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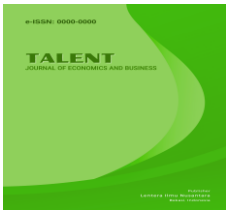

Digital Transformation Strategy and Learning Development Initiatives for Workforce Agility in Manufacturing Companies : The Mediation Role of Organizational Support

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Abstract
This study aims to analyze the influence of digital transformation strategy and learning & development initiatives on workforce agility by considering the mediating role of organizational support in the manufacturing sector. The background of this study is the need to improve workforce agility in the manufacturing sector to face the challenges of a dynamic and competitive digital era. Quantitative research methods with non-probability sampling techniques were used to collect data from 145 respondents in the Cikarang area, Bekasi Regency. The results show that digital transformation strategy and learning & development initiatives have a significant influence on workforce agility, with organizational support as a mediating variable that strengthens the relationship. This study demonstrates the importance of digital transformation strategy and learning & development initiatives in improving workforce agility, with organizational support as a mediating factor, to optimize the competitiveness of the manufacturing sector in the digital era. This research's theoretical contribution lies in strengthening the workforce agility literature by incorporating organizational support as a mediating mechanism explaining how digital strategies and learning initiatives impact workforce agility. Meanwhile, its practical contribution provides guidance for manufacturing management in designing more integrated digital transformation policies and employee development programs to create an adaptive workforce capable of competing in the Industry 4.0 era.

Keywords: Digital Transformation Strategy, Learning & Development Initiatives, Organizational Support, Workforce Agility , Manufacturing

Introduction

The industrial revolution has created significant changes in the global business environment. Transformation has impacted the way companies operate and compete in the market. Competitive challenges drive organizations to improve the adaptability of their workforce to face dynamic changes. Workforce agility is key for companies to maintain competitive advantage in the digital era, and workforce agility also encourages accelerated employee learning and development to align with technological needs and business innovation. The workforce's ability to respond to change quickly and effectively determines an organization's success in facing technological challenges. Manufacturing companies, in particular, require a high level of workforce agility to optimize their production and service processes (Muduli & Pandya, 2018) .

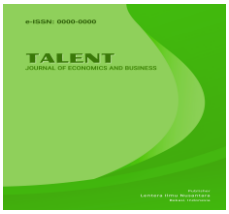
The workforce's unpreparedness for technological change creates a significant competency gap. Manufacturing companies face challenges in aligning workforce skills with the demands of digitalization. Workforce agility plays a crucial role in bridging this gap by increasing employee flexibility and adaptability. An organization's ability to develop workforce agility influences the effectiveness of new technology implementation and business process innovation. Companies need to establish a comprehensive competency development system to enhance workforce agility through continuous training programs and innovative learning approaches (Munteanu et al., 2020). This is key to maintaining competitiveness and innovation in a rapidly evolving industry (Muduli, 2016). Yet, although the literature highlights capability gaps in digital transformation settings, prior empirical studies have not sufficiently identified why these gaps persist, nor how specific organizational mechanisms can mitigate them. This illustrates an unresolved research problem concerning the drivers that effectively strengthen agility during digital transition.

Companies across various sectors, including manufacturing, face significant challenges in building and maintaining workforce agility. This trend toward workforce agility is also supported by global data demonstrating the importance of investing in digital transformation strategies, learning, and human resource development. A 2020 McKinsey Global Institute report showed that 87% of companies worldwide reported difficulty finding employees with the skills needed for Industry 4.0. This indicates that many companies, including those in the manufacturing sector, have not been able to effectively develop workforce agility .

To effectively improve workforce agility , companies need to integrate digital transformation with human resource learning and development programs. This includes investing in modern technology, digital-based training, and a culture of continuous learning to ensure employees have relevant and adaptive skills. Companies that successfully implement workforce agility have higher productivity levels and better adaptability to technological change than those that do not (Muduli & Pandya, 2018). However, most existing research focuses on technology and training variables without explicitly highlighting how organizational support can mediate these relationships. This creates significant research space to examine the mediating role of organizational support, particularly in the context of Indonesian manufacturing, which is undergoing a massive digital transformation.

The Industry 4.0 era has brought significant changes to the manufacturing sector, creating new challenges related to workforce agility that remain largely unaddressed. The adoption of advanced technologies such as artificial intelligence, robotics, and the Internet of Things offers opportunities to increase efficiency and productivity, but their impact on workforce agility and their ability to adapt to technological change still needs to be better understood. Workforce agility is a crucial factor in supporting digitalization strategies (Muduli, 2017) . To address these challenges, manufacturing companies must develop strategies that align workforce agility with company objectives. Further study of workforce agility is crucial for finding the best solutions for managing change, designing more efficient work in an increasingly automated environment, and building a work culture that supports employees to continuously adapt and thrive alongside rapid technological developments.

effective digital transformation strategy is crucial for developing workforce agility to address the challenges of rapid change in the Industry 4.0 era. Digital transformation strategy



plays a crucial role in enhancing workforce agility by creating a more flexible and adaptive work environment. The appropriate implementation of digital technology enables employees to work more efficiently, collaboratively, and responsively to market changes. An effective digital transformation strategy can transform business processes, operating models, and customer experiences, which in turn drives increased workforce agility. (Vial, 2019) . Technologies such as cloud computing, artificial intelligence , and the internet of things enable employees to quickly access information and resources, make data-driven decisions, and adapt quickly to changing business needs (Westerman et al., 2020) .

Research conducted by Schwarzmüller et al (2018) found that digital transformation strategy has a significant positive impact on workforce agility . This indicates that the use of digital technology enables employees to work more flexibly and responsively to change. Research conducted by Warner & Wäger (2019) showed that a comprehensive digital transformation strategy significantly contributes to increased workforce agility . This emphasizes the importance of developing digital capabilities in enhancing organizational adaptability. This contrasts with the research conducted by Nwankpa & Roumani. (2016) found that although digital transformation strategy had a negative impact, it was not significant on workforce agility . They highlighted that factors such as organizational culture and employee readiness can moderate this relationship.

Learning and development initiatives also play a crucial role in building workforce agility , as amidst rapid changes in the workplace, companies need a flexible and adaptable workforce. Well-designed training and development programs not only improve technical skills but also broaden knowledge and strengthen employee mindsets, enabling them to be more responsive and responsive to new challenges. Investing in continuous learning is key to building an agile workforce. (Ulrich & Yeung, 2019) .

Research conducted by Muduli (2017) showed that human resource development practices, including learning and development initiatives, have a significant positive impact on workforce agility . This study emphasizes the importance of training and development in increasing employee flexibility and adaptability. The study was conducted by Nijssen & Paauwe (2012) found that ongoing learning and development initiatives significantly contribute positively to the development of organizational agility, including workforce agility . This highlights the crucial role of organizational learning in facing a dynamic business environment. This contrasts with the findings of research conducted by Alavi et al. (2014), which found that learning and development initiatives did not significantly contribute to workforce agility . They suggested that contextual factors such as organizational culture and management support can influence the effectiveness of learning and development initiatives in improving workforce agility .

