

Hospital digitalization in the era of industry 4.0 based on GHRM and service quality**Asep Saifudin^{a*}, M. Havidz Aima^b, Ahmad Hidayat Sutawidjaya^c and Sugiyono^d**^a*Student of the Doctoral Program at Mercu Buana University, Jakarta, Indonesia*^b*Professor and Chair of the Doctoral Program at Mercu Buana University, Jakarta, Indonesia*^c*Associate Professor Mercu Buana University, Jakarta Indonesia*^d*Lecturer at the Postgraduate Program at Mercu Buana University, Jakarta Indonesia***CHRONICLE***Article history:*

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ABSTRACT

Health services, especially hospitals, are facing significant changes in the industrial era 4.0. Hospital digitization is responsible for building green hospitals and improving service quality in the era of modern technology. Green Human Resources Management (GHRM) is becoming known as the HRM concept that encourages employee commitment and environmental aspects. GHRM is an HR management system suitable for organizations, including hospitals that have a significant environmental impact. Hospitals are very dependent on the quality of service provided to their customers. GHRM as a management model in hospitals is very important to encourage hospital digitization and service quality. This research was conducted to answer the gap in hospital research in seeing the effect of GHRM on service quality in digitizing hospitals in the industrial era 4.0. GHRM and Service Quality is used in the healthcare industry to test its application in hospitals in Indonesia. They are using the SEM PLS method, a variant-based structural equation analysis that focuses on predictive models, to look for predictive linear relationships between variables to process data for 1004 respondents from 19 State-Owned Enterprises' hospitals throughout Indonesia. This research can answer research gaps related to the effect of GHRM on Service Quality and Hospital Digitalization in Indonesia. Based on Hospital Digitalization, GHRM affects Service Quality, which is closely related to environmental problems.

1. Introduction

Hospital digitization is currently considered one of the most effective answers in facing the pressure to improve service quality while reducing costs (Locatelli et al., 2010, 2012). As a health service provider organization, hospitals must pay attention to hospital digitalization based on human resource management and service quality issues related to business and environmental benefits. According to Handayani et al. (2015), the main priority that the hospital needs to implement is human resources. HR management currently has various strategic concepts and is proven to improve its environmental impact more efficiently (Sudin, 2011). GHRM is also considered a useful strategy for organizations to improve their human resources, which can be managed to better environmental performance (Roscoe et al., 2019). Referring to Kim et al. (2019), GHRM can promote good environmental behavior and encouraging all workers to participate in companies. The hospital already evolved from a non-profit organization to a profit organization because it needs to consider many factors, including economic, social, and environmental factors (Setyawan & Supriyanto, 2020). The hospital itself must pay attention to service quality in providing health services because it influences reducing costs, retaining existing and new customers, increasing profitability, and increasing company image (Yoon & Suh, 2004). Environmental factors are more critical for hospitals because if the hospital fails to

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manage the environmental impact, it will cause the community to become sick (Azmal et al., 2014). Besides, the HSSE (Health, Safety, Security and Environment) management system in Indonesia, including in hospitals, is still not fully implemented. Employees, hospital management, and the community must all take responsibility for developing the HSSE culture. (Sutawijaya & Nawangsari, 2018). This previous research has identified research gaps related to GHRM, which still requires further research. GHRM's role in influencing environmentally friendly worker behavior in the workplace has emerged as a new research topic (Dumont et al., 2016), especially the influence of GHRM on organizational-related factors such as service quality (Pham et al., 2019). Research related to GHRM has also had more output on Resource Efficiency, Performance, and Organizational Image (Agus, & Lieli, 2017), the concept or model of GHRM (Shah, 2019); construction of the dimensions of GHRM (Tang et al., 2017), the main attributes of GHRM practice (Gupta, 2018) or the humanism side of the employee to build environment organization in long-range (Jabbour & Renwick, 2018). However, until now, this research was conducted, no one has specifically examined the effect of GHRM directly on service quality, especially in hospitals. This research is also to follow up on research gaps related to GHRM's research in the UK's health service industry (Pinzone et al., 2016), which has not examined the impact further on service quality. This study investigates the concept of a multi-item scale to assess service quality which provided employee and management in SOE's Hospital Indonesia compared to previous studies, which were only conducted at a hospital in Seoul, South Korea (Lee, 2017).

