



Building Quality Digital Patient Experience Based on Innovation in Health Service Facilities in West Java

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Abstract. Digitalization has begun to emerge in the healthcare industry as an effort to overcome the issues of health services access. Thus, this study was conducted to investigate the relationship between healthcare quality, innovation, and digital patient experience in dental healthcare facilities in West Java. The data were collected using an online survey involving 214 patients spread throughout West Java, in which the data analysis was carried out using linear regression and path analysis. The findings revealed that innovation and health services quality had a significant role in realizing digital patient experience. In addition, there was an indirect influence between health services quality and the digital patient experience through innovation. This research's novelty is in the testing and analysis of the relationship between innovation, healthcare quality, and digital patient experience in a conceptual model, which was carried out at healthcare facilities in West Java.

Keywords: Digital Patient Experience · Healthcare · Health Services Quality · Innovation

1 Introduction

Health is society's major need. Currently, Indonesia's healthcare industry has been developing well as reported by the Central Bureau of Statistics (Badan Pusat Statistik) [1] that the health service industry in Indonesia has the highest growth rate compared to other sectors in the third quarter of 2021, with a growth rate of 14.6%. Therefore, judging from this growth rate, this sector is considered promising and can be said to make a significant contribution to the Indonesian people. To support this sector, building the quality of digital patient experience based on innovation in health service facilities is considered significant.

The growth of the health sector is inseparable from issues related to health services access occurring in almost all parts of Indonesia. The Health Ministry of Indonesia [2] reported that there were 62.9% of the Indonesian population who had difficulty accessing health service facilities. This also occurs in West Java, one of the most populous regions in Indonesia [1]. As many as 33 million residents (73.6%) of West Java had difficulty

accessing health facilities. There have been various efforts done to address this issue by digitizing the health sector. The digitalization implementation is expected to drive business growth and generate efficiencies ranging from 5% to 10% [3]. Global Digital Health Index [4] reported that health services digitization in Indonesia has not been optimal compared to other Southeast Asian countries, so it requires to be improved. This is essential to provide a good digital patient experience for all Indonesian people, especially in West Java as the most populous region.

The digital patient experience can be enhanced by leveraging innovation. Several previous studies reported that the creation of a digital patient experience was driven by the presence of innovation, such as technological innovation [5, 6]. In accordance, Mihardjo et al. [7], Bolton et al., [8], and Keiningham et al. [9] examined the relationship of innovation to customer experience that were not focused on digital experiences. Digital customer research on innovation has been carried out by previous researchers in various industrial fields [5, 6, 10], but did not focus on the healthcare industry. Furthermore, digital patient experience is also related to the health service quality provided by health facilities. Saberian et al. [11] found that service quality on digital products had a positive impact on customer purchase intentions based on their experience. Other studies also revealed that there were relationships between service quality and customer experience [12, 13]. However, there has not been any study that specifically research health service quality and digital patient experience in the healthcare industry. The aforementioned studies showed that these three variables were not researched together and not conducted in West Java.

1.1 Health Service Quality

Health service quality needs to be considered as an effort to meet patient needs and is useful for building patients' loyalty and satisfaction [14]. According to Shabbir et al. [15], improving the services quality can be carried out by providing experienced health workers affecting patient care. Shabbir et al. [15] and Irfan and Ijaz [16] reported that patients have several preferences in making decisions regarding the selection of health services, namely personalization of the care they receive, technological factors, environment, and waiting time. The service quality that the patients get can also be observed from the physical environment, a customer-friendly environment, communication, privacy and security, and the health service providers' responsiveness [17]. In addition, face-to-face services are not seen to be similar compared to online services as distinguished from their basic quality factor, online services shift service delivery from face-to-face to technology-based that reducing contact between users and staff [12].

1.2 Innovation

Innovation is closely related to the business world and is defined risky, expensive, and time consuming. Innovation is also aimed at new ways of thinking and problem solving. Problem solving can come from many aspects, including products, processes, organization, and marketing [18]. The combination of several existing ones can be considered as innovation, and its combination with technology can also create innovation [19]. Knowledge integration creates solutions to company problems [20]. Innovation is not

only about the knowledge acquisition, but also a continuous learning, and must be put into practice to achieve the expected results [21]. Besides, innovation can be described as an effort to create opportunities to support the growth of the company. According to Denicolò and Zanchettin [22], innovation is associated with company growth and the creation of new things. According to Danarahmanto et al. [18], innovation is significant because it can help creating services that meet customer needs so that it has a positive impact on the company's sustainability.

