



The Role of Digital Transformation in Enhancing Performance Management Information Systems and Fostering Innovative Work Behavior

Agus Rahayu¹ , Sulastris Sulastris² , Ratu Dintha Insyani
Zukhruf Firdausi Sulaksana³ 

^{1 2 3} Universitas Pendidikan Indonesia, Bandung, Indonesia
ratudinthaizfs@upi.edu

Abstract. This study investigates the impact of Digital Transformation (DT) on Performance Management Information Systems (PMIS) and Innovative Work Behavior (IWB), focusing on the mediating role of PMIS. Using Structural Equation Modeling (SEM), data analysis reveals that DT significantly improves PMIS and directly enhances IWB. Furthermore, PMIS mediates the relationship between DT and IWB. The findings highlight that Digital Transformation supports organizational performance by automating processes, improving data accuracy, and facilitating adequate information access. Additionally, Digital Transformation fosters Innovative Work Behavior by enabling employees to utilize digital tools for collaboration, creativity, and innovation. Performance Management Information Systems is a vital link, providing data and feedback to guide innovation and decision-making processes. This research underscores the strategic importance of DT and robust PMIS for driving organizational performance and innovation. Organizations are encouraged to integrate digital tools and systems to enhance efficiency, foster innovation, and remain competitive in the digital era.

Keywords: Digital Transformation, Performance Management Information Systems, Innovative Work Behavior, Digital Tools, Data-Driven Decision-Making

1 Introduction

The Industrial Revolution 4.0 has brought about fundamental transformations in human life, including education. The rapid development of digital technologies has created an environment that is increasingly complex, uncertain, ambiguous, and rapidly changing (VUCA). In this context, higher education institutions must be more adaptive and resilient in facing global challenges. According to the World Economic Forum, jobs and ways of working have undergone significant changes due to technological disruption. The skills required in the future are likely to be more complex and demand high adaptability. As institutions responsible for producing qualified human resources, higher education institutions must adapt to these demands.

The Organization for Economic Cooperation and Development emphasizes that innovation and knowledge drive knowledge-based economic growth. In this context,

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higher education institutions play a central role in producing competent and innovative graduates. Indonesia's demographic bonus in the future presents an excellent opportunity to enhance human resource quality. However, in order to capitalize on this opportunity, the quality of higher education in Indonesia needs continuous improvement. Indonesia's Human Development Index (HDI) and Global Innovation Index (GII) still lag behind other ASEAN countries. The quality of higher education, one of the benchmarks of which is university accreditation, remains a challenge. Currently, fewer than 2.5% of universities in Indonesia are accredited as Excellent or A institutions. In fact, around 20% of universities are either not accredited or not accredited at all, indicating a significant need for efforts from all stakeholders to maintain the quality of higher education.

This highlights the challenges related to the quality of education and productivity. Indonesian universities that are ranked globally, such as in the QS World University Rankings and Times Higher Education, are still relatively few. According to Quacquarelli Symonds (QS) and Times Higher Education (THE), only 36 and 24 universities in Indonesia, respectively, appear in the World University Rankings (WUR), or less than 1%. The focus should be on improving rankings and enhancing the quality of graduates and universities' contributions to national development, including promoting innovative work behavior among faculty members. By emphasizing innovative work behavior in faculty, we can highlight the crucial role of faculty in driving change and improvement in universities. Furthermore, this can serve as a basis for formulating more specific policies and programs to enhance the quality of faculty and overall university performance.

Challenges such as digitalization, financial crises, and pandemics have made innovation essential for organizational survival. Innovation is a factor that organizations cannot overlook because companies are required to adapt to rapidly changing environments [1]. When innovating, employees are expected to be proactive in generating new ideas to achieve organizational goal [2,3]. Therefore, Innovative Work Behavior (IWB) needs to be developed [2]. IWB is related to employees' developing, adopting, and implementing new ideas for products, technologies, and work methods; it is considered a crucial determinant of organizational success [4]. IWB is critical for organizational effectiveness and survival, ultimately leading to sustainable organizational development [5].

