Original Article

Analysis of the Types of e-Business of the Healthcare Information Provision Service on the Internet

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Abstract

Objective: To define the healthcare information industry in order to propose a developmental direction for the industry, classify and analyze the healthcare information industry business models, and propose strategic guidelines for development of the healthcare information industry. **Methods:** A survey was conducted to investigate the private companies that provide healthcare information. For in-depth investigation of the study subjects, they were categorized based on their means of service provision. Open colloquium participation requests were extended to the representative companies, and five open-colloquiums were held. Additional data were obtained through a structured questionnaire investigating the problems and complaints, followed by a discussion on strategies and future plans. **Results:** Through a review of previous research on internet business model classification, four major model classification systems were chosen and the healthcare information business models were classified. Based on the composite opinions derived from the participating companies, policy guidelines were proposed. **Conclusion:** It is important to cooperate with experts from each field under governmental supervision and help the general public appreciate the value of healthcare information, thereby achieving the industrialization and development of the health information provision business. ***(Journal of Korean Society of Medical Informatics 15-3, 255-263, 2009)***

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I. Introduction

As medical technology evolves, more attention is paid to "Well-Being", and geriatric diseases, high blood pressure, diabetes are on the rise following the aging of the population, the needs for consumer's disease prevention and lifelong health management as well as healthcare information are increasing. In the year 2005, 67.8% of the US population (twenty million 930 thousand) were active users of the internet, and 66% of the adult activities online were related to health or medical information search[1]. Currently, in Korea, thousands of health and medical related internet portal is in use and if including foreign resources, the amount of health information available on the internet is enormous. In many instances, medical facilities, pharmacies, relative industries and groups provide health and medical information on their websites in addition to the basic facility information; and more websites whose main objects is to sell these kind of services and related products are appearing[2].

To address this type of consumer needs, US and other major developed countries are providing safe and reliable healthcare information to their citizens through consumer healthcare information web portal managed by government or other major public institution. On the other hand, although many internet websites exist in Korea that provides healthcare information, the quality of these information is yet to be verified. Problems such as exaggerated or false advertisement of given healthcare products or medical advice that are given under questionable responsibilities, are on the rise, and at the same time healthcare information provision system that is evidence-based verified is still not prepared. The provided information is managed by institutions, service-centered in competitive and scattered manner, and the extent and quantity of such information is limited and hard to understand. Even though consumers are demanding high-quality healthcare information, currently no system exists to meet such demands[3].

After observing business industry that provide healthcare information, their definition, approaches, and application data differ based on participants which results in chaotic business objective management and plan establishment. Also, in order to systematically advance the healthcare information industry, comprehensive data on market research and investment potential that can serve as market indices, however there is very limited amount of such data. Moreover, there is currently no research effort made to analyze the roles and conflicting interest among the existing healthcare information provision industry entity, promote the understanding of healthcare information business environment and predict future trend[4].

According to the research by Yang et al.[5], internet is an advertisement mean that can derive rational decision centered on contents, thus it allows rational decision making for strongly committed internet user through informational approach. Healthcare service is a major example of highly committed product and healthcare service consumers show tendencies to obtain medical facility decision options through healthcare information available on the internet. Therefore, it is important to note the possibility of obtaining low-cost, high-efficacy through the internet[6-8].

Therefore, the need for research regarding healthcare information business through internet has surfaced, and many such efforts have been made globally[6,9-13]. Considerable time has passed since the start of healthcare information service industry in Korea, however, not many companies achieved business success, and many companies have given up their efforts, resulting reduced private industries within the field. This is due to insufficient market analysis and lack of systematic investment, or premature participation into the market before the market and consumers are prepared. However, not enough research is being done to revitalize the healthcare information industry. Therefore, a policy research that can establish the strategic direction of long-term healthcare information business, and foster efficient

healthcare information industry.

The major objective of this research project is to provide strategic guidelines for healthcare information industry development, and to achieve this objective, following detailed objectives are established.

- Define healthcare information industry in order to propose the development direction of the industry.
- Classify and analyze healthcare information industry business models.
- Propose strategic guidelines for healthcare information industry development.