Previous research on the relationship between digital transformation strategy and learning and development initiatives on workforce agility has shown inconsistent results. A study by Hess et al. (2016) found that digital transformation strategy has a significant positive impact on workforce agility , and development contributes to improving workforce agility . Other studies have shown different results, indicating that digital transformation strategy has no impact on workforce agility (Qiao et al., 2024) . Meanwhile, research in the context of learning and development initiatives on workforce agility according to Petermann & Zacher (2022) shows a very important and influential, in contrast to research by Alavi et al. (2014)

which shows that learning and development initiatives on workforce agility have no significant impact. This inconsistency indicates the complexity of the relationship between variables and suggests the need for a deeper understanding. To address this gap, this study proposes the role of organizational support as a mediating variable. Considering the mediating role of organizational support , this study aims to provide a more comprehensive understanding of how digital transformation strategy and learning and development initiatives can effectively improve workforce agility in the context of organizational support .

Digital transformation strategies play a crucial role in enhancing workforce agility to adapt to the evolving digital era. According to Vial (2019), implementing the right digital transformation strategy can bring about changes in organizational structure, work methods, and company culture, ultimately making employees more flexible and adaptable. Similarly, Verhoef et al . (2021) also emphasize that a comprehensive digital transformation strategy can help employees develop digital skills, encourage collaboration between teams, and accelerate decision-making, all of which contribute to increased workforce agility. Strong organizational support serves as an important mediator in ensuring that the digital transformation strategy is well received by employees, supporting them in adapting, and developing the skills necessary to improve workforce agility .

The relationship between digital transformation strategy and workforce agility is highly dependent on organizational support . Research from Warner & Wäger (2019) showed that organizational support , such as management commitment, adequate resources, and a culture that supports innovation, is crucial for ensuring the success of digital transformation and enhancing employees' ability to adapt. Consistent organizational support can help overcome barriers to change and create an environment that encourages employees to develop the mindsets and skills needed in the digital age.

Learning & development initiatives play a vital role in enhancing workforce agility in an era of rapid change and uncertainty. Research conducted by Chadwick & Li (2018) well-designed learning & development initiatives can significantly improve employees' ability to adapt to new technologies, changing work processes, and dynamic market demands. In line with this, Whysall et al. (2019) found that learning & development initiatives that focus on developing cross-functional skills and complex problem-solving abilities contribute directly to increased workforce agility , enabling organizations to respond more quickly to changes in the business environment.

The relationship between learning and development initiatives and improving workforce agility is highly dependent on strong and consistent organizational support . Research shows that organizational support , including the provision of adequate resources, sufficient time for learning, and recognition of employee self-development efforts, has a significant positive impact on the success of learning and development initiatives in improving workforce agility. (Muduli & Pandya, 2018) . Organizational Support can be a key mechanism in explaining how learning & development initiatives can effectively improve workforce agility .

The industrial area in Bekasi Regency, particularly the Cikarang area, is an ideal and relevant location for conducting in-depth research on digital transformation strategies and learning & development initiatives for workforce agility mediated by organizational support in the manufacturing sector. The Cikarang area is a leading manufacturing industry center in

Indonesia that is undergoing significant transformation due to the development of digital technology. The complexity of the manufacturing industry dynamics requires organizations to continuously develop adaptive strategies to maintain competitiveness. The need for an agile workforce that is responsive to technological changes is a primary prerequisite in facing the industrial revolution. The characteristics of the Cikarang manufacturing area, which is dominated by multinational and local companies, require a comprehensive approach in implementing digital transformation. Organizational support is a critical factor in encouraging the development of human resource competencies that are able to adapt quickly. This study aims to explore the interaction mechanisms between digital transformation strategies , learning & development initiatives, and organizational support in shaping workforce agility . The complexity of the challenges faced by the manufacturing industry in the region requires an in-depth analysis of the factors that influence workforce agility. The uniqueness of the research location in the Cikarang industrial area with its diverse characteristics makes this area very interesting for in-depth study.

This research takes a novel approach that connects digital transformation strategy and learning & development initiatives in the manufacturing industry. Both elements are crucial in the Industry 4.0 era, but previous research has tended to examine them separately. This research offers a different perspective by positioning organizational support as an intermediary variable that bridges the relationship between digital transformation strategy and learning & development initiatives , which together play a role in improving workforce agility. This novelty is highly relevant, especially as the manufacturing sector faces challenges in adopting digital technologies while maintaining the adaptability of its workforce.

Study conducted by Sousa & Rocha research (2019) combined the technological aspects of digital transformation strategy with the human resource development aspects of learning and development initiatives towards workforce agility . This study provides a comprehensive view of how these two aspects are interconnected and work together to improve the workforce's ability to adapt and respond to change. Furthermore, research conducted by Hanelt et al. (2021) emphasizes digital transformation strategy on workforce agility . This study states that digital transformation strategy in the manufacturing industry requires a more comprehensive approach, not only focusing on technology adoption but also on workforce agility . This study explores the potential use of learning analytics in learning & development initiatives to identify individual and team learning needs in real-time , enabling rapid adjustments to changing skills needs and supporting workforce agility development. (Prieto-Alvarez et al., 2019) .

Based on the previous background, the purpose of this study is to analyze the influence of digital transformation strategy and learning and development initiatives on workforce agility , by considering the mediating role of organizational support in the context of a manufacturing area. Specifically, this study aims to understand how digital transformation strategies and employee development initiatives can improve workforce agility in the face of rapid technological change and market dynamics. This study also seeks to uncover the crucial role of organizational support as a connecting factor between the implementation of digital strategies and development programs and increased workforce flexibility and adaptability. Focusing on the manufacturing sector, this study is expected to

provide valuable insights into effective ways to improve industrial competitiveness through the development of human resources that are responsive and adaptive to the demands of the digital era, as well as contribute to a more comprehensive understanding of the factors influencing the success of digital transformation in organizations.

Methods

This study aims to examine the influence of digital transformation strategy, learning & development initiatives, and organizational support on workforce agility in manufacturing companies located in the Cikarang area, Bekasi Regency. The methodology adopted a quantitative approach with the implementation of non-probability sampling techniques through a purposive sampling method , where sample selection is based on specific criteria, namely employees with a minimum of one year of service. Determination of the number of samples refers to the formula of Hair et al. (2019) which states taking 5 to 10 times the number of research indicators, resulting in a total of 145 respondents. The Cikarang industrial corridor was chosen not only because it hosts a dense concentration of multinational and domestic manufacturing firms, but also because it represents one of Indonesia's most advanced and rapidly digitalizing industrial ecosystems, making it a highly appropriate and generalizable setting for examining workforce agility in the context of Industry 4.0. The diversity of organizational scales, technological maturity levels, and human resource structures in Cikarang allows the findings to reflect broader manufacturing patterns beyond a single-company context, thereby strengthening the external relevance of the study.