2. Theoretical background and hypotheses

2.1 GHRM

As a concept of GHRM, management is needed to manage workers, including in hospitals, to create, improve, and maintain the environmental aspects of each worker so that workers can give maximum contribution to each individual (Opatha & Arulrajah, 2014). In short, GHRM can be understood as an aspect of worker management from an environmentally oriented management point of view (Renwick et al., 2016). GHRM is very prominent in supporting companies to improve environmental performance (Jabbour et al., 2015). Hospitals are increasingly showing the importance of managing human resources to achieve desired results and behaviors such as job satisfaction and employee retention (Stanton & Leggat 2010). Therefore, GHRM practice, which is not limited to one particular aspect of human resource practice but is integration and amalgamation of several aspects and functions of human resource management, is essential. GHRM is also essential for companies to socialize environmental issues related to human resource policies and practices (Bombiak & Marciniuk-Kluska, 2018). In the context of environmental preservation, human resource management that focuses on environmental management can be successful if management makes the formulation through planning and makes it happen in implementation (Daily & Huang 2001). This step must also follow applicable HR practices such as planning, selection and recruitment, training and development, performance evaluation, and remuneration. All of these must-have objectives are related to the environment (Jabbour et al., 2013). Through this GHRM, workers will improve company performance and provide good quality service that can be felt directly by customers. Workers such as in hospitals are precious essential capital for a company. GHRM stands to be the most capable of integrating all workers who have succeeded in achieving positive performance (Rawashdeh & Al-Adwan, 2012). Green Relations and Human Resources emphasize the importance of environmentally friendly practices carried out by workers as human resources in the company. With GHRM as the basis for planning, implementation, and an integrated system, it can make the organization more concerned with environmental aspects that can provide broad benefits to all hospital stakeholders (Opatha & Arulrajah, 2014). Thus, GHRM maintains roles, functions, and responsibilities in the planning process and evaluates workers to follow the company's environment. GHRM can be a useful management tool in ensuring a sustainable business model for hospitals (Watson & Kavid, 2014). It is made GHRM a new phenomenon that can understand and analyze the relationship between planning, organizational action, and human resource factors in a company, including in the health service industry (Provasnek et al., 2017). In presenting the GHRM concept, later it will use a theory consisting of Ability, Motivation, and Opportunity which has proven to be reliable in explaining the concept of GHRM (Renwick et al., 2013; Jiang et al., 2013). The AMO theory consists of several sets of human resource practices carried out by the company and then formulated specifically into three core aspects. Ability is a series of human resource practices to perform specific tasks that can be fulfilled. Therefore, from recruitment, selection, placement, training, and employee development, employees' abilities and competencies meet the required qualifications. Motivation towards workers is always needed because the situations and conditions that affect workers move dynamically. So, for that motivation of workers needs to be ensured so that company performance can be achieved. Various activities that aim to motivate workers financially and non-financially are intended to encourage workers to strive to achieve predetermined performance targets. Finally, the opportunity is to provide opportunities for all workers to participate, provide ideas and contributions, share knowledge, and be involved directly or indirectly in environmentally friendly activities to impact the company positively (Marin-Garcia & Tomas, 2016). The dimensions and indicators of GHRM in this study use the AMO theory as used in previous research by Pinzone (2006), which uses three dimensions, namely Ability which is interpreted through Green Competence Building (GCB), a motivation which is interpreted through Green Performance Management (GPM), and Opportunity is interpreted in Green Employee Involvement (GEI).

2.2 Service quality

The hospital needs to provide quality services and help hospital leaders and workers achieve their long-term goals (Bahadori et al., 2014). As with other companies in providing quality services, hospitals also need to identify an approach to the quality

of service needed (Parasuraman et al., 1991). According to Lee (2009), quality itself is often seen as an intangible concept, so it will be difficult to measure it from various perspectives. Perceptions of the intangible characteristics of service quality cannot be separated from one another because it has many variables, so that it is unique and easily misinterpreted (Kotler & Keller, 2012). Therefore, service quality can be interpreted as the customer's essential perception of a service provided to be felt, whether good or bad. Service quality will also compare what the customer expects and what the customer experiences (Cheng, 2013). Service quality in this study uses a unique approach for health services such as hospitals. Therefore, Health Service Quality (HEALTHQUAL), developed by Lee (2017), is used to reference the dimensions and indicators of service quality in research at SOE hospitals. The Health Service Quality variable (HEALTHQUAL) consists of several dimensions, namely Quality of Empathy (EMA), Aspects of Tangible Quality (TGA), Aspects of Quality of Safety (SFA), Aspects of Quality of Efficiency (EFA), and Degree of Improvement of Care. Services (DICS). These dimensions are the basic concepts of the dimensions of service quality developed by Parasuraman et al. (1988), which are then adapted explicitly to health service organizations such as hospitals (Lee, 2017).