II. Materials and Methods

Firstly, the entities that provide healthcare information needed to be analyzed, thus a survey was done to investigate private companies that provide healthcare information. In order to choose appropriate candidates, www.rankey.com (a web service that ranks query results) was used to search for key words such as 'healthcare information', 'healthcare contents', 'healthcare knowledge', etc. The query results and the companies included in the members list of related companies were composited, removed for duplicates and the fifty-one websites were chosen for preliminary study that roughly investigates whether these websites provide healthcare information. Among them, websites with inactive internet links, those that predominantly introduce their company were removed, upon which twenty-seven study subjects that develop and provide private healthcare information were chosen. For in-depth investigation of the study subjects (the websites), they were grouped based on their means of service provision, open colloquium participation requests were extended to the representative companies for each grouping standard, and finally total of five open-colloquiums were held with thirteen companies that agreed to participate. The objectives of these open colloquiums were to obtain comprehensive opinion of the companies and derive policy proposal in order to revitalize the healthcare information industry. Participating companies made presentations on the present business condition, and through discussion among the participating research staff and companies, the objectives, management result, success

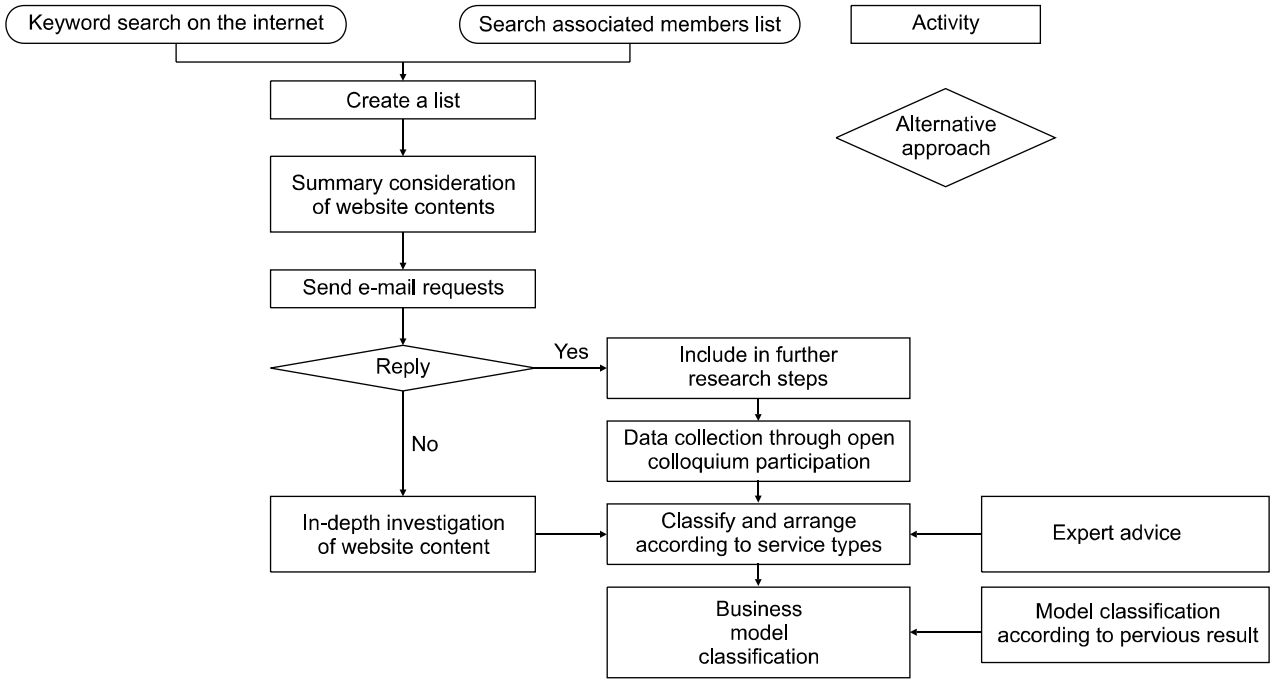

Figure 1. Healthcare information provision business model investigation process.

of management and usage information of healthcare information provision service were observed; and based on these findings, as well as evaluation of the healthcare information provision services as revenue business was obtained. After the open colloquiums, additional data were obtained through structured questionnaire on problems and complaints, followed by discussion on strategies and future plans. Through review of previous researches on internet business model classification, four major model classification systems were chosen and healthcare information business models were classified. Figure 1 graphically describes the research investigation process.

