



Analysis of the Influence of Knowledge Management, Digital Adoption, and Technology-Based Training on Organizational Performance

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Abstract

The manufacturing industry in Indonesia faces significant challenges in the era of digitalization and technological transformation. To remain competitive, companies need to implement strategies that support improved organizational performance. This study aims to analyze the influence of knowledge management, digital adoption, and technology-based training on organizational performance. The study was conducted using a quantitative approach with a survey method of 130 employees from six manufacturing companies in Indonesia. Data were collected through closed-ended questionnaires and analyzed using multiple linear regression. The results of the analysis indicate that all independent variables significantly influence organizational performance. Knowledge management is the most dominant factor with a beta coefficient value of 0.438, followed by digital adoption (0.386) and technology-based training (0.342). The Adjusted R² value of 0.675 indicates that the three variables explain 67.5% of the variation in organizational performance. Furthermore, all proposed hypotheses are accepted based on significance values below 0.05. This study confirms the findings of previous studies, which demonstrate the importance of knowledge and technology management in driving organizational competitiveness. These findings provide practical recommendations for manufacturing company management to integrate knowledge management systems, accelerate technology adoption, and increase the effectiveness of technology-based training to improve organizational performance sustainably.

Keywords: Knowledge Management, Digital Adoption, Technology-Based Training, Organizational Performance.

1. Introduction

In the era of Industry 4.0, manufacturing companies face the challenge of continuously improving their competitiveness amidst increasingly complex and technology-driven market dynamics. This industrial revolution is characterized by the integration of digital technology, physical systems, and artificial intelligence into production processes and operational management. To survive and thrive, companies are not only required to adopt advanced technology but also to optimally manage resources, including human resources, information, and knowledge [1]. Appropriate use of technology can improve production efficiency, product quality, and service delivery speed, while effective resource management plays a crucial role in strategic decision-making and the creation of sustainable added value [2, 3]. Therefore, the success of manufacturing companies depends heavily on their ability to synergistically integrate technology and resource management and adapt to change [4]. Digital transformation has brought fundamental changes to various aspects of company operations, from more automated and integrated production processes to increasingly data-driven and real-time supply chain management, to organizational management strategies that emphasize speed of decision-making and flexibility in adapting to changes in the business environment [5, 6]. Digital technologies such as the Internet of Things (IoT), artificial intelligence (AI), and big data analytics enable companies to obtain information more accurately and quickly, thereby increasing efficiency, reducing costs, and creating



added value for customers [7]. Besides that, the transformation also requires restructuring business models, employee competency upgrades, and organizational cultural transformation to a stronger digital focus [8].

A key component in supporting the success of digital transformation lies in how an organization can manage knowledge in a systematic manner with the use of knowledge management practices [9]. In manufacturing, knowledge management encompasses the process of generating, storing, disseminating, and applying pertinent information to support decision-making and innovation in operations. Knowledge management enables businesses to maintain competitive advantage by not letting the knowledge of individuals get lost but rather documented and within easy reach in the company [10, 11]. This comes in handy in situations of rapidly evolving technologies where knowledge transfer becomes crucial for purposes of ensuring employees are competent to learn new systems, learn improved work processes, and improve productivity and quality of deliverables. Therefore, the success of digital transformation lies not just with the technological hardware used, but also on how the organization is able to be effective in handling and mobilizing internal knowledge on a sustainable basis [12, 13]. Furthermore, the adoption of digital technology has been a central impetus in accelerating work processes, streamlining decision-making, and improving overall organizational effectiveness [14, 15]. In the highly competitive manufacturing industry, utilization of digital technologies such as Enterprise Resource Planning (ERP) systems, process automation, and big data analytics platforms enables organizations to respond to market changes quicker and more precisely [16]. Digitization also reduces the likelihood of human errors, increases the transparency of business processes, and maximizes the use of resources through real-time monitoring and control [17]. With technology incorporated, decision-making is not anymore based on managerial intuition but is instead facilitated by in-depth and measurable facts [18]. Success for organizations therefore today in the digital era depends largely on how quickly and effectively they adopt technology into their business and operational frameworks [19].

