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Artificial Intelligence, Digital Competence, Digital Autonomy and Innovative Work Behaviour: An Empirical Study of Information Technology Professionals in Uttar Pradesh, India

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Abstract
The study aims to determine the cause and effect among artificial intelligence, digital competence, digital autonomy and innovative work behavior towards information technology professionals in Uttar Pradesh, India. This research study employed an exploratory and descriptive research design. A web-based, structured Google form questionnaire was designed for the primary data collection from the information technology professionals. The reliability and validity of the questionnaire was checked using Cronbach's alpha, Bartlet test of significance and Kaiser-Meyer-Olkin (KMO) values. A convergent and discriminant validity was also checked for the four constructs as artificial intelligence, digital competence, digital autonomy and innovative work behavior using average variance extracted (AVE), composite reliability (CR) values, discriminant values. This study employed a sample size of 324 respondents. The correlation, regression enter method and the Structural Equation Modelling (SEM) techniques were used to check the cause-and-effect relationship and simultaneously hypothesis testing. The study's findings concluded that artificial intelligence, digital competence, digital autonomy had a significant effect towards the innovative work behavior among the information technology professionals in Uttar Pradesh, India. The SPSS 23.0 version software performed simple data entry, data coding, value label, descriptive, and frequency inferences, while SEM-AMOS 23.0 version statistical add-on software performed complex statistical calculations.

Keywords: Artificial intelligence; Digital competence; Digital autonomy; Innovative work behaviour; Information technologies professionals, Structural equation modelling

Introduction
Artificial Intelligence (AI) is profoundly transforming industries across the globe, and its impact is particularly notable within the realm of information technology (IT) in Uttar Pradesh, India. As organizations increasingly adopt AI technologies to enhance efficiency, accuracy, and innovation, IT professionals in the region must adapt to this evolving landscape. Digital competence, which encapsulates the ability of individuals to effectively utilize digital tools and platforms, becomes essential in this context. It extends beyond mere technical skills to include critical thinking, problem-solving abilities, and the capacity to learn and apply new technologies swiftly. In Uttar Pradesh, where the IT sector is witnessing rapid expansion, fostering digital competence among professionals is crucial to meet emerging demands and remain competitive in a global market. Furthermore, digital autonomy, a concept that refers to the ability of individuals to act independently within a digital environment, is becoming an increasingly important trait for IT professionals. This autonomy allows them to make judicious decisions, engage in self-directed learning, and proactively seek out innovative

solutions to complex problems without relying heavily on hierarchical structures. By cultivating digital autonomy, IT professionals are empowered to embrace change, take risks, and express their creativity in their work, ultimately leading to more effective and innovative outcomes. The confluence of AI, digital competence, and digital autonomy gives rise to innovative work behaviors, which encompass proactive idea generation, risk-taking in the pursuit of new solutions, and a willingness to collaborate in interdisciplinary teams. In an environment characterized by rapid technological advancements, these behaviors are essential for driving organizational success and adaptability. Within the context of Uttar Pradesh, as IT professionals harness AI to improve service delivery and operational processes, the promotion of innovative work behaviors can significantly enhance job satisfaction and overall performance. Moreover, the state's strategic investments in digital infrastructure and education are providing a fertile ground for exploring the intersections of these concepts. Government initiatives aimed at digital inclusion and improving access to technological education are equipping the workforce with the necessary tools to thrive in this dynamic setting. However, it is also crucial to address existing challenges such as the digital divide, varied access to resources, and varying levels of skill among professionals, which can impact their ability to fully engage with AI and digital technologies. Thus, understanding the relationships among AI, digital competence, digital autonomy, and innovative work behavior presents an opportunity for stakeholders, including educational institutions, industry leaders, and policymakers, to design targeted interventions that support IT professionals in their journey. This understanding can lead to tailored training programs, mentorship initiatives, and resource allocations aimed at enhancing digital skills and fostering a culture of innovation within organizations. Additionally, collaboration between academia and industry can facilitate knowledge exchange and practical experience, ensuring that IT professionals are well-equipped to leverage AI effectively. Ultimately, as Uttar Pradesh continues to embrace technology and innovation, the success of its IT professionals will depend not only on their technical proficiency but also on their ability to navigate the complexities of the digital age with competence, autonomy, and a spirit of innovation. This tripartite framework can drive not just individual success, but also contribute to the broader economic development of the region, making it a significant player in the national and global digital economy. By investing in these areas, Uttar Pradesh can create a robust ecosystem that nurtures talent and promotes sustainable growth in the field of information technology, thereby enhancing its competitiveness and adaptability in an ever-evolving global landscape. In summary, the interplay between AI, digital competence, digital autonomy, and innovative work behavior represents a transformative pathway for IT professionals in Uttar Pradesh, as they harness technology to drive progress, foster creative solutions, and play a pivotal role in shaping the future of the digital economy in the region.