III. Results

1. Analysis of healthcare information provision service companies in Korea

There were total twenty seven internet healthcare information provision service companies based in Korea chosen as the research subjects. Inspection of the type of healthcare information provision revealed that 24 (88.9%) companies chose textbook-wise healthcare information provision, taking up the majority, followed by News (21, 77.8%), healthcare advisory and Q&A (19, 70.4%), video and Flash type (13, 48.1%). Additionally, 'other' (8, 29.6%) types were used to provide healthcare information.

Provided information contents consisted of information on diseases, physiology, medications, traditional medicine, alternative medicine, and Well-Being (obesity, diet-related information, exercise), etc. The information leaned toward general rather than personalized information. Majority of them provides healthcare information, not as primary means of benefit model, but rather as means of advertising the said company. The contents of the provided information were related to the company products such that a company that sells diabetes-phone provided diabetes-related information. Companies that perceive information provision as their primary objectives were limited to few specialized companies. Majority of the provided healthcare information revealed limited or no reference, and the reference qualities ranged from those that went through verification to those that were not at all. Most companies provide their contents without requiring the users to register to their websites, but some websites were members-only, thus making it difficult to examine their contents and presenting difficulties to the research.

2. Analysis of healthcare information business model types

In order to analyze the healthcare information business model types, internet business models were investigated. Various models were proposed, and among them, models that describe healthcare information business best were chosen; 5C by Eng, Internet business models by Timmers and Rappa, and internet business

Table 1. Comparison of Internet business model types

		Eng (role)	Timmers (role)	Rappa (role + benefit)	Kwon (benefit)
Role	I	Content type	Information intermediary	Infomediary model	
	II	Community type	Virtual community	Community model	
	III	Commerce type	Online mall, online store, online purchasing	Merchant model Manufacturer direct-buy model	
	IV	Connectivity type	Value chain intermediary	Cooperation model	
	V	Care type			Device-information composite
Benefit	A	Advertising		Advertisement model	Advertisement
	B	Subscription		Subscription model	Subscription fee
	C	Sponsor		Cooperation model	
	D	Value-added service			

benefit model proposed by Kwon were analyzed (Table 1). Each model defines the classification based on the role and profits. In this research, among internet business models, areas not appearing in the healthcare information provision business were excluded from the analysis.

Table 2. Business model analysis of healthcare information provision service companies in Korea

No	Business model type			
	ENG	Timmers	Rappa	Kwon
1	Content	Information intermediary, value-chain coordinator, virtual community	Infomediary model	Advertisement type
2	Content	Information intermediary	Infomediary model, advertisement model, coordination model	Advertisement type
3	Content	Information intermediary, value-chain coordinator	Infomediary model, advertisement model, coordination model	Advertisement type
4	Content	Information intermediary, value-chain coordinator	Infomediary model, advertisement model, coordination model	Advertisement type
5	Content	Information intermediary, value-chain coordinator, virtual community	Infomediary model, advertisement model, coordination model	Advertisement type
6	Content	Information intermediary, value-chain coordinator	Infomediary model, advertisement model, coordination model, merchant model	Other (offline sales of traditional print)
7	Content	Information intermediary, value-chain coordinator	Infomediary model, advertisement mode	Advertisement type
8	Content	Information intermediary	Infomediary model	Advertisement type
9	Content, care	Information intermediary	Infomediary model	Subscription fee type
10	Content, care, commerce	Information intermediary, value-chain coordinator, online store	Infomediary model, manufacturer direct-buy model	Device-information composite type
11	Content, commerce	Information intermediary, online store, online mall	Infomediary model, manufacturer direct-buy model, coordination model	Other (product sales goal)
12	Content, connectivity	Information intermediary, value-chain coordinator	Infomediary model	Advertisement type
13	Care	Information intermediary, value-chain coordinator	Infomediary model	Other
14	Care	Information intermediary, value-chain coordinator	Infomediary model	Subscription fee type
15	Care	Information intermediary	Infomediary model	Subscription fee type
16	Care	Information intermediary, value-chain coordinator	Infomediary model	Subscription fee type
17	Care	Information intermediary, online store	Infomediary model, manufacturer direct-buy model	Device-information composite type
18	Care	Information intermediary, online store	Manufacturer direct-buy model, subscription model	Device-information composite type
19	Care	Information intermediary, value-chain coordinator	Infomediary model	Subscription fee type
20	Care	Information intermediary, online store	Infomediary model	Subscription fee type
21	Care, community	Information intermediary, value-chain coordinator, online store, virtual community	Infomediary model, manufacturer direct-buy model, community model	Device-information composite type
22	Commerce	Information intermediary, value-chain coordinator, online purchase	Infomediary model, coordination model, merchant model, advertisement model	Other (product sales goal)
23	Commerce	Information intermediary, online store	Manufacturer direct-buy model	Device-information composite type
24	Commerce	Online store	Manufacturer direct-buy model	Other (product sales goal)
25	Commerce	Information intermediary, online mall	Infomediary model, manufacturer direct-buy model, coordination model	Other (product sales goal)
26	Commerce, community	Information intermediary, value-chain coordinator, virtual community, online store, online purchase	Infomediary model, manufacturer direct-buy model, coordination model, community model	Other (product sales goal)
27	Connectivity	Information intermediary, value-chain coordinator	Infomediary model	Subscription fee type

