

Relationship Between Kaizen, Employees Work and Quality of Service A PLS-SEM Approach

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Abstract

Hospital management must improve their performance and services, especially during the COVID-19 pandemic. One way that might be done is by implementing Kaizen. This study tries to see the effect of the application of Kaizen on improving the quality of work and overall service in Indonesian Hospitals. From this research, it can be identified the factors that drive and inhibit the success of Kaizen implementation in hospitals. In this study, the Kaizen aspect is viewed from 4 variables, namely company policies and awareness; education and training; work culture; and internal training. Data was collected by distributing questionnaires to 150 employees in 2 hospitals in South Jakarta-Indonesia, using a random sample, consisting of executives, managers, and hospital employees. Statistical analysis using PLS-SEM (second generation SEM approach) yielded more significant results. The findings of the study indicate that the application of Kaizen affects the overall improvement of work and the quality of hospital services through the intermediate variables of employee work. Thus, the increase in employee work is a strong predictor of the overall increase in employment and services in hospitals. One of the interesting findings shows that culture is a leverage that drives the success of Kaizen implementation, especially employee commitment to continuously improve work systems and when employees believe what they are doing will add and build company value. Internal processes are an important factor that needs to be improved so that the implementation of Kaizen is successful, especially regarding working in teams and being process oriented.

Keywords

Kaizen, Hospital, Employees work, Service quality, Overall work

1. Introduction

During the COVID-19 pandemic, hospital management must improve their performance and services. Kaizen has the principle of making continuous improvements in stages, which aims to increase organizational productivity (Soltani & Amanat, 2019). Adopting Kaizen means making continuous improvements in all parts of the organization to maintain its long-term competitiveness (Cwikla, Gwiazda, Banas, Monica, & Foit, 2018). The method of implementing Kaizen in the workplace does not require high costs or sophisticated technology, but the cooperation among employees is a major part of the progress of the system (Ohno, 1988). Thus, Kaizen can be expressed as an approach to improve performance through small changes by involving participation of the employees (Brunet & New, 2003), facilities, equipment, materials to improve work processes and increase efficiency. This implies that quality, productivity, efficiency, and work effectiveness are the responsibility of everyone in every production line (Petru & Abbas, 2015). Work effectiveness is important because it states the adequate performance of an employee based on quality, quantity, timeliness, and productivity used to achieve the desired goals (Ricardianto, Ikhsan, Setiawati, & Gugat, 2020).

Kaizen can be applied to various areas of the organization, including hospitals (Sankoff and Mintzer, 2013). Hospitals are one of the most complex types of service organizations. Hospitals, especially in developing countries (Harrison et al., 2015) face daily challenges to ensure safety, effectiveness, efficiency, and quality of service (L.W. Biffi, 2011). In hospitals, there are continuous human interactions, which create opportunities for misalignment in services during the interaction process (Berry and Seltman, 2008; Institute of Medicine, 2000). Hospitals have successfully utilized

Kaizen as a mechanism to improve the timeliness of service and quality of treatment as well as to perform work more efficiently (Kimberly, 2021), including to train health care providers to improve their service quality (Aveling et al., 2015). Its main focus is to improve process efficiency, patient safety, and employee satisfaction (Gonzalez Aleu and Van Aken, 2017). Several publications describe the successful implementation of Kaizen in hospitals. For example, patient satisfaction with hospital food services increased by 35 percent after implementing Kaizen (Williams et al., 1998). The reduction in the duration of hospitalization at Avera Mc Kennan Hospital occurred through the implementation of the Lean-Kaizen project (Dickson et al., 2009).

Although Kaizen has been implemented, several studies have found that it is difficult to create a culture of high quality and good safety services among healthcare providers. In addition, hospitals also face a lack of socialization and inadequate quality of facilities (Elmontsri et al., 2017), and a lack of human resources (Mosadeghrad, 2014). At the same time, there is concern for policy makers and health care providers as rates of preventable harm and death are also increasing (Wilson et al., 2012; World Health Organization, 2012). That is why many quality improvement (QI) initiatives have emerged in the health sector in low- and middle-income countries by training health care providers in various QI approaches (Aveling et al., 2015). This is important because quality and safety in health services remains a major challenge for health services (World Health Organization, 2016). Manufacturing and service organizations have used continuous improvement to improve their performance by reducing waste and achieving outstanding results. However, when Kaizen is carried out in the health sector, only a few shows the success of Kaizen implementation. Therefore, this study aims to examine the factors that drive and hinder the successful implementation of Kaizen in Indonesian hospitals. By knowing these driving and inhibiting factors, it can be expected that the application of the Kaizen concept will increase its success which can be seen from the increased performance of hospital services. If the Kaizen concept can be widely applied in hospitals in Indonesia, the quality of hospital services in Indonesia will increase at an affordable cost.

2. Literature Review

2.1. Kaizen

Kaizen comes from Japanese which means continuous improvement which is done gradually and regularly. “Kaizen” means “change for the better” (Doria et al., 2003), which denotes continuous improvement in standard operating processes/procedures (Chen et al., 2000). System improvement is possible because it learns from previous mistakes (Chiarini, 2012), to achieve new, better improvements. Kaizen aims to improve the production process by eliminating the factors that have no added value.