The data collection instrument used a questionnaire compiled based on key indicators for each research variable. The digital transformation strategy variable adopts the conceptual framework of Warner & Wäger (2019) which includes digital technology, digital capability, digital culture, digital process, and digital experience. The learning & development initiatives variable refers to the research of Arulsamy et al. (2023) with indicators including corporate culture and support, strategic alignment, needs assessment, design and delivery effectiveness, management support, feedback and evaluation, career development opportunities, recognition and rewards, and change management and flexibility. The workforce agility variable adopts the concept from Petermann & Zacher (2022) which consists of accepting changes, decision making, creating transparency, collaboration, reflection, user centricity, iteration, testing, self-organization, and learning . Meanwhile, the organizational support variable refers to Sun's (2019) conceptualization which includes supervisor support, procedural fairness at work, coworker support, human resources practices , and rewards . All indicators are measured using a Likert scale to quantify respondents' perceptions.

Before the analysis using PLS-SEM was conducted, the instrument's validity and reliability procedures were tested first. Content validity was ensured through expert judgment to assess the suitability of the indicators with the theoretical concepts of each variable, while construct validity was tested by looking at the convergent validity value (loading factor > 0.7) and discriminant validity using the Fornell-Larcker criteria. Instrument reliability was analyzed through Cronbach's Alpha and Composite Reliability (CR) values, with a minimum criterion of 0.7 as the acceptance limit. This procedure was carried out to ensure that the research instrument was suitable for use and the analysis results could be scientifically accounted for. The data collection process was carried out through a systematic distribution

of questionnaires to respondents who met the criteria, while data analysis implemented the Partial Least Squares-Structural Equation Modeling (PLS-SEM) approach with the help of Smart PLS to evaluate the interrelationships between variables. This study is projected to provide a comprehensive understanding of how digital transformation strategies and learning & development initiatives and organizational support can optimize workforce agility , while providing practical implications for the development of human resource management strategies in the manufacturing sector.

Results and Discussion

This study presents a comprehensive overview of the respondents' profiles, covering employees working in various industrial areas. Demographic characteristics indicate a workforce distribution with a higher proportion of males and a predominance of the younger generation. Organizationally, respondents are spread across several strategic divisions such as production, human resource management, and marketing. In terms of experience, the majority of respondents are in the early to mid-career phase, reflecting the dynamics of workforce regeneration. The education aspect shows a concentration of at the upper secondary level, with some respondents having completed higher education. This overall profile provides an in-depth perspective on the characteristics of the research sample, which represents the diversity of the workforce in the relevant industrial sector. The following table presents detailed demographic data for the respondents:

Table 1. Respondent Profile

Item	Type	Respondents	Percentage
Gender	Man	80	55.2%
	Woman	65	44.8%
Age	18-25 Years	92	63.4%
	26-30 Years	29	20%
	31-35 Years	22	15.2%
	>35 Years	2	1.4%
Length of work	1-3 years	84	57.9%
	4-6 Years	52	35.9%
	7-9 Years	8	5.5%
	>10 Years	1	0.7%
Department / Division	Production	58	40%
	Marketing	21	14.5%
	Finance	13	9%
	Human Resources	41	28.3%
	Other	12	8.3%
Last education	High School/Equivalent	74	51%
	D3	6	4.1%
	S1	51	35.2%
	S2	14	9.7%

Talent: Journal of Economics and Business
Volume 03 No 04 December 2025
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	Other	0	0%
Work Area	GIIC	25	17.2%
	MM2100	35	24.1%
	EJIP	31	21.4%
	Jababeka	32	22.1%
	Other	22	15.2%

Source : SmartPLS 3 Output (2024)

Based on the analysis of the respondent profiles in this study, several diverse demographic characteristics can be identified. In terms of gender, male respondents are dominated by (55.2%) and female respondents (44.8%), indicating a relatively proportional gender balance in the work environment. The majority of respondents are in the productive age group of 18-25 years (63.4%), the 26-30 age group is (20%), the 31-35 age group is only (15.2%), while the age group >35 years is relatively low at only (1.4%), this reflects a workforce dominated by the dynamic millennial and Gen-Z generations. In terms of length of service, the majority of respondents (57.9%) have 1-3 years of work experience, around (35.9%) workers have between 4-6 years of work experience. Only (5.5%) of them have worked for 7-9 years, and meanwhile the group with a work period of >10 years is only (0.7%). Regarding departments, the work unit with the largest contribution is the Production Department (40%), followed by the Human Resources Department (28.3%), followed by the Marketing Department (14.5%), and the Finance Department (9%), while other departments only account for (8.3%), this illustrates the company's operational focus on production and HR management aspects. In terms of education, the majority of respondents (51%) are high school graduates/equivalent, followed by bachelor's degree graduates (35.2%), master's degree graduates (9.7%), and for diploma three graduates only (4.1%), indicating the diversity of educational levels within the organization. The distribution of respondents' work locations is relatively even in strategic industrial areas such as MM2100 (24.1%), Jababeka (22.1%), and EJIP (21.4%), GIIC (17.2%), and other areas (15.2%) indicating the company's broad operational coverage in various major industrial areas. The demographic profile of respondents presents a comprehensive picture of the characteristics of the organization's human resources. The research findings indicate significant potential in organizational development through optimizing the diverse demographic composition of employees.

Table 2. Validity Test

Variables	Statement	Outer Loadings	Information
Y	Y.1	0.885	VALID
	Y.2	0.894	VALID
	Y.3	0.903	VALID
	Y.4	0.875	VALID
	Y.5	0.887	VALID
	Y.6	0.891	VALID
	Y.7	0.902	VALID
	Y.8	0.905	VALID

	Y.9	0.882	VALID
	Y.10	0.899	VALID
X1	X1.1	0.823	VALID
	X1.2	0.836	VALID
	X1.3	0.861	VALID
	X1.4	0.851	VALID
	X1.5	0.860	VALID
	X1.6	0.832	VALID
	X1.7	0.842	VALID
X2	X2.1	0.848	VALID
	X2.2	0.850	VALID
	X2.3	0.824	VALID
	X2.4	0.814	VALID
	X2.5	0.828	VALID
	X2.6	0.825	VALID
	X2.7	0.837	VALID
	X2.8	0.843	VALID
	X2.9	0.810	VALID
M	M.1	0.802	VALID
	M.2	0.828	VALID
	M.3	0.856	VALID
	M.4	0.812	VALID
	M.5	0.794	VALID
	M.6	0.825	VALID
	M.7	0.790	VALID
	M.8	0.805	VALID
	M.9	0.825	VALID