3. Business model analysis of healthcare information provision service companies in Korea

Table 2 summarizes the analysis result obtained through studying each company based on the service provided by the companies, using the classification of the internet business model shown in Table 1. In the case of ENG model, Content type ranked the highest with 12 cases (44.4%), followed by Care type with 11 cases (40.7%). The rest were Commerce type (7 cases, 25.9%), and Community type and Connectivity type each had 2 cases (7.4%).

Using Timmers' model classification, Information Intermediary model had 26 cases (96.3%), Value chain intermediary 15 cases (55.6%) and Online Store 9 cases (33.3%). Virtual community, online purchase each had 3 cases (11.1%), Online Mall 2 cases (7.4%), while the rest had none.

Analysis using Rappa's model showed Infomediary to have 24 cases, as the top ranked, followed by Manufacturer Direct-buy model and Cooperation model each having 9 cases (33.3%). The rest consisted of Advertisement model (7 cases, 25.95), Merchant model (2 cases, 7.4%), Community model (2 cases, 7.4%), subscription model (1 case 3.7%), while the other models had none.

Among the five benefit models proposed by Kwon, those that appeared in the healthcare information provision area where Advertisement, subscription fees and device-information composite. Among them, Advertisement type had 8 cases (29.6%), device-information composite type 5 cases (18.5%), subscription type had 4 cases (14.8%), while the type that cannot be expressed by Kwon's benefit models - healthcare provision as an additional service to product sales objective - had 7 cases (25.9%), making up a considerable part. From this, it can be observed that instead of charging usage fees for information itself, advertisement and other main products serve as the source of financial benefit.

IV. Discussion

Internet healthcare information provision service in Korea most frequently fall under textbook-wise type, News type or Q&A type. Most companies individually develop and provide information, but the qualities showed wide range. Though some clearly indicate their references, but considerable amount of companies do not, indicating that the quality of healthcare information is yet to be verified.

All four internet business models used in this study were shown to be limited for analyzing healthcare information service companies. ENG business model was mainly for e-Health, whereas models by Timmers, Rappa and Kwon are for internet business related and were shown to be limited for fully representing healthcare information service business model intended for this study. Also, each healthcare information service companies contain various types of complex forms instead of being classified by a single type of business model, making clear classification difficult. Therefore, instead of using models by Timmers or Rappa that classify models into several types based on value proposition, product/service, resource system, benefit model that make up the said business model, models by Timmers and Kwon that classify internet healthcare information provision service companies based on a single point of view will prove to be more accurate. The analysis results are agreed across all models, but it was observed that one of the healthcare information provision service objectives is an additionally offered service to the sales of main products. Therefore, in the future, in order to develop more detailed healthcare information provision service business model, based on the types analyzed in this study, further reflection on what business models are possible is needed.

Based on the composite opinions derived from the participating companies, policy guidelines are summarized as follows.