Kaizen was originally used to improve production processes in Japan, which means continuous improvement in the workplace (Chen, Dugger, & Hammer, 2001) and is carried out continuously (Suzaki, 1987). Initially, Kaizen was only applied in the manufacturing sector, but now it is also relevant in the service industry (Emiliani, 2004). The purpose of using Kaizen is as follows: (1) Reducing labor and production costs based on worker recommendations. (2) Improving product quality by making continuous improvement involving everyone in the organization. (3) Increasing customer satisfaction through system improvement (Hilton, 1999). There are three main principles of Kaizen, namely: (1) process orientation; achievement and improvement. For this reason, it is very important to pay attention to the linkage of the process with other activities (Smadi, 2009). This approach allows employees to engage in improving their skills and increasing the benefits of work for employees' lives (Schroeder and Robinson, 1991; Berger, 1997; Brunet and New, 2003). (2) Standard development and maintenance; to support consistency and performance. (3) People-oriented; enable the involvement of everyone in the organization (Imai, 1986). Kaizen demands the involvement of every individual in the improvement process, both management and workers on the production floor (Motwani, 2003). Thus, the goal of the Kaizen concept is to avoid waste and improve quality throughout the organization, including the quality of work and service. Kaizen results in organizational culture change through continuous improvement (Bhuiyan & Baghel, 2005) and techniques for reducing waste. Reducing waste is seen as an intention to improve process quality. Waste minimization can be done in several cases: reduction of waiting time, optimization of JIT delivery of goods/services, etc. Practitioners have identified Kaizen tools and techniques in Japan's competitiveness (Brunet & New, 2003). Wayne et al. (2015) stated that Kaizen is used to improve production techniques, operating methodologies, and employee contributions.

2.2. Kaizen Success Measurement Variables

2.2.1. Organizational Policies and Awareness

Kaizen requires initiative and persistent commitment in the organization, and Kaizen does not require significant expenditure in its implementation (Singh & Singh, 2012). Management and staff commitment as well as motivation to achieve organizational goals which are influenced by the dedication and involvement of leadership play significant role important role (Vento et al., 2015). Because Kaizen can improve the performance of the work, it needs managerial support before and during the implementation of kaizen, so that the employees can implement their ideas on improvement without any obstacles and at the end their motivation to participate actively and enthusiastically in Kaizen initiatives will increase (Dickson et al., 2009). Resistance to change, lack of employee motivation, lack of understanding of the company's strategic direction, and difficulties in improving quality are obstacles in implementing Kaizen (Maarof & Mahmud, 2016). Creating an environment that supports Kaizen initiatives will help employees use their skills, creativity, and motivation to improve in the area of their work (Andersen et al., 2014). Strong managerial support can influence how effectively hospital teams implement Kaizen (Shatrov, 2021). Managers who support teams and give team members the autonomy to make changes tend to create good learning cycles for kaizen. Teams can develop different identities according to the desired goals (Bortoloti's, 2017). This activity is not commonly encountered in daily work in health care because the hospital organizational hierarchy is organized according to specific departments and skills, rather than focusing on patient care pathways or processes (Drotz & Posinska, 2014).

2.2.2. Education and Training

Organization training has proven to be effective in groups. Training with peers has a prominent impact (Helfrich, 1994) (Kabst, et.al., 1996). Educational associations should emphasize in-service training and growth and a continuous process of acquiring knowledge and skills for administrative staff to acquire and improve social, technical, and theoretical skills and abilities. It is crucial to make learning permanent that preparation and training take place close to the workspace (Kabst et.al., 1996). Training institutions should provide continuous training programs for employees where each program aims to achieve the organization's vision and mission (Farooq et.al., 2007).

2.2.3. Cultural Factors

Kaizen is a valuable resource for promoting work culture, practices, and relevant experiences. Kaizen practices can help to reduce staff turnover, costs, errors, and strengthen operator skills by creating a work culture that enables workers to understand the company's top priorities and the Kaizen processes needed to map and analyze them. Companies need to ensure that their consumers receive goods and services with economic value. Some experts research cultural factors (Dombrowski & Mielke, 2014) (Mohammed & Khayum, 2015) for example, consider different types of quality improvement processes with efficient and sustainable lean implementation in several companies. These qualities are associated with different approaches to leadership, which reinforces the importance of the "leadership and culture". Motivating employee participation in regular important tasks can create more ideas and suggestions for improvements (Mohammed & Khayum, 2015). This is alluded to by Kaizen's quest for progress and its emphasis on continuous improvement through the obligations and tasks of the daily and personal life of workers (Saleem, et.al., 2012). On the same line, employee motivation and satisfaction were also identified as dominant factors, such as employee participation. This also reflects the prevailing culture in the company for quality improvement.

2.2.4. Internal process

Kaizen promotes process-oriented thinking, where processes need to be optimized to gain insightful results (Hammer & Champy, 1994). In this regard, Patidar, Soni, & Soni (2016) reported that several companies, inspired by the successful experience of Japan, have made Kaizen the most successful way to increase productivity and product quality through better internal organizational processes (work and managerial). A study conducted by Suarez-Barraza & Lingham (2008) on the Kaizen team suggested that the internal processes of the Kaizen team are a predominant component of the staff's personality and should be integrated into the Kaizen. Action Kaizen represents the preference of team members to experiment with improvement ideas in the work area, where action is expected to contribute to improving employee skills and attitudes in Kaizen initiatives in healthcare. Hands-on experience in the field will help team members quickly understand and recognize the benefits of Kaizen initiatives. The field experiments increase employee enthusiasm for improvement, and "hands-on experience" in the team contributes to increasing employees' understanding of Kaizen principles.

