The Impact of Digital Transformation on Human Resource Productivity: The Mediating Role of Strategic Renewal

Vahid Sharafi[1*] | **Hassan Hoseini**[2]

Article Type:
Research Article

Vahid Sharafi
Corresponding Author, Assistant Professor, Department of Management, Faculty of Humanities, Hazrat Masoumeh University, Qom, Iran.
E-mail: v.sharafi@hmu.ac.ir

Hassan Hoseini
Ph.D. student in Media Management, Faculty of Islamic Governance, Islamic Azad University, Khorasgan Branch, Isfahan, Iran.
E-mail: Hassan.hosseini63@gmail.com

ABSTRACT

Digital transformation is essential for various businesses. Organizations seek to create a competitive advantage and improve productivity through digital transformation. The main objective of this research is to examine the impact of digital transformation on human resource productivity, considering the mediating role of strategic renewal. This research is applied in purpose and descriptive-correlational in nature. The statistical population of this study consists of 103 employees from the post office in Ilam, Iran. Due to the small size of the statistical population and the risk of non-response bias, a census method was used for sampling. The data collection method was survey-based, as the data were primarily collected using questionnaires. The standardized questionnaire by Gavarila et al. (2022) was used to measure the digital transformation variable, the standardized questionnaire by Elyasi et al. (2018) was used to measure the productivity variable, and the standardized questionnaire by Fatehmi et al. (2017) was used to measure the strategic renewal variable. The data was analyzed using LISREL software. The results indicated that digital transformation has a positive and significant impact on human resource productivity (0.89) and strategic renewal (0.72) of Ilam Post Office. Strategic renewal also has a positive and significant impact (0.84) on human resource productivity in Ilam Post Office.

KEYWORDS

Digital Transformation, Human Resource Productivity, Post Office, Strategic Renewal.

Autumn & Winter (2024-2025)
1(2): 177-192

Received: 30 August 2024
Revised: 20 September 2024
Accepted: 20 October 2024
Available Online: 29 October 2024

Cite this article: Sharafi, V., & Hoseini, H. (2024). The Impact of Digital Transformation on Human Resource Productivity: The Mediating Role of Strategic Renewal. *Journal of Knowledge Economy Studies (JKES)*, 1(2), 177-192. DOI: http//doi.org/10.22034/kes.2024.717149

Publisher: Hazrat-e Masoumeh University.
Online ISSN: 3060-7329

Introduction

Digital transformation is essential for various businesses. It involves the integration of digital technology across all areas of a business and fundamentally focuses on changing the way operations are conducted and value is delivered to customers (Amali & Mohammadi, 2022). The digitization of an organization's processes means creating new data sources. In fact, every digitized process is a data source, consisting of both human and machine data (Li et al., 2023). Digitized processes generate data, which are monitored and measured through key performance indicators, leading to a more realistic understanding of organizational performance (Zhao et al., 2024). With the digitization of processes, the ability to control and monitor activities and individuals within the organization increases, as digitization transforms processes into rich data sources. This allows for measuring processes, assessing how closely the organization is aligned with its goals and strategic priorities, and identifying the future objectives and goals it should pursue (Nasiri et al., 2022).

Organizations aim to create a competitive advantage through digital transformation. Businesses might adopt transformation for many reasons, but the most significant reason seems to be that they are compelled to do so. For many, this issue is a matter of survival, and organizations must embrace digital transformation to ensure their long-term continuity (Hauer et al., 2021). The digitization of processes leads to improved productivity, which is recognized as one of the most important indicators of economic, social, and cultural development within organizations. In fact, success in productivity is a key requirement for achieving a strong position in the global competitive arena (Soma & Insprack, 2016).

Hence, one of the main objectives of any organization is to achieve higher productivity. One of the primary criteria for evaluating an organization's performance is its human resource productivity (Tabibi et al., 2018). Implementing productivity and examining the factors that influence productivity enhancement in any organization create a wave of change and transformation within that organization, as productivity is inherently dynamic, transformative, and evolutionary. Therefore, if organizations wish to benefit from productivity gains, they must adopt it as one of their primary strategies, embody it in all of their organizational activities, maintain a systems-thinking approach, and foster a culture of innovation and creativity within the organization (Azimian et al., 2023).