Source : SmartPLS 3 Output (2024)

The validity analysis results in this study revealed very satisfactory findings regarding the measurement accuracy of all variables studied. Through convergent validity analysis by evaluating the outer loadings value on each indicator, it was found that all indicators showed values that exceeded the established threshold, which is 0.7. This indicates that all measurement instruments have very good validity. The results of the validity analysis showed very good measurement quality for all study variables. Variable Y showed strong measurement consistency with outer loadings values ranging from 0.875 to 0.905, indicating the accuracy of the instrument in measuring the intended construct. Measurement of variable X1 showed adequate validity with a value range of 0.823 to 0.861, reflecting the reliability of the statement items in representing the variable. Construct X2 produced a satisfactory outer loading value in the range of 0.810 to 0.850, indicating the suitability of the indicator in measuring the intended variable. Variable M showed good construct validity with values

ranging from 0.790 to 0.856, confirming the accuracy of the measurement instrument. All indicators in the four variables met validity criteria with outer loadings above 0.7, demonstrating that the research instrument met the validity standards required in scientific studies. The results of this validity test confirmed that each statement item accurately measured the construct under study. The integrity of the resulting data provides a strong foundation for further analysis in this study. These findings indicate that the research instrument is suitable for use in data collection and subsequent analysis.

Table 3. Reliability Test

Variables	Cronbach's Alpha	Information
Y	0.972	Reliable
X1	0.933	Reliable
X2	0.944	Reliable
M	0.937	Reliable

Source : SmartPLS 3 Output (2024)

Reliability testing of the research instrument yielded highly satisfactory findings across all variables. Variable Y demonstrated an exceptional level of internal consistency with a Cronbach's Alpha value of 0.972, reflecting a very high instrument reliability. Construct X1 demonstrated excellent reliability with a Cronbach's Alpha value of 0.933, indicating reliable measurement stability. Measurement of variable X2 yielded a Cronbach's Alpha value of 0.944, confirming strong consistency within the research instrument. Variable M achieved a reliability value of 0.937, proving the instrument's robustness in producing consistent measurements. Overall Cronbach's Alpha values exceeding 0.9 for all variables indicate a very high level of reliability, well above the minimum standard of 0.7 required in research. The research instrument was proven to have excellent stability and consistency in measuring the constructs. This strong reliability provides high confidence in the quality of the data generated for further analysis. These findings confirm that the research instrument is suitable for use as a reliable data collection tool.

Table 4. R Square Test

Variables	R Square	R Square Adjusted
Y	0.519	0.512
M	0.446	0.442

Source : SmartPLS 3 Output (2024)

Based on the analysis results shown in Table 4, it can be concluded that this research model has quite substantial predictive ability. Variable Y shows an R Square value of 0.519 or 51.9%, which indicates that the independent variables in the model are able to explain 51.9% of the variation in the dependent variable Y, while the other 48.1% is influenced by factors outside the research model. The Adjusted R Square value for variable Y of 0.512 or 51.2%

indicates the level of accuracy of the model that has been adjusted for the number of predictor variables. Furthermore, for variable M, an R Square value of 0.446 or 44.6% is obtained, indicating that the independent variables can explain 44.6% of the variation in the mediating variable (M), with the remaining 55.4% explained by other variables not included in the model. The Adjusted R Square value for variable M of 0.442 or 44.2% reflects the predictive ability of the adjusted model. These results indicate that the research model has a fairly good level of explanatory ability in explaining the phenomena studied, although there is still room for developing a more comprehensive model in the future.

Table 5. Path Coefficients Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
DTS -> OS	0.418	0.417	0.067	6,265	0,000
DTS -> WA	0.279	0.280	0.050	5,600	0,000
LDI -> OS	0.428	0.427	0.071	6,068	0,000
LDI -> WA	0.286	0.287	0.053	5,391	0,000
OS -> WA	0.668	0.671	0.044	15,315	0,000

Source : SmartPLS 3 Output (2024)

path coefficient analysis that has been conducted, it was found that digital transformation strategy has a positive and significant influence on organizational support with a path coefficient of 0.418 (p-value <0.05), indicating that the implementation of digital transformation strategy contributes substantially to increasing organizational support . Furthermore, learning and development initiatives also show a significant positive influence on organizational support with a path coefficient of 0.428 (p-value <0.05), indicating that learning and development initiatives play an important role in strengthening organizational support . In the context of workforce agility , the results of the analysis revealed that both digital transformation strategy and learning and development initiatives have a significant positive influence with path coefficients of 0.279 and 0.286, respectively (p-value <0.05), emphasizing the contribution of both variables in increasing workforce agility . Organizational support shows the strongest influence on workforce agility with a path coefficient of 0.668 (p-value <0.05), underscoring the crucial role of organizational support as a catalyst in creating an agile workforce. These findings comprehensively illustrate the strong interconnection between digital transformation strategy , learning and development initiatives , organizational support , and workforce agility in the context of modern organizational dynamics. Overall, the results of this study provide strategic implications for management in optimizing digital transformation and human resource development to achieve higher levels of organizational agility through strengthening organizational support . These findings also enrich the strategic management literature by providing empirical evidence on the mediating role of organizational support in the relationship between digital transformation strategy and learning and development initiatives on workforce agility . The results of this study can serve as a foundation for organizations in designing and implementing more effective strategies to improve workforce agility in the digital era.

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Table 6. Specific Indirect Effects Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
DTS -> OS -> WA	0.279	0.280	0.050	5,600	0,000
LDI -> OS -> WA	0.286	0.287	0.053	5,391	0,000

Source : SmartPLS 3 Output (2024)

Based on the results of the specific indirect effects analysis , this study revealed significant findings regarding the mediating role of organizational support in the relationship between independent variables and workforce agility . Digital transformation strategy showed a positive and significant indirect effect on workforce agility through the mediation of organizational support , with a coefficient of 0.279 (p-value <0.05), indicating that digital transformation strategy can improve workforce agility more effectively when mediated by strong organizational support . In parallel, learning and development initiatives also showed a positive and significant indirect effect on workforce agility through organizational support with a coefficient of 0.286 (p-value <0.05), confirming the vital role of organizational support in learning and development initiatives to improve workforce agility . These findings strengthen the argument that the effectiveness of digital transformation strategy and learning and development initiatives in improving workforce agility is highly dependent on the existence of adequate organizational support . The results of this study provide crucial managerial implications, where organizations need to ensure the existence of strong organizational support as a prerequisite to optimize the impact of digital transformation strategy and learning and development initiatives on improving workforce agility . These findings also contribute to the development of strategic management theory by providing empirical evidence on mediating mechanisms that explain how digital transformation strategy and learning and development initiatives can improve workforce agility through organizational support . The results of this analysis can serve as guidelines for management practitioners in designing more effective organizational interventions to enhance workforce agility in the era of digital transformation.

