



How to cite this article:

Wang, G., Mansor, Z. & Yee, C. L. (2024). Decoding employee digital performance: An in-depth literature analysis. *Global Business Management Review*, 16(1), 55-82. <https://doi.org/10.32890/gbmr.2023.16.1.4>

DECODING EMPLOYEE DIGITAL PERFORMANCE: AN IN-DEPTH LITERATURE ANALYSIS

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Received: 02/01/2024

Revised: 01/02/2024

Accepted: 08/06/2024

Published: 30/06/2024

ABSTRACT

Digitalization has permeated into personal life and organizational operations, capturing significant interest from various organizations. They are uncertain about how to measure the impact of factors and metrics in the digital transformation process on Employee Digital Performance (EDP). This uncertainty poses challenges for decision-makers in assessing the feasibility of digitization and predicting employee performance outcomes. This study, employing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), conducted a comprehensive evaluation of 32 articles, providing influencing factors, performance indicators, metrics, and scales to fill this crucial research gap. The paper reviews the results based on the theoretical vantage points of the Results and Determinants (RD) and "Adaptive Enterprise Architecture" frameworks (EA). The research results indicate that, firstly, in terms of factors influencing employee performance, leadership types, HRM, and digital technology as independent variables significantly impact employee performance, with numerous studies highlighting the crucial role of digital technology. Furthermore, employee attitude and behavior variables, as important mediating variables, exist between organizational support factors and employee performance. Secondly, in the PI style assessment domain, the evaluation of Employee Performance emphasizes flexibility, job quality, and innovation capabilities, particularly highlighting the utilization of resources (i.e., improving job performance with digital resources). However, there is a research gap in the study of competitiveness and finance. Additionally, this study compares the differences in measurement between organizational digital performance and EDP. The research findings lay a solid foundation for further exploration of "digital design" and performance outcomes and provide direction for future studies.

Keywords: Digital transformation (DT); Digitalization; Employee digital performance; Adaptive enterprise architecture (EA).

1.0 INTRODUCTION

Digital technology has swept the business world over the past decade, transforming organizational administration and creativity (Benitez et al., 2022). Digital transformation (DT) changes organizational strategy, business processes, knowledge, and socio-technical structure (Park & Saraf, 2020). A common misconception is that digital transformation occurs only when businesses upgrade and adapt to new technologies. In reality, DT is not solely about software or technology; it is intricately linked to an organization's adaptability and responsiveness to the digital environment and change (Verhoef et al., 2021). Considering the transformations in organizational dynamics and external environments induced by digital technology, it is critical to comprehend the elements that support or impede digital strategic initiatives (Hanelt et al., 2021). Furthermore, the outcome of digitization is frequently dependent on the abilities, expertise, and attitude of the workforce (Engelsberger et al., 2023). Employee performance has consistently been the focal point of discussions regarding the impact of digital solutions on the transformative journey toward sustainable business development (Turyadi et al., 2023). Various researchers offer distinct definitions for employee performance, categorizing it into innovative and routine performance. Innovative performance means employees come up with new solutions to challenges. Routine performance involves completing tasks and executing fundamental responsibilities on schedule (Ali-Hassan et al., 2015). Another group of scholars defines employee performance as the quality and quantity with which employees achieve goals and objectives, along with the responsibilities they undertake (Campbell et al., 2020). Furthermore, Ren and Sun, among others, have defined in-role job performance, as reflecting tasks within an individual's scope of responsibilities (Ren & Sun, 2023), as well as diverse definitions such as individual learning performance (Arashpour et al., 2023).

Nevertheless, in the digital age, regardless of being digital natives or immigrants, employees must possess digital fluency in the workplace—enabling them to adeptly employ technology for data manipulation, creative information representation, problem-solving, and innovating new products and work methodologies (Shajek & Hartmann, 2023). Digital technology has become a basic part of job performance for the digital workforce, transforming job performance into employee digital performance (EDP) (Ali-Hassan et al., 2015). Researchers share a consistent definition in their studies (Shao et al., 2022; Zhang et al., 2022). In 2022, Shao and colleagues introduced the concept of EDP, categorizing it into two interrelated dimensions: digital task and innovation performance. Digital task performance entails efficiently completing routine and repetitive tasks using digital technology, while digital innovation performance involves using digital tools to stimulate innovation and achieve novel results (Shao et al., 2022). While their classification of EDP into task and innovation dimensions has advanced our understanding of digital performance, there is a deficiency in providing a comprehensive and systematic perspective on digital performance by applying appropriate theoretical frameworks. Therefore, this shifts our attention to the subsequent crucial research inquiries: RQ1: What factors influence employee performance during digitization/DT? RQ2: What are the criteria, scales, and indicators used to measure the results of employee performance during the process of DT? RQ3: How is the outcome of employee performance in digitization/DT measured?

A comprehensive literature review (Prisma) identified digital performance indicators (PI) and employee performance elements to answer the research questions. This study used the Adaptive EA and RD Framework to develop its findings (Alsufyani & Gill, 2022). This study provides a more thorough EA design approach to help scholars and practitioners identify critical variables affecting EDP while planning and implementing digital projects, which helps decision-makers grasp PI kinds and indicators to make informed judgments (Verhoef et al., 2021). Therefore, the objectives of this research are as follows:

- 1) Identify and analyze the key factors influencing employee performance in the context of digitization/DT.
- 2) Examine and catalog the criteria, scales, and indicators employed to measure the outcomes of employee performance during the process of DT.
- 3) Investigate and assess the methodologies and metrics used to gauge the results of employee performance in the context of digitization/DT.

Furthermore, it underscores potential gaps in future research in this crucial and timely field. This paper's structure is as follows. The research backdrop is explained first. The second section describes the research methodology for systematic literature reviews. Thirdly, the findings of the study are reported. The study's limitations and findings are presented in the end.

2.0 BACKGROUND AND RELATED RESEARCH

Digitalization is commonly used interchangeably with digitization and DT, which represent different perspectives. Digitization converts analog data to digital, represented by binary code—zeros and ones—facilitating the storage, processing, and communication of data by computers (Sandberg et al., 2023). Digitalization encompasses not only the technical dimension but also integrates the social facets, embodying a comprehensive approach that addresses both technological and societal elements (Carayannis, 2022). In addition, DT transcends a broader spectrum, extending beyond both social and technical dimensions. It encompasses the swift assimilation of cutting-edge digital technologies, reflecting a comprehensive metamorphosis (Shostak, 2023). Moreover, DT permeates the entire organization, reshaping its operational paradigms and transcending the mere digitalization of rudimentary organizational processes and tasks. It changes procedures and the firm's business logic (Heubeck, 2023) or its value generation process (Ghosh et al., 2023). DT requires decision-makers to create a digital vision with goals, tactics, and expected results (Heubeck, 2023). Digital technology may provide a company with a competitive edge by allowing it to harness core capabilities or develop new ones (Guzmán-Ortiz et al., 2020). In conclusion, DT is a company-wide phenomenon that changes the firm's underlying business model by integrating digital technologies (Heubeck, 2023).

Finally, we cover digitization, digitalization, and digital transformation. This study examines digital transformation—the use of current technology in individual, corporate, and societal situations (Hanelt et al., 2021). Adaptive EA has been demonstrated in the literature as a useful tool for enhancing performance metrics (Alsufyani & Gill, 2022; Brignall & Ballantine, 1996; Franco-Santos et al., 2007). There are several frameworks for corporate architecture, such as The Open Group Architecture Framework (Josey, n.d.) and Zachman Framework (Zachman, 1999). These frameworks were developed using classic architecture methodologies and ontologies. The modern Adaptive EA framework was chosen since it comes from digitalization and digital ecosystems, which fits this study. It presents a complete digital enterprise hierarchy. The Adaptive EA has six architectural layers: Interaction, Human, Technology, Environment, Infrastructure, and Security (Alsufyani & Gill, 2022). Although it mentions performance elements, it does not specify performance indicators or criteria. The RD Framework supplements the Adaptive EA. Competitiveness, Financials, Service Quality, Flexibility, Resource Utilization, and Innovation are the RD Framework performance assessment elements (Alsufyani & Gill, 2022). This study uses two relevant frameworks: adaptive EA and the RD framework for synthesizing and explaining data and insights. Future research may examine related theories, frameworks, and perspectives.

3.0 RESEARCH METHOD

PRISMA was used to scan, select, and summarize enterprise design literature on digitalization's impact on EDP. These systematic literature review (SLR) methods were scrutinized and employed as

guidelines to avoid any potential oversights. For instance, drawing inspiration from SLR strategies to synthesize extracted data involved using two different frameworks for mapping and analyzing the extracted data (Rowe, 2018). This review used reference quality assessment methods to assure the quality of the selected research. (Dybå & Dingsøyr, 2008).