First, amendment of the Acts related to healthcare information is needed. In order to revitalize the healthcare information market, basic maintenance of legal policies is presently in demand. To start up a new business, business in B2C sense is required, but although current law standardizes the service provision in the B2B sense, there are challenges when entering B2C market. "Industrialization" means "capital investment", but current law makes this impossible, as well as blocking provision of appropriate information, effectively disabling the consumer's "right to know". Current government restrictions on the healthcare market make it impossible to discuss the information development guidelines. Just by instating law regarding healthcare information service would provide noticeable solution to the problem. Most urgent matter is to modify or create law that prevents companies that do not consult legitimate medical experts from practicing medicine. Swift action of modifying law that allows privately lead healthcare information and healthcare related industry development is required, as well as information sharing and interoperability related laws and system. Reducing risk factors of deficit by eliminating restrictions on the market and governmental support to increase the market are required.

Secondly, health insurance should apply to healthcare information provision businesses. By including healthcare information provision service to the National Health Insurance, supply and consumption are increased thereby promoting service. Among the healthcare information provision services, include in the insurance coverage those with larger cost-efficiency which results in reduced healthcare cost and increased consumer satisfaction. For the sake of balance, financial consideration effort needs to be made toward various healthcare information provision service, thereby assigning priorities and swiftly determining the applicability of health insurance to these services.

Thirdly, systematic structure and long-term planning must be devised for healthcare information business. Due to the nature of healthcare information, making a connection with medical field is unavoidable and thus it retains public goods characteristics. Therefore, a strategic approach that balances a part of publicity (governmental support) and a part of entrepreneurship (self-purification ability of market and provision of motivation for industrial development). However, there exist numerous variable factors which call for a plan that can scientifically prove the effect of long-term healthcare information provision. For this purpose, healthcare information management group and system that maintain publicity on the national scale need to be established. Also, by providing the perspective that healthcare information industry will aid in creating futuristic industry clusters with new abilities, a continuous research and analysis effort on the effect of healthcare information industry on creating new jobs.

Fourthly, a verification system for healthcare information needs to be established. Through governmental level purchase, distribution, and circulation management of such verified information, a support system that assists in the distribution of healthcare information is needed.

Fifthly, an aid for healthcare information industry technological development and foundation establishment support are needed. It is important to avoid trial-and-error or competitive duplicate investment that results in inefficiency in the process of developing high quality healthcare information and related industries through the standardization of healthcare information. Through such measure, public health and welfare information needs to be converted into a composite database. Within the Ministry of Health and Welfare, its sub-branch departments and other related facilities must create a database of all of their healthcare information and subsequently allow easy approach for other industries and general public.

Sixthly, a direct support for creating healthcare information is requires as well. Information regarding healthcare, disease, doctors and medication that are vast and possesses public need to be created and distributed to

internet websites free of charge through a government supported project. Also, cost related to expensive information such as video media require a financial aid not just for producing, but equipment purchasing and rental benefits. In order to increase the public's accessibility to such healthcare information, specific planning or business that actively implement new TV channels, mobile device and IPTV for distributing healthcare information need to be supported.

Lastly, in addition to the recommendations mentioned previously, a solid support and environment for sufficient R&D are required. It is realistically impossible to create capital from healthcare information itself, therefore the government needs to provide motivation to other businesses and thereby help develop healthcare information. If the government can help even partly with the development cost for core technology, this is a significant support in the industry perspective and thus a research grant needs to be provided.

Healthcare information is an essential part in the future medical industry and its importance is enormous. However, in current condition, healthcare information serves a limiting role as a tool and has not yet entered the personalized information domain. Once the consumer recognizes its purchase value or it rises in the list of purchase priorities, then can the healthcare information business become industrialized. Also, by understanding the needs of consumer interface, a various disease and healthcare information that can be easily understood by consumers need to be developed. By examining the consumer's motivation, trial and error can be reduced and in order to aid the consumers in their decision making, a number of preliminary services that address varying needs of the consumers to be provided. The government needs to provide seed money to support these preliminary services and provide detailed incentive for success cases form the private sectors, thereby making it possible to create self-motivation within the industry. In order to realize the industrialization of healthcare information business, an appropriate time that allows recognition for information value and the ability to pay for such information. Thus it is important to cooperate with experts from each field under the aid of government and help the general public appreciate the value of healthcare information, thus achieving the industrialization and development of the health information provision business.

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