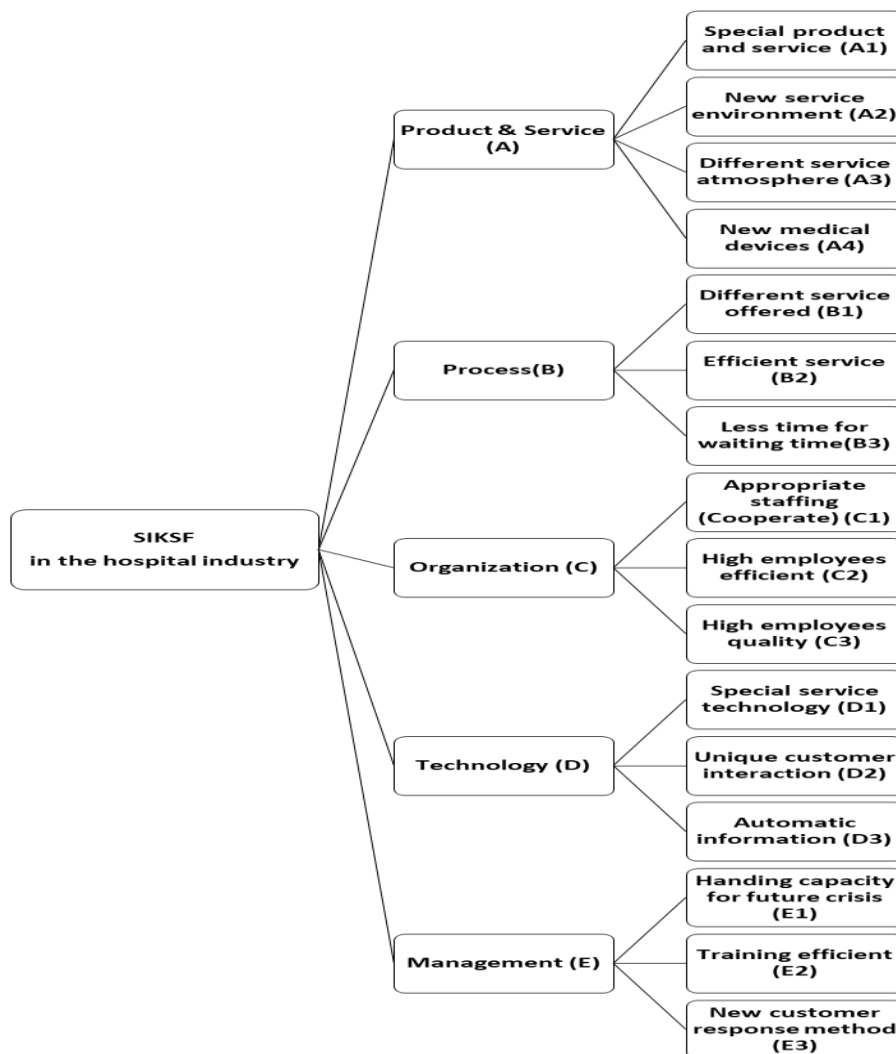


Figure 1 The Analytical Hierarchy Process: Key success factors in hospital industry



### 3.7 Research sample and Data collection

In order to study the importance of each factor in this study, 12 respondents (marketing experts, hospital manager and higher involved consumers) were asked about their opinion regarding the service innovation key success factors involved in their way of thinking about the service process in the hospital. The survey questionnaires are sent by a researcher.

### 3.8 Data Analysis Method

In this study, in order to obtain the right data, the researcher decided to use the Analytical hierarchy process to be able to identify the important factor that influence the consumers on their purchase intention. Using this method makes the data analysis easier, scaling the weights of the elements in each level of the hierarchy. The pairwise comparison of the levels where the entries indicate the strength of the factors on each level and which of these factors dominates the other factors on the different criterion. The five steps of determining a successful outcome in this method are the following:

- Defining the problem
- Construction of the Hierarchy
- Creating the Questionnaire
- Reliability Test
- The result of the data gathered

## 4. Results

In this part the researcher analyze the data computed in the AHP program (Expert Choice 2000) and rank the most important factor chosen by the respondents. To handle the consistency of each factor, AHP provides a method for measuring the degree of consistency among the pairwise judgments and that is when the Consistency Ratio (CR) < 0.1, the degree of consistency is acceptable and if CR > 0.1, the degree of consistency is unacceptable.

**Table 2 First Level Assessment Outcome**

Main Criteria	Weights	Rank Order	
Product & Service	0.211	3	<b>CR=0.05</b> (≤0.1)
Process	0.257	1	
Organization	0.126	5	
Technology	0.252	2	
Management	0.154	4	

Table 2 shows the various types of key success factors and its' weights based on the respondents' choice and ranked in order to be able to know the most important factor in the view of the respondents that they think influence them more. The most important factor first is the Process. Second is Technology, third is Product & Service, Fourth is Management and the last is Organization. The Consistency Ratio of these factors is 0.05 which means that the results are high reliability.

