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The effect of leadership on operational performance: The mediating role of quality improvement

Dedi Purbowo^{(a)*} Sunaryo^(b) Nur Prima Waluyowati^(c)

^(a) Faculty of Economic and Business, University of Brawijaya, Gamping, Sleman 55291 Yogyakarta, Indonesia

^(b) Ph.D. Faculty of Economic and Business, University of Brawijaya, Griyashanta, 65142, Malang, Indonesia

^(c) Magister, Faculty of Economic and Business, University of Brawijaya, Watugong Street No.7, 65141, Malang, Indonesia

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ABSTRACT

The high quality and productivity of employees reflect the company's success in running its production business. This research was conducted to analyze the direct influence of leadership on operational performance (product quality and productivity) and to analyze the indirect influence of leadership on operational performance (product quality and productivity) mediated by Quality Improvement (Process Control and Teamwork) at PT Pindad (Persero). This research is categorized as survey research. Sampling in this study used cluster sampling with a total sample of 110 respondents. Data collection methods using questionnaires and interviews, data analysis used is SEM-PLS with Smart PLS 3.0 software. The results of the study indicate that leadership has a positive and significant influence on operational performance. Process control and teamwork have a role in mediating the relationship between leadership and operational performance.

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Introduction

Industry competition is increasingly competitive, the Company competes to produce products that meet customer expectations and produce high employee productivity. Companies compete to provide the best prices, satisfactory service and superior quality. Companies cannot ignore productivity and quality because they can build a company's reputation, maintain profit margins, and can save operational costs and other costs (Slack & Brandon, 2018).

Problems related to productivity and qualities are still faced by many manufacturing companies, mainly related to defective products and low employee productivity. Research conducted by (Sreedharan et. al., 2018) shows that manufacturing companies in Saudi Arabia have complaints against their products because of the large number of defects/defects produced. Puspasari et al (2019) also show that there are still many defective products produced by rubber and plastic manufacturing companies in Indonesia, causing losses to companies. As a result of damaged/defective products, the children's toy industry and the medical equipment industry in the US carried out a recall to repair and replace damaged components. This recall is detrimental to the industry because it adds to the company's operating costs (Hora et. al., 2011; Ball et. al., 2018). In 2014, manufacturing companies in the US experienced problems related to product quality, finally carrying out a recall to improve the products that had been produced. (Steven et. al., 2014).

Quality problems are still being faced by manufacturing companies in Indonesia, one of which is PT Pindad (Persero). PT Pindad (Persero) is the only state-owned manufacturing company that is engaged in providing the main weapons system equipment in Indonesia. PT Pindad (Persero) is required to produce superior products to support national defense and security and one of PT Pindad

* Corresponding author. ORCID ID: 0000-0002-0058-7492

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(Persero)'s superior products is ammunition in various calibers. This product must be made with a high level of quality and precision because global competition in this industry is very tight and demands a high level of accuracy.

Quality pioneers W. Edwards Deming and Joseph M. Juran explain that 85% of organizational failures are failures of management-controlled systems (Leader). In their opinion, employees who do the job can only control 15% of what causes failure. Deming & Juran's opinion is reinforced by a model presented by Slack & Brandon (2018) which is known as the EFQM (European Foundation Quality Management) Excellence Model. This model shows that the results (results) of an organization are influenced by several things, one of which is leadership. Goetsch & Davis (2016) and Urlich et. al. (2015) also strengthens the opinion of Deming & Juran that Leaders have a great influence on organizational performance.

The relationship or direct influence of leadership on organizational performance has been proven by several studies including Singh et. al. (2018), Panuwatwanich & Nguyen (2017), Anil & Satish (2016), Iscan et. al (2014), Hasan et al. (2013), Hirtz et. al. (2007), Prajogo & Sohal (2003), Curkovic et. al. (2000) and Samson & Terziovski (1999). Other research shows the indirect effect of leadership from a leader on organizational performance, mediated by quality improvement practices including process control and teamwork. As pointed out by Habtoor (2016), Abdullah et. al (2008) & Laohavichien et.al. (2008). The next researcher, Woldesilassie & Ivatury (2020), showed the indirect influence of leadership on organizational performance in terms of product quality.

The EFQM Excellence Model shows that the organization is a system consisting of (1) Leadership, (2) People, (3) Strategy, (4) Partnerships & Resources, (5) Processes, Product & Services. This model shows that leadership alone is not enough to run an organization. Systems in an organization need to be well controlled, one of which is through solid People (teamwork) and the need for continuous control processes (process, products & services) so that the organization's vision and mission can be achieved.