To support the development of innovative work behavior in the digital era, digital transformation must be implemented within organizations to enhance employee innovation and organizational performance. In this context, Performance Management Information Systems (PMIS) are vital for measuring, monitoring, and improving organizational performance. Along with this, understanding how digital transformation can strengthen PMIS and, in turn, shape innovative work behavior becomes essential. Focusing on improving organizational performance from various perspectives, PMIS can be seen as a means to achieve organizational performance goals. PMIS is a type of 'business intelligence' system [6], a term broadly referring to management support systems for collecting, storing, and accessing data for decision-making [7,8]. Acknowledging the supportive role in tactical and strategic decision-making [9] PMIS is primarily designed for executives, though not exclusively [10,11]. They are collectively used

by organizational managers [12]. Internal systems can be acquired as packaged software or developed specifically for an organization's particular needs [9,13]. External systems can be accessed as diagnostic tools [14,15] and used ad hoc and voluntarily.

The concept of Innovative Work Behavior (IWB) was first introduced by Scott and Bruce [16,17], and after its introduction, this concept has been widely implemented in various studies. IWB is defined as "all individual actions directed at generating, introducing, and implementing new ideas that are beneficial at any organizational level" [18]. The intentional introduction and application of new ideas, processes, products, or procedures to the relevant adopting unit are designed to provide significant benefits for individuals, groups, organizations, or society at large [19]. IWB has three dimensions: idea generation, promotion, and realization [20]. Innovation plays a vital role in success [21]. It provides opportunities for organizational growth and allows them to gain competitive advantages [22]. Creativity is an important component of innovative work behavior [23,24]. However, innovation is broader than creativity, encompassing the generation of new ideas and their application [25]. Consequently, IWB plays a crucial role in enhancing organizational and societal performance and should be a primary concern for educators [26]. According to recent research, innovation is critical for organizational performance because it allows organizations to adapt quickly to market changes and provide new goods and services. Among various types and levels of innovation, IWB is seen as fundamental because it is individuals who generate ideas, not organizations [27,18].

IWB refers to a series of behaviors that help employees develop, promote, and apply new and innovative ideas [29-31]. It also refers to employees' intentional efforts to provide new services/products or new ways of performing work by developing, promoting, and implementing ideas effectively [32-34]. This definition clearly emphasizes that IWB is not limited to innovation, although the core component of IWB is generating valuable and innovative ideas [27,35]. However, the inclusion of idea development and implementation expands the concept beyond creativity. Additionally, since the early studies on this issue by Scott & Bruce [16], who understood IWB as a multi-stage process describing how an individual innovates in the workplace, the conceptualization of IWB has become a key focus in various studies.

Digital Transformation is changes driven or influenced by technology in all aspects of human life [36]. Digital transformation is now generally understood as the use of Information and Communication Technology when automation is not trivial, but fundamentally new capabilities are created in business, public governance, and society [37]. Transformation is defined as the process of leveraging existing digital technologies such as virtualization, mobile computing, cloud computing, system integration within organizations, and others [38]. Digital transformation refers to the impact of using a combination of digital innovations that causes changes in the structure, values, processes, positions, or ecosystems within and outside an organization [39]. It is an evolving process based on the capabilities and digital technologies used to create or alter business processes, operational processes, and customer experiences to generate new value [40]. It also refers to transformation driven by the widespread adoption of digital technologies that generate, process, share, and transfer information, built on the evolution of various technologies: telecommunications networks, computer technologies,

software engineering, and amplified by their use [41]. In simple terms, digital transformation is a radical process involving the use of available digital technologies to produce outputs from organizations that provide new experiences. These new experiences can be in the form of new value for consumers, such as ease of transaction, shopping, communication, and more [42]. There are four driving factors for digital transformation: (a) regulatory changes, (b) changes in the competitive landscape, (c) the shift to digital forms in industries, and (d) changes in consumer behavior and expectations 40. A similar model is proposed by Bumann & Peter [43], which states that the dimensions of digital transformation consist of strategy, organization, culture, technology, customer, and people.

