Impact of Artificial Intelligence Tools on Employee Productivity: A Quantitative Analysis in Tertiary Care Hospitals of Gujranwala

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Abstract

Given the Social Cognitive Theory concept in global understanding, Employee Productivity through Artificial Intelligence can be tested in other contexts. It is research within the tertiary care hospitals of City Gujranwala (GTH (775 bedded) and GMCTH 502 bedded). The results shows that AI tools significantly & positively helps the management and give a road map to facilitate their routine tasks and healthcare professionals to ease their clinical and theoretical concepts by using AI tools. This study also explores the hypothesis and the mediating role of Organizational Support (OS), use of Information Technology (IT) and Employee Innovations. The data was collection from the tertiary care hospitals of Gujranwala from 165 doctors, management and supportive staff. Partial Least Squares (PLS) results shown that the research can be conducted in other tertiary care hospitals to examine its impact. Other research areas include expanding the theoretical model with other independent and dependent variables and to validate it in different

organizational contexts to make out a clearer image of the relationships one during the testing.

Keywords: AI Tools, Employee Productivity, Quantitative Analysis, Tertiary Care Hospitals, Gujranwala

Introduction

Artificial Intelligence has emerged as a core facilitator of innovation across numerous industries and is most commonly employed in the medical care sector. Medical centers in urban settings, such as Gujranwala City, have been using artificial intelligence to better respondents' treatment, speed up administrative duties, and provide decision-making guidelines (Kirshan Kumar, 2023). Despite a developing inclination in the medical care sector, there is a major scarcity of proof related to the precise results of artificial intelligence use to employees' output. Productivity is a critical measure for a human organization in any industry and influences the outcome of an administrative program, a firm's performance in competition, or the medical body's scorecard (Kumari, Pandey, Verma, Naidu, & Gupta, 2023). Therefore, this research will explore the impact of AI Tools (Artificial Intelligence Tools) abridged as AI on the effectiveness of employees who work in the urban tertiary health centers located in Gujranwala City (Hayat, 2019). These organizations face unique operational challenges, including high patient influx and maintaining quality service delivery with minimal resources; hence, the relevance. The research will examine how AI affects output, accuracy, creativity, and time management through innovative health care (Mr. Anudeep Aravala1, 2020). As a result, it will present fresh insights into AI's possible utilization for operational enhancements in the medical care sector. The project will also review organizational support as a driving influence and the health information system as a regulating stakeholder.

Therefore, this study will contribute to scholarly and practical knowledge of AI in the healthcare industry. This study seeks to advise hospital managers and policymakers in Gujranwala City and similar urban health care surroundings on the best way of allowing AI technology to drive productivity

2

improvements among employees, which will help improve health care delivery and services. According to Abrams et al., In computer science, AI denotes machine intelligence, replacing natural intelligence as intelligence in businesses takes a back seat. Coined by McCarthy in 1955, AI has been undergoing its actualization phases and also over moved expectations as it was anticipated that AI would surpass human intelligence and replace human jobs. Businesswise, AI is no single technology but rather a combination of technologies that can be applied to a wide range of business industries and functions. With growing business needs, AI has generated business requirements and has been operating ground in many departments of business (Suddin Lada a, 2023). The Human Resource department HR of businesses is one of the targeted areas. AI has been developed to address the human requirements of an organization. Ai systems helps organizations in acquiring and retaining a successful workforce, hence the focus of this study. AI is quickly overcoming limits to boost personnel performance by stimulating interest in the results of business functioning within the business objectives for each associate the ongoing progress of data technology enables organizations to introduce digital functionality as a subject to transform members. This means implementing new work forms that might include less touch but more collaboration with IT … The equivalent merging of innovative processes means that human attitudes or practices may well need to transform (Kiran JameelI, 2020).

Theoretical Framework - Social Cognitive Theory

(Bandura, 1989) wood & Bandura state that SCT also focuses on the cognitive processes of workers and are affected by what they anticipate from the outcomes in their immediate environment, and thus impact on the productivity by workers (Wang, Hung, and Huang 2019). Wood and Bandura theorize that using SCT to this study, organizational support contributes to increase Employee Creativity (EC) & Information Technology (IT) use which is also cognitive orientation towards learning. This means that using the SCT theory, the productivity by the workers is higher where they

have more confidence and assurance of their environment. By SCT, workers will only be more productive where they are more self-assured and confident (Bandura, 1989).