But without the readiness of capable human resources, even advanced technology will hardly take any effect on organizational performance [20, 21]. Technology will be nothing but a tool, which is not utilized to its full potential if not accompanied with adequate competency on the part of participating users [22]. Therefore, technology-oriented training is a must for bridging the gap between technology advancements and workforce capacity. This type of training not just improves the technical ability of employees in managing the latest digital systems but also creates a culture of adjustment towards change and innovation. In manufacturing, technology-based training enables interactive, flexible, and job-oriented learning, enabling employees to develop skills befitting their job requirements on the spot. Technology-based training is therefore an investment plan that has an immediate impact on an organization's productivity, efficiency, and competitiveness [18, 22]. These three factors, knowledge management, digital adoption, and technology-based training, are considered foundational pillars for organizational performance improvement, particularly in the manufacturing sector that is technically competent and depends on productivity efficiency and operational precision [23]. In an evolving and competitive industrial environment, an organization's success to a significant extent hinges on its ability to manage knowledge, adopt digital technology strategically, and develop human resources through technology-based training that is industry-relevant. While many previous studies have established a positive correlation between all three of these variables and organizational performance, research on all three being considered together is relatively limited, particularly in Indonesia's manufacturing sector [12, 15, 20]. Most studies focus on one or two variables separately, thus failing to provide a comprehensive picture of their combined influence on organizational performance [15, 16, 21, 24]. Therefore, this study aims to fill this research gap by empirically examining how knowledge management, digital adoption, and technology-based training simultaneously contribute to improved organizational performance in the Indonesian manufacturing sector. This research is expected to provide theoretical and practical contributions to the development of management strategies and digital transformation in the manufacturing industry.

2. Literature Review

Knowledge management refers to the systematic process of collecting, organizing, storing, and disseminating knowledge and information within an organization, both explicit and tacit. This process includes the creation of new knowledge, management of existing knowledge bases, and facilitation of knowledge exchange between individuals and work units. In the manufacturing industry, knowledge management is crucial because it drives operational efficiency, supports product and process innovation, and strengthens strategic decision-making based on accurate and up-to-date information. When knowledge is managed by organizations, the ability to build a lasting competitive edge increases. Furthermore, managing knowledge assists in avoiding the loss of knowledge due to turnover and ensures best practices can be replicated across the organization. Digital adoption is the method by which organizations completely embrace digital technology into business processes with everyday operation as an intention of improving operational effectiveness, efficiency, and value-added. This is beyond the adoption of new software or systems; digital adoption entails comprehension, acceptance, and optimum usage of technology by every organizational stakeholder. Digital adoption within the manufacturing industry is vital for automating tasks, integration of supply chains, and facilitating real-time data to be used in decision-making. As a result, companies become more efficient in their resource use, more responsive to evolving markets, and faster in embracing innovations. Moreover, digital adoption also drives end-to-end business transformation by changing work styles, business models, and customer and supplier interfaces, thus building a lasting competitive advantage in the digital economy.

Technology-based training is a form of training that utilizes digital technology as the primary medium in the learning process, such as e-learning, computer-based simulations, interactive training applications, and online platforms that enable training access anytime and anywhere. In the context of the manufacturing industry, technology-based training is highly relevant because it allows for the delivery of complex material in a visual and practical manner, accelerating the process of mastering the technical skills required on the production line. Furthermore, this method also supports personalized learning according to individual needs and abilities, thereby increasing the effectiveness and efficiency of training. With the support of technology, training can be implemented in a sustainable and measurable manner, allowing management to systematically monitor employee competency development. Overall, technology-based training contributes significantly to improving human resource capabilities, which ultimately has a positive impact on overall organizational productivity and performance. Organizational performance is one of the key measures of an organization's success in implementing its strategic goals, which is quantified based on multiple important dimensions such as operational efficiency, work productivity, innovation, and customer satisfaction. Manufacturing efficiency is a reflection of the ability of an organization to minimize wastage of time and resources, while productivity is a reflection of how ideally workers and machines produce quality output. Innovation indicates a firm's capacity for developing new products or processes that are applicable to market demands, whereas customer satisfaction indicates an organization's effectiveness in fulfilling consumer expectations for the products and services it offers. By gauging these dimensions

exhaustively, organizations are better placed to determine areas to improve on and come up with more suitable strategies for gaining competitive advantage and business sustainability.