Human resource productivity is recognized as a precursor to organizational productivity. It refers to the scientific maximization of resources, human capital, and arrangements to reduce costs and enhance the satisfaction of employees, managers, and consumers (Sepahvand et al., 2023). Human resource productivity involves making the most appropriate use of human resources to achieve organizational goals with minimal time and cost (Balaz et al., 2024). Strategic management plays a key role in developing and enhancing human resource productivity. Strategic renewal is a suitable approach for fostering innovative performance in today's business environment. This approach

provides an alternative advantage in highly competitive and unpredictable market (Charles et al., 2023).

The Post office, as one of the service providers of the country, is a communication agency that interacts with other agencies, organizations, institutions, and the public. Human resource productivity is a key focus in the strategic plans of the post office. Therefore, the main research question of this study is as follows: Does digital transformation significantly impact human resource productivity, considering strategic renewal, in the Post Office of Ilam?

Literature Review

Digital Transformation and Human Resource Productivity

With the emergence of digital transformation, businesses are evolving, leading to increased efficiency and profitability (Al-Oqaily et al., 2022). The adoption of new technologies has driven innovations that are reshaping the way we live and work. Information has become a digital asset, and modern tools and processes have provided a clearer reflection of workforce's status. , businesses are empowered through shared platforms, and a culture of continuous advancement is fostered (Sabk Araa and Pourghaderpoob, 2022). Digital transformation can help businesses automate manual tasks, free up their employees' time, and allow them to focus their time and energy on more valuable projects (Wang et al., 2020).

Given that digital transformation affects all dimensions of individual and social relationships in local, national, regional, and even global economies, it can be generally stated that it has led to an increase in competitive capability, productivity, and overall performance of organizations (Zhao et al., 2024).

Digital transformation requires new skills, such as artificial intelligence, data analysis, programming, and cybersecurity. To achieve greater productivity, the workforce must be trained and updated on these new skills (Du and Kang, 2022). As digital transformation reshapes organizations and work methods, it necessitates a shift in behavior and attitude. Thus, employees must familiarize themselves with advanced developments and new technologies and learn to to leverage new methods. This change in attitude can contribute to improving human resource productivity (Bertani et al., 2020).

The advancement of technology and the growing digitization of processes and tools reduce errors and mistakes, and by minimizing the time spent on correcting minor errors and mistakes, allow the workforce to focus more on important and critical tasks, (Gaglio et al., 2022). Based on the above points, the following hypothesis is formulated:

H1: *Digital transformation has a significant impact on human resource productivity.*

Digital Transformation and Strategic Renewal

Digital transformation plays a crucial role in innovation and affects different aspects of an organization. It influences methods and processes of innovation significantly, enabling companies to achieve substantial improvements in innovation (Trevisan et al., 2024). By

enhancing existing workflows and offering new opportunities, digital transformation supports the creation of innovative work processes (Vaska et al., 2021). It provides companies with new tools that enable them to deliver innovative products and services. By leading to improvements in research and development processes, product design and manufacturing, and data use, it helps companies bring newer and better products and services to market. It allows companies to refine their approaches and processes, align with new technologies, and experience greater innovation (Zhao et al., 2024). Digital transformation equips companies with new tools and opportunities for innovation, enables them to perform existing functions, and strive more powerfully and creatively in designing new strategies (Li et al., 2023). Based on the above points, the following hypothesis is formulated:

H2: *Digital transformation has a significant impact on strategic renewal.*

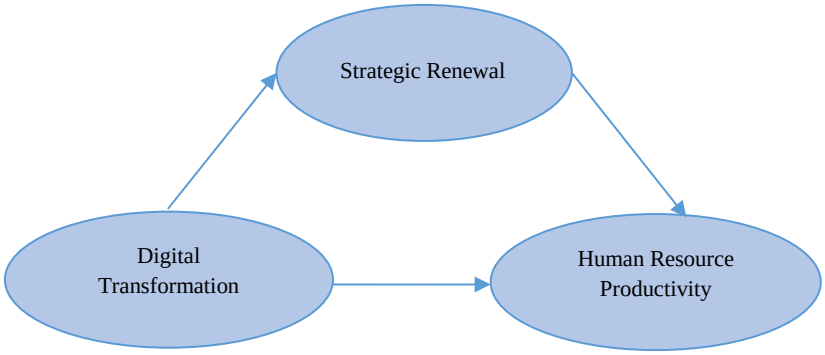
Strategic Renewal and Human Resource Productivity