2.3. Employee Work Improvement

Continuous improvement or Kaizen is an incremental approach to improving performance through small changes and workforce participation (Brunet & New, 2003). Thus, sharing knowledge, incentives, and power with staff is a

fundamental management activity that encourages them to take initiative and make decisions to solve problems, increase effectiveness and improve services (Kumar V, Singh J, Kumar, & Antil, 2016). These improvements involve facilities, equipment, materials, work practices, efficiency, and worker behavior. This implies that the quality, time, productivity, and effectiveness of the manufacturing process are everyone's responsibility, whether in top management or the workshop (Petru & Abbas, 2015). In this sense, work effectiveness is the adequate performance of an employee based on the quality, quantity of work, timeliness, productivity, and accuracy of work used to meet the actual goals (Ricardianto et.al., 2020). While the work welfare enrichment program is a program that includes organizational reform, involves significant resources, affects the company, and is long-term oriented (Nangoy et.al., 2020).

2.4. Quality of Services

Previous literature revealed that manufacturing companies need to differentiate themselves in the market by emphasizing quality and continuous improvement of products and services as critical components for preservation and future performance (Shan, Ahmad, & Nor, 2016). Companies need to build a quality system that continues to improve and increase productivity and quality (Jadhav et.al. 2014). As a result, the Kaizen philosophy has significantly influenced the attention of scholars as it increases organizational productivity and supports delivering high-quality goods with minimal effort (Jain et al., 2015). Continuously improving product quality, product defect rates can be reduced, and product costs decreased; meanwhile, sales and market share improved (Khan et al., 2018). However, staff training for the current process does not require continuous improvement. However, introducing new ideas into the workplace and transferring them throughout the organization, can results in sustainable improvement. Over the years, the demand for continuous improvement on a wider scale within the company has become a necessity. Therefore, various steady improvement methodologies have been formulated based on the simple principle of improving quality or process, or both, to minimize waste and increase efficiency (Bhuiyan & Baghel, 2005). Kaizen is a relevant method to improve hospital work and services. It begins with an emphasis on continuous small-scale improvement of internal processes, involving personnel through increased education and training, thereby contributing to improving hospital work and services.

This study was developed from the framework of previous research conducted by Omoush et al. (2020) which aims to determine the success of implementing Kaizen to improve work and service improvements in Jordanian insurance companies. This study aims to determine how successful the application of Kaizen is to improve hospital work and services in Indonesia, considering the variables: company policies and awareness, training, work culture, and internal processes. Company policy and awareness (O) is measured through 5 indicators: 1. Management and staff are committed to continuous improvement; 2. Good communication between top management and workers; 3. Company strategy is well understood; 4. Workers voluntarily engage in Kaizen in the company; 5. Leaders motivate employees to participate in important tasks and make workplace improvements. Training (P) is measured through 3 indicators: 1. Companies conduct training with their colleagues; 2. The company provides training to improve the knowledge and skills of workers; 3. The company provides continuous training programs related to their work. Culture (B) is measured through 4 indicators: 1. Employees understand the main priorities at work; 2. Employees are satisfied with the company; 3. Employees believe what they do adds and builds company value; 4. Employees are committed to continuous improvement of the work system. Internal processes (I) are measured through 5 indicators: 1. The existence of rework due to the emergence of work errors; 2. Delay in medical treatment; 3. Consumer complaints about service; 4. Work in a team; 5. Work with process oriented. Employee performance improvement (PK) is measured through 3 indicators: 1. On time service; 2. Work more efficiently; 3. Improved service quality. Overall work and the quality of services (PKL) is measured through 2 indicators: 1. Clear service standards (reliability) and 2. Fast, precise and accurate service (responsiveness). The conceptual model can be seen in Figure 1.

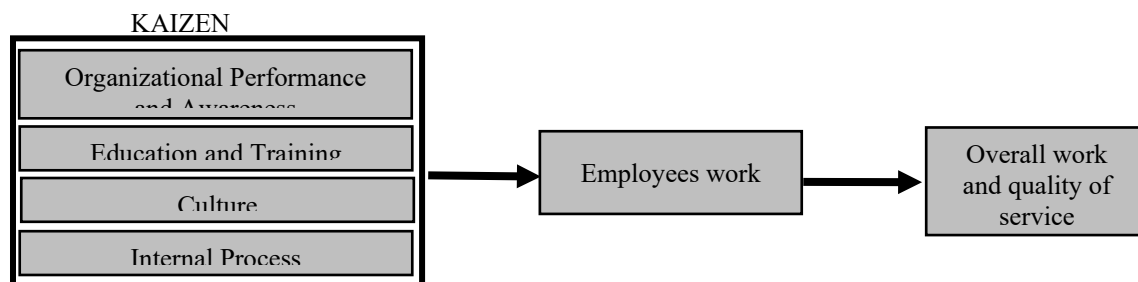


Figure 1. Conceptual Model

3. Methods

The model on Figure 1 is formulated to the hypothesis as follows:

H0 1: Kaizen method will not affect the increase the work of hospital employees

H0 2: An increase in work of employees will not affect the overall work and quality of hospital services in Indonesia.

H0 3: The Kaizen method will not affect the overall work and quality of hospital services through intermediate variable employee work.