Literature Review

The systematic evaluation of how AI affects workers' performance in the healthcare field will be analyzed by the literature review. In that regard, studies have shown that AI enhanced employee productivity with ESO, worker IMT, and worker creativity. In addition to this, AI supported data analysis and execution outcomes by reducing the process timelines and improving the decision's precision.

Artificial Intelligence Tools & Employee Productivity

AI application in the healthcare industry has high potential to improve employee productivity. Machine learning algorithms and data analytics are used to optimize routine processes, ensure data-driven decision-making, and overall make healthcare more efficient (Catherine Prentice, 2020). According to previous research by Chen et al., who specifically focuses on AI implementation within the healthcare industry, and General research by Li et al., within the general framework of organizational performance and AI, AI implementation can be correlated with improved employee productivity (Kazi AM, 2020). Nevertheless, it is important to explore a causative relationship within the healthcare industry voter framework, which will be achieved through this paper. AI tools can have many forms with specific applications and advantages. Machine Learning, in particular, is able to analyze large cohorts of information and find patterns of employee performance analysis and visualization (Abid S, 2019). That may help HR professionals draw the right implications and, for example, predict who is about to turn over or who deserves praise. Lastly, AI can also analyze resumes and video interviews automatically, saving time for an HR (Vertesy, 2021).

HI: There is positive relationship between AI Tools & Employee Productivity

Organizational Support & Employee Productivity

According to Hradecky et al. 2022), organizational readiness is an organizational resource for the successful readiness and ability to use AI, and it influences the operations and performance of SMEs. It can be defined as the degree of an organization and all its stakeholders, in particular leadership, employees, culture, infrastructure, processes, to support the AI adoption and use. An organizational support moderates the relationships between AI implementation and employee's productivity. In other words, when employees believe that the organization helps AI implementation, they have a more favorable perception of the AI acceptance and adaptation. A study conducted by Zhang and Hu 2019 among the technology firms, also supported the positive moderation of organizational support between AI and employee content. Thus, the creation of an organizational support environment is positively moderates AI and employees outcome, which means that healthcare organizations.

H2: Organizational Support significantly mediates the relationship among the AI Tools and the Employee Productivity

Information Technology (IT) and Employee Productivity (EP)

AI Tools are undoubtedly capable of performing tasks, analyzing vast datasets, and making predictions, which underpin the development of innumerable fields. There is a seamless way to become more technology alert through Artificial Intelligence Tools, which can be achieved by making and use of technology wider accessible and user-friendly; it can educate individuals about what technology can do. The use of AI by incorporating AI capabilities by virtual assistants can simplify and augment the mode of communication between individuals and technology. Thus, as a human, they will interact with technology, and this will instill a sense of realization, and they will understand the possibility of technology. It can process a large scale of tedious data and detect patterns that the human brain can find difficult to acknowledge using machine learning methods (Hayat, 2019). AI helps in the automation of time-consuming administrative duties such as filing, allowing HR professionals to realign their attention in other critical areas of their jobs.

The latter leads to improved productivity for HR professionals, meaning that they spend much of their time doing work that demands their expertise. AI facilitates the measurement of employee work based on real-time trends. AI-powered systems can analyze and compute calculation time, for example, work completion times or the average time some takes to do an assignment and provide feedback and recommendations on how to improve output. Unlike traditional methods, which largely depend on bias and subjective analysis, AI ensures measurement of employee work productivity based on data and analytics. Ginni Rometty, IBM Chief Executive Officer and President, predicts there will be a massive change in the way people do jobs, suggesting a digital transformation will soon occur within one decade. She argues that analytics will be the area where business happens, meaning that HR will need to equip its workforce with the relevant knowledge and skills in big data and predictability in how they make decisions.