Strategic renewal helps organizations align and adapt their human resources with organizational strategies and goals. This means attracting individuals and training them with the skills and capabilities essential for achieving the organization's strategic objectives. Additionally, this approach assists organizations in preparing their personnel for new tasks that require new expertise and skills (Albis et al., 2023). Strategic renewal enables organizations to identify and develop the necessary expertise, skills, and motivations to enhance the capabilities of their human resources. By improving human resource management and aligning strategies with the workforce, it enhances human resource productivity and improves organizational performance (Sanchis et al., 2024). Strategic renewal can also improve internal communication and collaboration across different departments of an organization. This leads to more information sharing, and better adjustments to organizational processes and structures (N'Diko et al., 2023). Organizations that adopt a strategic perspective often demonstrate stronger competitive capabilities, better efficiency, and improved effectiveness. In such organizations, strategic renewal is prioritized, leading to an innovative atmosphere, improved productivity, and superior performance (Kalabi et al., 2016). Based on the above points, the following hypothesis is formulated:

H3: *Strategic renewal has a significant impact on human resource productivity.*

Based on the above theoretical foundations and formulated hypotheses, the conceptual model for the current research is illustrated in Figure 1.

Figure1.
Conceptual Model of Research



(Source: Researcher's Findings)

Methodology

The present research is applied in terms of its objective and descriptive-correlational in terms of its methodology. Additionally, it is classified as field research (survey) regarding data collection. The statistical population of this study consists of 103 employees of the post office in Ilam Province. Given the small size of the statistical population, a census method was employed. The data of this study were collected through a standardized questionnaire package that includes the following three questionnaires: Gavrila et al (2022) 12- item questionnaire which was utilized to measure digital transformation, Elyasi et al.'s (2018) 10-item questionnaire which was used to measure productivity, and Fatehmi et al.'s (2019) 6-item questionnaire which was employed to measure strategic renewal.

The overall structure of the questionnaire package and the questions of each variable are presented in Table 1.

Table 1.
Research Questionnaire

Variable	Number of Questions	Source
Digital Transformation	12	Gawriela et al. (2022)
Human Resource Productivity	10	Elyasi et al. (2018)
Strategic Renewal	6	Fatehmi et al. (2019)
Total Questionnaire	28	--------

(Source: Researcher's Findings)

To establish the validity of the research questionnaire, both content and construct validity were utilized. Given that the questionnaires deployed in this research were standard, content validity was assessed based on the opinions of 12 faculty members from the management department. For construct validity, confirmatory factor analysis was employed. As shown in Table 2, all factor loadings exceed 0.50 and the Average Variance Extracted (AVE) for all research variables is also greater than 0.50, confirming the construct validity of the questionnaire.

To assess reliability, both Cronbach's alpha coefficient and composite reliability were used. As the results reported in Table 2 show, the Cronbach's alpha coefficients and composite reliability (C.R) for all variables are greater than 0.70, confirming the reliability of the research questionnaire.

Table 2.
The Results of Validity and Reliability of the Research

Variable	Factor Loading	Ave	C.R	Cronbach's Alpha
Digital Transformation	0.87	0.74	0.91	0.87
	0.89			
	0.82			
	0.82			
	0.88			
	0.91			
	0.89			
	0.86			
	0.90			
	0.85			
	0.80			
	0.84			
Human Resource Productivity	0.83	0.78	0.93	0.89
	0.89			
	0.84			
	0.88			
	0.85			
	0.87			
	0.80			
	0.83			
	0.81			
	0.85			
Strategic Renewal	0.82	0.70	0.90	0.84
	0.86			
	0.90			
	0.81			
	0.77			
	0.80			

(Source: Researcher's Findings)

After examining the validity and reliability of the variables, the next step is to examine the absence of cross-loadings of the variables, which is referred to as discriminant validity. It determines the extent to which a construct is distinct from other constructs. Alack of discriminatory validity suggests that an indicator is associated with more than one construct, a phenomenon known as cross-loading.

Table 3.
Cross Factor Loadings

Questions	Digital Transformation	Human Resource Productivity	Strategic Renewal
Question 1	0.8954	-0.0022	0.2745
Question 2	0.9428	0.0853	0.1563
Question 3	0.9081	0.0157	0.0756
Question 4	0.8994	0.0063	0.1985
Question 5	0.7859	0.2318	0.0858
Question 6	0.8149	0.0843	0.0037
Question 7	0.8365	0.2640	0.0005
Question 8	0.9055	0.2731	0.0017
Question 9	0.9471	-0.1067	0.0802
Question 10	0.8760	0.0070	0.0207
Question 11	0.8529	0.0321	0.1238
Question 12	0.8945	0.2640	-0.1234
Question 13	0.0921	0.9066	0.0023
Question 14	0.0834	0.7952	0.1093
Question 15	0.0040	0.8129	0.1256
Question 16	0.2539	0.8859	-0.0302
Question 17	-0.2341	0.9642	-0.1005
Question 18	0.0981	0.8865	0.0916
Question 19	0.0321	0.9216	0.0045
Question 20	-0.1164	0.8497	0.1146
Question 21	0.1705	0.8318	0.1039
Question 22	0.0181	0.9055	0.0058
Question 23	0.1202	0.0562	0.8847
Question 24	0.1047	0.1108	0.8642
Question 25	0.2091	0.0104	0.8522
Question 26	0.1193	0.1053	0.8945
Question 27	0.1218	0.1342	0.9143
Question 28	0.1066	-0.2301	0.8681