Discussion

The Relationship between Digital Transformation Strategy and Workforce Agility

digital transformation strategy policy appears to have a significant impact on workforce agility . Digital transformation strategy in the manufacturing context requires a comprehensive approach to improving workforce agility, which significantly impacts company productivity and competitiveness. The implementation of advanced technologies such as artificial intelligence, the internet of things , and data analytics encourages workforce adaptability through continuous upskilling and reskilling . The development of digital platforms enables more flexible workflow integration, supporting real-time collaboration between production, engineering , and management teams . This transformation results in a work ecosystem that is responsive to market changes, enabling rapid adaptation to industry challenges and customer needs. Investments in digital infrastructure and continuous training

create a culture of innovation, enhancing employee adaptability through direct access to cutting-edge technology. Data-driven management systems enable more precise strategic decision-making, driving operational efficiency and developing human resource capabilities.

The impact of digital transformation strategy on workforce agility can be understood through the demographic characteristics of respondents spread across various industrial areas such as GIIC, MM2100, EJIP, and Jababeka, demonstrating consistent implementation of digital strategies across various operational areas. The predominance of young workers with the majority of respondents, combined with diverse educational backgrounds ranging from high school to postgraduate, creates a workforce that is more adaptable to digital change. The fairly balanced gender proportion between men and women indicates that workforce agility in adopting digital transformation strategy is not limited to a particular gender, creating an inclusive and adaptive work environment. The majority of respondents with 1-6 years of work experience demonstrate an ideal combination of understanding business processes and openness to digital innovation. The diverse distribution of departments with concentrations in production and human resources indicates that the digital transformation strategy has successfully increased workforce agility across various organizational functions. The educational background dominated by undergraduate graduates provides a strong knowledge base for understanding and implementing digital change, while relatively recent work experience brings a fresh perspective in the adoption of new technologies and processes.

The results of this study are consistent with a number of previous empirical studies that have demonstrated a positive relationship between digital transformation strategy and workforce agility . Research conducted by Larjovuori et al. (2018) revealed that digital transformation strategy drives increased workforce agility through technological adaptation and changes in work methods. This study highlights the importance of digital transformation strategy in creating significant changes in employee work patterns. Research conducted by Correani et al. (2020) added that an effective digital transformation strategy creates an environment that encourages the development of employee adaptability to increase workforce agility . This study emphasizes that developing employee adaptability is a critical factor in the successful implementation of a digital transformation strategy . The study conducted by Verhoef et al. (2021) also confirmed that digital transformation strategy has a significant impact on workforce agility by increasing the flexibility and adaptability of the workforce to adapt to the dynamics of a constantly changing work environment. This study underscores the strategic role of digital transformation strategy in helping organizations and employees remain relevant amidst rapid change. The consistency of this research finding further strengthens the evidence that digital transformation strategy is a crucial element in building a resilient and adaptive workforce agility .

This study presents important findings on the relationship between digital transformation strategy and workforce agility . Theoretically, the results of this study enrich the organizational change management literature by providing empirical evidence on the role of digital transformation strategy in improving workforce agility . These findings broaden the theoretical understanding of how digitalization can be a catalyst in creating a more adaptive and responsive workforce to change. The theoretical implications developed provide a foundation for understanding the mechanisms by which digital transformation drives increased employee adaptability to technological changes and market demands. From a

practical perspective, the results of this study provide concrete recommendations for organizations in developing digital transformation strategy programs oriented towards improving workforce agility . Organizations need to consider implementing technologies that support work flexibility, such as digital collaboration platforms, cloud- based project management systems , and automation tools that increase work efficiency. The development of ongoing digital skills training programs , the formation of agile cross-functional teams , and the creation of a work environment that encourages digital experimentation are also keys to success.

The Relationship of Learning & Development Initiatives to Workforce Agility

Research findings reveal that learning & development initiatives have a positive and significant impact on workforce agility . This makes learning & development initiatives play a crucial role in enhancing workforce agility through strategies that foster organizational adaptability . Multi-level competency development programs are designed to continuously enhance the workforce's technical and soft skills . Methods such as cross-training , job rotation, and micro-learning help employees master cross-functional skills and increase operational flexibility. Investments in upskilling and reskilling ensure the workforce is ready to face technological changes and industry dynamics. The use of digital learning platforms, interactive simulations, and mentorship programs create a learning environment that supports skills transformation. Competency needs analysis and career development mapping help align individual capabilities with the company's strategic objectives. The results are seen in increased productivity, innovation, and the manufacturing team's ability to face technological challenges and global market changes. An integrated learning & development approach not only improves skills but also shapes a dynamic, learning-focused, and sustainable organizational culture.

The influence of learning & development initiatives on workforce agility can be explained by the characteristics of respondents, who are predominantly young and educated workers. The majority of respondents are in the young, productive age range; this combination creates a workforce that is more responsive to learning and development programs and quicker to adopt change. The diverse distribution of departments, particularly in production and human resources, indicates that learning & development initiatives have successfully increased workforce agility across various organizational functions evenly. A good level of education, with many respondents holding at least a bachelor's degree, facilitates more effective absorption of new knowledge and skills. The even distribution of work locations across various industrial areas demonstrates consistency in developing workforce agility through learning programs. A balanced gender composition indicates that development programs have successfully increased workforce agility regardless of gender. Work experience, dominated by employees with one to six years of service, demonstrates an ideal combination of development needs and adaptability to change. The diversity of educational backgrounds, from high school to undergraduate levels, creates a rich learning dynamic, with each level contributing to improving overall organizational agility.

The findings of this study on the relationship between learning and development initiatives and workforce agility align with several previous empirical studies that have confirmed a positive relationship between the two variables. Research conducted by Muduli

(2017) shows that human resource development practices, including learning and development initiatives, have a significant positive impact on workforce agility , emphasizing the importance of training and development in increasing employee flexibility and adaptability. In line with this, research conducted by Nijssen & Paauwe (2012) revealed that continuous learning and development initiatives contribute significantly to the formation of organizational agility, including workforce agility . This highlights the important role of organizational learning in facing a dynamic business environment. Furthermore, research by De Meuse (2017) strengthens these findings by proving the significant impact of learning and development initiatives on increasing workforce agility , where learning agility is a major predictor of leadership success and organizational adaptability. The consistency of these findings with previous studies emphasizes the importance of learning and development initiatives that focus on developing the ability to learn from experience and adapt to new situations in improving employee adaptive capabilities.

