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Factors Affecting Service Innovation, Customer Value toward Customer Satisfaction: Case on Health Care Industry

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Abstract

The fierce competition among industries and the rapid environment changes have health care companies not only face the competitive prices of products but also bear the pressure of shortening product life cycle. Looking back the barter time before, there was not customer service. With the time and space changes, customer service is constantly enhanced along with the economic development. In the service era, a business should complete the service value from the aspect of customer to achieve the goal of customer satisfaction, actively understand customers' real needs, and provide products and services required for customers in order to create higher service value for customers. Taking the employees of health care industry in Shanghai City as the research object, questionnaire survey is used for collecting relevant data. With statistical analyses, the following research conclusions are summarized: (1) Service innovation shows significantly positive correlations with customer value; (2) Customer value reveals remarkably positive correlations with customer satisfaction; (3) Service innovation reveals notably positive correlations with customer satisfaction. Reference for health care industry making operation policies is provided in this study. By strengthening customer value and customer satisfaction, it is expected to enhance customer loyalty and create the niche for the sustainable management of health care industry.

Keywords: service innovation, customer value, customer satisfaction, health care industry, social innovation.

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Introduction

Due to the fierce competition among industries and the rapidly changing environment, medical industry is facing the problems of price competition on products as well as suffering the time pressure caused by shortening product life cycle. New economy is service economy, and service is the competitive advantage that reveals the importance of service. Recalling the time with object exchange, there was no customer service. Nonetheless, customer service is constantly promoted accompanied with economic development. Advanced countries in the world have focused on service to gradually form the leading pattern, with increasing proportion. Service therefore becomes the engine of economic development. Nevertheless, people still know little about the creation of service innovation. An industry intends to develop service, but does not know how to develop it. When service become the internationally new focus, it would be liberalized and provide knowledge-service businesses and those with service innovation for larger development space.

Under fiercely financial environment nowadays, medical industry, when facing fierce competition, is welcoming the approach of new service era. Sustainable management requires the maintenance of existing customers and the constant development of new customers. A medical business should stand on the position of customers to complete the service value that a medical business should stress more on locality, emphasize the promotion of service quality, under the business items, and provide customers with more satisfactory product and service quality to satisfy the maximum needs of customers in the market to achieve customer satisfaction. Moreover, taking customer needs into account, actively understanding customers' real needs, providing customers with necessary products and service, as well as creating higher service value for customers could keep customers' loyalty to the medical business through the deeper and broader service. Such an objective could be achieved merely by developing continuous relationship based on long-term benefits and consensus.

Literature review

Service innovation

Chen, Batchuluun, & Batnasan (2015) indicated that service innovation was not new technology or new product innovation, but the service introducing technology into the market. Mahmoud, Hinson, and Anim (2018) stated that service innovation stressed on ideas, methods, or objects, as a new organization and relevant environment. Durst *et al.* (2015) pointed out service innovation as the existing product of an organization reducing the profits with increasing market competitors that the organization had to develop new products or service

and modify and improve existing products and service. Al-Ababneh (2015) considered that service innovation was not simply the successful development of new service or new products, but contained all innovation activities to modify and improve existing products, service, and delivery systems from small scale to large scale. Heinonen & Strandvik (2015) pointed out service innovation as a series of innovation activities centered on products and production processes, including conception, research, development, production, and commercialization, to enhance the competitive advantages for satisfying customers' changing needs.

Referring to Shan, Song, & Ju (2016), service innovation is classified into quality measures, financial measures, and competitive measures for the measurement.

(1) Quality Measures refer to the service result outperforms the competitors and the service experience is better than the competitors.
(2) Financial Measures refer to reducing costs, achieving cost efficiency, and acquiring higher profits.
(3) Competitive Measures refer to key competitive advantages, market share exceeding the estimation, and customer growth exceeding the estimation for an enterprise.