Crosby in Omachonu & Ross (2005) and Habtoor (2016) show that teamwork and control processes are categorized Quality Improvement practices. Furthermore, Goetsch & Davis (2016) stated that teamwork has a very important role for an organization or company, especially in helping organizations make effective decisions and improve overall organizational performance. Teamwork is a fundamental element of total quality where leadership is one of the variables that can affect teamwork (Yang et. al., 2011).

Process control in a company plays an important role in creating high quality products. Quality products can be produced by monitoring during the production process and providing proper feedback from the production process. Process control can be carried out on production machines, raw material & process inspection systems, and problem-solving systems when problems arise (Habtoor, 2016). Leaders must ensure that managers and employees control work processes and methods by working together to standardize them. The aim is to reduce variation in output by eliminating variations in the way work is done (Goetsch & Davis, 2016).

The location of the research was carried out in PT Pindad (Persero) Malang area with the consideration that this area is a complete manufacturing line starting from the process of raw materials to finished products. This research will be carried out in several manufacturing functions at PT Pindad (Persero) Malang area. This research will examine the influence of Leadership on Operational Performance (Product Quality and Productivity), which is mediated by Quality Improvement (Process Control and Teamwork).

Literature Review

Conceptual Background

Operational Performance

The world of industry is growing rapidly and competition is getting more competitive. Quality is a demand for every organization in order to compete well. Quality is a dynamic state associated with products, services, people, processes, and environments that meet or exceed customer expectations and help generate superior value (Goetsch & Davis, 2016). Deming developed the Quality Theory known as the "Deming Chain Reaction": as quality increases, costs will decrease and productivity will increase, resulting in more jobs, greater market share, and long-term survival. Deming emphasized worker pride and satisfaction rather than setting measurable goals, even though it was the workers who would ultimately produce quality products. His overall approach focuses on process improvement, where systems, not workers, are the cause of process variation (Omachonu & Ross, 2005).

High quality will then have a major effect on several things, including increased productivity. The details can be seen in the Figure 1 below:

Figure 1: Quality Effect; Source: Slack & Brandon, 2018

Leadership

Armand V. Feigenbaum's opinion regarding leadership in Omachonu & Ross (2005:23):

“Getting quality results is not a short-term, instant-pudding way to improve competitiveness; implementing total quality management requires hands-on, continuous leadership.”

Some principles and practices of total quality management (TQM) may differ between companies and industries, but there is unanimous agreement on the importance of leadership by top management in implementing TQM. Leadership is a prerequisite for all strategies and action plans. According to Juran, leadership cannot be delegated. Companies that have succeeded in making total quality work for them have been able to do so because of strong leadership.

Leadership is an intangible concept that produces tangible results. Sometimes it is referred to as an art and other times as a science. In reality, leadership is both an art and a science. The impact of good leadership can easily be seen in any organization where leadership exists. A well-led organization, whether it is a large company or a small department within a company, has several easily identifiable characteristics (Goetsch & Davis, 2016):

- i. High productivity rate
- ii. Positive attitude, can do
- iii. Commitment to achieve organizational goals
- iv. Effective and efficient use of resources
- v. High level quality
- vi. Teamwork approach that supports each other to get the job done.

Teamwork

Teamwork is a fundamental element of Total Quality. The reason is simple and practical. It is the organization, not the individual that produces the product and provides the service. A team is a group of people with a common collective goal (Goetsch & Davis, 2016). Teamwork has a very important role for an organization or company, especially in helping organizations make effective decisions and improve overall organizational performance. When the team works effectively and well-coordinated, the results will be better than the results individually.

Process Control

Process control needs to be carried out after quality has been established and measured. This process is to check whether the quality is in accordance with the set quality standards or not. Process control is usually done by sampling, not checking everything (Slack & Brandon, 2018). Process control is not only on the product but also on the process line and the machine. Managers and supervisors in traditional organizations plan and control each of these jobs. Work teams are usually formed, then managers and teams work together to plan and control each job (Goetsch & Davis, 2016).

Conceptual Framework and Hypothesis Formation

This research investigates four main constructs consisting of one independent variable (leadership) and one dependent variable (Process Control). In addition, this study also add two mediating variables (process control and teamwork). For more details, see Figure 2 below:

Figure 2: Conceptual Framework

The hypotheses of this study are:

H1: Leadership has a significant effect on operational performance (Product Quality and Productivity).

H2a: Leadership has a significant effect on operational performance (Product Quality and productivity) is mediated by process control

H2b: Leadership has a significant effect on operational performance (Product Quality and productivity) is mediated by teamwork

Research and Methodology

Participants and Data Collection

The sample of this study is 110 permanent employee of the Munitions Division of PT Pindad (Persero) who has been an employee for at least 2 years, aged 20-56 years with educational backgrounds ranging from high school to master's degree. The method of data collection was done by interview and distributing questionnaires to participants. The study was conducted in September 2021.