This research was conducted at 2 hospitals in South Jakarta-Indonesia, namely Fatmawati Hospital (owned by government) and Premier Bintaro Hospital (owned by private). Fatmawati Hospital was founded in 1979, is one of the government hospitals that is experiencing rapid development with various awards for medical services it has received. On April 14, 2004 Fatmawati Hospital obtained full accreditation status for 16 service areas provided by the Commission for Accreditation of Hospitals and Other Health Facilities (KARS) (<https://lifepal.co.id/media/rumah-sakit-fatmawati/>). Premier Bintaro Hospital as one of the leading healthcare providers in Indonesia, which offers comprehensive services with international standards (Quoted from <https://ramsaysimedarby.co.id/rspb>, 7 July 2022).

This research is explanatory research. The problem-solving framework of the study is described in terms of the causal relationship between Kaizen and interactions that affect employees work and overall work and quality of hospital services, which will be examined in this research. The independent variable in this study is culture, organizational awareness, education and training, and internal process and the dependent variable is overall work and quality of hospital services. While the intermediate variable is employee work. The questionnaire contains 19 items to examine whether culture, organizational awareness, education and training, and internal process affect overall work and quality of hospital services. The data are collected with five-point Likert scale questionnaires, where 1 indicates strongly disagree and 5 states strongly agree. Data collected then will be processed by PLS-SEM (second generation SEM approach) to examine the relationship between culture, organizational awareness, education and training, and internal process that affect employees work and quality of hospital services.

4. Data Collection

This study reviews the available literature on the research topic and collects data through questionnaires given to employees at two selected hospitals, namely: Fatmawati Hospital and Premier Bintaro Hospital. The research sample was 150 employees in the 2 hospitals, consisting of: inpatient installation (16%), radiology installation (6%), HCU (21%), office (12%), nursing (5%), customer care (5%), laboratory (4%), hemodialysis 3%, food & beverage 3%, polyclinic 3%, other divisions 22%. Both hospitals allowed the distribution of questionnaires to their employees, which was carried out in December 2021. Respondent data is shown in Table 1.

Table 1. Respondent data

Variable	Category	Frequency	%	Mean	Std.D
Gender	Male	41	27,33%	3,75	0,33
	Female	109	72,67%	3,80	0,28
Age Group	18 - 24 Years	3	2,00%	3,70	0,08
	25 - 34 Years	50	33,33%	3,79	0,27
	35 - 44 Years	59	39,33%	3,77	0,32
	45 - 58 Years	38	25,33%	3,81	0,30
	Total	150	100,00%		

Data processing uses SEM, a multivariate statistical analysis method with Smart PLS software that aims to test the relationship between variables. Smart PLS is considered powerful and does not rely on various assumptions. The number of samples required in the analysis is relatively small, and the data is not necessarily having a normal distribution, since SmartPLS uses the bootstrapping method or random multiplication. PLS-SEM is an analytical method that is widely used because of its robustness (Penga and Lai, 2012).

5. Results and Discussion

5.1. SEM with Proposed Path Loadings Model

Table 2 provides an overview of the factor loading of the research construct.

Table 2. Factor loading

Variables	Item	Factor Loading	Result	Item	Factor Loading	Result
Kaizen	B1	0.604	Accept	O1	0.558	Accept
	B2	0.552	Accept	O2	0.585	Accept
	B3	0.658	Accept	O3	0.551	Accept
	B4	0.569	Accept	O4	0.382	Delete
	I1	0.636	Accept	O5	0.475	Delete
	I2	0.559	Accept	P1	0.582	Accept
	I3	0.565	Accept	P2	0.680	Accept
	I4	0.267	Delete	P3	0.617	Accept
	I5	-0.003	Delete			
Employees work improvement	PK1	0.707	Accept			
	PK2	0.628	Accept			
	PK3	0.884	Accept			
Overall work and the quality of services	PKL1	0.797	Accept			
	PKL2	0.872	Accept			

Indicators I4, I5, O4, O5 are eliminated from the model because they have a loading factor value of <0.5. Variables I4, I5 can be omitted because there are other indicators used to measure each latent variable. Likewise, the variables O4 and O5.

5.2. Modified Path Loadings Model

Figure 2 provides an overview of the Modified Path Loadings Model for all variables in this study. The figure illustrated three aspects: the Kaizen implementation, employees' work improvement, and the overall work and quality of service. All indicators exceed 0.55, declared significant (Falk and Miller, 1992).