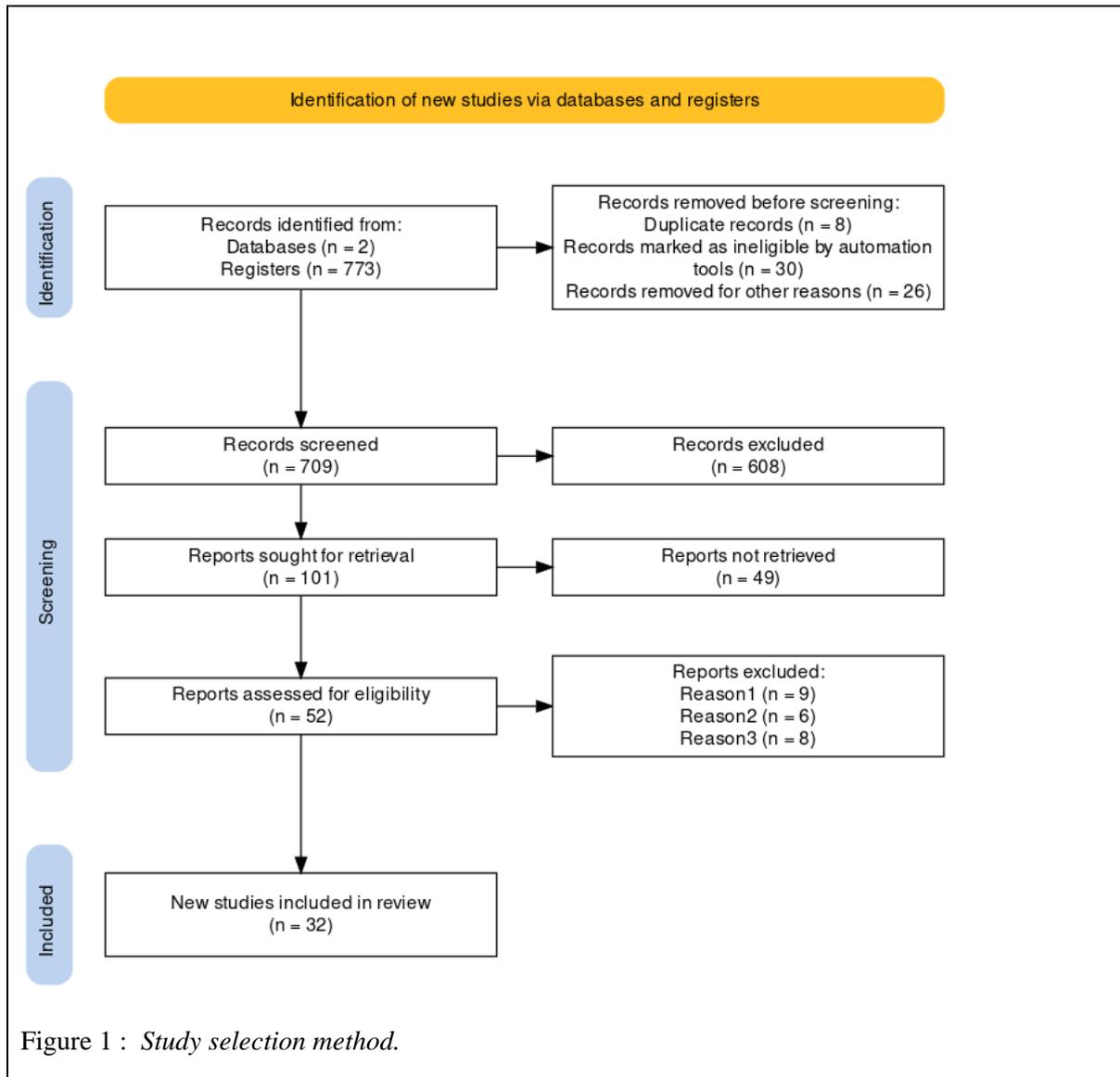
4.0 IDENTIFICATION CRITERIA FOR RESEARCH

Our investigation was driven by research questions. The eight-year review includes English-only papers from 2015 to 2023. The current literature is fully included. This review rejected articles that did not answer the research questions.

4.1. Strategy for Research Selection

Comprehensive research databases are essential. This study used Scopus and The Web of Science. This decision was guided by their regular updates and extensive coverage across a wide range of scientific subjects, as outlined in the Review Protocol (Appendix) (Chadegani et al., 2013; Costa Melo et al., 2023). Additional quality thresholds were set using these databases. Falagas and other scholars examined PubMed, Scopus, Web of Science, and Google Scholar's pros and cons (Falagas et al., 2008). PubMed was specifically excluded from this investigation due to its predominant emphasis on the fields of medicine and life sciences (Falagas et al., 2008). Cross-disciplinary research using Scopus, Web of Science, and Google Scholar was examined by (Harzing & Alakangas, 2016). Quarterly publication and citation increase was consistent across all three databases. This suggests that Scopus, Web of Science, and Google Scholar provide reliable cross-disciplinary comparison coverage (Harzing & Alakangas, 2016). Nevertheless, it's worth noting that Falagas and other scholars have expressed concerns about the use of Google Scholar in certain fields due to potential inadequacies and issues with quality (Falagas et al., 2008). To ensure reliability, we opted to concentrate on the two databases that are widely considered reliable without controversy. Therefore, we employed these two databases for our search string, with Google Scholar serving as a supplementary search database in our study (Harzing & Alakangas, 2016). The following keywords were employed for filter titles, keywords, and abstracts of publications spanning from 2015 to 2023. This endeavor aimed to delineate the trajectory of research based on the latest literature. The envisaged eight-year study duration is anticipated to furnish an adequately broad scope. The Scopus preliminary scrutiny used the search keywords "(digital? ation" OR "digi*") and "employee performance" and "impact" OR "effect" to diagnose.

These keywords searched titles, keywords, and abstracts from 2015 to 2024 to establish research orientation based on recent publications. The eight-year study should cover plenty. A search string test was used to find relevant research. To avoid restricted queries automatically excluding or overlooking vital studies, all papers with the specified keywords were retrieved (click) and then excluded based on titles, abstracts, and full-text reading. Specific screening methodologies are detailed in Figure 1.



4.2. Quality assessment

The PRISMA flowchart for this study is depicted in the figure below, elucidating the process of selecting and critically analyzing the chosen research (Ramezani et al., 2022). The PRISMA statement aims to help authors deliver systematic reviews better. Once eligible articles are identified, a checklist comprising nine questions must be employed as inclusion and exclusion criteria to assess their quality (Clearly articulated research aims; Research design goals; Well-defined variables; Study context clearly defined; Data collecting methods discussed enough; Discussion of measure reliability and validity; Statistical methods defined sufficiently). The included studies adhere to the following criteria: (1) Empirical surveys, excluding technical studies; (2) Case studies; (3) English language; (4) In peer-reviewed scientific journals. The following criteria exclude studies: (1) non-peer-reviewed articles; (2) Newspaper articles; and (3) Books.

Table 1:*Quality Assessment Checklist*

N	Questions
1	Well-defined research goals.
2	objectives met by the study plan.
3	variables that are explained clearly.
4	The study's context is presented clearly.
5	Discussion of data collection was sufficient.
6	Clear discussion of measure reliability and validity.
7	Effectively specified statistical methods.
8	Results add to literature.
9	Study improves knowledge.

4.3. Theoretical lens

The study uses two main ideas to analyze review findings. The Adaptive EA guides through six architectural layers and underpins specific elements (Figure 2): Human, Environment, Facility, Security layers, Technology, and Interaction (Anwar & Gill, 2019). Each layer is organized based on its foundational elements. Layers are first sorted by their basic components. The Interaction layer connects individuals through digital channels, touchpoints, and journeys. Second, the Human layer includes business, information, social, and professional architecture. Third, technology encompasses applications, data, infrastructure, and platform architecture. Each Adaptive EA layer is addressed by the security layer. Fifthly, strategic macro-environmental analysis in the environmental layer considers political, economic, social, technological, environmental, and legal factors. Finally, the Facility layer covers HVAC, space, energy, and ancillary factors. Performance factors are not specified in adaptive EA. To supplement Adaptive EA, RD Framework was employed (Brignall & Ballantine, 1996). This performance measurement framework is common. This framework has RD. Financial and competitive performance indicators show the organization's ultimate aims (lagging considerations). However, determinants include resource utilization, innovation, adaptability, and quality performance (leading factors) (Figure 2) (Anwar & Gill, 2019).

5.0 RESULTS

This research selects 32 relevant papers using a Systematic Literature Review (SLR) (Appendix A). They were meticulously chosen and reviewed using keyword search methods across three databases and a 4-stage search process. Adaptive EA and RD Framework (Figure 2) are used to analyze existing literature to answer research questions during data extraction and analysis. The retrieved digital performance indicators (PIs) are thoroughly analyzed utilizing the Adaptive EA and RD framework (Appendices B, C, D) to determine literature support for evaluating architecture layers and their representative elements in enterprise design.

RQ1: What factors influence employee performance during digitization/DT?