Customer value

Tan & Xu (2015) regarded customer value as a customer's perceived value, the overall evaluation of product utility or service after the customer paid for and acquire the product or service. Arshad & Su (2015) mentioned that a customer's perceived value in the purchase would be different from it during the use or after the use. In this case, a consumer would consider the distinct characteristics and results in the phases when purchasing and using products. Kim & Fesenmaier (2015) regarded customer value as the offered products or service exceeding customer needs and expectation, i.e. the degree of offered products or service to the enhancement of a customer's performance; besides, the provided products or service should benefit both parties. Dainiene & Dagiliene (2015) defined customer value as a customer's cognition of all tangible products and intangible service provided by an enterprise; such customer cognition contained satisfaction with needs, product selection, price and brand, value-added service and relationship, and transaction experience. Okeyo (2015) pointed out customer value as the gap of value between a customer paying for a product or service and the purchased product or service.

Referring to Lin (2015), customer value is divided into practical value, hedonic value, and symbolic value in this study.

(1) Practical value: the problem-solving capability of a product or service provided for a consumer. Such capability could satisfy consumer needs for the function or utility of the product or service and further have the consumer perceive the benefits of enhancing profits or reducing costs.

(2) Hedonic value: the capability which a seller could provide a consumer with a positive sensory emotion during the product or service purchase process. Such sensory emotion could have the consumer perceive the benefits of enhancing profits or reducing costs.

(3) Symbolic value: A consumer considers that the self-image, role & status, group belongingness, or self-discrimination could be promoted in the product or service purchase process. Such a relationship has the consumer perceive the benefit of profit enhancement or cost reduction.

Customer satisfaction

Zhou, Kautonen, & Wei (2015) regarded customer satisfaction as a customer's cognition of the reward acquired from the purchase being proper. Barrett *et al.* (2015) indicated that customer satisfaction was the evaluation of the purchase process of a customer considering the quality and profits as well as the cost and effort paid. Kunttu & Torkkeli (2015) regarded customer satisfaction as the emotional reaction to an object. Ebrahimi *et al.* (2016) pointed out customer satisfaction as the total attitudes of a customer after purchasing a product or using a service. Lusch & Nambisan (2015) regarded customer satisfaction as the result of purchasing and using a product generated by the comparison between expected reward and invested costs. Desai, Potia & Salsberg (2015) defined customer satisfaction that a customer, after using a product, would evaluate the consistency between produce performance and the belief before the purchase; when there was certain consistency, the customer would be satisfied.

Referring to Wang & Juan (2016), a customer would evaluate the product quality and the service quality of a store for the satisfaction or dissatisfaction that customer satisfaction is a measurement with multiple items, which could be divided into overall satisfaction, product satisfaction, and service satisfaction: (1) *Overall satisfaction*: an emotional state to the consumption experience in a product or service; (2) *Product satisfaction*: consumer satisfaction with the quality of a purchased product; (3) *Service satisfaction*: consumer satisfaction with the service quality offered by a product.

Research hypothesis

Chen, Batchuluun, & Batnasan (2015) indicated that service innovation was the method with novel and different service ideas from the past or service delivery, or to solve problems for delivering added value to a customer. Blut *et al.* (2015) regarded that innovation could gradually improve products, processes, service, organizational systems, and marketing systems to create customer value. Wong, Liu, & Tjosvold (2015) argued that a company should provide better and latest service or reduce customers' perceived cost to enhance customer value. Piligrimiene, Dovaliene, & Virvilaite (2015) found out the positive and significant effects of

service innovation on customer value as well as positive and remarkable effects of customer value on customer loyalty. Shan, Song, & Ju (2016) indicated that a hotel could have the customers perceive value-added integrated service through service innovation and further promote customers' cognition value to enhance the occupancy rate. According to above literatures, the following hypothesis is inferred.

H1: Service innovation shows positive relations with customer value.