Artificial intelligence (AI) digital competencies and digital autonomies are becoming more widely acknowledged in the information technology (IT) industry as important forces behind innovation. IT workers can now automate repetitive operations as AI technologies advance, freeing them time and mental energy to concentrate on more intricate, imaginative problem-solving exercises. In addition to increasing efficiency, this change encourages creative work practices, which are essential for preserving a competitive edge in the quickly evolving IT sector. To fully utilize AI, IT personnel must possess digital competency, which is the capacity to use digital tools and technology efficiently. High digital competency individuals are better able to incorporate AI into their processes, which results in more creative ideas and solutions. According to research, artificial intelligence (AI) has the potential to greatly influence creative processes by enhancing human intelligence. This might change the way IT

professionals come up with ideas and create new goods or services. Because these abilities allow professionals to use AI in new ways, companies that invest in their employees' digital skills tend to see higher levels of creativity. The interaction between AI and digital competencies is therefore increasingly seen as a stimulus for creative work practices by IT professionals as well as by enterprises that aim to remain at the forefront of technology breakthroughs. The impact of technical advancements, especially artificial intelligence, on job security has been brought to light by recent occurrences. These technological advancements have the potential to change job dynamics, automate processes, and influence employees' decisions to leave their current positions. However, because these effects may be exaggerated, we strongly advise being vigilant.

2. Literature Review

A literature review is a critical analysis and summary of existing research on a particular topic, which aims to provide an overview of current knowledge, theories, and findings. It identifies gaps in the literature, highlights methodological strengths and weaknesses, and situates the current study within the broader academic discourse. By synthesizing relevant sources, a literature review helps establish the significance of the research question, guiding researchers in developing their hypotheses and informing their methodologies. Ultimately, it serves as a foundation for advancing understanding and facilitating further inquiry in the chosen field of study. In this study, for reviewing previous study, a Mendeley desktop and Mendeley reference manager was used. The American Psychological Association (APA) 7th edition referencing style was used for the references in the end of this study. The hyperlink and bookmark were also used for easy access to the references for each finding. The previous findings are thematic arranged in the chronological order from recent to past as under:

2.1 Artificial Intelligence (AI) and Organizational Performance

2.1.1 AI Impact on Work Efficiency & Productivity

(Alexandro and Basrowi, 2024) found that all facets of life, including businesses and digital sectors like the internet, are subject to information technology abuse. Any digital industry or organization will require an application or information system. An organization can become a smart digital agency more quickly by using information technology, which can improve the efficacy and efficiency of business activities within the firm. The impact that artificial intelligence technologies will have on how individuals handle their work, positions, and social connections cannot be overstated as they continue to permeate enterprises. (A et al., 2024) found that artificial intelligence is already revolutionizing financial analysis, medical diagnostics, visual identification, and industrial processes, and new applications are being created. Artificial intelligence will be able to reach its full potential when more people use it, which will accelerate development and enhance decision-making abilities.