2.3 Hospital digitization

Technological innovation will have an impact on all aspects of human life. For example, in the health sector, health institutions/institutions have begun to emerge non-formal, changes in patient care patterns in the hospital, and change patient and doctor communication patterns (Rahimi, 2019). Hospital management has changed a lot. It is an era where digital systems assist hospital management to be faster and more accurate. It is in line with the expectation of service quality in the healthcare service industry, which has grown to be more competitive and competitive. To excel in this competition, hospitals must restructure their HR systems and service quality based on hospital digitization. Opportunity to create models that will continue to create value over time. The chance to take the lead in the competition will likely be one of the hospital's most significant changes. According to Gartner (2016), digitalization is defined as information and communication technology, including various types of other software that can support the operation process. Digitization needs several things to support and characterize digitization, such as using the Internet of Things (IoT), big data technology, augmented reality, blockchain, and digital twins. According to Bilal et al. (2016), digital facilities are available with digitalization that will provide data and supervision on time to be applied to a series of business process activities that continue to develop. It responds to the flow of data originating from internal parties within the organization and externally from outside the organization. With digitization, manual and analog processes will soon be abandoned because, in addition to being slow, there also tend to be many errors caused by human error.

In this digitalization era, technological developments, especially the very rapid ones in the medical field, besides having a significant impact on patient healing efforts, can also be a significant factor in increasing health care costs that must be incurred (Rahimi, 2019) because the sophisticated and modern equipment used for medicine is expensive and is a hospital investment item. For example, Magnetic Resonance Imaging (MRI) is owned by a hospital as a tool that uses accurate diagnostic techniques because it can provide specific images that can be used as material to strengthen doctors' diagnoses against previous patient complaints. Patients who complain of impaired bodily functions can undergo a comprehensive examination of essential organs such as the head, heart, lungs, abdomen, and legs. However, for this medical device's procurement, the hospital must buy a high price and be an investment calculated as a cost return plus a margin for each utilization in the coming years. Of course, these costs are a burden to customers who need the use of the MRI device. However, technology is also proven to save costs, time, energy, and accuracy. The hospital management information system developed based on digitalization can make breakthroughs such as telemedicine, online diagnostic, and robotic surgery. Through this digital technology often, the primary source of the disease is identified more quickly so that the treatment is faster and it is more likely to heal. Thus, patients have a shorter time to stay in the hospital, which means that they reduce the burden on hospital costs and the burden on the patient's family care costs. Besides that, digitization in hospitals has a paperless effect that can help prevent environmental damage. Water treatment technology also helps hospitals to use water more optimally so that it does not interfere with the environment by infiltration of water in the ground. Digitalization also helps reduce medical waste that is harmful to hospitals and the surrounding environment. Moreover, what is even more felt is that digitalization can protect from dangerous and high-risk actions against health workers and the environment.

3. Methodology

In this research, quantitative methods are used with hypothesis testing. The quantitative method aims to explain the variable under the study's position and the relationship between variables and other variables and test the previously formulated hypotheses. This research will ultimately be concluded through a causal relationship between these variables by testing the hypothesis (Sugiyono, 2017). Considering that the research was conducted in mid-August 2020, which is still in a COVID-19 pandemic situation, researchers must distribute questionnaires through a digital format to obtain data on research subjects. The questionnaire uses a Likert scale of 1 to 5 with ratings where 1. Strongly Disagree, 2. Disagree, 3. Neutral, 4. Agree, and 5. Strongly Agree.