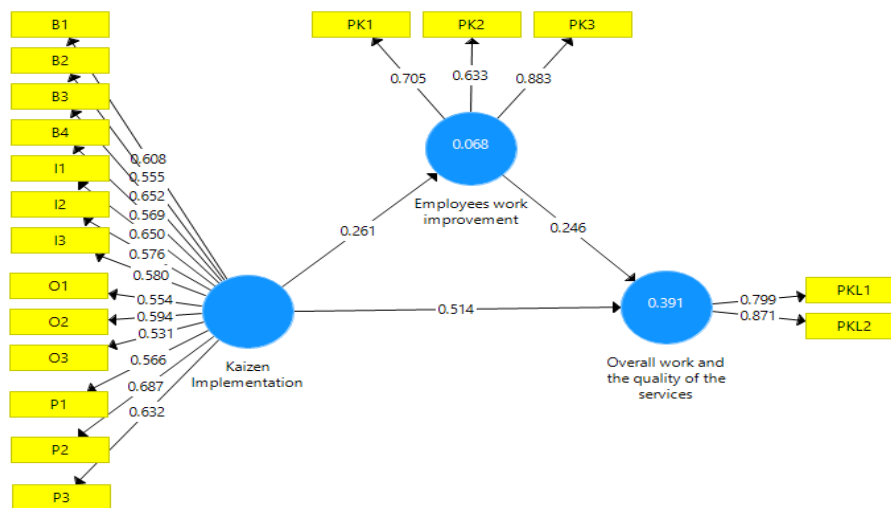


Figure 2. Path loading for modifying the model

5.3. Reliability and Validity Test

The reliability test on the SEM-PLS model is used as an evaluation for the measurement model (outer model). Reliability aims to assess the latent variable measurement indicators. The latent variable is claimed as good if the composite reliability value is greater than 0.65 and Cronbach's alpha value is greater than 0.65 (Nunnally and Bernstein, 1994). Table 3 provides clarification on the results of Cronbach's alpha (CA), Composite Reliability (CR). The results show that the reliability for all constructs exceeds the limit value (0.65), where: – employees work

improvement (CR value = 1.00), Kaizen implementation (CR = 0.869), and OWQS (CR = 0.779) – thus indicating good internal consistency.

Table 3. Validity and reliability results

Construct	Cronbach alpha (CA)	Composite Reliability (CR)
Employees work improvement	1.000	1.000
Kaizen Implementation	0.836	0.869
Overall work and quality of services	0.734	0.779

5.4. Discriminant Validity Test

Table 4 shows discriminatory validity, where no correlation coefficient exceeds 1.0; this ensures that there is no multicollinearity between factors. Thus, it can be concluded that all constructs or latent variables have good discriminant validity, where the indicator block is better than the other blocks.

Table 4. Discriminate validity

Construct	Employee work improvement	Kaizen implementation	Overall work and quality of services
Employees work improvement	1.000		
Kaizen Implementation	0.478	0.598	
Overall work and quality of services	0.898	0.591	0.739

5.5. R (Square) Test

The calculation of the path coefficients indicates the cross-construction relationship in terms of which mediation constructs are used and not. Therefore, the use of the R (square) test is recognized as reasonable in explaining the measurement and its interpretation. The R-squared test is shown in Table 5.

Table 5. R (square) test

Relation	R Square
Effect of Kaizen implementation on the overall work and the quality of services without the mediation of Employees work improvement	0.229
Effect of Kaizen implementation on the overall work and the quality of services with the mediation of employees work improvement	0.840

The R-squared (R²) test is conducted to measure the level of Goodness of Fit of a structural model. The value of R-squared (R²) measures how much influence certain independent latent variables have on the dependent latent variable. According to Chin (1998), the R² result of 0.67 indicates that the model is classified as good. The result of R² between 0.33 and 0.67 indicates that the model is moderate. The results of R² of 0.229 indicated that the model is weak. The R-value (squared) related to the effect of Kaizen implementation on improving overall work and service quality with mediating employee work improvement shows a score of 0.840 (has exceeded 67%). The model is categorized as good, and the prediction level is acceptable, which is in line with what has been emphasized by Gaur & Gaur (2006).

5.6. Hypothesis Testing

The next step is to analyse the determined model framework to present satisfactory conclusions related to the hypothesis, which is conducted through Bootstrapping analysis in PLS software. In Bootstrapping analysis, the compulsory procedure is to determine the t value and beta value because of the PLS-SEM, to complete the analysis on all tested hypotheses. Table 6 provides an overview of the results of the Kaizen implementation test on overall work and quality of service with the mediation of employee improvement.

Table 6. Test results of Kaizen implementation on overall work and quality of service with the mediation of employee improvement

Relation	t-value	beta	p-value
Kaizen implementation on employees work improvement	6.360	0.501	0.000
Employees work improvement in overall work and quality of services	5.354	0.800	0.000
Kaizen implementation on overall work and quality of services	3.155	0.203	0.002

Hypothesis testing shows the following results:

The application of Kaizen affects the increase in employee work at hospitals in Indonesia (α 0.05). The value of the t statistic shows several 6.360, while the value (beta) shows (0.501). This value provides a clear picture that the implementation of Kaizen can drive the changes by 50.1% to improve employee work. Thus, the Kaizen method positively affects employee work.

The test results show that the increase in employee work influences improving the overall work and quality of hospital services in Indonesia (α 0.05). The value of the t statistic shows 5.354, while the value (beta) shows 0.800. This value provides a clear picture that an increase in employee work can drive a change of 80% to improve the overall work and quality of hospital services in Indonesia. Thus, the Kaizen method positively affects employee work. The increase in employee work has a positive effect on the overall work and quality of hospital services in Indonesia.

The test results show that the implementation of Kaizen affects the overall work and service quality in Indonesian Hospitals through the intermediate variable employee work improvement ($\alpha \leq 0.05$), where the t statistic value is 3.155, while the ratio value (beta) is (0.203). This value illustrates that the implementation of Kaizen encourages changes of (20.3%) in overall work and service quality through the variable between improving the work of employees in Indonesian Hospitals. The table 7 provides an overview of the results and shows that the improvements in employee work

Table 7. Test results of Kaizen implementation on overall work and quality of service with the mediation of employee improvement.