Data Analysis

The method of data analysis uses SEM (Structural Equation Modeling) based on Partial Least Square (PLS) that using SmartPLS 3.0 software application.

Measurements

All indicators to measure the four variables were adopted from several previous studies. indicators of leadership, process control, teamwork, and operational performance were adapted from Habtoor (2016).

Analysis and Findings

Findings

Based on the results of data processing, the respondents were 108 people based on age, the largest percentage of respondents aged 30-40 years was 60 employees with a percentage of 55.5%. Furthermore, aged less than 30 years are 22 employees with a percentage of 20.4% and those aged over 50 years are 16 employees with a percentage of 14.8%. Based on gender, the largest percentage of respondents are male with a total of 101 employees or 93.5% while the remaining 6.5% are female with a total of 7 employees. Based on years of service, the largest percentage of respondents were 2 – 10 years of service with 73 employees or 67.6%, 22 employees or 20.4% working years over 20 years, 11 – 20 years of service 11 employees or 10.2% and the minimum is less than 2 years of service with a total of 2 employees or 1.8%.

Based on education level, the largest percentage of respondents came from high school/vocational education level of 85 employees or 78.7%, undergraduate education level of 18 employees or 16.7%, postgraduate education level of 3 employees or 2.8% and at least a Diploma Education level of 2 employees or 1.8%. Based on job strata, the largest percentage of respondents came from strata 5 of 60 employees or 55.6%, strata 4 of 33 employees or 30.5%, strata 3 of 12 employees or 11.1%, and at least is a strata 2 number of 3 employees or 2.8%.

Table 1: Composite Reliability, Cronbach Alpha, AVE

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
X (Leadership)	0.944	0.956	0.783
Y1 (process control)	0.960	0.966	0.781
Y2 (Teamwork)	0.947	0.960	0.826
Z (operational performance)	0.799	0.908	0.832

Source: Primary data processed, 2021

Table 1 shows that the Cronbach's Alpha value for each variable is greater than 0.7. So that the variables used, namely X (Leadership), Y1 (process control), Y2 (teamwork), and Z (operational performance) were declared reliable. The composite reliability number of each variable used is greater than 0.7, so that these variables are included in the high reliability category. Discriminant validity using Average Variance Extracted (AVE) numbers is known that each variable has an AVE number greater than 0.5 (Hair et al., 2010), so all variables are declared valid.

The total diversity of data in this research uses the Q² formula as follows:

$$Q^2 = 1 - [(1 - R1^2) \times (1 - R2^2) \times (1 - R3^2)]$$

Where R12 is R square for equation 1 of 0.417, R22 is R square for equation 2 of 0.465, and R32 is R square for equation 3 of 0.512. The calculation is as follows:

$$Q^2 = 1 - [(1 - 0.417) \times (1 - 0.465) \times (1 - 0.465)] = 0.848$$

The results of the Q square calculation show that the diversity of data that can be explained by the model is 0.848 or 84.8% of the information contained in the data can be explained by the model. The model in this research belongs to the strong model category (> 0.35).

The Goodness of Fit model in this study uses the following formula:

$$GoF = \sum \sqrt{\text{Communality} \times \bar{R}^2}$$

$$GoF = \sqrt{\left(\frac{0.781 + 0.826 + 0.832}{3}\right) \times \left(\frac{0.417 + 0.465 + 0.512}{3}\right)}$$

$$GoF = \sqrt{0.806 \times 0.465} = 0.612$$

The calculation results show the GoF value of 0.612. This value indicates that the accuracy of the model in this study belongs to the large category (> 0.36) (Hair, 2013).

Direct effect, variable X (Leadership) has a positive and significant effect on variable Z (operational performance), with T-statistics values greater than critical value (2.841 > 1.96), and p-values smaller than (0.005 < 0.05). A positive coefficient indicates that an increase in the variable X (Leadership) can significantly increase the variable Z (operational performance). Based on the data from this calculate, H1: "Leadership has a direct effect on Operational Performance (Product Quality and Productivity)" is accepted.

The indirect effect between variable X (Leadership) on variable Z (operational performance) through variable Y1 (process control), is obtained from the product of the direct influence between variable X on variable Y1 and the direct effect between variable Y1 on variable Z, so that the effect is not directly by 0.155. With a p-value smaller than (0.010 < 0.05), then the indirect effect between variable X (Leadership) on variable Z (operational performance) through variable Y1 (process control) is significant. So it can be concluded that the variable Y1 (process control) is a mediating variable for the effect of variable X (Leadership) on variable Z (operational performance). Based on the data from this calculate, so H2a: "Leadership has an effect on operational performance (product quality and productivity) with Process Control mediation" is accepted.