This study's population was at 19 state-owned hospitals with different classes spread across various cities and provinces in Indonesia. This study's population is all elements in the hospital, combined from various elements of health workers who

work there, medical equipment, and similar events to become a particular concern of researchers. This type of sampling selection is based on the researcher's judgment that the selected sample follows the profile of the research object being studied; therefore, the technique is also known as the judgmental/selective/subjective sampling technique (Crossman, 2019). This study uses a unit of analysis in the form of respondents taken as the unit of analysis. The requirements for becoming a respondent are as follows:

- a. The company workers are workers in various positions and professions, both medical, nursing, medical support, and other non-medical workers.
- b. Respondent categories are also determined to have worked for at least two years in order to have the experience, know the hospital where they work, understand their duties and functions, and understand the ins and outs of the division and the organization as a whole where workers work, to avoid measurement bias and reduce errors in research.
- c. The worker concerned receives health services at the BUMN Hospital to know and has experience as a patient both on outpatient and inpatient care.
- d. Minimum age 20 years to be mature enough to consider the answers in the questionnaire given.

This criterion is important because, in this study, the workers will later act as respondents from the supply side, where the demand side respondents also act as the supply side of service quality. Sasser and Arbeit (1976), who first pioneered the internal customers' concept, assumed that workers are internal customers. Kim and Han (2012) used a service quality model to measure hospitals' service quality using their research workers. Service quality can be defined from a patient perspective or a management perspective (Aghamolaei et al., 2014). Besides, workers are more accessible than customers and become a rich source of information that is often neglected in service quality (Shahani-Denning, 2010). Using the Variance Based technical model with Structural Equation Modeling as a data analysis method, this data is processed on computer media using SmartPLS software. Partial Least Square is also widely used in research in Information Systems, Strategic Management, Human Resources, Marketing, and other disciplines (Hair, 2012), and path modeling is an excellent statistical tool and suitable for use in this research study (Albers, 2010; Li et al., 2015).

4. Results and discussion

4.1. Results of Descriptive Analysis of Respondents

Based on gender, the number of female respondents who participated in this study was 635 people (63.2%), while 369 people (36.8%) were men. Based on the results of the descriptive analysis of the age of the respondents, it was found that the majority of respondents were between 31 to 40 years old as many as 401 respondents or 39.9%, followed by those aged between 20 to 30 years as many as 274 respondents or 27.3% and then aged 40 to 50 years as many as 270 respondents or 26.9%. The lowest remaining respondents aged more than 50 years were 59 people or 5.9%.

4.2. The results of the Outer Model

In the Outer Model Test, it can be seen how each indicator is related to its latent variable. The Outer Model is interpreted by looking at several things, including convergent validity, discriminant validity, composite reliability, Average Variance Extracted (AVE), and Alpha Cronbach. The PLS Algorithm Model is presented in Fig. 1 as follows.

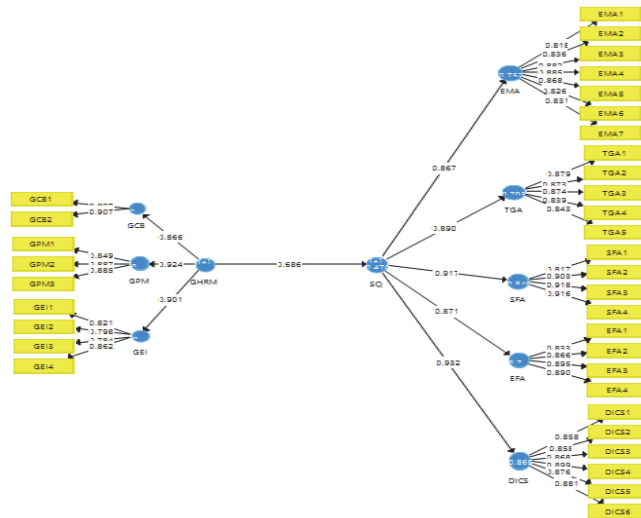


Fig. 1. Model PLS Algorithm

From the convergent validity analysis results, it was found that all indicators used to measure latent variables had a Loading Factor value above 0.70. It is shown that all indicators are valid to measure their latent variables and illustrate how each indicator can result in each of its latent variables. The discriminant validity analysis results showed that each factor loading value against the intended variable was more significant than the cross-loading value. It is confirmed that each indicator can explain the latent variable. The results of AVE analysis show that the value of each variable has an AVE value greater than 0.50 which provides an explanation that each indicator used to measure the variable is valid. These results also illustrate that the variance value of each indicator on the latent variable captured by these variables is greater than the variance caused by measurement error (error). Reliability composite is used to describe the consistency of the indicators used to measure the variables. The indicator is considered high consistency to measure its construct if it has a CR value above 0.70. From the above analysis results, it was found that the GHRM and SQ variables each had a CR value of 0.929 and 0.975. It is shown that each of the indicators used to measure the dimension and the latent variable has reliable consistency.