H3: Employee innovation and IT are positively likeable with the use of Artificial Intelligence Tools and EP.
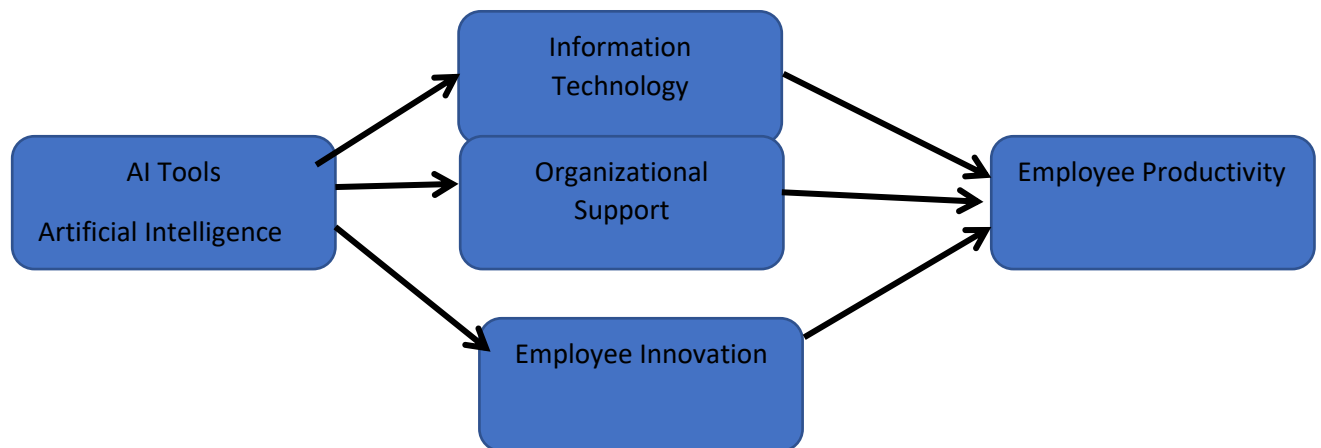
Research Hypothesis

1) Artificial Intelligence Tools is positively & significantly related and affects Employee Productivity

2)   Organizational Support is the mediator and ploy a positive impact Artificial Intelligence Tools and Employee Productivity

3)   The moderating variable Employee Innovation and Information Technology hypotheses are enclosed with Employer and Productivity

Methodology

The data collection was based on the tertiary care health sector of Gujranwala City i.e. GMC & GTH because both the hospital is providing facilities to division of Gujranwala and body from Gujrat, Wazirabad, Sialkot, Alipur Chutha, Hafizabad and impacted districts. The reasons for selecting these hospitals were chosen as both the hospitals are fully equipped with state of art medical science and providing their health facilities at door step because Gujranwala lacks mega health care services in all. The other logic for selecting techno projected and contain data learning practice for using AI tools and work and will more intensive to enhance more knowledge in this document . Third reason for selecting this data source is that health care has become a center of gravity to every governments and enough to apply AI Tools and IT on this developed country Pakistan (I, Abid S. Medical Development of GP. 2019). Therefore, it was implied to check AI tools for applying on these institutions to study perceptions of medical, paramedical, management staff using through a framework will contribute to the literature of AI. Lastly, the topic i.e. AI tools in the context of health care is less read in developing countries.

Data Collection

 Data Collection: Survey collection and all procedure was done and record in English version; populaces of regulars, contract and adhocs employee from Gujranwala Teaching Hospital and GMC Teaching Hospital, Gujranwala; both Gazetted and non-Gazetted. A survey questionnaire has been circulated among the above employees. The data collection process took 3-4 weeks because stratified random sampling was used to collect the data from GTH and GMC TH. The employee was asked to fill in the employee ID, so the related employee has done the filling.

Survey

Consequently, the survey was carried out among of two tertiary care hospitals i.e. GTH and GMC & Allied Teaching Hospitals. The target population was the Gazetted and non-Gazetted employees of the two, tertiary care teaching hospitals. The survey was developed using Google Forms and shared via email and the official groups of the two hospitals. Finally, a total of 165 responses were obtained from a population of 197 employees, which accounted for a response rate of 83.84%. Notably, the survey was verily taken by employees who utilize Artificial Intelligence Tools in their daily duties and assignments.

Measures: The Survey of this research contained 5- points Likert scale 1 being strongly disagree and 5 being strongly agree.

Demographic Analysis

Table 1 presents the demographic analysis where valuable information was inferred about the participants. The study comprises 47.3% females and 52.7% men, with the total number of participants being 165. Such gender proportionality ensures that the findings of the study are generalizable enough to be used across different populations. In terms of age distribution, the participants were diverse as the higher percentage was within the 40 to 50 years category 33.3% and the least was for individuals between 26 to 30 years, with 10.9 %. The high diversity implies that the study represents a wide range of age groups and hence contributes significantly to exploring the variables. Moreover, the educational gaps were also diverse, with 65.5% that had a Master's degree and above.