**Table 3 Second Level Product & Service factors Assessment Outcome**

Main Criteria	Weights	Rank Order	
Special product and service	0.204	2	<b>CR=0.02</b> (≤0.1)
New service environment	0.177	3	
Different service atmosphere	0.174	4	
New medical devices	0.445	1	

Table 3 shows the factors affecting the Product & Service. Result reveals the New medical devices interaction between consumers is the most important factor. The Consistency Ratio of the Level 2 criteria is 0.02 which means that the results are high reliability.

**Table 4 Second Level Process Factors Assessment Outcome**

Main Criteria	Weights	Rank Order	
Different service offered	0.191	3	<b>CR=0.02</b> (≤0.1)
Efficient service	0.449	1	
Less time for waiting time	0.359	2	

Table 4 shows that the factors affecting the Process. Result reveals that efficient service is the most important factor. The Consistency Ratio of this is 0.02 which means that the results are high reliability.



**Table 5 Second Level Organization factors Assessment Outcome**

Main Criteria	Weights	Rank Order	
Appropriate staffing (Cooperate)	0.273	3	
High employees efficient	0.378	1	CR=0.00 (≤ 0.1)
High employees quality	0.348	2	

**Table 6 Second Level Technology Factors Assessment Outcome**

Main Criteria	Weights	Rank Order	
Special service technology	0.398	1	
Unique customer interaction	0.321	2	CR=0.00 (≤ 0.1)
Automatic information	0.281	3	

Table 5 shows that the factors affecting the Organization. Result reveals the high employees

efficient is the most important factor based from the respondents' decision. The Consistency Ratio of the above data is 0.00 which means that the results are high reliability.

Table 6 shows that the factors affecting the Technology. Result reveals that special service technology is the most important factor based from the respondents' decision. The Consistency Ratio of the above data is 0.00 which means that the results are high reliability.

**Table 7 Second Level Management Factors Assessment Outcome**

Main Criteria	Weights	Rank Order	
Handing capacity for future crisis	0.337	2	
Training efficient	0.470	1	CR=0.00 (≤ 0.1)
New customer response method	0.193	3	

Table 7 shows that the factors affecting the Management. Result reveals the training efficient is the most important factor based from the respondents' decision. The Consistency Ratio of the above data is 0.00 which means that the results are acceptable.

**Table 8 Second Level Overall Results**

Main Criteria	Second Criterion	Weights	Synthesis with respect to Goal : KSF	Overall Rank Order
Product & Service (A) 0.211	Special product and service (A1)	0.204	0.043	12
	New service environment (A2)	0.177	0.037	13
	Different service atmosphere (A3)	0.174	0.037	14
	New medical devices (A4)	0.445	0.094	3
Process (B) 0.257	Different service offered (B1)	0.191	0.049	9
	Efficient service (B2)	0.449	0.115	1
	Less time for waiting time (B3)	0.359	0.092	4
Organization (C.) 0.126	Appropriate staffing (Cooperate) (C1)	0.273	0.034	15
	High employees efficient (C2)	0.378	0.048	10
	High employees quality (C3)	0.348	0.044	11
Technology (D) 0.252	Special service technology (D1)	0.398	0.100	2
	Unique customer interaction (D2)	0.321	0.081	5
	Automatic information (D3)	0.281	0.071	7
Management (E) 0.154	Handing capacity for future crisis (E1)	0.337	0.052	8
	Training efficient (E2)	0.470	0.072	6
	New customer response method (E3)	0.193	0.030	16



Table 8 reveals the overall weighted results of the service innovation key success factors and the factors in each dimension. Based from the decision choice of the respondents, the results show that the most influential factor is the “efficient service (B2)” which is categorized in the type process. The second important factor is the “Special service technology (D1)” which is categorized in the type technology. The third important factor is the “New medical devices (A4)” which is categorized in the Product & Service dimension. On the other hand, the lowest two factors are the “New customer response method (E3)” in the management dimension and “Appropriate staffing (Cooperate) (C1)” in the organization dimension. It is interesting that the second level factors’ order is similar to the result of the first level factors’. This study suggests the hospital industry’s manager must improve and supervise service “Process”, “Technology”, and “Product & Service” first.

## 5. Conclusion

This research reviews the comparative study of the different factors of key success and the determinants affecting service innovation. With the improvement of service day by day, more and more people are adopting different service innovation, therefore in the hospital industry must think of a way on how to tend their customers with the quality of uniqueness. Overall results of the analysis followed the AHP method, it reveals Product & Service, Process, Organization, Technology and Management have a great impact and influences on the success of service innovation.

In this study, the data provides a quantitative summary of the decision of the 12 respondents’ regarding on the most important factors of key success factors and discussed the factors on each type. In relation to this study is the different comment on hospital industry of the consumer. Based on the gathered results the most important type of key success factors of service innovation.

As sustainability becomes an increasingly urgent global concern, all hospital industry and businesses should take the opportunity and consider to expand the definition of key success factors as an effective marketing strategy which will adjust and increase their product and service sales if used smartly.

Since this study is only limited to only few amount of data and did not consider the point of view of the different hospitals, so for future studies could

add the data from a broader source of information to improve the analysis of the results. Future studies can also consider comparing the different kind of hospitals’ key success factor.

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