4.3. Inner Model Analysis

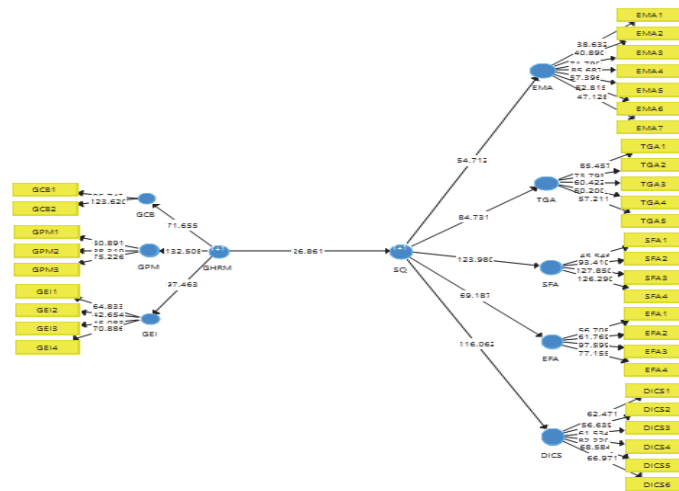


Fig. 2. PLS Bootstrapping GHRM to Service Quality

4.3.1 Path coefficients

Table 1 demonstrates the results of path coefficients. The path coefficient results show a positive sign and a good significance value where these results are in line with the research hypothesis that was built and in line with the literature references that have been previously formulated. This can be concluded based on the Goodness of Fit criteria using the path coefficient as Fit model. The path coefficient which is positive 0.256 illustrates that the value of the independent variable is high, so this makes the target dependent variable value high following the increase in the independent variable.

Table 1

The results of path coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
GHRM → SQ	0,256	0,257	0,037	6,862	0,000

From the R Square value analysis, the R Square value for the SQ variable was 0.470. It is illustrated that the coefficient of determination (KD) for the OCBE variable is 47.0%, which means that the SQ variable is influenced by 47.0% by the GHRM variable while the rest amounting to 53.0% influenced by other variables outside the variables used in this model. The value of Stone Geisser Value (Q²) for the GHRM variable is 0.342, where this value is > 0.0, so it can be concluded that the GHRM variable is a predictor variable that has a good relevance value for predicting the Service Quality variable. Table 2 presents the summary of the results.

Table 2

The summary of the results of Stone Geisser Value (Q²)

	SSO	SSE	Q ² (=1-SSE/SSO)
SQ	26.104,000	17.180,000	0,342
GHRM	9.036,000	9.036,000	

The Goodness of Fitness Index (GoF) is also calculated as follows,

Average AVE = (0.593+0.603)/2= 0.598 Average R² = 0.470 GoF = $\sqrt{0.598 \times 0.470} = 0.530$

According to Tenenhou (2004), the GoF Index value range is divided into three categories: first to 0.00-0.24 is a small category, second is for a medium category of 0.25-0.37, and third for 0.38 1.00 is a high category. So it can be concluded that with the GoF index value of 0.530, the model is included in the high category, which means that the research model built has high compatibility or no difference (discrepancy) between the observed values and the expected values in the research model.

Table 3 presents details of the hypotheses testing.

Table 3

The results of hypotheses testing

	Original Sample (O)	Sample Mean (M)	Standard (STDEV)	Deviation	T Statistics ((O/STDEV))	P Values
GHRM → SQ	0,256	0,257	0,037		6,862	0,000

If the T Statistical Value > Z Score 1.96, then the relationship is significant; conversely, if the T Statistical value < Z Score 1.96, then the relationship is not significant.