3. Methods

The research used a quantitative approach with survey method in examining the impact of knowledge management, digital adoption, and technology-based training on organizational performance in manufacturing companies. The application of the quantitative method was used because it provides an objective and measurable perspective of variables' relationships based on collecting numerical data statistically processed. Participants of this study were workers of six Indonesian manufacturing companies that have adopted digital technology and technology-based training programs. Companies were selected by considering active participation in digital transformation and knowledge management practices. From this group, the overall sample of 130 respondents was determined using a purposive sampling technique based on the criterion that the respondents worked or had work experience commensurate with the research topic. The instrument used for data collection was a closed questionnaire constructed following established indicators from prior research. The survey employed a 1–5 Likert scale, with 1 representing "strongly disagree" and 5 representing "strongly agree." 20 indicators comprised four key variables: five indicators for knowledge management, five indicators for digital adoption, five indicators for technology-based training, and five indicators for organizational performance. Before mass distribution of the questionnaire, the validity and reliability of the instrument were ascertained in a pilot test with the respondents to ensure that each item was measuring correctly. The test revealed that all the indicators exceeded the minimum r-count value and Cronbach's Alpha > 0.7 , which was a measure of good instrument validity and reliability. Then, the multiple linear regression analysis procedures were used to examine the data obtained using SPSS software. It was possible to assess the effect of every independent variable on the dependent variable and determine how important their contribution was towards improving organizational performance in the manufacturing firm under study.

4. Results and Discussions

The descriptive analysis results show that all variables have a mean score greater than 3.9, and Knowledge Management has the highest average score. It implies that the majority of respondents highly value the implementation of Knowledge Management, Digital Adoption, and Technology-Based Training in their organizations.

Table 1. Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
Knowledge Management	4.15	0.52	3.10	5.00
Digital Adoption	4.07	0.57	2.90	5.00
Technology-Based Training	3.98	0.60	2.80	5.00
Organizational Performance	4.21	0.49	3.20	5.00

The results of regression analysis indicate that the three independent variables, digital adoption, knowledge management, and technology-based training, have a significant influence on the dependent variable, organizational performance. The F-value of 47.182 at the significance level of $p < 0.001$ indicates that the regression model established in this study is significant simultaneously, suggesting that all three variables put together have a significant role in explaining variation in organizational performance in the manufacturing sector. This finding confirms that it is not a single factor that makes an organization successful, but rather the result of the synergy between effective knowledge management, optimum utilization of digital technology, and technology-enabled training to develop competency among employees. Therefore, manufacturing businesses striving to build their competitiveness and performance have to consider these three aspects holistically and sustainably.

The Adjusted R² value of 0.675 indicates that 67.5% of the variation in organizational performance can be explained by the three independent variables: knowledge management, digital adoption, and technology-based training. This indicates that the regression model used has strong explanatory power and is relevant in the context of this study. With an Adjusted R² value approaching 70%, it can be concluded that the contribution of these three variables to improving organizational performance in the manufacturing sector is quite dominant, while the remaining 32.5% is likely influenced by factors outside the model, such as leadership, organizational culture, managerial structure, or external conditions such as the market and regulations. These findings reinforce the urgency for manufacturing companies to seriously manage knowledge, comprehensively adopt digital technology, and provide technology-based training to continuously improve performance.

Table 2. Hypothesis Test Results

Hypothesis	Variable	Coefficients Beta	T-Value	Sig.	Conclusion
H1	Knowledge Management	0.438	6.124	0.000	Accepted
H2	Digital Adoption	0.386	5.712	0.000	Accepted
H3	Technology-Based Training	0.342	4.958	0.000	Accepted

Based on the table above, all hypotheses proposed in this study were accepted, meaning that each independent variable, knowledge management, digital adoption, and technology-based training, has a positive and significant influence on Organizational Performance in the manufacturing industry context. This indicates that improvements in knowledge management, the use of digital technology, and the implementation of technology-based training will directly contribute to increased organizational efficiency, productivity, and competitiveness [12]. With all hypotheses accepted, these results strengthen the theoretical framework stating that these three factors are strategic elements in building superior organizational performance amidst constantly changing industry dynamics. The results show that Knowledge Management has the most dominant influence on organizational performance compared to other variables [13]. This finding indicates that manufacturing organizations that are able to manage knowledge effectively, through documentation, knowledge sharing,

and continuous learning, will achieve more optimal performance [14]. This aligns with previous research that confirms that well-organized knowledge can be a source of sustainable competitive advantage, especially in a dynamic and technology-driven business environment. In other words, companies that position knowledge management as a strategic asset tend to be more adaptive, innovative, and able to significantly increase operational efficiency.