(Source: Researcher's Findings)

Discriminant validity is established when the manifest variables (questions) of each variable have the highest factor loading for their respective variable and the lowest factor loading for latent variables. As seen in the above table, the factor loadings for each variable are highest for their respective variable and lowest for other variables, confirming the discriminatory validity of research variables.

Findings

Before discussing inferential statistics, the results of descriptive statistics are presented. As for the demographic information of the respondents, 70.3% were male and 29.7% were female in terms of education, 5.5% had post-graduate education and below, 41.3% held a bachelor's degree, 51.2% had a master's degree and 2% had a PhD. Regarding

service experience14% had less than 10 years of experience, 64% had between 10 and 20 years of experience, and 22% had more than 20 years of experience. In terms of age, 6%were younger than 35 years, 61.9%were between 35 and 45 years old, 29.8%were between 45 and 55 years old, and 2.3%were over 55 years old.

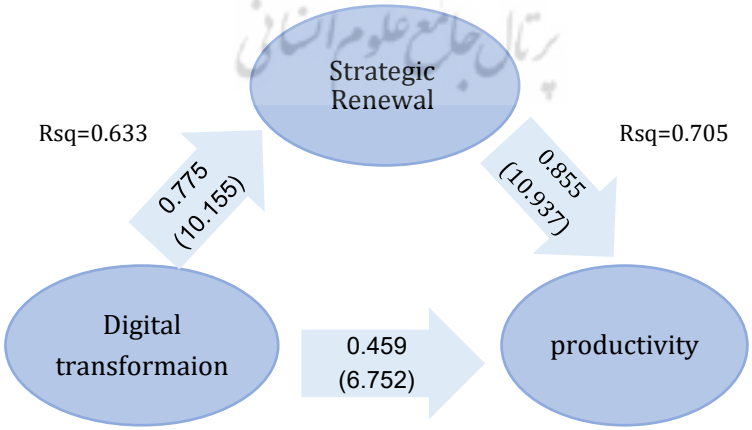
Table 4.
Descriptive Statistics of Respondents

Variable	Frequenc	Percent ge	Variable	Frequency	Percentage
Age	Less than 35 years	6%	Education	Associate Degree and below	5.5%
	35 to 45 years	61.9%		Bachelor's Degree	41.3%
	45 to 55 years	29.8%		Master's Degree	51.2%
	55 years and older	2.3%		Doctorate	2%
Gender	Male	70.3%	Work Experiene	Less than 10 years	14%
	Female Frequency	29.7%		10 to 20 years	64%
				Morethan20 years	22%

(Source: Researcher's Findings)

To test the research hypotheses, the Partial Least Squares (PLS) method was employed using the Visual PLS software. The results are presented in Figure 2. Visual PLS software, designed to solve Partial Least Squares problems, allows for examining the relationship between latent variables and observable measures. This technique is particularly useful when the sample size is small or the distribution of variables is not normal. The most important fit index in the Visual PLS software is the Goodness of Fit (GOF) index, which has also been examined in this research.

Figure 2.
Structural Model of Research



(Source: Researcher's Findings)

To assess the structural model of the research hypotheses, two criteria, $R^2$and Q^2, were used. The value of R^2 is 0.633 for the strategic modernization variable and 0.705 for

human resource productivity variable. These values indicate a good fit for the model. The value of Q^2 is 0.382 for strategic renewal and 0.552 for human resource productivity. Given that the obtained Q^2 values exceed 0.35, they show a strong predictive power for the structural model. The GOF index was used to evaluate the structural model. The value of GOF for the structural model of the research hypotheses is 0.83, indicating a strong overall fit.

The overall results of the research hypotheses, based on the path coefficient and the significance value obtained from the structural model, are summarized in Table 5.