This research makes a significant contribution to understanding the relationship between learning & development initiatives and workforce agility . The theoretical dimension of the research enriches the human resource management literature by presenting empirical evidence on the role of learning & development programs. initiatives to improve workforce agility . The developed theoretical system provides a foundation for understanding how investments in learning and development can improve the workforce's adaptability to changes in the business environment. These findings strengthen organizational learning theory by demonstrating that structured development programs contribute to the formation of a more flexible and responsive workforce. In a practical context, the research results provide concrete guidelines for organizations in designing learning and development initiatives that support increased workforce agility . Organizations need to develop adaptive learning curricula, including cross-functional skills training, agile leadership development programs , and innovation workshops . Practical implementation also includes the use of experiential learning methods and the implementation of learning evaluation systems oriented towards improving agility.

The Relationship between Organizational Support and Workforce Agility

The analysis results show that organizational support has a very strong positive and significant influence on workforce agility . Comprehensive organizational support includes the development of a flexible organizational structure, continuous investment in employee training and skills development, and creating a culture of innovation and continuous learning. Top management needs to implement supporting strategies such as providing work teams with autonomy in decision-making, encouraging cross-functional collaboration, and developing an adaptive performance management system. Providing access to cutting-edge technology, open communication platforms, and responsive feedback mechanisms will encourage employees to be more proactive, creative, and agile in facing the challenges of modern manufacturing. Investment in workforce agility has been proven to provide a competitive advantage through increased productivity, operational efficiency, and the ability to quickly adapt to technological changes and market demands.

The strong relationship between organizational support and workforce agility is supported by the respondent profile, which shows balance across various demographics. The

balanced gender composition between men and women indicates that organizational support is effective in enhancing workforce agility without gender bias, creating an inclusive and adaptive work environment. The predominance of young workers under thirty with one to six years of service demonstrates the ideal combination of energy, potential, and sufficient experience to leverage organizational support in enhancing workforce agility . The diverse distribution of departments with a concentration in production and human resources indicates that organizational support has been successful in effectively enhancing workforce agility across various business functions. The even distribution of work locations across various industrial areas such as GIIC, MM2100, EJIP, and Jababeka indicates the consistency of organizational support in building an agile workforce across all operational units. Varying educational levels, from high school to postgraduate, indicate that organizational support has successfully accommodated and developed workforce agility at all levels. The work experience dominated by employees with relatively new tenure demonstrates the effectiveness of organizational support in shaping and developing workforce agility from the early stages of employees' careers.

The results of research on the relationship between organizational support and workforce agility support previous findings that have demonstrated a significant relationship. Research conducted by Eisenberger & Stinglhamber (2011) revealed that strong organizational support increases employee adaptability and flexibility in dealing with change, leading to workforce agility . This study highlights the importance of organizational support in creating a work environment that enables the workforce to be more responsive to change. Research conducted by Harraf et al. (2015) revealed a strong positive correlation between organizational support and workforce agility , particularly in terms of employees' ability to innovate and respond quickly to market changes. This study emphasizes the crucial role of organizations in fostering innovation through the support provided to employees in facing change. Similar results were found in research by Nejatian & Zarei (2013) , who reinforced this finding by analyzing two forms of organizational support : reward systems and empowerment, both of which were shown to motivate employees to be more adaptive and collaborative. These consistent findings emphasize the importance of empowerment through delegation of authority, autonomy in decision-making, and easy access to information as key factors in increasing employee responsiveness and adaptability. These studies confirm that organizational support is a crucial element in building a resilient workforce .

This study makes a significant contribution to the relationship between organizational support and workforce agility . Theoretically, the results contribute substantially to the development of organizational behavior literature by demonstrating the strong influence of organizational support on improving workforce agility . The theoretical framework developed enriches the understanding of how an effective organizational support system can encourage the creation of a more adaptive and responsive workforce. These findings also strengthen social exchange theory in the context of organizational capability development, demonstrating that strong organizational support encourages employees to develop their adaptability. In a practical dimension, the results of the study provide concrete recommendations for organizations in developing effective organizational support to improve workforce agility . Organizations need to focus on establishing flexible organizational

structures, developing transparent communication systems, and implementing policies that support innovation and measured risk-taking.

The Relationship between Digital Transformation Strategy and Organizational Support

The analysis shows that digital transformation strategy has a positive and significant impact on organizational support . Developing digital capabilities through investment in human resources, technology, and organizational infrastructure is key to successful transformation. Top management needs to foster a culture of innovation, encourage employee adaptation to new technologies, and build comprehensive digital competencies. The digital transformation process is not simply the implementation of technology, but rather a comprehensive change in the way people think, work, and communicate across all levels of the organization. A commitment to integrating advanced technologies such as artificial intelligence, the internet of things , and data analytics will drive operational efficiency, increase productivity, and create sustainable added value. An organization's ability to transform business processes, develop employee digital skills, and create an innovation ecosystem will be a determining factor for the competitiveness of manufacturing companies in the digital era. Full organizational support from all levels of management, the development of technological infrastructure, and an adaptive approach to managing change will ensure the continued success of a digital transformation strategy and maximize its contribution to organizational performance.

The strong relationship between digital transformation strategy and organizational support can be explained by the demographic composition of respondents, who are dominated by young people in the productive age range of eighteen to twenty-five. This age group is generally more adaptable to digital change and new technologies. This characteristic is further strengthened by their relatively high level of education, with the majority of respondents having completed undergraduate degrees and some even pursuing master's degrees, providing a strong foundation of knowledge to understand and support digital transformation initiatives. The diverse distribution of departments, with a primary concentration in production and human resources, indicates that digital transformation has touched various aspects of the company's operations across the board. The majority of respondents have one to three years of work experience, indicating a fresh perspective that supports the adoption of new technologies and digital transformation. The diversity of educational backgrounds, from high school to postgraduate levels, also provides a broad spectrum of understanding of digital transformation, with each level bringing a unique perspective to support the implementation of digital strategy. This is further supported by the even distribution of work locations across various industrial areas, indicating that the digital transformation strategy has been implemented consistently across all company operational units, creating an ecosystem that supports comprehensive digital transformation.

Research on the relationship between digital transformation strategy and organizational support strengthens evidence from previous studies that indicate a positive relationship between the two variables. A study conducted by Vial (2019) revealed that the implementation of a structured digital transformation strategy creates fundamental changes in organizational culture and increases organizational support . This study shows that digital transformation involves not only technological changes but also influences organizational

culture and structure. In line with this, research conducted by Warner & Wäger (2019) identified that digital transformation strategy requires and simultaneously encourages the creation of strong organizational support to facilitate change. This study emphasizes the importance of organizational support in facilitating the digital transformation process. Research by Hanelt et al. (2021) also support these findings by demonstrating that an effective digital transformation strategy can increase organizational support by creating structures and processes that are more adaptive to digital change. These findings further strengthen the evidence that digital transformation strategy plays a crucial role in creating the organizational support necessary to support change. The alignment of these findings with previous research confirms the crucial role of digital transformation strategy in driving increased organizational support as a key factor in transformation success.