The indirect effect between variable X (Leadership) on variable Z (operational performance) through variable Y2 (Teamwork), is obtained from the product of the direct influence between variable X on variable Y2 and the direct influence between variable Y2 on variable Z, so that the indirect effect is large. of 0.168. With a p-value smaller than ($0.017 < 0.05$), then the indirect effect between variable X (Leadership) on variable Z (operational performance) through variable Y2 (Teamwork) is significant. So it can be concluded that the variable Y2 (Teamwork) is a mediating variable for the effect of variable X (Leadership) on variable Z (operational performance). Based on the results of this calculate, so H2b: "Leadership affects operational performance (product quality and productivity) with Teamwork mediation" is accepted.

Discussion

Influence of Leadership (X) on Operational Performance (Z)

The results of testing the first hypothesis show that the Leadership variable (X) has a significant effect on the operational performance variable (Z). These results illustrate that leadership has a very large role in realizing the targets set by the company. At PT Pindad, the commitment of a leader has a very large influence on the employees under him (executors) in carrying out work programs that have been previously determined. Employees will be very obedient and loyal to the leader to realize the targets that have been set, such as employee commitment in reducing reject/defect values and increasing the productivity of each employee

The results of the hypothesis test show a high average answer value for the leadership variable. These results indicate that the company's operational performance can be influenced by the leadership of a leader. Leadership commitment has the greatest influence while the results orientation of a leader is below it. The company's operational performance in terms of decreasing defect/reject (quality improvement) and productivity will increase when a leader is committed to making it happen. When a leader focuses more on production results, there is a tendency for an increase in the value of defects/rejects (decreasing quality) in the production process.

The results of this study are in line with previous research conducted by Singh et. al. (2018), Panuwatwanich & Nguyen (2017), Anil & Satish (2016), Iscan et. al (2014), Hasan et al. (2013), Hirtz et. al. (2007), Prajogo & Sohal (2003), Curkovic et. al. (2000) and Samson & Terziovski (1999) where leadership has a direct influence on organizational operational performance. This research is also in line with the theory presented by Goetsch & Davis (2016) where the impact of good leadership can be easily seen in any organization where leadership exists. A well-led organization will have high productivity, employees will always think positively, employees will be committed to achieving organizational goals, the use of resources can be effective and efficient, and quality will increase.

Process Control Variables (Y1) and Teamwork (Y2) mediate the influence of Leadership (X) on Operational Performance (Z)

The results of the second hypothesis test (2a and 2b), namely the indirect influence of the leadership variable (X) on operational performance (Z) through the control process variable (Y1) and teamwork (Y2) indicate that the control process variable (Y1) and teamwork (Y2) can mediate the effect of leadership variable (X) on operational performance (Z). These results indicate that leadership alone is not enough to realize operational performance as expected. Leadership cannot stand alone, it needs to be supported by other things, namely a good control process and solid teamwork

The results of this hypothesis test show that the average answer value is high for the control process variable and the teamwork variable. These results indicate that the role of the work team in teamwork greatly affects the final result (operational performance) of a company, both in terms of quality and productivity. Process control, whether it incoming material control process, product yield control process and production process control process can then affect operational performance in terms of product quality. Solid teamwork also greatly affects the operational performance of a company, the more solid the teamwork, the productivity of employees will also increase, the less solid the teamwork, the weaker the operational performance, such as an increase in reject values and a decrease in employee productivity.

The results of this research are in line with previous research conducted by Habtoor (2016), Abdullah et. al (2008) & Laohavichien et.al. (2008) and Woldesilassie & Ivatury (2020) where there is an indirect influence of leadership from a leader on organizational operational performance, mediated by quality improvement practices, namely control and teamwork processes. This research is also in line with the theory presented by Goetsch & Davis (2016) where teamwork has a very important role for an organization or company, especially in helping organizations make effective decisions and improve overall organizational performance. Regarding process control, quality products can be produced by monitoring during the production process and providing proper feedback from the production process. Process control can be carried out on production machines, inspection systems for raw materials & processes, as well as problem solving systems when problems arise.

Conclusion

The results of this study can be concluded that leadership can affect operational performance either directly or indirectly through teamwork and control processes. Leadership has a very big role in realizing the targets set by the company. The commitment of a

leader has a very large influence on the employees under him (executors) in carrying out work programs that have been set in order to realize the company's vision and mission. However, leadership alone is not enough to realize operational performance as expected. Leadership cannot stand alone, it needs to be supported by other things, namely a good control process and solid teamwork. The role of the work team in a teamwork greatly affects the final result (operational performance) of a company both in terms of quality and productivity. Process control, whether it's incoming material control process, product yield control process and production process control process can then affect operational performance in terms of product quality.

Further research can be carried out in all areas of PT Pindad, both the Turen (Malang) area and the Bandung area. Further research can add other variables that can affect Operational Performance in an Organization based on the latest references.

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