4.4 Hypothesis

GHRM to SQ has a T statistic value of 6.862, where this value is more significant than 1.96. It can be concluded that the relationship between GHRM to SQ is significant so that the hypothesis is accepted. The test results show that GHRM has a significant effect on service quality. It means that GHRM at BUMN Hospital has become one of the success factors in realizing good service quality, which is very important for its survival. These results also show that the GHRM variable and service quality influence can provide a new foundation because this is a new study that has never been studied before regarding these two variables. It is also shown that GHRM is a good concept for management to manage the employee that is suitable for current hospital management, which faces many challenges related to internal and external hospital environmental management. GHRM will also help today's hospitals realize a Green Hospital from facilities and infrastructure and from a personal aspect, which is very important. GHRM has a significant effect on service quality. If managed properly, it can improve service quality, ensure patient safety and customer satisfaction at SOE Hospital. The three dimensions of GHRM are a manifestation of the AMO theory (Ability, Motivation, Opportunity). The Ability dimension is represented through Green Building Competency Practices, the Motivation dimension is represented through Green Performance Management Practices, and the Opportunity dimension is represented through Green Employee Involvement. From the research conducted, the represented AMO theory can support good quality service in the hospital.

The results of this study also show that GHRM is primarily supported through the dimension of Green Performance Management where workers get motivation and appreciation from management, which is proven to be able to support workers always to provide quality service that continues to improve which can guarantee safety and customer satisfaction in SOE Hospital. The application of GHRM, which is applied by management in the hospital, besides impacting the environment, also increases workers 'competencies and encourages workers' motivation to improve their performance based on environmentally friendly principles. Besides, the workers also have a strong desire to support and participate actively in various company activities in protecting the environment. All of these have a significant impact on the quality of services provided to customers and all other stakeholders (Huang, 2001). This research supports previous research conducted by Rawashdeh (2018); Husin et al. (2012) and Haynes and Fiyer (2000).

5. Conclusion

The test results show that GHRM has become one of the success factors in realizing good service quality. Even with GHRM, green hospitals' implementation will be easier to realize considering that HRM as a fundamental factor in the hospital business process has better understanding and involvement in various activities related to the environment. It is also one of the things that stands out in service quality indicators in BUMN hospitals. Trust in nurses can arise because the training provided increases competence and builds nurses' confidence for stakeholders. It is necessary to involve employees and provide employees with the competencies needed (Haynes & Fryer, 2000). GHRM through practical training that provides increased competence and employee development. Besides, through a system of remuneration and benefits, workers are also motivated to improve their performance achievement. The workers also feel involved in every step of the company to have a high sense of responsibility and belonging. Therefore, GHRM also influences service quality in previous studies (Husin et al., 2012). This research at SOE Hospital also confirms where the role of variables, dimensions, and indicators in GHRM and service quality shows a strong influence in supporting the Digitalization realization in the hospital environment. The service quality variable that can provide satisfaction to stakeholders is part of digitalization. By digitalization, paperless is also no longer a thing of discourse to reduce forest exploitation and save energy. Development technology makes electronic systems integrated with web platforms. The website system for health services is better known as EMR or Electronic Medical Record that records patient data in an integrated manner so that only by entering the identity of health staff with direct interest can access data quickly and is integrated. The practice of GHRM will be easier to materialize with the support of digitalization, where the management of workers will be increasingly helped. Recruiting new workers can be done online and through interviews via video conferencing or through the Zoom Meeting, which has a broader scope nationally and internationally. Monitoring and

coaching talent can also be more comfortable and more objective with a digitalization system. It is shown that the need for digitizing health services continues to increase. Therefore, GHRM BUMN Hospital's research results understand that this is in line with the paradigm of the hospital digitization concept.

6. Implications

This research has implications for theoretical thinking and enrichment in management, notably the GHRM study of service quality in hospitals. The application of GHRM practices developed over several decades answers the question that GHRM management is suitable for improving service quality (Sheehan, 2005). Effectively by managing human resources, service companies can develop employee behavior that is important for the company's competitive strategy, especially when providing service quality to their customers (Li et al., 2001; Agarwal et al., 2010).

7. Limitations and suggestions

Future research can adopt research methods and dig deeper into various theories that can be applied later. For a more in-depth understanding, further research can examine service quality changes due to all stakeholders' GHRM influence over a more extended period. The research population is also limited to employees so that service quality is viewed from a self-assessment and supply-side perspective. Future research can be carried out across all hospital stakeholders by involving a larger population. Further research can also be carried out in other service industries by adapting this research to different locations and cultures.

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