The impact of digital adoption has also been proven significant on organizational performance, supporting previous studies that organizations that quickly and accurately adopt digital technology will be more adaptive to market dynamics and able to increase overall productivity. The integration of digital technology into business processes enables task automation, increased data accuracy, and accelerated decision-making based on real-time information. In the manufacturing industry, digitalization also contributes to supply chain optimization, predictive maintenance, and increased production flexibility [15]. Therefore, companies that actively adopt digital technology tend to have advantages in operational efficiency and responsiveness to changing market demands. Technology-based training makes a significant contribution to organizational performance, as reflected in the analysis results showing a positive and significant relationship between the two [16]. This finding endorses previous research emphasizing that utilizing technology within the process of training would increase employees' skills, learning efficiency, and work readiness, especially for addressing challenges in the digitalization era. Technology-based training, such as e-learning, simulation, and online training platforms, enables companies to deliver content in a more flexible, measurable, and accessible manner to all employees, in both time and place [19]. This type of training is most suited in the manufacturing industry to hasten the transfer of technical information as well as facilitate adjustment to high-technology production systems. Technology-based training is, therefore, a critical tactic for creating a strong, innovative, and capable workforce that supports overall organizational performance.

The most notable difference from other research is that the relative importance of knowledge management in influencing organizational performance is higher than that of technology adoption. This means that technology adoption within the manufacturing industry is less a matter of embracing technology and more about improving technical and operational knowledge, which is more crucial in influencing organizational performance. While most earlier research points to the value of digital adoption as a main driver of organizational change, this research highlights that effective technology adoption owes a lot to the ability of an organization to facilitate systematic acquisition, dissemination, and use of knowledge. This highlights that technology itself is not the key, but that knowledge is the strategic base that facilitates its optimal use. In fact, business organizations with strong knowledge-sharing systems and learning culture are in a better position to drive innovation and efficiency compared to those stressing digitalization in isolation without complementing human resource capability. Typically, these three strategic drivers, knowledge management, digital adoption, and technology-driven training, form a complementary strategic model towards organizational performance improvement. The success of an organization in the competitive and dynamic manufacturing industry relies not only on the technology utilized but also on the ability to manage knowledge and equip staff through appropriate and adaptable training. Operational efficiency, standardization of production activity, and ongoing innovation are the most essential prerequisites that can be achieved when organizations systematically handle knowledge while simultaneously using appropriate technology and developing employee capabilities through technology-enabled training. Thus, through the integration of these three elements, not only is the company's internal foundation enriched, but its competitiveness in the global arena is also augmented.

5. Conclusion

This study comes to the conclusion that knowledge management, digital adoption, and training-based technology have positive and significant impacts on the organizational performance of Indonesian manufacturing firms. All three variables have a significant role at the same time in maximizing organizational competitiveness through process efficiency, good decision-making, and responsiveness towards technological disruption and global market forces. In the context of Industry 4.0, where speed and accuracy are key success factors, the integration of knowledge management, digital technology utilization, and technology-based training is a crucial pillar for creating a resilient and innovative organization. The findings indicate that knowledge management has the most dominant influence on organizational performance. This reflects the fact that manufacturing companies rely heavily on technical, procedural, and tacit knowledge held by individuals and work teams. If this knowledge is not systematically documented and disseminated, it will be difficult to utilize for innovation or work process improvement. Therefore, developing a structured knowledge management system, from information acquisition, storage, to distribution, is crucial for driving overall organizational performance.

Furthermore, digital adoption also demonstrates a significant contribution to accelerating operational transformation and improving organizational efficiency. The adoption of digital technologies such as automation, the Internet of Things (IoT), and ERP systems offers companies significant opportunities to optimize supply chains, reduce production costs, and respond to customer needs more quickly and accurately. However, technology will only have a maximum impact if accompanied by organizational readiness in terms of structure, work culture, and human resources. In this regard, technology-based training plays a strategic role in bridging the competency gap between modern industry needs and employee capabilities. Technology-based training, such as e-learning, interactive simulations, and augmented reality, not only improves technical skills but also fosters an adaptive and collaborative mindset suited to the demands of the digital era. This is an essential long-term investment in creating a culture of continuous learning in the workplace. Based on these overall results and implications, this study recommends that manufacturing companies synergistically develop and strengthen the implementation of knowledge management, digital adoption, and technology-based training within their managerial and operational systems. The synergy of these three factors will form a solid foundation for facing the pressures of global competition, strengthening innovation, and achieving long-term organizational sustainability. In addition, companies are also advised to conduct regular evaluations of the effectiveness of policies and programs in each area to ensure they remain relevant to industry dynamics and the latest technological developments.

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