Previous studies have emphasized that technological changes can have significant impacts on how organizations manage information and measure performance. However, there is still a lack of understanding about how digital transformation specifically affects PMIS and its innovative consequences on work behavior, indicating a need for more in-depth research. Digital transformation has been extensively studied in the context of improving processes and organizational efficiency. Studies show that digitalization can enable organizational learning and innovation [44]). This study proposes a model for understanding how digital transformation in PMIS influences IWB, as it becomes a vital component in improving organizational performance.

2 Methods

This study employs a descriptive and verificative research design. The descriptive approach aims to systematically describe the values of variables related to digital transformation, Performance Management Information Systems (PMIS), and Innovative Work Behavior (IWB). The verificative approach tests hypotheses and investigates the relationships or effects between variables in real-world settings. This study aims to bridge this knowledge gap by examining the role of digital transformation in enhancing PMIS functionality and its subsequent impact on fostering IWB in the workplace. By exploring the interconnections between digital transformation, performance management, and innovation, this research seeks to provide valuable insights for organizations striving to improve their competitiveness in the digital era. Hypothesis testing was conducted using Structural Equation Modeling (SEM), a robust analytical method for examining complex relationships between latent variables. SEM enables the simultaneous assessment of direct and indirect effects, providing a comprehensive understanding of the relationships under study.

3 Result and Discussion

3.1 Results

The frequency distribution indicates that most respondents tend to agree or strongly agree with implementing digital transformation within their organization. Most indicators show the highest percentages in the Agree and Strongly Agree categories, reflecting a high level of acceptance of digital technology in organizational operations. This

aligns with theories suggesting that digital transformation positively impacts organizational performance and efficiency by enabling faster, more accurate, and more efficient information processing [44].

Similarly, Performance Management Information Systems (PMIS) received high scores in the Agree and Strongly Agree categories from most respondents. This demonstrates the significant positive influence of implementing digitized performance management systems within organizations. Respondents highlighted how digital PMIS facilitates performance monitoring, accelerates decision-making, and enhances accountability within the organization [12].

Regarding Innovative Work Behavior (IWB), the majority of respondents also agreed or strongly agreed that innovative work behaviors are evident within their organization. These findings underscore the importance of organizational support for innovation and using digital technologies to foster creativity and implement new ideas. IWB reflects individual capabilities to develop, promote, and apply novel ideas that benefit the organization [16].

These descriptive findings collectively illustrate a favorable perception among respondents toward digital transformation, PMIS, and IWB, providing a solid foundation for exploring their interrelationships and impacts on organizational outcomes.

Table 1. Overall Model Evaluation

Indeks Fit	Value	Criteria	Conclusion
Chi-Square	195.68	$p > 0.05$	Good
RMSEA	0.058	≤ 0.08	Good
CFI	0.92	≥ 0.90	Good
GFI	0.90	≥ 0.90	Good

The results of the Chi-Square, RMSEA, CFI, and GFI tests indicate that the proposed model aligns well with the observed data.

Chi-Square: A small Chi-Square value with a p-value > 0.05 suggests no significant difference between the observed data and the data generated by the model. This indicates the proposed model adequately fits the data and can statistically be accepted as representative of the observed relationships [45].

RMSEA: An RMSEA value of 0.058 (< 0.08) confirms good model fit, implying the model has minimal approximation error and accurately represents the population data [46]. CFI and GFI: The CFI values of 0.92 and 0.90 exceed the threshold of 0.90, supporting the conclusion that the model effectively captures the relationships among the latent variables (Hu & Bentler, 1999). These indices confirm that the structural equation model (SEM) provides a robust and valid representation of the relationships among the studied variables.

The measurement model links latent variables—Digital Transformation (TD), Performance Management Information Systems (PMIS), and Innovative Work Behavior (IWB)—to their observed indicators.