As mentioned in the background section, the research on digitalization and employee performance outcomes is fragmented, as shown by references such as (Ali-Hassan et al., 2015; Shao et al., 2022; Zhang et al., 2022). Currently, the effective synthesis of literature remains unclear. The study utilized the hierarchical and elemental aspects of the Adaptive EA framework layers and elements to organize

and summarize the literature on the factors influencing employee performance in the context of DT, summarizing each dimension of the scales developed for employee performance. These factors are then synthesized into the relevant layers in the EA as Performance Indicators (PI). We also use the RD Framework's six broad performance factors to classify each PI type. (Anwar & Gill, 2019).

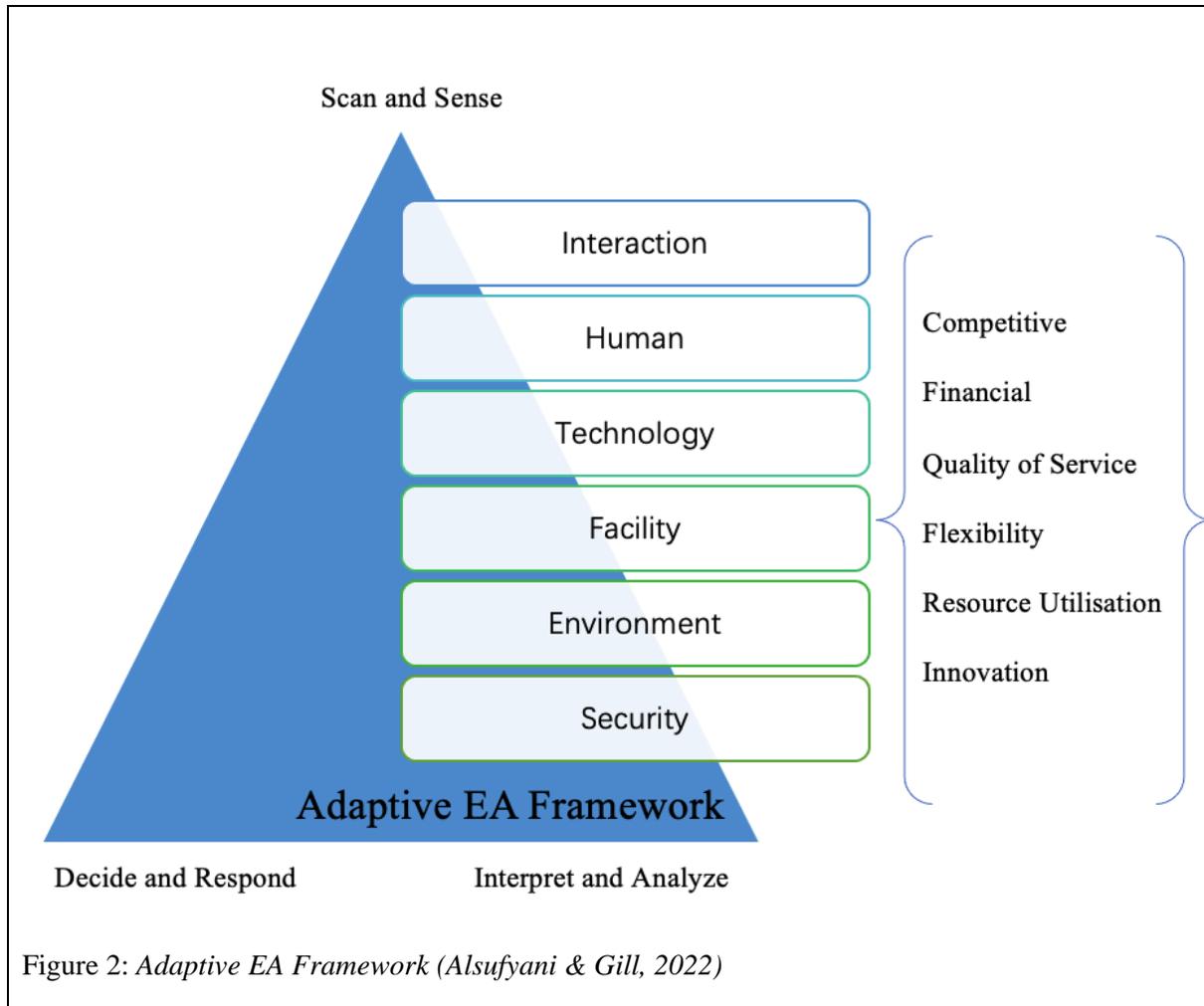


Figure 2: Adaptive EA Framework (Alsufyani & Gill, 2022)

5.1 Interaction layer

Within the Interaction Layer, nine Performance Indicators (PI) pertinent to digitalization have been discerned. As delineated in Appendix B, there are nine items in the PI type that measure employee performance; five of them are related to resource utilization, three to flexibility, and one to competitiveness. Therefore, the interaction layer lacks financial, service quality, and innovation measuring metrics. Regarding the influencing factors, most of these indicators predominantly pertain to participant interactions, wherein independent variables exert influence on employee performance.

These variables encompass corporate internal communication, leadership styles, technological shifts, aesthetic considerations, goal orientation, customer service experience, collaborator capability, procedural intricacies, and the structural framework of the business model.

Empirical studies, as detailed in three indicators, delve into the impact of digital technology variables (Corporate internal communication, Technological shifts, and Aesthetics) on employee performance. Factors gauging employee performance span job planning, work initiative, job efficiency, leader

support, job stress, employee competition, and market share. The assessment of employee performance predominantly centers around two key facets: job efficiency and work initiative. Themes related to competition, resource utilization, and adaptability are prevalent, with only five papers (16%) acknowledging this layer, underscoring a discernible gap in the existing body of research. Finally, a total of 5 papers are featured in the interactive layer, comprising three case studies and two quantitative analyses.

5.2. Human layer

DT affected employee performance in 40% of the literature (13 articles), which mapped to RD identifying 52 Performance Indicators (PIs), as shown in Appendix C. From the extracted data, 52 PIs related to the human layer were recognized, comprising 2 financial, 33 resource utilization, 0 competitiveness, 8 innovation, and 1 flexibility PI. These indicators predominantly focus on job efficiency (26.9%), approximately 10% on job quality, work motivation, work responsibility, and job satisfaction, and 6% on job skills, serving as determining factors. Empirical research variables comprise the individual-level entrepreneurial orientation of employees, their wealth of customer service experience, collaborative proficiency, intricacies of organizational processes, and the architecture of the business model. Furthermore, influential elements include top-tier management endorsement, transformative supervisory leadership, personal dexterity, and subjective evaluations of the utility and ease of use of mobile technologies.

In addition to technological variables, operational parameters, quality management standards, and strategic solutions, the investigation extends to encompass security considerations, leadership styles, high-involvement Human Resource Management Practices (HI-HRMP), phenomena such as social loafing, work-life balance, End-User Computing Satisfaction (EUCS), virtual connectedness, technology-based knowledge sharing, and digital competencies. Moreover, pivotal to these empirical studies are mediation variables, such as psychological empowerment, and moderating variables, including leadership styles, training initiatives, transformative leadership approaches, organizational resource allocations, Industry 4.0 technology adoption, knowledge risks associated with technology, and incentivized gamification strategies. Finally, in the human layer, there are a total of 13 references, including two mixed-methods studies and 11 quantitative research papers.

5.3. Technology layer

In this layer, 43.8% of 14 research accept the technological perspective's impact on employee performance (Appendix D). Identified from the extracted data are 55 Performance Indicators (PI) related to the technological layer, including 2 financial, 33 resource utilization, 0 competitiveness, 8 innovation, and 1 flexibility PI. There are a total of 55 items measuring employee performance (PI), with around 7% involving job responsibility, and job quality, 11% incorporating job efficiency, and 10% focusing on job innovation. Empirical research variables influencing employee performance encompass data analytics, HRMP, social media use, information technology use, digital feedback, digital work, digital transformation, digital technology, electronic monitoring, digital assistance systems, teleworking, operational variables, strategic solutions, security, user adaptation of technology, post-adoption enterprise social media use, individual entrepreneurial orientation, social, hedonic, and cognitive social media use. Moreover, mediation variables include social capital, knowledge sharing, technostress, social media context awareness, and job crafting. In the technology layer, there are a total of 14 references, with only one being a case analysis, and the remaining 13 are quantitative analyses.

5.4. Security, environment, and facility layers

Interestingly, only Paper (A8) examines how social media anxiety and the epidemic affect employee performance at the security layer. It summarizes four PI indicators based on the items measuring

employee performance (work intensity, sales volume, knowledge, and administrative performance). In the facilities layer, only two papers emphasize the impression of digital infrastructure and enterprise social software platforms on employee performance. These are mapped to employee performance from the perspectives of quality, innovation, and resource utilization. Unfortunately, to date, there is no literature focusing on the impact of environmental performance, which has a significant gap that future research needs to consider. In this section, all three papers are quantitative research studies.

RQ2. What is digitalization/DT performance measures, scales, and metrics?