This research makes a significant contribution to the development of theoretical and practical understanding of the relationship between digital transformation strategy and organizational support . From a theoretical perspective, the research findings enrich the strategic management literature by revealing that digital transformation strategy has a positive influence on organizational support . This theoretical contribution also strengthens the argument that the success of digital transformation depends not only on technology, but also on the organization's ability to build a comprehensive support system. In a practical dimension, these findings provide concrete guidance for managers and organizational leaders in designing an effective digital transformation strategy . Organizations need to focus efforts on developing an integrated digital infrastructure, improving employee technological capabilities, and creating a work culture that supports digital innovation. Practical implementation can be done through the formation of a dedicated digital transformation team, developing a sustainable technology training program, and providing incentives for digital innovation initiatives. Priority should also be given to building an effective communication system to ensure that all members of the organization understand and support the digital transformation process.

The Relationship of Learning & Development Initiatives to Organizational Support

The results of the study indicate that learning & development initiatives have a positive and significant influence on organizational support . Learning & development initiatives contribute to improving organizational performance by providing significant support for employee competency development. Effective training programs not only improve technical skills but also build a culture of innovation and leadership across the company. Through skills development, manufacturing companies can improve operational efficiency, reduce production errors, and improve product quality. Furthermore, learning & development initiatives also directly contribute to employee retention, as employees who feel they have development opportunities tend to be more loyal and motivated. This has an impact on reducing turnover rates that can hinder smooth production. Learning & development initiatives that are aligned with organizational goals help create synergy between individuals and company goals, thereby increasing overall productivity. Ultimately, learning & development initiatives not only support the achievement of business targets but also strengthen an adaptive corporate culture focused on continuous improvement, which is crucial in the competitive manufacturing industry. These findings emphasize the importance

of learning & development initiatives in building a strong foundation of organizational support . When organizations invest resources in employee development through various training programs, workshops , and competency development initiatives, this will create a more supportive organizational climate, increase employee motivation, and strengthen the organization's commitment to human resource development.

The strong influence of learning & development initiatives on organizational support is reflected in the diverse departmental composition of respondents, with a significant contribution from the human resources department, which is generally responsible for employee development programs. The respondents' varied educational levels, ranging from high school graduates to master's degrees, demonstrate a high need for and appreciation for learning & development programs at all levels. The predominance of workers with one to three years of experience indicates a high need for development programs to enhance competency, while the diversity of work locations across various industrial areas demonstrates consistency in the implementation of learning programs. The age distribution, dominated by young groups, indicates a population hungry for learning and self-development, characteristics that strongly support the effectiveness of development programs. The gender balance in the respondent composition also indicates that learning & development initiatives are implemented evenly without gender bias. The majority of respondents working in the production and human resources departments demonstrates the organization's focus on developing competencies in critical areas of the company's operations. The even distribution of work locations across various industrial areas indicates consistency in the implementation of learning & development initiatives across all organizational units.

Research on the relationship between learning and development initiatives and organizational support reinforces previous findings showing a positive relationship between the two. Research conducted by Noe et al. (2014) revealed that effective learning & development initiatives can strengthen organizational support by increasing employee commitment and engagement. In line with the previous study, Garavan et al. (2021) found that structured learning and development initiatives for organizational support create a more supportive and collaborative organizational climate, which fosters better relationships between employees and the organization. Sung & Choi's (2018) study further confirms this finding by showing that investing in learning and development initiatives can improve employees' perceptions of the organizational support they receive. These findings are consistent with previous research, which confirms that learning and development initiatives contribute significantly to increased organizational support . A good learning program not only improves employees' skills and competencies but also strengthens their relationship with the organization, creating a higher sense of trust and engagement. The success of learning and development initiatives not only impacts individual performance but also strengthens support and relationships within the organization as a whole.

This study yields valuable insights into the relationship between learning and development initiatives and organizational support . The theoretical contribution of this study enriches the human resource development literature by revealing how learning and development initiatives can significantly increase levels of organizational support . The theoretical framework developed provides an in-depth understanding of the mechanisms by

which investments in learning and development create a more supportive organizational climate. The findings also strengthen social exchange theory in the context of employee development, demonstrating that organizational investments in employee learning foster positive reciprocal relationships. Practically, the research findings provide guidance for HR practitioners in designing effective learning and development programs. Organizations need to develop in-depth learning systems, including mentoring, coaching , job rotation, and competency-based training. Practical implementation also includes establishing an integrated learning management system , developing clear career paths, and creating a culture of continuous learning.

The Relationship between Digital Transformation Strategy and Workforce Agility as Mediated by Organizational Support

The analysis shows that digital transformation strategy has a significant positive influence on workforce agility through the mediation of organizational support . Digital transformation strategy enables the implementation of advanced technologies such as automation , the internet of things , and data analytics, which directly improve operational efficiency. Workforce agility is achieved when employees are able to adapt quickly to process changes, market demands, and technological innovations. Organizational support is a key factor in strengthening the effectiveness of this strategy. Continuous training programs, the provision of relevant digital work tools, and transparent communication create a conducive environment for employee development. As a result, employees are not only able to operate new technologies but also have an innovative mindset in solving operational challenges. The significance of this influence is seen in increased productivity, flexibility, and reduced production downtime. Organizations that support their employees with a targeted digital transformation strategy make a significant contribution to competitive sustainability. This initiative helps companies respond quickly to market changes without sacrificing quality or efficiency. The integration of technology with structured organizational support creates an adaptive manufacturing workforce ready to face future challenges. The impact is felt not only in operational efficiency but also in building a dynamic and innovative work culture.

The significant influence of digital transformation strategy on workforce agility through organizational support can be better understood by examining the characteristics of the study respondents. The majority of respondents were from the younger age group, classified as digital natives, with most being between the ages of eighteen and twenty-five, followed by those from the twenty-six to thirty age group. The dominance of respondents from this technology-savvy generation demonstrates their readiness to adopt digital transformation. This is reinforced by the educational background of the respondents, who were mostly high school/equivalent graduates and undergraduates, who generally had been exposed to various digital technologies during their education. Interestingly, the majority of respondents came from the production and human resources departments, with a dominant tenure of between one and three years, indicating that they are in the adaptive phase of organizational change. The distribution of respondents spread across various industrial areas such as MM2100, Jababeka, and EJIP, with a fairly balanced gender composition between men and women, provides a comprehensive picture of how digital transformation strategy can be effectively adopted across various work contexts and demographic characteristics.