Tan & Xu (2015) pointed out customer value as the gap between a customer paying for a product or service and the value of the purchased product or service. Pires, Dean, & Rehman (2015) mentioned that an enterprise had to create characteristic customer value to lead the advantage; the customer value was the customers' overall evaluation of products. When a buyer successfully transmitted a product to customers, the customers would perceive satisfaction and value. Moreover, Dainiene & Dagiliene (2015) revealed that customer satisfaction relied on a customer's perceived value and expected standard. Bontis, Janosevic, S., & Dzenopoljac (2015) pointed out customer value as customer feeling about the spent time, paid insurance fee, and acquired satisfaction being worthy, reasonable, and value added. Lin (2015) discovered that the spent time, paid insurance fee, and inner satisfaction with the product of Mercuries Life Insurance being higher than the expectation of the product would enhance higher customer satisfaction with Mercuries Life Insurance. Lin further pointed out the positive and notable effects of customer value on customer satisfaction. Accordingly, the following hypothesis is inferred.

H2: Customer value reveals positive relations with customer satisfaction.

Zhou, Kautonen, & Wei (2015) found out the positive and significant effects of service innovation (including new service concepts and new customer interface) on customers' perceived value. van der Have & Rubalcabe (2016) revealed the positive effect of service innovation on customer satisfaction, brand image, and purchase intention. Ebrahimi *et al.* (2016) pointed out the positive effect of service innovation on employee satisfaction. Uddin, Bose, and Yousuf (2015) discovered that the service innovation of a nursing institution would positively affect customer satisfaction. Wang & Juan (2016) indicated that increasing life income and consumer taste would enhance a consumer's acceptance of innovation service or products promoted by a store; in this case, a store could enhance customer satisfaction by offering complete, and even exceeding, customer expectation. The following hypothesis is therefore inferred in this study.

H3: Service innovation appears positive relations with customer satisfaction.

Methodology

Research sample and object

Aiming at employees of medical industry in Shanghai City, total 420 copies of questionnaire are distributed, and 328 valid copies are retrieved, with the retrieval rate 78%.

Reliability and validity test

Validity refers to a measuring tool being able to measure what a researcher intends to measure. Validity is generally divided into content validity, criterion-related validity, and construct validity. The questionnaire items in this study are referred to domestic and international researchers that the questionnaire presents certain content validity. The dimensions of service innovation, customer value, and customer satisfaction in this study are tested the overall structural causation with linear structural relations model, and the data input is based on the correlation coefficient matrix of above observation variables. The linear structural relations model analysis result reveals that the overall model fit achieves a reasonable range that it presents favorable convergent validity and predictive validity. Item-to-total correlation coefficients are utilized in this study for testing the construct validity of the questionnaire, i.e. reliability analysis, and the calculated item-to-total correlation coefficients are used for judging the questionnaire content. The item-to-total correlation coefficients of the dimensions in this study are higher than 0.7, showing certain construct validity of the dimensions in this study.

To further understand the reliability and validity of the questionnaire, reliability and validity analyses are preceded. The higher Cronbach's α reveals the better reliability. The formal questionnaire in this study is developed based on the standard, and the measured Cronbach's α appears in 0.75~0.90, apparently conforming to the reliability range.

Results

LISREL model evaluation indicator

LISREL (linear structural relation) model combining factor analysis and path analysis in traditional statistics and added simultaneous equations in econometrics could calculate multiple factors and multiple paths at the same time. The model fit could be evaluated with preliminary fit criteria; overall model fit, and fit of internal structure of model. The data of this study are organized in *Table 1*, and the preliminary fit criteria, internal fit, and overall fit of the model are explained as followings.

Table 1 shows the model analysis result, in which three dimensions of service innovation (quality measures, financial measures, competitive measures) reveal significant explanations on service innovation (t>1.96, p<0.05), three dimensions of customer value (practical value, hedonic value, symbolic value) appear remarkable explanations on customer value (t>1.96, p<0.05), and three dimensions of customer satisfaction (overall satisfaction, product satisfaction, service satisfaction) present notable explanations on customer satisfaction (t>1.96, p<0.05). Apparently, the overall model shows favorable preliminary fit criteria.