The study retrieved measurements, scales, and indicators for 120 elements usually linked with PI types from the reviews of the selected 32 papers to reinforce the research conclusions. The study mapped the extracted PIs to six main dimensions for the navigation of performance indicators using the RD Framework. Based on the analysis of 143 items from 32 reviewed studies according to PI style, it is evident that resource utilization accounts for 59 items (41.3%), flexibility for 32 items (22.4%), work quality for 24 items (16.8%), innovation for 16 items (11.2%), and competitiveness and financial aspects are relatively fewer, with 7 and 5 items, respectively. From the analysis of the PI style, the measurement of employee performance predominantly reflects the utilization of resources. Digital technology adoption by firms has a substantial impact on employee performance, demonstrating the importance of employees using digital technology to improve their digital performance in the digital age (Keller et al., 2022; Ritala et al., 2021; Zhang et al., 2022). Furthermore, the assessment of EDP emphasizes the flexibility of employee work, the quality of work, and innovation capabilities. However, there is insufficient measurement of internal and external competitiveness and financial aspects, highlighting areas that require attention in future research.

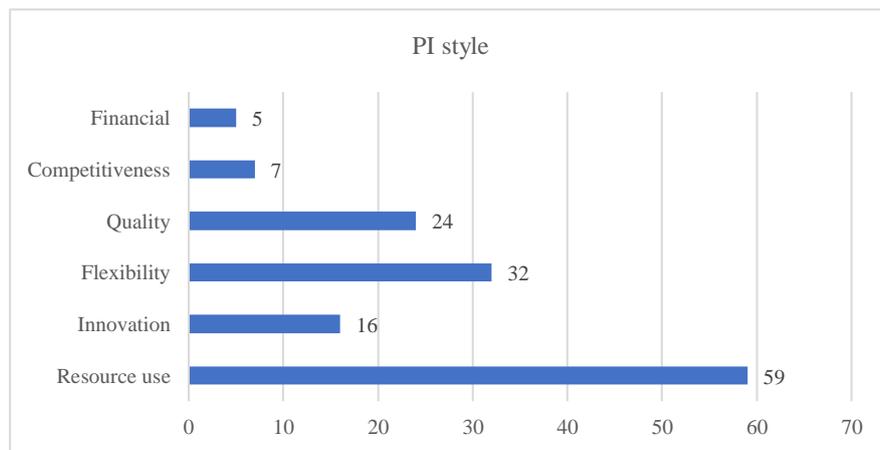


Figure 3: Number of studies discussing each PI style

Thirdly, concerning the measurement of PIs, organizations primarily focus on assessing the efficiency of employee work, with a predominant emphasis on innovation efficiency (52%). Additionally, organizations place notable importance on measuring employee job satisfaction (25%) and work flexibility (10%). There is, however, a research gap in studying stability at work, productivity, job autonomy, as well as profitability, and sales growth. Compared to the research of Alsufyani and Gill regarding the measurement of organizational performance (Alsufyani & Gill, 2022), their research analysis reveals three gradients in assessing organizational performance. The first gradient primarily

focuses on Profit, Market share, return on assets, Revenue, sales growth, and innovative effectiveness (Alsufyani & Gill, 2022). The second gradient emphasizes enterprise efficiency ratio, ratio, enterprise market measures, operational performance, return on investment, and turnover (Alsufyani & Gill, 2022). The third gradient is specifically centered around employee performance. From this, it can be inferred that there is significant differentiation in measuring organizational performance and employee performance in the digital era. This further underscores the substantial distinction between organizational digital performance and EDP (Alsufyani & Gill, 2022; Shao et al., 2022; Zhang et al., 2022).

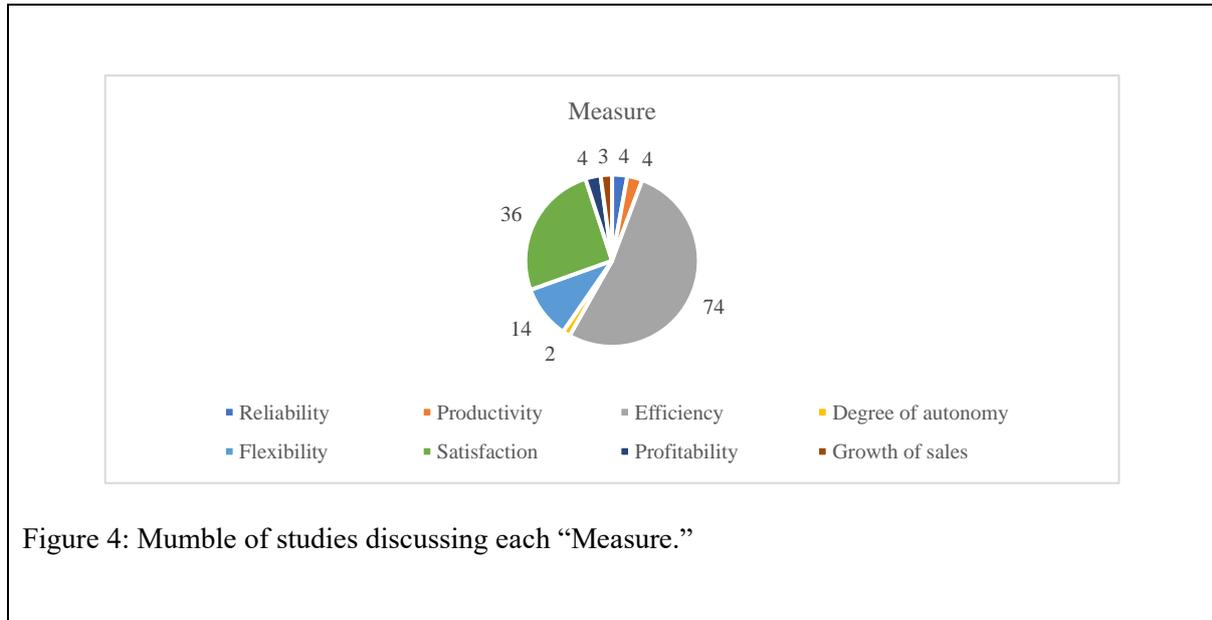


Figure 4: Mumble of studies discussing each "Measure."

RQ3. What methods can be used to assess the performance results of digitalization or digital transformation?

RQ2 determines measurements, while RQ3 measures "how" to measure them. Thus, RQ3 discusses measurement methods (e.g., surveys and interviews). In other words, research question 2 mainly explores which indicators from empirical studies in the literature influence employee performance, while research question 3 pertains to the specific measurement methods extracted from these performance indicators. Hence, RQ3 refers to the concrete measurement processes. Through this review, we observed that current literature appears to employ questionnaire-based methods, analyze resource utilization, and measure non-financial aspects or qualitative interviews to assess digital performance indicators. Surprisingly, approximately 90% of the studies use survey methods to measure performance indicators, while 10% of the research extracts indicators influencing employee performance through case studies.

6.0 DISCUSSION

For research question one, through the analysis and summary of each layer, the primary independent variables influencing employee performance are HRM, digital capabilities, and digital technology variables. The mediating variables mainly consist of employee attitude and behavioral variables (such as knowledge sharing, technostress, social media context awareness, job crafting, psychological empowerment, etc.). There is limited literature in this study mentioning moderating variables affecting employee performance. Only three papers discuss leadership styles, training initiatives, transformative

leadership approaches, organizational resource allocations, Industry 4.0 technology adoption, knowledge risks associated with technology, and incentivized gamification strategies as moderating factors.

For research question two, the study identified Performance Indicators (PIs) and linked them to key Adaptive EA layers and their components by examining these articles. We also identified each PI's type in the six performance dimensions using the RD framework. We found feasible measurement criteria, indicators, and scales for each PI. We gained useful insights by using the Adaptive EA and RD frameworks to synthesize the retrieved data (Appendices B, C, D) to navigate the PIs: Firstly, a comprehensive synthesis and analysis of the 143 items extracted from the 32 papers revealed that most indicators are concentrated in resource utilization, constituting 41.3% of the entire performance measurement (extracted from the studies), while work flexibility accounts for 22.4%. However, competitiveness and financial aspects have relatively lower proportions (Figures 3 and 4). Adaptive EA emphasizes work flexibility, quality, and resource utilization when monitoring and planning digital performance results. Second, only 5 papers with 9 PIs are about digital channels and touchpoints in the interaction layer. This underscores that the Interaction Layer, particularly touchpoints, channels, and experiences, has not been exhaustively investigated as a potential factor influencing performance. This underscores the imperative for additional research to delineate the digitalization of interaction Performance Indicators (PIs) and their consequential impact on outcomes. Moreover, a noteworthy observation is that 40%, or 52 items of PIs, are situated within the human layer of Adaptive Enterprise Architecture (EA), contributing to the enhancement of job efficiency (26.9%) and quality (10%) through the integration of digital technology. This study indicated that most human layer indicators, particularly information digitalization, were under-supported. The selected papers evaluated emphasize different things. For instance, it is surprising that there is relatively less measurement related to competitiveness and finance. Lastly, this study is mostly concentrated on the technology layer, with relatively low research on the security layer (only one paper involved), the environment layer (none), and the facility layer (two papers involved). Among these, 43.8% of the selected studies (14 papers) emphasize the impact of the utilization of digital technology and work innovation and flexibility on EDP.