1.3 Digital Patient Experiment

Schmitt [23] affirmed that customer experience is the process of managing the entire customer experience through a product or a company. Customer experience refers to the factors related to cognitive, emotional, physical, sensory, mental, and social aspects, which consist of direct or indirect interactions between customers and more market participants [24]. Currently, the digital patient experience is believed to be part of customer experience linked with digital touchpoints [25]. Moreover, customer perception can also be inferred as company or organization treatment to its customers [26]. Alfa et al.'s [27] study confirmed that customer experience can be labelled to be associated with employees, core services, added value, speed, and marketing mix factors. In accordance, Silalahi and Rufaidah [28] stated that patients' digital experiences can be classified through digital service experiences, digital image experiences, and digital touchpoint experiences.

1.4 Relationship Between Health Service Quality, Innovation, Digital Patient Experience

Creating a digital patient experience can be driven by technological innovation [5, 6]. According to Bolton et al. [8], innovation is related to customer experience, useful in delivering experiences to customers. Additionally, customer experience is related to the integration of physical, social, and digital aspects useful for creating superior customer experiences in the market, which need attention to build customer experiences under different conditions. In accordance, customer experience is also related to health services quality [12, 29, 30]. According to Sukendi et al. [13], there was an effect of service quality on customer experience, which could be indicated through customer confidence of service quality leading to positive feelings. In relation, service companies need to provide new services and improve services by utilizing innovation and providing quality services [31]. Improvements in service quality are carried out through increasing the innovation ability and work productivity of workers [32].

This study aimed at investigating the effect of mediating innovation on health service quality and digital patient experience in health facilities in West Java. Therefore, this study is believed to contribute in better understanding the efforts to create patient experience by leveraging innovation and health service quality in the healthcare industry. This study consists of four sections. First, a review of relevant literature for theoretical frameworks and hypotheses development. Second, a description of research methodology and data collection method. Third, data analysis and interpretation and data discussion. Fourth, the implications, conclusions, and suggestions of the study. Based on

the aforementioned elaboration of previous research, this study proposed the following hypotheses.

- H1: Health Service Quality has a significant effect on innovation in health facilities in West Java.
- H2: Health Service Quality has a significant effect on Digital Patient Experience at health facilities in West Java.
- H3: Innovation has a significant effect on Digital Patient Experience at health facilities in West Java.
- H4: Health Service Quality has a significant effect on Digital Patient Experience through Innovation in health facilities in West Java.

2 Method

This research is a descriptive and exploratory research that uses quantitative methods with path analysis and regression analysis [33]. According to Jeon [34], route analysis requires a sample size of at least 20 times the number of paths. Each variable in this study was connected by three paths, based on the conceptual framework, so that the required number of samples is at least 60. Specifically, it used purposive sampling technique as a sampling technique with certain considerations [35]. Quantitative research can be carried out with a minimum sample size of 50 samples, and a recommendation of about 10 subjects per variable is generally recommended [36]. The data collection was carried out using an online survey involving 214 patients using oral and dental health services spread throughout West Java to see the ratio gap between the number of health workers is much larger than that of general health services. The data were analyzed using linear regression and path analysis with SPSS 21.0 software to test the validity and reliability, correlation, regression, and path analysis. Reliability is shown through Cronbach's Alpha coefficient. A construct or variable is said to be reliable if it gives a Cronbach Alpha value of more than 0.60 [37]. While the validity test for each question item was carried out through Pearson correlation calculations.

3 Result and Discussion

3.1 Description of Respondents

Most respondents in this study were female patients (78.5%) aged 17 and 35 years (75.7%). This reveals that women had more concerns with their dental and oral health. In addition to maintaining health, the visits to dental facilities also aim to improve appearance. Most of the patients visited were young adults with a high level of education (64%). Young adults are more open to digitization and thus receive more information and have more concerns on the importance of oral health.

3.2 Validity and Reliability

Reliability is expressed by the Cronbach Alpha coefficient, in which the alpha values for each variable are presented in Table 1. The construct is considered reliable if the

Table 1. Measuring reliability and validity

Variable	Dimension	Cronbach’s Alpha	Pearson Correlation
		(Reliability)	(Validity)
Health service quality	Physical environment	0.937	0.812
	Friendly customer	0.942	0.687
	Communication	0.938	0.802
	Privacy and security	0.937	0.825
	Responsiveness	0.938	0.795
Innovation	Marketing innovation	0.949	0.868
	Process innovation	0.946	0.923
	Product innovation	0.945	0.938
	Organization innovation	0.947	0.883
Digital patient experience	Digital service experiences	0.948	0.776
	Digital imaging experience	0.948	0.771
	Digital touchpoints experience	0.949	0.759

Cronbach Alpha coefficient is greater than 0.60 [38]. In this study, the value of the three variables exceeds 0.60, so the construct is considered reliable. In this study, all Pearson Correlation scores for each question are higher than the r-table (0.256), proving that all questions were valid.

Measuring reliability and validity shown in Table 1 as follow:

3.3 Hypothesis Testing

The hypothesis testing was done with regression using IBM SPSS software version 25.0. The relationship between innovation, healthcare service quality, and digital patient experience was analyzed using path analysis. The analysis results showed direct and indirect relationships between variables. The results of the regression calculations and the relationship between variables is presented in Table 2.