T1: Demographic Analysis of the study

Variables	Attributes of Variables	Frequency	Percentage
Genders	Females	78	47.30%
	Males	87	52.70%
	Total	165	100.0%
Age	26-30 Y	18	10. 9%

	31-35 Y	25	15.2%
	36-40 Y	38	23.0%
	40-50 Y	55	33.3%
	Above 50	29	17.6%
	Total	165	100.0%
Education	Matric	1	.6
	Intermediate	6	3.6
	Graduation	50	30.3
	Master & Above	108	65.5

Measurement Model Analysis FIGURE 2 shows the measurement model analysis where the relationships between constructs and indicators are determined. The constructs including AI tools, organizational support, employee innovation, information technology, and employee productivity were measured by several indicators having differences in factor loading. For example, the AI construct has indicators of AI1, AI2, and AI4 with 0.868, 0.520, and 0.549 factor loadings respectively. In addition, the VIF values of indicators were less than 5 to show the absence of multicollinearity in the measurement model. The measurement model presented in Figure 2 is strong and underlies the relationships.

T2: Measure Models

Constructs	Indicators	Factor Loadings	VIF
AI Tools	AI1	0.868	1.161
	AI2	0.520	1.057
	AI4	0.549	1.084
Organizational Support	OS1	0.881	1.120
	OS 3	0.779	1.181

Employee Innovation	EI2	0.677	1.175
	EI3	0.549	1.069
	E4	0.779	1.136
Information Technology	IT2	0.800	1.058
	IT3	0.560	1.093
	IT4	0.617	1.178
Employee Productivity	EP1	0.795	1.018
	EP2	0.690	1.081
	EP5	0.521	1.087

Reliability and Validity Analysis The reliability and validity analysis of the study variables is paramount for ensuring the appropriateness and consistency of the research. Table 2 and 3 provide the reliability statistics of the variables used where the CA and Rho_A values of the CA range between 0.510-0.706 and0.554-0.716 respectively. The results indicate that the study variables are reliable since they are consistent. In addition, the AVE values (0.549-0.667), establish the convergent validity of the variables since they account for a larger proportion of the variance between them and the constructs. Overall, the reliability and validity test confirm the credibility of the measurement instruments and the results of the study.

T3: Reliability & Validity

Variables'	Cronbach's Alpha (CA)'	"Rho_A"	Composite Reliability (CR)	Average Variance Extracted (AVE)
AI	.685	.680	.693	.578
EI	.510	.576	.680	.665