For research question three, out of a total of 32 papers, 27 have been demonstrated using quantitative (survey) methods. Hence, literature employing quantitative approaches to study employee performance appears to be relatively prevalent.

7.0 Conclusion and limitation

First, this paper delves into the impactful and timely topic of the influence of digitization on employee performance outcomes. Utilizing the Adaptive EA assessment and RD framework as theoretical perspectives, this review scrutinizes 32 carefully chosen studies. Five dimensions of Adaptive EA design are examined, emphasizing the need to evaluate digitization (Digital EA) across the layers of Interaction, Human, Technology, Facility, Environment, and Security, along with their supporting elements.

Second, the review analysis indicates, firstly, concerning factors influencing employee performance, leadership type, HRM, and digital technology significantly impact employee performance as independent variables, emphasizing the critical role of digital technology. Additionally, employee attitude and behavioral variables serve as crucial mediating factors existing between organizational support factors and employee performance. However, the measurement of employee performance rarely incorporates moderating variables, with only two papers discussing the moderating effects of leadership and resource allocation. Secondly, in the PI (Performance Improvement) style assessment, employee performance assessment emphasizes flexibility, work quality, and innovation capability, particularly

highlighting resource utilization (i.e., leveraging digital resources to enhance job performance). However, research in the domains of competitiveness and finance remains limited. Furthermore, this study also compares organizational digital performance with EDP (Employee Development Plan) in terms of measurement differences. This analysis shows research gaps and the need to build and test a universal, adaptive digital performance ontology using scientific methods.

Finally, a universal ontology can help build an EA-driven digital performance evaluation and improvement model that is consistent and flexible. This study uses the Adaptive EA and RD frameworks to provide new findings. Like other studies, this one has limitations. It is critical to emphasize that the study only uses publicly available material in the specified databases. Digitization-performance studies may be excluded. This research is based on two databases (Scopus and Web of Science), hence further validation is needed to ensure literature search coverage. Wider database searches could improve conclusions in future studies. This paper's selected studies were assessed using quality evaluation standards that explicitly defined acceptable quality. This research was discussed and confirmed by the research team several times, reducing human errors and biases. Therefore, we are confident in this study's findings, which seem to open many options for further research into "digital design" and performance outcomes.

DECLARATION OF INTEREST'S STATEMENT

The authors declare that they have no conflicts of interest regarding this research. No financial or non-financial interests have influenced the design, conduct, or reporting of this study.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my supervisor, Prof. Zuraina Dato Mansor, for her guidance, expertise, and unwavering support, which played a crucial role in this research. I also extend my appreciation to Prof. Yee Choy Leong, whose valuable insights and perspectives greatly enriched the project. His expertise significantly contributed to the research process and outcomes. I am sincerely thankful for their contributions.

Appendix A. Literature search results

ID	Literature Paper
A1	Keller, T., Bayer, C., Bausch, P., & Metternich, J. (2019). Benefit evaluation of digital assistance systems for assembly workstations. <i>Procedia CIRP</i> , 81, 441-446.
A2	Listyorini, M. D., & Susanty, A. I. (2019, May). Corporate Internal Communication using WhatsApp Messaging Application and the Employee Performance of an IT Company in Indonesia. In <i>1st International Conference on Economics, Business, Entrepreneurship, and Finance (ICEBEF 2018)</i> (pp. 815-819). Atlantis Press.
A3	Çini, M. A. (2023), Erdirençelebi, M., & Akman, A. Z. The effect of organization employee's perspective on digital transformation on their technostress levels and performance: the public institution's example.
A4	Muthuswamy, V. V., & Varshika, G. (2023). Employees Performance in Digital Environment: Role of Cyber-loafing, electronic monitoring, social media context awareness and job crafting. <i>International Journal of Cyber Criminology</i> , 17(1), 128-145.
A5	Nguyen, M., Rundle-Thiele, S., Malik, A., & Budhwar, P. (2023). Impact of technology-based knowledge sharing on employee outcomes: moderation effects of training, support, and leadership. <i>Journal of Knowledge Management</i> .
A6	Ravi, H. (2021). Innovation in banking: fusion of artificial intelligence and blockchain. <i>Asia Pacific Journal of Innovation and Entrepreneurship</i> , 15(1), 51-61.
A7	Cahyadi, A., Marwa, T., Hågen, I., Siraj, M. N., Santati, P., Poór, J., & Szabó, K. (2022). Leadership styles, high-involvement human resource management practices, and individual employee performance in small and medium enterprises in the digital era. <i>Economies</i> , 10(7), 162.
A8	Wang, K., Lin, K., Yang, S., & Na, S. G. (2021). The relationship between social media digitalization and coronavirus disease 2019 Fear among service sector employees. <i>Frontiers in Psychology</i> , 12, 702423.
A9	Erro-Garcés, A., & Aramendia-Muneta, M. E. (2023). The role of human resource management practices on the results of digitalisation. From Industry 4.0 to Industry 5.0. <i>Journal of Organizational Change Management</i> .
A10	Adhiatma, A., Sari, R. D., & Fachrunnisa, O. (2022). The role of personal dexterity and incentive gamification to enhance employee learning experience and performance. <i>Cognition, Technology & Work</i> , 1-13.
A11	Manley, A., & Williams, S. (2022). 'We're not run on Numbers, We're People, We're Emotional People': Exploring the experiences and lived consequences of emerging technologies, organizational surveillance, and control among elite professionals. <i>Organization</i> , 29(4), 692-713.
A12	Hoffmann, C., & Thommes, K. (2020). Can digital feedback increase employee performance and energy efficiency in firms? Evidence from a field experiment. <i>Journal of Economic Behavior & Organization</i> , 180, 49-65.
A13	Narayanamurthy, G., & Tortorella, G. (2021). Impact of COVID-19 outbreak on employee performance—moderating role of industry 4.0 base technologies. <i>International Journal of Production Economics</i> , 234, 108075.
A14	Guzmán-Ortiz, C., Navarro-Acosta, N., Florez-Garcia, W., & Vicente-Ramos, W. (2020). Impact of digital transformation on the individual job performance of insurance companies in Peru. <i>International Journal of Data and Network Science</i> , 4(4), 337-346.
A15	Louati, H., & Hadoussa, S. (2021). Study of Social media impacts on social capital and employee performance—evidence from Tunisia Telecom. <i>Journal of Decision Systems</i> , 30(2-3), 118-149.
A16	Ritala, P., Baiyere, A., Hughes, M., & Kraus, S. (2021). Digital strategy implementation: The role of individual entrepreneurial orientation and relational capital. <i>Technological Forecasting and Social Change</i> , 171, 120961.
A17	Carreri, A., Gosetti, G., & Masiero, N. (2023). Digitalization of relational space in the service triangle: The case study of retail banking. <i>Frontiers in Sociology</i> , 8, 53.
A18	Thielsch, M. T., Haines, R., & Flacke, L. (2019). Experimental investigation on the effects of website aesthetics on user performance in different virtual tasks. <i>PeerJ</i> , 7, e6516.