Relation	Direct Effect		Indirect Effect	Total Effect	
	t-value	Beta	Beta	t-value	beta
Employee work improvement on overall work and the quality of the services	2.838	0.249	-	-	0.249
Kaizen implementation on employees work improvement	3.198	0.287	-	-	0.287
Kaizen implementation on overall work and the quality of services	5.713	0.523	0.070	2.093	0.593

Table 7 provides an overview of the results and shows that the improvements in employee work have a positive effect on overall work and services with a Beta coefficient value of 0.249 and a t value of 2.838. The table also shows that the application of Kaizen has a positive effect on increasing employee performance with a Beta coefficient value of 0.287 and a t value of 3.198. The correlation coefficient between the implementation of Kaizen on overall work and services with the mediation of the improvement of employee's work is 0.593, which means it shows a positive effect. The higher the value of the implementation of Kaizen, the overall value of work and services will also increase through increasing employee work. The increase that occurred was 59.3% with a t value of 2,093. The value of the indirect effect shows that there is a positive indirect effect between the implementation of Kaizen on the overall work and services through an increase in employee work of 0.070 (an increase of 7% with a t value of 2.093).

5.7 Discussion

The purpose of this study was to examine the influence of the implementation of Kaizen on the improvement of employees' work and on the improvement of overall work and service quality in Indonesian Hospitals. In addition, this study also looks at the mediating role of the intermediate variable the improvements of employee work on increasing overall work and service quality in Indonesian Hospitals. The findings of this study indicate that the application of Kaizen affects the increase in employee work at hospitals in Indonesia, as hypothesized in (H0 1). This finding supports the results of previous research which states that the implementation of Kaizen influences improving employee work and improving overall work and service quality (Omoush et al, 2020). One of the interesting findings is that the culture indicator has the highest average value (3.96), where employees believe what they are doing will add and build company value and employees are committed to continuous improvement of the work system. This shows that employee participation is very important for improving employee work and on the improvement of overall work and service quality.

As expected, the research findings indicate that the increase in employees affected the overall employment and quality of hospital services in Indonesia. An increase in employee work can lead to major changes to improve the overall work and quality of hospital services. Thus, the improvement of employees' work is a strong predictor of the rise in overall work and services in hospitals (H02). The development of employees' work can be completed through increasing training so that this has an impact on increasing abilities and skills to meet the demands of their work. Organizational efforts to improve training activities and teamwork development based on quality, and interpersonal skills will improve work outcomes in the workplace (Husin et al., 2012). Improving the skills and knowledge of employees gives a positive signal that human resources are an important asset for the organization. This will impact employee job satisfaction, increase motivation, and contribute to enhancing employee performance (Theresia et.al., 2018). Individuals who work in hospitals are involved in highly dynamic interactions and work a lot in the field, therefore it is crucial to improve their professional skills. Managing human resource skills is a leverage to improve the quality of services in the health sector (Theresia et.al., 2019). This is in line with research findings which show that internal processes have the lowest average score (3.34), related to working in teams and being process oriented.

Subsequent findings show that the improvement of employee performance mediates the implementation of Kaizen and affects overall work and service quality (H0 3). The research findings show that there is a relationship that states that the implementation of Kaizen can improve the overall work and service quality in the hospitals through intermediate variable the improvement of employee's work. These results indicate the importance of the role of the enhancement of employees' work to improve hospital services. The development of employee's work through increasing skills is a major part of increasing the responsive factor, where which is a leverage factor to improve service quality (Theresia, et.al, 2018).

Although the main objective of this study is to test theory-driven hypotheses, the findings of this study have several significant implications for organizations. The findings of this study confirm that the improvements carried out continuously, without substantial costs, are quite significant in influencing the enhancement of employees' work and overall work and services in hospitals. This implies that hospital organizations need to prioritize improving employees' work through training to enhance their knowledge and skills. Training should be carried out in teams and programmed regularly. Therefore, the HRM division needs to review the current training program and training dimensions so that the success of the next training could be more effective. Training programs should be designed according to employee needs and training satisfaction should be reviewed as part of maximizing employee satisfaction. The use of PLS-SEM – a second generation SEM approach – has the effect of achieving more meaningful results (Richter et al., 2016).

6. Conclusion

This study aims to see the significant impact of Kaizen implementation on the improvement of employee's work and the improvement of overall work and services at hospitals in Indonesia. The research findings show that the application of Kaizen improves the work of employees and can significantly improve their overall work and services. Therefore, HRM activities need to focus on improvement of employee's work, enhancing skills and knowledge, which are important prerequisite for improvement the overall work and services in the workplace. The improvement of employee's work proved to be a predictor of overall employment and services in this model. This study contributes to the understanding of a causal relationship which shows that the application of Kaizen can significantly improve the work ability of employees and their services. The current research results clearly show a strong relationship between employee's work and overall improvement of work and services. In addition, employee work has become a valuable mediator so that it becomes an important factor for the organization to pay attention to. One of the interesting findings where employees believe what they are doing will add and build company value and employees are committed to

continuous improvement of the work system. This shows that employee participation is very important for improving employee work and on the improvement of overall work and service quality.

However, this study also has some limitations. The focus of this research is hypothesis testing, so that in this study no cultural control (namely individualism vs collectivism) was carried out. For further research, it is necessary to consider cultural and demographic variables (namely age, education, years of service) as control variables in order to better represent research findings.