EP	.633	.554	.692	.667
IT	.686	.602	.705	.549
OS	.706	.716	.670	.558

Results

Direct Effects

The first dimension was direct effects, which was based on the two factors direct effects based into the model, which it has to note with no another intermediary variable. This means that direct effects can just be the concerning item on the other variable of a one variable model. For example, the direct effect of Organizational Performance 60 on the AI Tools, in this part of the model the deponent variable of the AI Tools into the regarded model but into the OP none of the item has an effect on this variable. Into the research field, the direct effects are used to determine how the variable affects another in the blitzschema. Items Mediation Analysis. The mediation analysis is an algorithm used to analyze the rationale of the independent and dependent variable. For example, if the Employee Innovation 100, it intermediates between the AI Tools and the OP, the AI Tools effects on the OP is reduced and the remaining part is due to EI. There by the mediation analysis, the researcher could see how the terms and conditions can be linked and how can one item for another be amplified or clarified.
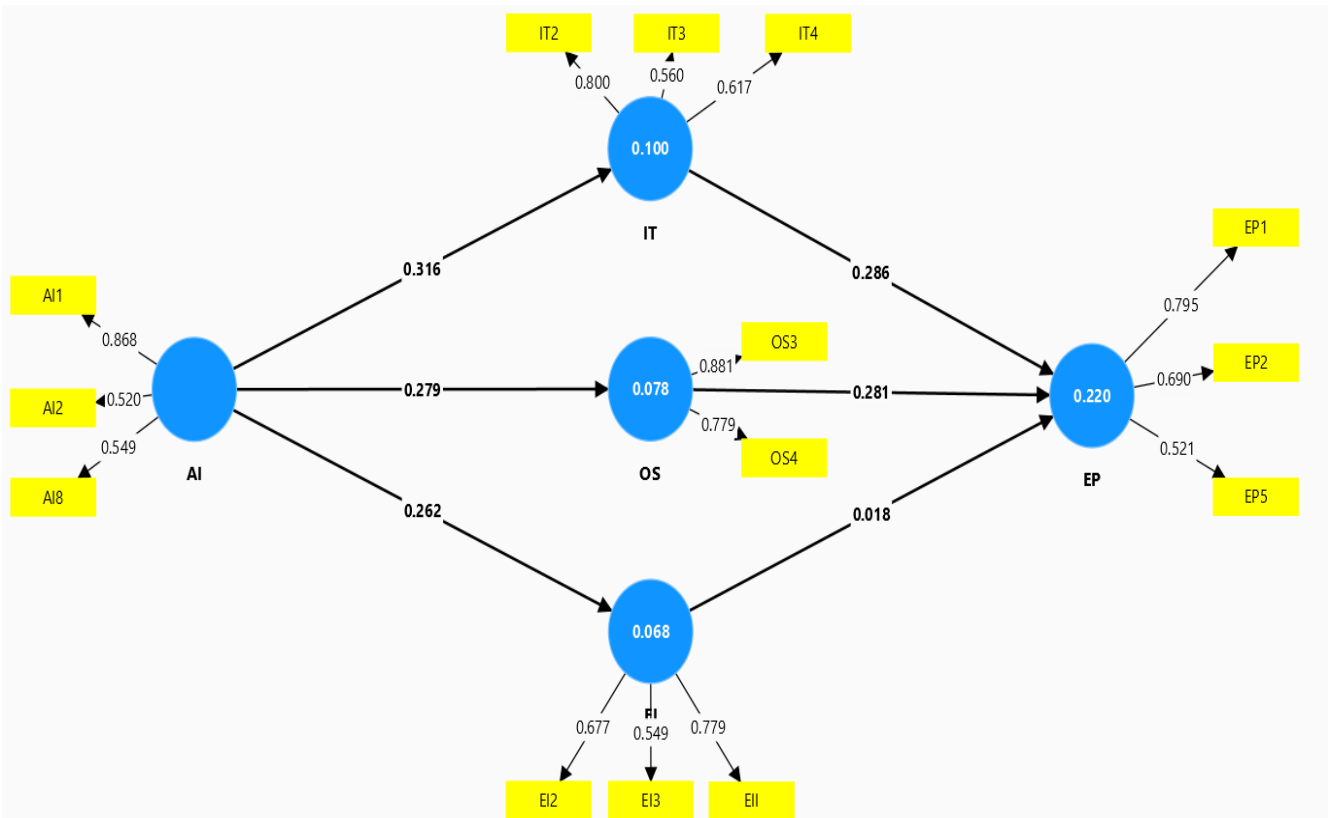
Figure 1: Structure Equation Model Describing that the use of Artificial Intelligence Tools brings productivity in employee

Discriminant Validity (DV) Hetrotrain-Monotrait Ratio

	AI	EI	EP	IT	OS
AI					
EI	.651				
EP	.823	.420			
IT	.839	.726	.832		
OS	.604	.553	.750	.722	

Mediation Analysis

The discriminant validity will be assessed using the Heterotrait-Monotrait Ratio relationship ratio (HTMT). It entails the computation of correlations among different constructs relative to those of the same construct. If the pattern of the values is less than 0.85, discriminant validity is adhered.

As shown in Table 10, all HTMT values ranged from 0.6879 to 0.830, which is less than 0.90the value; thus, the constructs have strong discriminant validity. This implies the constructs are different and measure distinct dimensions of the research model. This approach can help researchers gain an understanding of the conditional nature of the relationship between the constructs. Therefore, moderation analysis, along with the HTMT ratios, can provide researchers with a detailed understanding of the differences between the constructs and how they interact with external factors.

Discussion

This section of the manuscript discusses the implications derived from the research findings, answers to the research questions; and then general and unique implications, practitioners, and policymakers. The outcomes of the study emphasized different aspects of the construct. The construct measurement model showed excellent factor loading results, as well as VIF

and value that were appropriate, confirming that the indicators chosen had strong associations with their relevant constructs and minimal multicollinearity.