-
- A19 Kamdjoug, J. R. K., Tchana, P. B. T., Wamba, S. F., & Teutio, A. O. N. (2023). Task-Technology Fit and ICT Use in Remote Work Practice During the COVID-19 Pandemic. *Journal of Global Information Management (JGIM)*, 31(1), 1-24.
- A20 Deng, J., Liu, J., Yang, T., & Duan, C. (2022). Behavioral and economic impacts of end-user computing satisfaction: Innovative work behaviour and job performance of employees. *Computers in Human Behavior*, 136, 107367.
- A21 Uzkurt, C., Ekmekcioglu, E. B., Ceyhan, S., & Hatiboglu, M. B. (2023). Digital technology use of SMEs during the COVID-19 pandemic in Turkey: mobile applications' role on motivation and job performance. *Kybernetes*.
- A22 Pacheco, P. O., & Coello-Montecel, D. (2023). Does psychological empowerment mediate the relationship between digital competencies and job performance? *Computers in Human Behavior*, 140, 107575.
- A23 Duan, S. X., Deng, H., & Wibowo, S. (2023). Exploring the impact of digital work on work-life balance and job performance: a technology affordance perspective. *Information Technology & People*.
- A24 Topcuoglu, E., Kobanoglu, M. S., Kaygin, E., Karafakıoglu, E., Erdogan, S. U., Torun, B. T., & Oktaysoy, O. (2023). The Improving Role of Digital Leadership in the Impact of Social Loafing on Job Performance. *International Journal of Organizational Leadership*, 12(1), 22-40.
- A25 LI, X., LIU, P., LI, A., WANG, X., & ZHANG, J. (2022). A multipath model of leader after-hours electronic communication expectations and employee job performance. *Acta Psychologica Sinica*, 54(8), 964.
- A26 Borgia, M. S., Di Virgilio, F., La Torre, M., & Khan, M. A. (2022). Relationship between Work-Life Balance and Job Performance Moderated by Knowledge Risks: Are Bank Employees Ready? *Sustainability*, 14(9), 5416.
- A27 Shao, Z., Li, X., Luo, Y., & Benitez, J. (2022). The differential impacts of top management support and transformational supervisory leadership on employees' digital performance. *European Journal of Information Systems*, 1-27.
- A28 Kuegler, M., Smolnik, S., & Kane, G. (2016). What's in IT for employees? Understanding the relationship between use and performance in enterprise social software. *The Journal of Strategic Information Systems*, 24(2), 90-112.
- A29 Ali-Hassan, H., Nevo, D., & Wade, M. (2015). Linking dimensions of social media use to job performance: The role of social capital. *The Journal of Strategic Information Systems*, 24(2), 65-89.
- A30 Christ-Brendemühl, S. (2022). Bridging the gap: An interview study on frontline employee responses to restaurant technology. *International Journal of Hospitality Management*, 102, 103183.
- A31 Raišienė, A. G., Rapuano, V., Raisys, S. J., & Lučinskaite-Sadovskiene, R. (2022). Teleworking experience of education professionals vs. management staff: challenges following job innovation. *Marketing i menedžment inovacij*, (2), 171-183.
- A32 Zhang, X., Xu, Y., & Ma, L. (2022). Understanding the relationship between enterprise social media user adaptation, post-adoption uses and employee performance. *Behavior & Information Technology*, 1-19.
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Appendix B. Perspectives on PI interaction layer and aspects

1. PI: Summary of each item on the Employee Performance Scale
2. Description: Description of variables affecting employee performance (independent, mediating, and moderating variables)
3. 3. PI Type: This category includes qualities such as competitiveness, financial stability, service quality, flexibility, resource use, and innovation.
4. Data/facts about PIs are referred to as measures.
5. The metrics relate to the statistical analysis of PI measures (facts) on a scale or unit.
6. Scale/unit: A PI measure's scale or unit, for example, 5 stands for a 5-point Likert scale.
7. Source: This refers to a specific PI's literature source (A1-A32 in Appendix A).
8. Scale Description: it refers to Question items included in each scale.

PIs	Description	PI Type	Measure	Scale/ Unit	Source	Description
Internal communication	Corporate internal communication using WhatsApp vertically, horizontally, or diagonally affects employee effectiveness.	Resource utilization	Productivity	5	A2	Mean of internal communication
Leader support	Leaders can influence job performance by influencing self-esteem, stress perception, and reputation management.	Resource utilization	Efficiency		A25	Case study
Job stress	Technological changes alter	Resource utilization	Efficiency		A17	Case study
Employee competition	employee-supervisor and	Resource utilization	Degree of autonomy		A17	Case study
Market share	employee-customer relationships.	Competitiveness	Growth of sales		A17 ,	Case study
Interface aesthetics	aesthetics and goal orientation on accuracy and response times in all three tasks, nor significant interactions.	Resource utilization	Productivity	5	A18	Case study
Job plan	Customer service, collaborator	Flexibility	Degree of flexibility	5	A14	I arrange my work to meet company goals.
Work Initiative	capacity, processes, and company model affect employee task performance.	Flexibility	Degree of flexibility	5	A14	I set the priority for the tasks that need to be completed.

Job efficiency		Flexibility	Degree of flexibility	5-	A14	I complete my task within the allotted time.
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Appendix C: Examination of PI: Human Layer and Elements Viewpoints

PI	Description	PI Type	Measure	Scale/Unit	Source	Description
Job efficiency	Digital competencies and job performance were influenced by psychological empowerment.	Resource utilization	Degree of Efficiency	10	A22	Do you prioritize resource conservation in your work?
Job tasks		Flexibility	Degree of flexibility	10-	A22	How often are you given confident tasks?
Job motivation		Flexibility	Degree of flexibility	10	A22	How frequently do you solve difficulties the chief didn't define or foresee?
Job motivation		Flexibility	Degree of flexibility	10	A22	How often do you complete things within what was set?
Leader support		Flexibility	Degree of flexibility	10	A22	Which grade would your boss offer you for your work results from 1 to 10?
job responsibilities	Training, transformative leadership, and organizational resources moderate technology-based knowledge sharing.	Resource utilization	efficiency	5	A5	carrying out particular job duties
performance standards and expectations		Financial	Profitability	5	A5	fulfilling expectations and performance criteria
Job satisfaction		Quality	Responsiveness	5	A5	This employee is performing at a satisfactory level
Job efficiency		Resource utilization	Efficiency	5	A5	This worker performs their job well.
Employee competitiveness		quality	Satisfaction	5	A5	This worker outperforms many others in the same position.
Job quality		quality	Satisfaction	5	A5	Employee produces high-quality work.
Output quality	Adoption of I4.0 base	quality	Satisfaction	6	A13	Output quality

Output delivery	technologies positively moderates virtual connectedness and output quality.	quality	Satisfaction	6	A13	Output delivery
Job quality	EUCS boosts pleasant emotions and innovation in workers, enhancing job performance.	quality	Reliability	5	A20	Quality of job performance
Job productivity		Resource utilization	Productivity	5	A20	Job productivity
Job evaluation		Competitiveness	Growth of sales	5	A20	Compare your peers' employment performance to yours in the same field.
Job evaluation		Competitiveness	Growth of sales	5	A20	How do you compare your job success to colleagues in similar fields?
Employee competitiveness	Technological knowledge threatens moderate work-life balance-job performance relationships.	Competitiveness	Satisfaction	5	A26	My job quality and quantity are good compared to others.
Job efficiency		Competitiveness	Efficiency	5	A26	How productive are you compared to similar workers?
Work expectations		Competitiveness	Satisfaction	5	A26	How well do you anticipate and mitigate problems compared to other workers?
Team-level proactivity	Leadership moderates' social loafing's effect on job performance.	Resource utilization	Satisfaction	7	A24	Responders agreed or disagreed that their team could solve problems and continually sought better ones.
Team-level customer service		Resource utilization	Satisfaction	7	A24	whether respondents thought their team made good products and services and provided good customer service.
Job satisfaction		Resource utilization	Satisfaction	7	A24	Team members' satisfaction with wages, advancement prospects, team relationships with

						other departments, and job assignments varied.
Organizational commitment		Resource utilization	Efficiency	7	A24	Team members trusted management, were loyal to the company, and anticipated to stay.
Team commitment.		Resource utilization	Efficiency	7	A24	the amount to which team members agreed or disagreed that they were loyal, trusted, and anticipated to work together for a long time.
Job motivation	Leadership, high-involvement	Innovation	Degree of encouragement	5	A7	I have High motivation at work
Job productivity	HRM, and employee performance in the digital age	Innovation	Degree of encouragement	5	A7	I have High productivity at work
Job performance		Resource utilization	Degree of automatic	5	A7	I have high performance in completing tasks of work
Operating cost	tech, operations, quality, strategy, and security in employee performance forecasts.	Financial	Profitability	5	A6	Operating cost
Client reporting		Financial	Profitability	5	A6	Client reporting
Self-evaluation	Job motivation channels mobile app perceived usefulness (PU) and ease of use (PEOU) benefits to employee job performance	Resource utilization	Satisfaction	5	A21	Individual employee performance: how would you rank it?
Supervisor-evaluation		Resource utilization	Satisfaction	5	A21	Your supervisor's opinion on your performance?
Team-evaluation		Resource utilization	Satisfaction	5	A21	Where do you stand as a team player?
Work quality	Incentive gamification moderates	Quality	Satisfaction	5	A10	meeting work quality requirements

Job efficiency	the relationship between learning dexterity and performance	Quality	Satisfaction	5	A10	attainment of required work quantity
Timeliness		Quality	Satisfaction	5	A10	Timeliness emphasizes doing things at the proper moment for best results.
Cohesiveness		Innovation	Degree of innovation efficiency	5	A10	ability to cooperate with co-workers.
Work solutions	TOP management support and revolutionary supervisory leadership on digital-enabled task performance	Flexibility	Degree of flexibility	5	A27	After analyzing smart/digital technology huge data, I solve work challenges.
Job efficiency		Flexibility	Degree of flexibility	5	A27	I finish work faster by evaluating massive data.
Job quality		Quality	Satisfaction	5	A27	Big data analytics boosted my work.
Job innovation		Innovation	efficiency	5	A27	I experiment with digital technologies to boost business performance or product/service quality.
Creative solutions		Innovation	efficiency	5	A27	I solve task difficulties creatively using data analytics.
Innovative idea		Innovation	efficiency	5	A27	I experiment with new big data analytics ideas at work.
Job challenging	Employee performance is affected by customer service, collaborator capacity, processes, and business model.	Flexibility	Degree of flexibility	5	A14	After doing my prior chores, I tackle harder ones.
Knowledge update		Flexibility	Degree of flexibility	5	A14	Update my work-related knowledge
Job skill		Flexibility	Degree of flexibility	5	A14	regularly improve my work skills
Job innovation		Flexibility	Degree of flexibility	5	A14	constantly solve new issues creatively
Work Initiative		Flexibility	Degree of flexibility	5	A14	actively attend meetings/consultations
Digital management	Digital strategy success	Resource utilization	Efficiency	7	A16	Implement a profitable digital business