References

- Anderson, J., & Gerbing, D. Structural equation modeling in practice: A review and recommended two step approach. *103*(3), pp. 411-423. (1988).
- Aveling, E.L., Kayonga, Y., Nega, A. and Woods, M.D. "Why is patient safety so hard in low-income countries? A qualitative study of healthcare workers' views in two African hospitals", *Globalization and Health*, Vol. 11 No. 6, pp. 1-8, (2015), available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC4349795/ (accessed October 30, 2017)
- Bhuiyan, N., & Baghel, A. An overview of continuous improvement: From the past to the present. *Management Decision*, 43, 761-777. (2005).
- Brunet, A., & New, S. Kaizen in Japan: An empirical study. *International Journal of Operations and Production Management*, 23(12), 1426-1446. (2003).
- Chen, J., Dugger, J., & Hammer, B. A Kaizen based approach for cellular manufacturing system design: A Case Study. *The Journal of Technology Studies*, 27(2), 19-27. (2001).
- Chin, W.W. "The partial least squares approach to structural equation modelling", in Marcoulides, G.A. (Ed), *Modern Methods for Business Research*, Lawrence Erlbaum Associate, Mahwah, NJ, pp. 295-336. (1998),
- Cwikla, G., Gwiazda, A., Banas, W., Monica, Z., & Foit, K. Assessment of the efficiency of the continuous improvement system based on Kaizen in an example company. *IOP Conf. Series: Materials Science and Engineering*. (2018).
- Dale, G., Van-Der-Wiele, T., & Van-Iwaarden, J. A framework for the introduction of TQM. In: *Managing Quality*. 5th Ed. Oxford: Blackwell Publishing Ltd. (2007).
- Dombrowski, U., & Mielke, T. Lean leadership-15 rules for a sustainable lean implementation. *Procedia CIRP*, (pp. 565-570). (2014).
- Drotz, E., & Poksinska, B. Lean in healthcare from employees' perspectives. *J.Health Organ. Manag*, 28, 177-195. (2014).
- Elmontsri, A., Almashrafi, A., Banarsee, R. and Majeed, A. "Status of patient safety culture in Arab countries: a systematic review", *BMJ Open*, Vol. 7 No. 2, pp. 1-11, (2017), available at: <http://bmjopen.bmj.com/content/7/2> (accessed January 31, 2018).
- Falk, R., & Miller, N. *A Primer for Soft Modeling*. Akron, Ohio: The University of Akron Press. (1992).
- Farooq, M., Akhtar, M., Ullah, S., & Memon, R. Application of total quality management in education. *Online Submission*, 3, pp. 87-97. (2007).
- Fornell, C., & Larcker, D. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. (1981).
- Gaur, A., & Gaur, S. *Statistical Methods for Practice and Research: A Guide to Data Analysis using SPSS*. Thousand Oaks, California: Sage Publications. (2006).
- F. Gonzalez Aleu and E. M. Van Aken, "Continuous improvement projects: an authorship bibliometric analysis," *Int. J. Health Care Qual. Assur.*, vol. 30, no. 5, pp. 467-476, 2017.
- Hammer, M., & Champy, J. *Reengineering the Corporation Manifesto for Business Revolution*. Grand Rapids: Zondervan. (1994).
- Harrison, R., Cohen, A.W.S. and Walton, M. "Patient safety and quality of care in developing countries in southeast Asia: a systematic literature review", *International Journal for Quality in Health Care*, Vol. 27 No. 4, pp. 240-254(2015),
- Helfrich, C. Die praxis von lean management und prozessorientierung. *Management Zeitschrift Industrielle Organization*, 63(12), 78-80. (1994).
- Hilton, R. *Management Accounting 4th Ed*. New York: Mc Graw Hill. (1999).
- Imai, M. *Kaizen: The Key to Japan's Competitive Success*. New York: McGraw-Hill Education. (1986).
- Jadhav, G., Jamadar, V., Gunavant, P., & Gajghate, S. Role of kaizens to improve productivity: A case study. *Applied Mechanics and Materials*, 592, 2689-2693. (2014).
- Jain, A., Lad, A., & Tander, D. *The Kaizen Philosophy for Industries*. (2015).