Table 5.
Examining Research Hypotheses

Research Hypotheses	Path Coefficient	t-Statistics	Hypothesis Results
Digital Transformation → Human Resource Productivity	0.459	752/ 6	Confirmed
Digital Transformation → Strategic Renewal	0.775	155/ 10	Confirmed
Strategic Renewal → Human Resource Productivity	0.885	937/ 10	Confirmed

(Source: Researcher's Findings)

As shown, the significant value between digital transformation and human resource productivity is 6.752, which is greater than 1.96. Additionally, the path coefficient between them is 0.459. Therefore, we can conclude that digital transformation has a direct, positive, and significant impact on human resource productivity.

The significant value between digital transformation and strategic renewal is 10.155, which is also greater than 1.96. Given that the path coefficient between these two variables is 0.775, we can state that digital transformation has a direct, positive, and significant impact on strategic renewal. The significant value between strategic renewal and human resource productivity is 10.937, which is greater than 1.96. Additionally, the path coefficient between these two variables is 0.885. Thus, we can argue that strategic renewal has a direct, positive, and significant impact on human resource productivity.

Given that digital transformation has a significant impact (0.775) on strategic renewal, and strategic renewal also has a significant impact (0.885) on human resource productivity, we can conclude that digital transformation has an indirect impact (0.685 = 0.885 * 0.775) on human resource productivity.

To examine the mediating role of strategic renewal in the effect of digital transformation on human resource productivity, the Sobel test and VAF (Variance Accounted For) were used. In the Sobel test, a Z-value is obtained using Equation (1). If this Z-value exceeds 1.96, it confirms the significance of the mediating effect of a variable at a 95% confidence level.

Equation (1):

$$\text{Z-value}=\frac{a \times b}{\sqrt{(b^2 \times S_a^2)+(a^2 \times S_b^2)+(S_a^2 \times S_b^2)}}$$

In this Equation, a is the path coefficient between the independent variable and the mediator, b is the path coefficient between the mediator and the dependent variable, SEa is the standard error associated with the path between the independent variable and the mediator, and SEb is the standard error associated with the path between the mediator and the dependent variable. The values are as follows: a = 0.775, b = 0.885, SEa = 0.136, and SEb = 0.145. By substituting the obtained values into the above formula, the Z-value is calculated to be 4.92. Given that the Z-value is greater than 1.96, we can be conclude that the mediating effect of strategic renewal on the relationship between digital transformation and human resource productivity is significant at the 95% confidence level.

To determine the strength of the indirect effect on the mediator variable, the VAF statistic was used. It takes a value between 0 and 1, with values closer to 1 indicating a stronger the effect of the mediator variable. In fact, this value measures the ratio of the indirect effect to the total effect. VAF is calculated using Equation (2).

Equation (2):

$$VAF = \frac{a \times b}{(a \times b) + c}$$

In this equation, a is the path coefficient between the independent variable and the mediator, b is the path coefficient between the mediator and the dependent variable, and c is the path coefficient between the independent variable and the dependent variable. The values of a, b, and c are 0.775, 0.885, and 0.459, respectively. By substituting these values into equation (3), the VAF is calculated to be 0.599, indicating that more than half of the effect of digital transformation on human resource productivity is explained by the indirect effect and the mediating variable, strategic renewal.

Discussion and Conclusion

Human resource productivity is regarded as one of the key factors for organizational success and growth. It can add more value to the organization by increasing services and production level. A highly productive workforce can help improve performance, reduce unnecessary costs, and optimize work processes within the organization.

With recent advancements in technology, particularly digital transformation, the discussion of improving human resource productivity through this technology has gained momentum. Digital technologies can improve processes, reduce costs, increase human resource productivity, reduce human errors, enhance individual performance, facilitate communication among organizational members, and simplify the sharing of information, ideas, and knowledge.

The main objective of this research is to examine the impact of digital transformation on human resource productivity, considering the mediating role of strategic renewal. Based on the literature and the proposed conceptual model, one main hypothesis and three sub-hypotheses were formulated. The data was collected using standardized questionnaires, and analyzed using Visual PLS software. Based on the data analysis results, all research hypotheses were confirmed.

One of the hypotheses examined the impact of digital transformation on human resource productivity. The coefficient between digital transformation and human resource productivity was found to be 9.07, which is greater than 1.96, and the impact coefficient of digital transformation on human resource productivity was 0.72. Therefore, we can argue that digital transformation has a direct, positive, and significant impact on human resource productivity in the Post Office of Ilam. This finding aligns with the findings of Aditya et al. (2022), who demonstrated that digital transformation leads to learning and increases employee productivity. Bartch et al. (2021) also showed that digital transformation has a significant impact on employee productivity and performance.