In regard to internal fit, service innovation reveals positive and significant correlations with customer value (0.851, p <0.01), customer value appears positive and remarkable correlations with customer satisfaction (0.824, p <0.01), and service innovation presents positive and notable correlations with customer satisfaction (0.836, p <0.01) that H1, H2, and H3 are supported.

Regarding overall model fit, the overall model fit standards $\chi2/Df=1.386$, smaller than the standard 3, and RMR=0.003, showing the proper $\chi2/DF$ and RMR. Moreover, chi-square is sensitive to sample size that it is not suitable for directly judging the fit. However, the overall model fit standards GFI=0.982 and AGFI=0.925, higher than the standard 0.9 (the closer GFI and AGFI to 1 revealing the better model fit). This model therefore presents better fit indicators.

Table 1: Overall linear structural relation model analysis result

evaluation item	parameter/evaluation standard		result	t
preliminary fit	service innovation	quality measures	0.723	10.22**
		financial measures	0.706	9.44**
		competitive measures	0.714	9.83**
	customer value	practical value	0.735	10.69**
		hedonic value	0.758	11.92**
		symbolic value	0.742	11.44**
	customer satisfaction	overall satisfaction	0.783	13.16**
		product satisfaction	0.791	13.77**
		service satisfaction	0.766	12.35**
internal fit	service innovation→customer value		0.851	37.49**
	customer value→customer satisfaction		0.824	31.42**
	service innovation→customer satisfaction		0.836	35.28**
overvall fit	X2/Df		1.386	
	GFI		0.982	
	AGFI		0.925	
	RMR		0.003	

Note: * stnads for p<0.05, ** for p<0.01, and *** for p<0.001.

Table 2: Hypothesis test

research hypothesis	correlations	Empirical result	P	result
H1	+	0.851	P<0.01	supported
H2	+	0.824	P<0.01	supported
H3	+	0.836	P<0.01	supported

Conclusion

The research results show that a medical business should pay more attention to and satisfy customer needs. In addition to providing relevant service information and knowledge, effective, clear, and transparent communication and inquiry channels should be established so as to comprehend and satisfy different customer needs. A medical business could develop distinct innovation service by enhancing the technological service and provide customers with innovative service items through new service ideas in order to enhance customer value. With new customer service interface and innovative service functionality to provide technological and modern interaction model could enhance the practical value of innovation service and satisfy customers' service expectation and allow customers perceiving the promotion of symbolic value to further enhance customer satisfaction with the innovation service. In addition to enhance customer satisfaction, it should have customers realize the advantages of the medical business. In this case, a medical business could satisfy customer needs through the enhancement of practical value as well as actively introduce the advantages of the service items or the difference from other businesses in the same trade so that customers could understand the leading status and further enhance customer satisfaction and customer loyalty.

Suggestions

From the important research results and findings, following practical suggestions are proposed in this study.

(1) A medical business could establish a customer information system and customer communication platform or communication channel. In addition to stressing on customer opinions, different types, problems, and needs of customers should be classified and filed. Service innovation aiming at existing resources and customer needs should be proceeded to enhance customer value.

(2) A medical business could reinforce various service items of service contents, functions, quality, and specialty to strengthen the functions for customers solving problems and perceiving the service value. It would enhance customer satisfaction with the medical business and loyalty to revisit the medical business.

(3) In the fiercely competitive market, it is necessary to continuous modify and innovate existing service, promote innovation service, and further create customer satisfaction and loyalty. A medical business should emphasize each type of customers, constantly enhance the perceived value through service innovation, and promote customized service items, aiming at different types of customers, to satisfy customer needs and further promote the customer value.

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