- J. Sankoff, J. Taub, and D. Mintzer, "Accomplishing much in a short time: use of a rapid improvement event to redesign the assessment and treatment of patients with alcohol withdrawal," *American Journal of Medical Quality*, vol. 28, no. 2, pp. 95–102, 2013
- Kabst, R., Holt, L., & Bramming, P. How do lean management organizations behave regarding training and development? *International Journal of Human Resource Management*, 7(3), 618-639. (1996).
- Khan, H., Ali, S., & Hongji, L. Impact of continuous improvement on organization performance insight from Pakistan: An Empirical Study. *International Journal of Innovation Management and Technology*, 9(1), 7-14. (2018).
- Kumar V, Singh J, Kumar, D., & Antil, M. Total Quality Management. *National Journal of Advanced Research*, 2(3), 5-8. (2016). Retrieved from <http://www.allnationaljournal.com>.
- L.W. Biffi, M. Beno, P. Goodman, A. Bahia, A. Sabel, K. Snow, and P. S. Mehler, "Leaning the process of venous thromboembolism prophylaxis," *The Joint Commission Journal on Quality and Patient Safety*, vol. 37, no. 3, pp. 99-AP6, 2011
- Maarof, M., & Mahmud, F. A review of contributing factors and challenges in implementing Kaizen in small and medium enterprises. *Procedia Economics and Finance*, 35, pp. 522-531. (2016).
- Mohammed, H., & Khayum, O. Kaizen: Potentiality in utilization of human prospects to achieve continuous improvement in the quality of higher education. *International Journal of Multidisciplinary and Current Research*, 3, 1223-1229. (2015).
- Mosadeghrad, A.M. "Factors influencing healthcare service quality", *International Journal of Health Policy and Management*, Vol. 3 No. 2, pp. 77-89(2014).
- M. U. Culcuoglu, S. Wang, C. Powers, and M. Hillman, "A new approach to Kaizen events in healthcare delivery systems: Kaizen sessions." in IIE Annual Conference. Proceedings, Institute of Industrial and Systems Engineers (IISE), pp. 1, 2012
- Nangoy, R., Mursitama, T., Setiadi, N., & Pradipto, Y. Creating sustainable performance in the fourth industrial revolution era: The effect of employee's work well-being on job performance. *Management Science Letters*, 10(5), 1037-1042. (2020).
- Nunnally, J., & Bernstein, I. (1994). *The assessment of reliability*. 3, 248-292.
- Oakland, J. *Total Quality Management and Operational Excellence: Text with Cases*. London: Routledge. (2014).
- Ohno, T. *Toyota Production System: Beyond Large-Scale*. USA: CRC Press. (1988).
- Omoush, et. Al. Evaluating the Five Kaizen Success Measurements through Employees Work Improvement and its Effects on Overall Work and Quality of Services: Empirical Study of Insurance Companies in Jordan, *International Review of Management and Marketing*; Mersin, Vol. 10, Iss. 4: 43-52. (2020).
- Oropesa-Vento, M., Garcia-Alcaraz, J., Rivera, L., & Mantas, D. (Effects of management commitment and organization of work teams on the benefits of Kaizen: Planning stage. *Dyna*, 82(191), 76-84. 2015).
- Patidar, L., Soni, V., & Soni, P. Continuous improvement philosophy for manufacturing productivity: Critical review In: *Trends in Industrial and Mechanical Engineering*. New Delhi: Excellent Publishing House. (2016).
- Petru, S., & Abbas, K. (2015). Contributions to improving the use of ABC in Egyptian companies by implementing Kaizen costing concept. *Lucrări Științifice Management Agricol*, 17(3), 69. (2016).
- Penga, D.X. and Lai, F. "Using partial least squares in operations management research: a practical guideline and summary of past research", *Journal of Operations Management*, Vol. 30 No. 6, pp. 467-480. (2012).
- Ricardianto, P., Ikhsan, R., Setiawati, R., & Gugat, R. How to improve ship crew's work effectiveness through the leadership style, work life balance and employee engagement in Indonesia national shipping. *Management Science Letters*, 10(2), 399-410. (2020).
- Richter, N.F., Sinkovics, R.R., Ringle, C.M. and Schlägel, C. "A critical look at the use of SEM in international business research", *International Marketing Review*, Vol. 33 No. 3, pp. 376-404. (2016).
- Saleem, M., Khan, N., Hameed, S., & Abbas, M. An analysis of relationship between total quality management and kaizen. *Life Science Journal*, 9(3), 31-40. (2012).
- Shatrov K, Pessina C, Huber K, Thomet B, Gutzeit A, Blankart CR Improving health care from the bottom up: Factors for the successful implementation of Kaizen in acute care hospitals. *PLoS ONE* 16(9): e0257412. (2021) <https://doi.org/10.1371/journal.pone.0257412>
- Shan, A., Ahmad, M., & Nor, N. (2016). The mediating effect of Kaizen between total quality management (TQM) and business performance. *Conference Series: Materials Science and Engineering*. 160. UK: IOP Publishing. (2021)
- Singh, J., & Singh, H. (2012). Continuous improvement approach: State-of-art review and future implications. *International Journal of Lean Six Sigma*, 3, 88-111. (2021)
- Soltani, H., & Amanat, E. The mediating role of Kaizen in the relationship between total quality management and organization's performance. *Journal of System Management*, 51, 61-74. (2019).

- Suarez-Barraza, M., & Lingham, T. Kaizen within Kaizen teams: Continuous and process improvements in a Spanish municipality. *The Asian Journal on Quality*, 9(1), 1-21. (2008).
- Suzaki, K. *New Manufacturing Challenge: Techniques for Continuous Improvement*. New York: Simon and Schuster. (1987).
- Theresia L. et.al. (2018), The Influence of Culture, Job Satisfaction and Motivation on the Performance Lecturer / Employees, Proceedings of the International Conference on Industrial Engineering and Operations Management Bandung, Indonesia.
- Theresia L. et.al. Meningkatkan Kualitas Layanan Ekowisata (Studi Kasus Kebun Raya Bogor), Technopex, Institut Teknologi Indonesia(2018).
- Theresia L., Bangun R., Assessing Service Quality in Healthcare Public Sector: An Exploratory on Puskesmas, Proceedings of the International Conference on Industrial Engineering and Operations Management Bangkok, Thailand. (2019).
- Wilson, R.M., Michel, P., Olsen, S., Gibberd, R.W., Vincent, C., El-Assady, R., Rasslan, O., Qsous, S., Macharia, W.M., Sahel, A., Whittaker, S., Abdo-Ali, M., Letaief, M., Ahmed, N.A., Abdellatif, A. and Larizgoitia, I. "Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital", *BMJ*, Vol. 344, p. e832. (2012).
- World Health Organization "The inter-regional consultation on patient safety incident reporting and learning systems in Africa and the Asia-Pacific regions", (2016), available at: <http://apps.who.int/iris/bitstream/10665/255146/1/WHO-HIS-SDS-2016.21-eng.pdf> (accessed October 29, 2017).

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