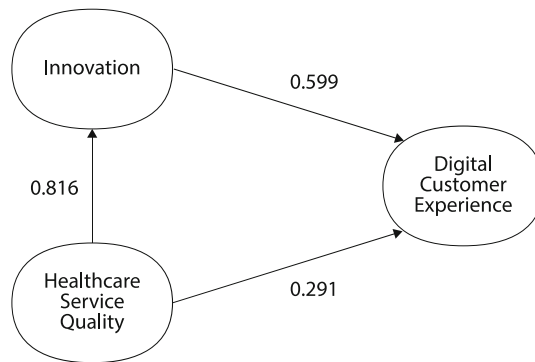
Table 2 presents the regression calculations results and the path description are illustrated in Fig. 1. In H1, H2, and H3 the calculated t-value of each path is greater than the t-table of 2.344. Therefore, it can be concluded that H1, H2, and H3 were accepted because the value of t-count > t-table. The H4 test was carried out using the Sobel Test to determine the effect of intervening innovation on the Health Service Quality and Digital Patient Experience path, resulting in a t-value of 8.527 and a t-table of 2.961. It is known that the t-value > the t-table value, so it can be said that there was an influence of innovation mediation or in other words H4 was accepted. In addition, simultaneous test

Table 2. Path Coefficient

Variable effect	Correlation Coefficient	t-count	F-count
H1: Health Service Quality → Innovation	0.816 **	20.59	
H2: Health Service Quality → Digital Patient Experience	0.291 **	4.671	
H3: Innovation → Digital Patient Experience	0.599 **	9.614	
H4: Health Service Quality & Innovation → Digital Patient Experience			28136

Note: ** sig < 0.01; t-table: 2.344; F-table: 4.707

Source: Processed data, 2022

**Fig. 1.** Research Finding

was carried out by calculating the F-value, resulting in a value of 281.36 and significant (sig < 0.01). Therefore, it can be inferred that the variables of healthcare service quality and innovation had a simultaneous effect on the digital patient experience.

The contributing paths coefficients was multiplied and resulted in the indirect effects. The indirect effect of Health Service Quality and Digital Customer Experience through Innovation (0.489) was calculated by multiplying the coefficient of Health Service Quality to Innovation (0.816) and Innovation to Digital Customer Experience (0.599). Thus, it can be inferred that the indirect effect (Health Service Quality - Innovation - Digital Customer Experience) was greater than the direct effect (Health Service Quality - Digital Customer Experience). The total effect (0.702) was the sum of the direct (0.489) and indirect (0.0.291) effects.

3.4 Discussion

The findings indicate that: 1) Health Service Quality had a significant effect on Digital Customer Experience; 2) Health Service Quality had a significant effect on Innovation;

3) Innovation had a significant effect on Digital Customer Experience; 4) Health Service Quality had a significant effect on Digital Customer Experience through Innovation.

This study reinforces the results of previous studies stating that there was an effect of service quality on customer experience [12, 13, 29, 30]. This happens because when the quality provided by health facilities through digital means, such as responsiveness, friendliness, and ways of communicating through digital means, it would make the patient feels good, then the customer will feel an increase in a good digital service experience as well.

In addition, this study also proves that improving the services quality provided by health facilities encourages innovation. Quality improvement can be done by implementing innovations that are useful for patients. This supports previous research conducted by Sasono and Novitasari [32] and Sok and O’Cass [31] stating that in service companies improving service quality, which can be done by increasing innovation.

In this study, innovations carried out by health facilities also had an effect on the Digital Customer Experience. It also strengthens the findings of previous studies explaining the relationship between innovation and customer experience [5, 6, 8]. Innovation is a change made as a solution to a problem [20]. Thus, innovation (process, product, marketing, and organization) will lead to positive effect on the creation of a good Digital Customer Experience for patients because it eases the patients to get digital services and access health facilities digitally. When patients feel the benefits of innovations made by health facilities, it will provide a pleasant experience.

4 Conclusion

This study demonstrates novelty by showing that there was an indirect influence between health service quality on digital customer experience through innovation. It showed that the indirect effect, which placed innovation as an intervention, was greater than the direct effect between health service quality and innovation. This is due to the role of innovation as a solution that can enhance the health services quality. The presence of quality health service quality alone is not optimal for improving the digital customer experience because the digital experience requires continuous updates that are carried out by presenting innovations that are needed by patients. The findings of this study are recommended to be a new reference for further research in developing science related to health service quality, innovation, and digital customer experience. This study has limitations as it only examined health facilities in West Java, which may have different interpretation of the survey results of non-health companies or other companies located outside West Java, and so further investigation may be needed. Future researchers are expected to be able to conduct research with other methods to test the model and add patient loyalty variables as the output of the model.

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