To improve human resource productivity through digital transformation in Post Office, the following recommendations are suggested:

Implementing Digital Human Resource Management Systems: it can help automate processes, improve internal communication, speed up decision-making process, and enhance transparency.

Implementing Online Training and Professional Development Systems: offering online training can help human resources become familiar with new skills and pursue their professional development.

Implementing Business Intelligence Tools: analyzing various data and information about human resources can assist post offices in making better decisions and increasing their productivity.

Developing Internal Communication Systems: establishing strong internal communication systems using intranet tools can enhance workforce excellence, productivity, and coordination.

The second hypothesis states that digital transformation has a significant impact on strategic renewal in Ilam Post Office. The coefficient between digital transformation and strategic renewal was found to be 10.89, which is greater than 1.96, and the impact coefficient of digital transformation on strategic renewal was 0.89. This finding is consistent with the findings of Gaglio et al. (2022), who stated that digital transformation enhances the innovative climate and organizational agility, ultimately leading to strategic innovation. Golestaneh et al. (2021) also demonstrated that digital transformation is one of the drivers of innovation in organizations.

Practical suggestions

To enhance the impact of digital transformation on strategic renewal in post offices, the following recommendations are suggested:

- Training and Development of Digital Awareness: implementing training programs for employees to improve their digital knowledge and skills, thereby improving their ability to execute digital strategies.
- Development of Digital Work Processes: improving and optimizing the post office's work processes through digital processes to increase productivity and reduce costs.
- Advancement of Modern Technologies: utilizing modern technologies such as artificial intelligence, the Internet of Things, and automation to enhance performance and productivity within post offices.

The third hypothesis states that strategic renewal significantly impacts human resource productivity in the Ilam Post Office. The coefficient between strategic renewal and human resource productivity was found to be 10.50, which is greater than 1.96, and the impact coefficient of strategic renewal on human resource productivity was 0.84. Therefore, we can argue that strategic renewal has a direct, positive, and significant impact on human resource productivity in Ilam post Office. This finding is in line with the findings of Kalabi et al. (2016), who demonstrated that strategic renewal enhances competitive capability and ultimately improves productivity in organizations. N'dicu, et al (2023) also argued that organizations that value innovation have higher levels of productivity.

To improve human resource productivity through strategic renewal in post offices, the following recommendations are suggested:

- Setting Goals and Commitment: establishing a clear strategy and setting specific goals based on the needs and conditions of the postal company ensure commitment from all team members.
- Identifying Strengths and Weaknesses: conducting a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to understand the strengths better and address weaknesses.
- Utilizing Appropriate Technology: employing modern technologies that are compatible with post office activities to enhance human resource productivity.
- Encouraging Collaboration and Teamwork: creating an environment where colleagues can propose innovative solutions collaboratively and are encouraged to engage in teamwork.

The main hypothesis of this research posits that digital transformation significantly impacts human resource productivity in Ilam Post Office, and strategic renewal plays a mediating role. Given that the z-value in the Sobel test was 4.92, which is greater than 1.96, the mediating role of strategic renewal in the impact of digital transformation on human resource productivity is confirmed. To the best of researchers' knowledge, previous studies have not examined this issue.

Regarding the variables of this research and the direct paths between them, studies have been conducted that examine the dyadic impact of the variables. The distinction of this research, however, lies in investigating both direct and indirect (mediating) paths, with strategic renewal confirmed as a mediating variable in the relationship between

digital transformation and human resource productivity. Thus, it can be stated that digital transformation has a significant impact on human resource productivity, and this impact is strengthened by strategic renewal. Moreover, the use of digital transformation and digital technologies improves communication, encourages individuals to present new ideas and innovations, improves individual performance, and enhances human resource productivity. Also, this study examined Ilam Post Office, whereas previous studies have mostly been conducted in governmental organizations.

Based on the results obtained, it is recommended that managers and policymakers in post offices develop policies and operational standards for the digitalization of work processes and digital security. It is suggested that post office managers strive to cultivate a culture of adhocracy, which supports creativity, entrepreneurship, openness, and risk-taking. Managers must ensure that all employees are aligned with the changes, as one of the key factors in a successful transformation is the adaptability of the organizational culture. In other words, overcoming cultural resistance is a challenge organizations must address. To achieve this, managers must ensure that all employees understand the reasons for these changes and are open to them. An organization with a culture that embraces these changes and encourages digital transformation is more likely to succeed.