Digital management	depends on employees' proactiveness,	Resource utilization	Efficiency	7	A16	Quick, consistent, and clear digital business choices
Digital development	risk-taking, innovation,	Resource utilization	Efficiency	7	A16	Customer co-creation to solve key problems
Digital development	and firm-wide relational capital.	Resource utilization	Efficiency	7	A16	Flexibility and efficiency in development projects

Appendix D : Perspectives on PI technology layer and aspects

PI	Description	PI Type	Measure	Scale/ Unit	Source	Items Description
Profit	data analytics or HRMP achieve profitability	Financial	Profitability	binary variable	A9	Profit or not
Job quality	Social media use affects	Quality	Reliability	5	A15	The mean of Job quality
Job satisfaction	employee performance	Quality	Reliability	5	A15	The mean of Job satisfaction
Efficacy of work	through knowledge exchange and social capital.	Degree of autonomy	Reliability	5	A15	The mean of Job efficacy
Job innovation	technology acceptance model greatly explains task-technology fit. ICT improves individual and organizational performance.	Resource utilizations	Degree of innovation efficiency	7	A19	The company's IT infrastructure during COVID-19 boosts my productivity and efficiency.
Job efficiency		Resource utilizations	Degree of efficiency	7	A19	I benefit from the company's IT and services during COVID-19.
Job productivity		Resource utilizations	Degree of efficiency	7	A19	I use ICT to generate new work ideas amid the COVID-19 pandemic.
Knowledge acquirement		Resource utilizations	Degree of efficiency	7	A19	During COVID-19, ICT gives new knowledge.
Job capabilities		Resource utilization	Efficiency	7	A19	ICT helps me learn about my COVID-19 role.
Internal competition	Digital feedback improves employee performance by promoting energy-efficient driving.	Competitiveness	Efficiency	Case study	A12	internal competition
Internal competition	By digital feedback increasing employee performance	Resource utilization	Efficiency of resource using	Case study	A12	internal competition
Fulfilling Duties	the impact of digital work on job performance	Resource utilization	Efficiency	5	A23	JP1 completes tasks
Compliance task	from a digital technology	Resource utilization	Efficiency	5	A23	JP2 meets established performance standards

Responsibility Fulfillment	affordance standpoint.	Resource utilization	Efficiency	5	A23	JP3 fulfills all obligations
Obligation Adherence		Resource utilization	Efficiency	5	A23	JP4 never ignores employment duties.
Task target		Resource utilization	Efficiency	5	A23	JP5 performs critical tasks always.
Senior management attitude		Resource utilization	Efficiency	5	A3	speed
Job satisfaction	Digital transformation effect on employee performance via Technostress	Resource utilization	Efficiency	5	A3	satisfaction
Job motivation		Resource utilization	Efficiency	5	A3	motivation
Continuity		Resource utilization	Efficiency	5	A3	continuity
Job quality		Resource utilization	Efficiency	5	A3	quality
Work-life imbalance		Resource utilization	Efficiency	5	A3	work-life imbalance
Job Efficiency		Resource utilization	Efficiency	5	A3	Job efficiency
Job efficiency.	Via using digital technology enhance employee performance	Resource utilization	Efficiency	Interview	A30	Job Efficiency
Employees. retention		Resource utilization	Efficiency	interview	A30	Employee retention
Job quality	Employee performance is affected by electronic monitoring.	Resource utilization	Efficiency	5	A4	I perform my duties well.
Job standard		Resource utilization	Efficiency	5	A4	I perform my main jobs well utilizing established methods.
Job quality	Job making and social media context awareness moderate cyber-loafing and performance.	Quality	Satisfaction	5	A4	I accomplish my tasks properly.
Profit	the effect of digital assistance systems on employee performance.	Financial	Profitability	5	A1	Profit
Emotional state		Quality	satisfaction	5	A31	I feel emotionally exhausted while working.
Management and cooperation	Teleworking effect employee performance	Quality	satisfaction	5	A31	Seeing all goals and duties in work organization
Communication awareness		Quality	satisfaction	5	A31	I communicated with managers/employees.
Working capacity.		Quality	satisfaction	5	A31	Teleworking hurts my mental health.

IT application		Quality	satisfaction	5	A31	My workplace's data digitalization has changed drastically.
Storage network,	technological, operational, quality management, strategic solutions, and security aspects in employee performance forecasting.	Resource utilization	Efficiency	5	A6	storage networks
Cloud system		Resource utilization	Efficiency	5	A6	smart contracts
Money laundering		Resource utilization	Efficiency	5	A6	Integration
Job duty		Resource utilization	Efficiency	7	A32	I always perform my job tasks.
Job performance	varied user adaptations and post-adoption company social media use and employee performance	Resource utilization	Efficiency	7	A32	I always meet my job's official performance requirements.
Job responsibility		Resource utilization	Efficiency	7	A32	I always do job duties.
Job innovation motivation		Innovation	Degree of innovation efficiency	7	A32	I often think about ways to improve.
Work Initiative		Innovation	Degree of innovation efficiency	7	A32	I regularly rally support for new ideas.
Work Initiative		Innovation	Degree of innovation efficiency	7	A32	I constantly seek new work strategies.
Work practice		Innovation	Degree of innovation efficiency	7-	A32	My original ideas typically become valuable implementations.
Digital networking		Digital strategy success depends on employees' proactiveness, risk-taking, innovation, and firm-wide relational capital.	Resource utilization	Efficiency	7	A16
Digital networking		Resource utilization	Efficiency	7	A16	Actively monitoring trends and opportunities
Job innovation	Innovative job performance: How social, hedonic, and cognitive social media use improves job performance through three social capital	Innovation	Degree of innovation efficiency	7	A29	Generate improvement ideas
Organization support		Innovation	Degree of innovation efficiency	7	A29	Gain support for unique ideas
Job motivation		Innovation	Degree of innovation efficiency	7	A29	Find new ways to work
Work realization		Innovation	Degree of innovation efficiency	7	A29	Make unique ideas useful.

	elements and technology use.					
Job efficiency	Technology usage perspective to explore how social, hedonic, and cognitive social media use affects routine job performance through three social capital aspects.	Resource utilization	Efficiency	7	A29	I always perform my job tasks.
Job requirements		Resource utilization	Efficiency	7	A29	I always meet my job's official performance requirements.
Job responsibility		Resource utilization	Efficiency	7	A29	I always do my work duties.
Job duty		Resource utilization	Efficiency	7	A29	I often do essential work.

Appendix E: PI security layer and element analysis

PI	Description	PI Type	Measure	Scale/ Unit	Source	Description
Work intensity	Social media fear affects employee performance, but the vaccination moderates it.	Flexibility	Degree of flexibility	7	A8	work intensity
Sales Volume		Quality	Satisfaction	7	A8	Sales Volume
Knowledge.		Quality	Satisfaction	7-	A8	Knowledge.
Administrative Performance		Quality	Satisfaction	7	A8	Administrative Performance

Appendix F: PI facility layer and element analysis

PI	Description	PI Type	Measure	Scale/ Unit	Source	Metric Description
Digital infrastructure	Digital strategy success depends on employees' proactiveness, risk-taking, innovation, and firm-wide relational capital.	Quality	satisfaction	7	A16	Using data to produce consumer and business value
Digital infrastructure		Quality	satisfaction	7	A16	A secure and reliable data infrastructure
Job innovation	Innovative performance: task equivocality moderates' enterprise social software platform utilization and employee performance.	Innovation	Degree of innovation efficiency	7	A28	I generate additional improvement suggestions utilizing the system.
Job ability		Innovation	Degree of innovation efficiency	7	A28	Using the system helps me solve difficulties creatively.
Job motivation		Innovation	Degree of innovation efficiency	7	A28	I have more innovative work improvement

						ideas when using the system.
Job Efficiency		Resource utilization	Efficiency	7	A28	I can finish jobs faster with the system.
Job quality		Resource utilization	Efficiency	7	A28	Using the system improves my work.
productivity		Resource utilization	Efficiency	7	A28	The system boosts my output.
Job Efficiency		Resource utilization	Efficiency	7	A28	System utilization improves my work.