Secondly, in the reliability and convergent validity levels show that the AI Tools, OS have high CR and AVE values compared to the IT, EI; which is a severe issue in any study to ignore the robustness factor of the measurement model due to a high possibility of non-validity and non-reliability.

Thirdly, direct effects and medial of the theoretical model explore the direct and indirect relationships and paths of how constructs affect the other. Meaning that direct effects explain how the constructor on others has to direct and mediation explains indirect. Therefore, direct and mediated variables in one study provide a clear picture of the whole framework that enables decision-makers and stakeholders to understand how such factors interact in the real world. (jButton), who defined that IV should not be more than IV squared. Furthermore, discriminable validity by calculating the HTMT ratio has given nuanced knowledge on being separate. The HTMT is below the threshold 0.85, which means good discriminant validity that indicates the being separate the variables. By using the HTMT ratio in moderating, the analysis can demonstrate how external factors moderate the non-moderating, facilitating scholars and stakeholders to understand the effect of those variables.

Amplification of Study

To conclude, the study benefits the area of existing knowledge by revolutionizing the comprehension of the links between AI Tools, EI, EP, IT, and OS from a new perspective. The repercussions of the study findings can get implemented across the domains of academia, industry, and policy making, offering numerous opportunities to researchers, marketers, and policymakers. Additional research should further develop the theoretical model by evaluating other variations of the independent and dependent variables as well as validating the outcomes in different circumstances to

achieve a better understanding of the multifaceted correlations between the constructs in the context of an organization.

Theoretical Amplifications

It should be noted that the theoretical implications of this study hold substantial implications for further research advances related to the relationships between AI Tools, EI and EP, IT, and OS in an organizational setting. This research guarantees stabilized measurement model with consistent test, therefore supporting various theoretical models of organizational behavior and technology adoption and extending the conceptual base. Additionally, one of the most critical research implications are popular, market-penetrating AI tools development to help better employee innovation; narrowing employee performance gap; expediting the success path in deploying IT; constructively identifying when to and not to call IT-based system AI in an organizational setting. Such theoretical implications build the basis for future investigations to explain how this set of variables operates in tandem and impacts various organizational outcomes, thus contributing to theory development and application into practice.

Limitations and Future Directions

Regarding the implications and limitations of this study, the primary issue is associated with its research design. Since this study was conducted in one particular organization, and its respondents were employees of one specific organization, the possibilities to generalize the results for the settings with different contexts and organizational environments are limited. To expand this research, future studies can use the multi-site research design, for example, or apply the longitudinal design to assess the changes over time. The second limitation is associated with the common method bias and the social desirability bias since the current study was based on the self-reporting surveys only. Future studies may apply other research methodologies, including qualitative, use secondary data from the organizations, or use the performance records instead of the self-reported data to ensure the validity of the results. As for the elements excluded, this study uses a relatively limited

number of variables, ignoring the impact of additional factors influencing the results. Future researchers are encouraged to examine the impact of organizational culture or leadership style, or include additional external factors in the research design.to several topics should be considered for further research. Finally, researchers may wish to delve into the underlying pathways of influence that guide AI Tools and their influence on employee innovation and performance. Many variables might mediate the way that this technology spreads in organizations, including the context of organizational support, training programs, or technology acceptance among the end-users. They might also want to examine the general effect of AI tools on other facets of organizational performance on financial indicators, customer satisfaction, or employee engagement. Finally, researchers also need to examine the contextual variables industry type, organizational size, or technology readiness that moderate the relationships between the constructs studied.

Conclusion

The study has contributed to the E-I-E-O literature. It has provided new perspectives about under discussion variables. The measurement model was presented, the reliability and convergent validity statics were elaborated, and the analysis of direct effects, the mediation of analyses, and the discriminant validity statistics were discovered to show that the relationships are complicated. The theoretical contributions of this study are vast as they underscore the pivotal role of AI tools in enabling employee innovation and achieving higher organizational performance, with the information technology playing a critical intermediate role in organizational success. Despite the study's limitations such as biases and limited number of constructs, the current results provide a strong basis for future researcher's studies. The current findings can be extended by including more variables, improving the methodology, and testing the moderating role of context on all hypothesized relationships to enhance our comprehension of the underlying dynamics within the organization. Researchers' ambitions to build on these results and

16

future research steps will help progress research in organizational behavior and technology adoption and output management to improve organizational efforts and outcomes during the digital age.

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