Limitations and Suggestions for Future Researchers

Despite the theoretical value and innovation of the present research, like other studies, it has certain limitations that could inform future research on digital transformation and productivity. First, the data were collected from employees of Ilam post office. Therefore, to enhance the generalizability of the model, it is recommended that similar studies be conducted across various organizations with different social and cultural contexts. Second, while our results provide valuable insights into how strategic renewal acts as a mediating variable in the relationship between digital transformation and human resource productivity, it is suggested that future research analyze these relationships considering moderating variables such as gender. Third, this study employed a quantitative approach using structural equation modeling (SEM). For a deeper understanding of how of digital transformation affects human resource productivity, conducting qualitative research is recommended.

Conflict of Interest

The authors declare that there are no conflicts of interest in this research.

REFERENCES

Albis Salas, N., Mora Holguin, H., Lucio-Arias, D., Sánchez, E.C. & Villarreal, N. (2023), Innovation and productivity in small and medium-sized enterprises: evidence from the Colombian manufacturing sector, *Journal of Small Business and Enterprise Development*, 30(5), 1011-1034. doi: https://doi.org/10.1108/JSBED-12-2022-0502.

Al-Okaily, M., Alqudah, H., Al-Qudah, A.A., Al-Qadi, N.S., Elrehail, H. & Al-Okaily, A. (2022), Does financial awareness increase the acceptance rate for financial inclusion? An empirical examination in the era of digital transformation, *Kybernetes*, 12(3), 459-466. doi: https://doi.org/10.1108/K-08-2021-0710

Amali, N., Mohammadi, S. (2022). Review and comparison of digital evolution in Iran's banking industry and three leading countries in the world, *Journal of Management and Accounting in the Third Millennium*, 18(2), 118-99 (In Persian).

Azimian, M., Karbasian, M., Rahimpour, H., & Fallahi, S. (1403). Productivity Evaluation and Measurement in Iranian Petroleum Industry Health Organization, *Productivity Management Quarterly*, 18(1), 63-89(In Persian).

Balázs É, Christine de la M. & David T. (2024) A new macroeconomic measure of human capital exploiting PISA and PIAAC: linking education policies to productivity, Education Economics, 11(3), 878-899.doi: 10.1080/09645292.2024.2318221

Bertani, F., Raberto, M. & Teglio, A. (2020). The productivity and unemployment effects of the digital transformation: an empirical and modelling assessment. *Review of Evolutionary Political Economy* 1(4), 329–355. doi: https://doi.org/10.1007/s43253-020-00022-3.

Charles R. Greer, G. D. Bruton & Miles A. Zachary (2023) Patent productivity: Strategic human resources and the attention-based view, *The International Journal of Human Resource Management*, 34(14), 2677-2707, doi: 10.1080/09585192.2022.2055970

Du, X, & Kangqi, J. (2022). Promoting enterprise productivity: The role of digital transformation, *Borsa Istanbul Review*, 22(6), 1165-1181, doi: https://doi.org/10.1016/j.bir.2022.08.005.

Eliasi, Q., Amirtash, A., Safania, A. (2017). Explaining the impact of organizational identity on human resource productivity with an emphasis on the mediating role of organizational waste, *Productivity Management Quarterly*, 12(4): 189-211(In Persian). doi: 20.1001.1.27169979.1397.12.4.7.7

Fatemi, S., Azar, A., Muqbalbaarz', A., & Khadivar, A. (2018). Analyzing the concept of strategic renewal with soft systems methodology approach, Strategic Management Thought Quarterly, 13(1), 1-24(In Persian). doi: 10.30497/SMT.2019.2555

Gaglio, C,. Erika, K,. Edward, L. (2022). The effects of digital transformation on innovation and productivity: Firm-level evidence of South African manufacturing micro and small enterprises, *Technological Forecasting and Social Change*, 182(2), 121-132. doi: https://doi.org/10.1016/j.techfore.2022.121785.

Gavrila G, S. & De Lucas A, A. (2022), Entrepreneurship, innovation, digitization and digital transformation toward a sustainable growth within the pandemic environment, *International Journal of Entrepreneurial Behavior & Research*, 28(1),45-66. doi: https://doi.org/10.1108/IJEBR-05-2021-0395.

Golestane, M. H., Hosseini, M., & Akbari M. (2021). Investigating the impact of digital transformation on market share with the mediating role of brand value (case study of Alborz Insurance Company). Scientific Journal of New Research Approaches in Management and Accounting, 5(19), 1718-1701. Retrieved from https://majournal.ir/index.php/ma/article/view/1206.