8. REFERENCES

- Ali-Hassan, H., Nevo, D., & Wade, M. (2015). Linking dimensions of social media use to job performance: The role of social capital. *The Journal of Strategic Information Systems*, 24(2), 65–89. <https://doi.org/10.1016/j.jsis.2015.03.001>
- Alsufyani, N., & Gill, A. Q. (2022). Digitalisation performance assessment: A systematic review. *Technology in Society*, 68, 101894. <https://doi.org/10.1016/j.techsoc.2022.101894>
- Anwar, M. J., & Gill, A. Q. (2019). A Review of the Seven Modelling Approaches for Digital Ecosystem Architecture. *2019 IEEE 21st Conference on Business Informatics (CBI)*, 94–103. <https://doi.org/10.1109/CBI.2019.00018>
- Arashpour, M., Golafshani, E. M., Parthiban, R., Lamborn, J., Kashani, A., Li, H., & Farzanehfar, P. (2023). Predicting individual learning performance using machine-learning hybridized with the teaching-learning-based optimization. *Computer Applications in Engineering Education*, 31(1), 83–99. <https://doi.org/10.1002/cae.22572>
- Benitez, J., Arenas, A., Castillo, A., & Esteves, J. (2022). Impact of digital leadership capability on innovation performance: The role of platform digitization capability. *Information & Management*, 59(2), 103590. <https://doi.org/10.1016/j.im.2022.103590>
- Brignall, S., & Ballantine, J. (1996). Performance measurement in service businesses revisited. *International Journal of Service Industry Management*, 7(1), 6–31. <https://doi.org/10.1108/09564239610109393>
- Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., Bywaters, D., & Walker, K. (2020). Purposive sampling: Complex or simple? Research case examples. *Journal of Research in Nursing*, 25(8), 652–661. <https://doi.org/10.1177/1744987120927206>
- Carayannis, E. G. (2022). The Futures of Europe: Society 5.0 and Industry 5.0 as Driving Forces of Future Universities. *Journal of the Knowledge Economy*.
- Chadegani, A. A., Salehi, H., Yunus, M. M., Farhadi, H., Fooladi, M., Farhadi, M., & Ebrahim, N. A. (2013). A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases. *Asian Social Science*, 9(5), p18. <https://doi.org/10.5539/ass.v9n5p18>
- Costa Melo, Dr. I., Queiroz, G. A., Alves Junior, P. N., Sousa, T. B. D., Yushimito, W. F., & Pereira, J. (2023). Sustainable digital transformation in small and medium enterprises (SMEs): A review on performance. *Heliyon*, 9(3), e13908. <https://doi.org/10.1016/j.heliyon.2023.e13908>

- Dybå, T., & Dingsøy, T. (2008). Empirical studies of agile software development: A systematic review. *Information and Software Technology*, 50(9–10), 833–859. <https://doi.org/10.1016/j.infsof.2008.01.006>
- Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: Strengths and weaknesses. *The FASEB Journal*, 22(2), 338–342. <https://doi.org/10.1096/fj.07-9492LSF>
- Franco-Santos, M., Kennerley, M., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D., & Neely, A. (2007). Towards a definition of a business performance measurement system. *International Journal of Operations & Production Management*, 27(8), 784–801. <https://doi.org/10.1108/01443570710763778>
- Ghosh, K., Dohan, M. S., Veldandi, H., & Garfield, M. (2023). Digital Transformation in Healthcare: Insights on Value Creation. *Journal of Computer Information Systems*, 63(2), 449–459. <https://doi.org/10.1080/08874417.2022.2070798>
- Gusenbauer, M., & Haddaway, N. R. (2020). Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. *Research Synthesis Methods*, 11(2), 181–217. <https://doi.org/10.1002/jrsm.1378>
- Guzmán-Ortiz, C. V., Navarro-Acosta, N. G., Florez-Garcia, W., & Vicente-Ramos, W. (2020). Impact of digital transformation on the individual job performance of insurance companies in Peru. *International Journal of Data and Network Science*, 337–346. <https://doi.org/10.5267/j.ijdns.2020.9.005>
- Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies*, 58(5), 1159–1197. <https://doi.org/10.1111/joms.12639>
- Harzing, A.-W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: A longitudinal and cross-disciplinary comparison. *Scientometrics*, 106(2), 787–804. <https://doi.org/10.1007/s11192-015-1798-9>
- Heubeck, T. (2023). Managerial capabilities as facilitators of digital transformation? Dynamic managerial capabilities as antecedents to digital business model transformation and firm performance. *Digital Business*, 3(1), 100053. <https://doi.org/10.1016/j.digbus.2023.100053>
- Josey, A. (n.d.). *TOGAF® Version 9.1 – A Pocket Guide*.
- Keller, A., Konlechner, S., Güttel, W. H., & Reischauer, G. (2022). Overcoming path-dependent dynamic capabilities. *Strategic Organization*, 14761270221125807. <https://doi.org/10.1177/14761270221125807>
- Kuegler, M., Smolnik, S., & Kane, G. (2015). What's in IT for employees? Understanding the relationship between use and performance in enterprise social software. *The Journal of Strategic Information Systems*, 24(2), 90–112. <https://doi.org/10.1016/j.jsis.2015.04.001>
- Park, Y., & Saraf, N. (n.d.). *Investigating the Complexity of Organizational Digitization and Firm Performance: A Set-Theoretic Configurational Approach*.
- Philipp, M. (n.d.). *DIGITAL WORKPLACE TRANSFORMATION: THE IMPORTANCE OF DEINSTITUTIONALISING THE TAKEN FOR GRANTED*.
- Ramezani, M., Tayefi, B., Zandian, E., SoleimanvandiAzar, N., Khalili, N., Hoveidamanesh, S., Massahikhaleghi, P., & Rampisheh, Z. (2022). Workplace interventions for increasing physical activity in employees: A systematic review. *Journal of Occupational Health*, 64(1), e12358. <https://doi.org/10.1002/1348-9585.12358>

- Ren, X., & Sun, X. (2023). How do enterprise social media affordances affect knowledge sharing within project teams: The social cognitive theory view. *Information Technology & People*. <https://doi.org/10.1108/ITP-12-2022-0990>
- Ritala, P., Baiyere, A., Hughes, M., & Kraus, S. (2021). Digital strategy implementation: The role of individual entrepreneurial orientation and relational capital. *Technological Forecasting and Social Change*, 171, 120961. <https://doi.org/10.1016/j.techfore.2021.120961>
- Rowe, F. (2018). Being critical is good, but better with philosophy! From digital transformation and values to the future of IS research. *European Journal of Information Systems*, 27(3), 380–393. <https://doi.org/10.1080/0960085X.2018.1471789>
- Sandberg, J., Holmström, J., & Lyytinen, K. (n.d.). DIGITIZATION AND PHASE TRANSITIONS IN PLATFORM ORGANIZING LOGICS: EVIDENCE FROM THE PROCESS AUTOMATION INDUSTRY. *Phase Transitions*.
- Shajek, A., & Hartmann, E. A. (Eds.). (2023). *New digital work: Digital sovereignty at the workplace*. Springer.
- Shao, Z., Li, X., Luo, Y., & Benitez, J. (2022). The differential impacts of top management support and transformational supervisory leadership on employees' digital performance. *European Journal of Information Systems*, 1–27. <https://doi.org/10.1080/0960085X.2022.2147456>
- Shostak, L. (2023). The Impact of Digital Transformation on the Economy: Technological Innovation and Efficiency. *Economic Affairs*, 68(4). <https://doi.org/10.46852/0424-2513.4.2023.19>
- The-zachman-framework-enterprise-architecture-original-paper-1987.pdf*. (n.d.).
- Turyadi, I., Tawil, M. R., Ali, H., & Sadikin, A. (2023). *THE ROLE OF DIGITAL LEADERSHIP IN ORGANIZATIONS TO IMPROVE EMPLOYEE PERFORMANCE AND BUSINESS SUCCESS*. 12(02).
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Zhang, X., Xu, Y., & Ma, L. (2022). Understanding the relationship between enterprise social media user adaptation, post-adoption use and employee performance. *Behaviour & Information Technology*, 1–19. <https://doi.org/10.1080/0144929X.2022.2162437>

9.0 APPENDIX

On the Web of Science database, a refined search using advanced logic: TS= ("digital? ation" OR "digi*") AND employee performance AND ("impact" OR "effect") within the period of 2016-2023 yielded a total of 507 articles. For Scopus, an initial search using keywords (Digital? AND action OR digi*) AND employee AND performance AND (impact OR effect) resulted in 585 articles. After narrowing the criteria to the English language, focusing on business management, social sciences, environmental science, economics, and finance, and psychology, it narrowed to 279 articles. Finally, with a period restriction of 2016-2023, the search concluded with 266 articles.

Table 9.1:

Literature Search Method

Database	Keywords	No
Scopus	(Digital? AND ation OR digi*) AND employee AND performance AND (impact OR effect) AND PUBYEAR > 2015 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "PSYC") OR LIMIT-TO (SUBJAREA , "ENVI")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (LANGUAGE , "English"))	266
Web of science	TS= (("digital? ation" OR "digi*") AND employee performance AND ("impact"OR "effect"))	507