Table 2. Measurement model links latent variables

Latent Variable	Indicator	Factor Loading	Validity
Digital Transformation (TD)	TD1 – TD9	0.74 – 0.85	Valid
PMIS	PMIS1 – PMIS8	0.75 – 0.86	Valid
IWB	IWB1 – IWB11	0.74 – 0.85	Valid

All factor loadings exceed 0.70, indicating that the indicators significantly contribute to their respective latent variables [47]. Convergent Validity: All Average Variance Extracted (AVE) values are more significant than 0.50, ensuring adequate variance as explained by the indicators. Reliability: Cronbach's Alpha and Composite Reliability (CR) values for all variables exceed 0.70, demonstrating strong internal consistency and reliability.

These results validate the indicators as reliable measures for their corresponding latent constructs, confirming the robustness of the measurement model.

Table 3. Structural Model Evaluation

Hypothesis	Relationship	Path Coefficient	P-value	Conclusion
H1	TD → PMIS	0.68	< 0.01	Diterima
H2	TD → IWB	0.55	< 0.01	Diterima
H3	PMIS → IWB	0.35	< 0.05	Diterima

The structural model results provide empirical evidence for the relationships among the studied variables: H1: Digital Transformation (TD) positively influences PMIS (path coefficient = 0.68, $p < 0.01$), suggesting that greater adoption of digital transformation enhances the effectiveness of performance management systems. This finding aligns with prior research emphasizing the role of digital technology in automating processes and improving data accuracy). H2: TD has a direct positive impact on IWB (path coefficient = 0.55, $p < 0.01$), highlighting that digital tools not only boost operational efficiency but also foster innovative employee behaviors by enabling access to data and collaborative tools. H3: PMIS mediates the relationship between TD and IWB (path coefficient = 0.35, $p < 0.05$). This underscores PMIS's critical role in channeling the benefits of digital transformation into innovative work behavior through efficient feedback and decision-making systems).

Overall, the structural model confirms that Digital Transformation directly impacts both PMIS and IWB, with PMIS acting as a significant mediator. These findings establish a clear pathway for leveraging digital technologies to enhance performance management and foster organizational innovation.

3.2 Discussion

The structural model supports the notion that digital transformation extends beyond enhancing operational efficiency and fosters innovative behaviors within organizations. Digital transformation facilitates radical changes in how organizations operate, interact, and manage information, promoting a culture that supports innovation [44]. Advanced performance management information systems (PMIS) powered by digital technologies enable faster and more accurate decision-making, which is instrumental in fostering innovative work behavior [19]. Organizations that adopt digital technologies can improve performance and accelerate the generation of new ideas and employee creativity.

Empirically, this study provides evidence that digital transformation influences both PMIS and innovative work behavior (IWB) directly and indirectly. The findings corroborate previous research indicating that adopting digital technology enhances the effectiveness of performance management systems and contributes to employee creativity and innovation [48-50]. This confirms that digital technology serves as a tool for efficiency and a critical catalyst in developing an innovation-oriented organizational culture.

The study demonstrates that digital transformation is pivotal in improving PMIS and IWB. Moreover, PMIS mediates the impact of digital transformation on IWB, suggesting that effective management information systems amplify the innovation-driving potential of digital technologies in the workplace. These findings hold significant implications for organizations that foster innovation and enhance performance through effective digital transformation.

4 Conclusion

In conclusion, the research highlights the significant role of Digital Transformation (TD) in enhancing organizational performance and fostering innovation. The findings show that most respondents strongly support implementing digital technologies, recognizing their positive impact on operational efficiency and performance. Performance Management Information Systems (PMIS) based on digital technologies improved performance monitoring and decision-making processes. Furthermore, Innovative Work Behavior (IWB) was positively influenced by digital tools, which facilitated the development and implementation of new ideas. Additionally, the study confirmed that PMIS acts as a crucial mediator between Digital Transformation and IWB, demonstrating that effective performance management systems are key in enabling the full potential of digital transformation to encourage innovation within organizations.

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