Hauer, G., Naumann, N. and Harte, P. (2021). Digital transformation challenges successful enterprises – an exploration of the collaboration of marketing and sales department in German organizations, *Innovation & Management Review*, 18(2),164-174. doi: https://doi.org/10.1108/INMR-05-2019-0066

Kalabi, A.M., Zali, M.R., Yadolahifarsi, J., Rezvani, M. (2015). Contextualization and Conceptualization of Entrepreneurial Strategic Renewal (Case Study: Tile and Ceramic Industry of Iran), *Business Management Perspective Quarterly*, 15(27), 13-30(In Persian). doi: https://jbmp.sbu.ac.ir/article_96422.html

Li, S, Luwen, G, Chunjia, H, Brij, G, Wadee, A,. Sul, an A. (2023). Exploring the effect of digital transformation on Firms' innovation performance, *Journal of Innovation & Knowledge*, 8(1), 317-328. doi: https://doi.org/10.1016/j.jik.2023.100317.

N'dicu, S., Ngui, D. & Barasa, L.(2023). Technological Catch-Up, Innovation, and Productivity Analysis of National Innovation Systems in Developing Countries in Africa 2010–2018. *Journal of Knowledge Economy*. 14(3), 271-296. doi: https://doi.org/10.1007/s13132-023-01327-4.

Nasiri, M., Saunila, M. & Ukko, J. (2022). Digital orientation, digital maturity, and digital intensity: determinants of financial success in digital transformation settings, *International Journal of Operations & Production Management*, 42(13),274-298. doi: https://doi.org/10.1108/IJOPM-09-2021-0616

Ordóñez de Pablos, P. (2024), Editorial: "Digital transformation, innovation and competitiveness: some insights from Asia, *Journal of Science and Technology Policy Management*, 15(1), 1-5.doi: https://doi.org/10.1108/JSTPM-01-2024-222.

Sabokara, M., and Pourqaderchubar, A. (1401). Digital Transformation of Innovation and Entrepreneurship: Progress, Challenges and Key Issues, Interdisciplinary Research Conference in Engineering and Management Sciences, Tehran, Iran (In Persian). doi: https://civilica.com/doc/1418324

Sanchis Llopis, J.A., Mañez, J.A. & Gómez-Sánchez, A.M. (2024). The dynamic links between product and process innovations and productivity for Colombian manufacturing. *Applied Economic Analysis*, 32(94), 62-82. doi: https://doi.org/10.1108/AEA-01-2023-0009.

Sepahvand, R., Arefnejad, M., Zaviyar, F., Fathi Chegini, F., & Mashhoudi, M. (1402). Analysis of the effect of humble leadership style on human resource productivity with the mediating role of psychological security. *Productivity Management Quarterly*, 17(4), 177-208. 10.30495/qjopm.2022.1943158.3253(In Persian). doi: 10.30495/qjopm. 2022.1943158.3253

Suma, D., & Einspruck, N. (2016). Productivity Awareness in the US: A Survey of Some Major Corporations. *Industrial Engineering*, 12(10), 84-90.

Tabibi, M., Wahebi, d., & Noornejadvenosh, V. (2017). Investigating the relationship between intellectual capital and productivity in Iran's manufacturing industries. *Productivity Management Quarterly*, 12(47): 37-59(In Persian). doi: 20.1001.1. 27169979.1397.12.4.2.2

Trevisan, L.V., Eustachio, J.H.P.P., & Dias, B.G. (2024). Digital transformation towards sustainability in higher education: state-of-the-art and future research insights. *Environ Dev Sustain* 26(2), 2789–2810. doi: https://doi.org/10.1007/s10668-022-02874-7.

Vaska S, Massaro M, Bagarotto EM & Dal Mas F. (2021). The Digital Transformation of Business Model Innovation: A Structured Literature Review. *Frontiers of Psychology*, 11(2),539-553. doi: 10.3389/fpsyg.2020.539363.

Wang, H., Feng, J., Zhang, H. & Li, X. (2020). The effect of digital transformation strategy on performance: The moderating role of cognitive conflict. *International Journal of*

Conflict Management, 31(3), 441-462. doi: https://doi.org/10.1108/IJCMA-09-2019-0166.

Zhao, X., Chen, Qa., & Yuan, X. (2024). Study on the impact of digital transformation on the innovation potential based on evidence from Chinese listed companies. *Scientific Representation* 14, 6183. doi: https://doi.org/10.1038/s41598-024-56345-2.