Research on the relationship between digital transformation strategy and workforce agility mediated by organizational support supports previous findings regarding a positive relationship between the three variables. A study conducted by Li et al. (2018) revealed that a digital transformation strategy implemented with strong organizational support can improve workforce agility more effectively than organizations that lack adequate support. In line with these findings, research by Tekic & Koroteev (2019) revealed that the success of a digital transformation strategy in improving workforce agility is greatly influenced by the quality of organizational support . Strong support from the organization enables employees to adapt more quickly and effectively to changes. Furthermore, research conducted by Sebastian et al. (2020) reinforce these findings by emphasizing the crucial role of organizational support as a bridge between digital transformation strategy and increased workforce agility . This support helps create an environment that fosters innovation and flexibility in facing new challenges. The alignment of these findings with previous research confirms the importance of organizational support as a mediator in the relationship between digital transformation strategy and workforce agility.

This study provides an in-depth understanding of the mediating role of organizational support in the relationship between digital transformation strategy and workforce agility . The theoretical contribution enriches the strategic management literature by demonstrating how organizational support acts as a connecting mechanism that enables digital transformation strategy to enhance workforce agility . The developed theoretical framework provides a foundation for understanding the complexities of the indirect relationship between digital transformation strategy implementation and workforce agility enhancement through strengthening organizational support . In a practical context, these findings provide guidance for organizations in integrating digital transformation strategy with organizational support systems to achieve workforce agility enhancement . Organizations need to build a digital infrastructure that supports collaboration, develop comprehensive training programs, and create an organizational culture that supports adaptability.

The Relationship between Learning & Development Initiatives and Workforce Agility Mediated by Organizational Support

The analysis shows that learning & development initiatives significantly influence workforce agility through the mediation of organizational support . Learning & development initiatives significantly contribute to improving workforce agility by providing significant organizational support for employee competency development. Relevant training programs and continuous skills development enable employees to adapt quickly to technological changes and dynamic market needs. Learning & development initiatives help create a more flexible workforce, ready to face challenges and change. Organizational support, in the form of a culture that supports learning and access to adequate resources, plays a key role in strengthening the impact of these learning & development initiatives . When organizations provide sufficient support, both in terms of resources and facilities, employees feel more motivated and secure in participating in self-development programs. As a result, workforce agility increases significantly, which in turn contributes to improved company performance. Research shows a significant positive relationship between learning & development initiatives and workforce flexibility, mediated by organizational support. In a learning-

supportive environment, manufacturing companies can create more adaptive teams, ready to face increasingly fierce market competition and rapid industrial development. The positive impact of this strategy not only increases individual effectiveness but also strengthens the company's long-term competitiveness.

The significance of the influence of learning & development initiatives on workforce agility through organizational support is strongly relevant to the demographic composition of respondents. The dominance of a young workforce with a majority of work experience between one and six years indicates a high need and enthusiasm for competency development programs. This is reflected in the large proportion of respondents from the production and human resources departments, which generally require continuous skills and knowledge updates. The diverse educational backgrounds of respondents, ranging from high school/equivalent to undergraduate and postgraduate levels, indicate a variety of learning needs that need to be accommodated in development programs. The even distribution of respondents across various industrial areas such as MM2100, EJIP, Jababeka, and GIIC reflects the consistent implementation of learning & development initiatives across various work locations. The gender balance in the composition of respondents also indicates that learning & development initiatives have been accessed equally by both male and female workers. The age characteristics of respondents, who are predominantly young, indicate high potential for absorption of learning & development programs, considering that this age group generally has a high motivation for self-development and career.

The results of research on the relationship between learning & development initiatives and workforce agility mediated by organizational support further strengthen previous research evidence showing a significant and positive relationship between the three variables. Research conducted by Qin & Nembhard (2015) revealed that learning & development initiatives have a significant impact on workforce agility , where organizational support acts as a partial mediator with an indirect effect. In line with this, research conducted by Muduli & Pandya (2018) found that learning & development initiatives contribute to increased workforce agility when fully supported by the organization. Furthermore, research by Sherehiy & Karwowski (2014) strengthens these findings by concluding that learning and development initiatives have a significant impact on workforce agility when the organization provides comprehensive support. The consistency of these findings with previous studies emphasizes the importance of organizational support as a mediator in the relationship between learning & development initiatives and workforce agility.

This research provides an important contribution to understanding the mediating role of organizational support in the relationship between learning & development initiatives and workforce agility . Theoretically, it enriches the human resource development literature by demonstrating how organizational support links learning programs to increased workforce agility . The developed theoretical framework provides a comprehensive understanding of the mechanisms by which learning initiatives can enhance employee agility through strengthening organizational support systems. In practical terms, these findings provide guidelines for organizations in integrating learning & development initiatives with organizational support systems to enhance workforce agility . Practical implementation includes developing integrated learning programs, establishing effective mentoring systems, and creating a work environment that supports continuous experimentation and innovation.

Conclusion

The conclusion of this study is that digital transformation strategy and learning & development initiatives have a significant influence on workforce agility in manufacturing companies. The novelty of this research confirms that workforce agility increases when digital strategies and learning initiatives are simultaneously linked through organizational support . The results show that organizational support mediates the relationship between these two factors and workforce agility , where effective digital transformation and learning require organizational commitment, flexible work structures, and a culture of innovation. Thus, the mediating mechanism of organizational support is a causal bridge that converts digital investment and learning into agile work behavior, while enriching the literature with evidence in the Indonesian manufacturing context.

Organizations are advised to focus not only on technology implementation but also on strengthening ongoing training programs, creating a work environment that supports innovation, and conducting regular evaluations of the effectiveness of digital strategies and employee development to continuously improve organizational competitiveness. Further research is expected to explore the role of other external factors, such as market changes or government policies, that also influence workforce agility. In addition, future studies should consider addressing the specific limitations of the present research, such as the reliance on cross-sectional data that restricts causal inference, potential measurement boundaries arising from the use of standardized Likert scales, and contextual constraints due to the study being conducted exclusively in the Cikarang industrial area. Incorporating longitudinal designs, multi-industry comparisons, or mixed-method approaches would allow researchers to validate the robustness of the mediating role of organizational support under different organizational, technological, and cultural conditions. Future studies are also suggested to test boundary conditions such as intensity of technology adoption, digital maturity, and differentiation of production strategies to validate the generalizability of the novel findings regarding the mediating role of organizational support.

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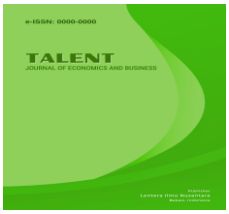

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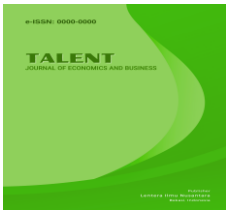

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