(Wang, Xing and Zhang, 2023) found that the variations in AI start times and application scope amongst particular organizations were not considered. An in-depth examination of the effects of different applications of artificial intelligence technology, as well as the ramifications of the amount of time employees spend using the program, will be feasible in a later study. According to another earlier study, (Tang et al., 2023) found that, artificial intelligence has a positive effect on worker productivity in the healthcare sector. In other study, (Shaikh et al., 2023) demonstrated that information sharing and employee mental health and well-being act as mediators in the relationship between AI and worker productivity. The study's findings emphasize how important it is to incorporate social cognition theory into the

process of creating and deploying AI in the workplace. . In other study, (Rajeshwari and Avinash, B, 2023) found that AI facilitates quick feedback, streamlines administrative procedures, and offers employees personalized experiences, it has a big impact on employee engagement. Consequently, this leads to a more contented and driven workforce, which enhances an organization's achievements and competitive edge.

According to another study, (Zeng, Li and Yousaf, 2022) found that the use of artificial intelligence in the modern era has drastically changed how trade and business are conducted. Artificial intelligence has changed how human resources work in technical firms by giving organizations access to the newest functional applications and digital transformations. In other study, (Tong et al., 2021) examined the effects of using artificial intelligence to generate performance feedback on workers' job productivity. Our study is based on a new field experiment conducted in a major financial services company. First, we demonstrate a positive "deployment effect" by demonstrating that artificial intelligence input improves work performance by 12.9% as compared to human feedback

2.1.2 AI Adoption Factors and Behavioral Intentions

In other study, (Chen, 2024) found that the effectiveness of employees' efforts to adopt artificial intelligence applications is not solely determined by administrative decrees, official directions, or procedures. However, the development of behavioral intentions is influenced by a variety of elements, including loyalty, behavioral characteristics, emotional factors, and cognitive considerations. There is a connection between the success of promoting integration competence and teamwork and the creation of carefully planned training programs that assist staff in comprehending the benefits of using AI technologies. In other study, (Bankins et al., 2024) found important insights into the key elements that affect successful human–AI collaboration, perceptions of human and algorithmic capabilities, employee attitudes toward AI and algorithmic management, and the effects of AI use on labor markets and skills in this thorough review of empirical research on the application of AI in the workplace. According to a recent study, the application of AI would enhance psychological contract and work happiness. In the context of adopting AI, another study, (Li et al., 2023) emphasized the significance of recognizing and addressing personal beliefs, task-oriented leadership, and resistance to change. The study also emphasizes how important it is for business executives to consider how employees perceive the appropriate adoption of high-performance work systems (HPWS).

2.2 Digital Literacy and Competency

2.2.1 AI Role in Digital Transformation

In another study, (Cetindamar, Abedin and Shirahada, 2024) looked into the relationship between digital transformation and digital literacy using the TBF framework. Digital literacy is essential for using digital technology, according to the prior study. As a result, a gap in the body of research was filled by expanding the TBF framework to include an investigation into the role of employees in the application of digital technologies. According to the results of a prior study, one of the main factors influencing the performance of integration capabilities and collaboration with other teams is the employees' intention to use artificial intelligence applications. (Chong and Zainal, 2024) found that computer literacy, information literacy, media literacy, and ICT literacy are terms that are commonly used interchangeably. The ability to access and disclose information using digital means is known as digital literacy, and it has grown to be a vital skill that affects many aspects of both personal and professional life.

According to earlier studies, people who have more digital liberty are more likely to work creatively, which enhances job performance. Digital technology significantly affects evolving corporate environments. (Hamdan, 2024) found that one of the many different kinds of technical innovations is artificial intelligence (AI), a technology agent that supports and is essential to digital marketing. In other study, (Carvalho et al., 2023) found a strong digital infrastructure combined with digital integration fosters creativity and innovation, which eventually has significant positive effects on society. The university's operations are greatly impacted by this digital competency, which also facilitates external collaboration, real-time communication, and innovative ideas. (Cramarenco, Burcă-Voicu and Dabija, 2023) found that the organizational environment has put in place a coping mechanism that entails reskilling and upskilling to deal with the talent mismatch. Training programs that focus on employee well-being (including cognitive, social, professional, emotional, and psychosomatic well-being) may help to support the emphasis on developing digital skills, especially the technical aspects of such abilities.

2.2.2 Academic and Workplace Applications

(Haq Nawaz, Muhammad Naveed Jabbar and Farah Qadir Malik, 2023) discovered a strong correlation between university instructors' effectiveness and their digital leadership competencies. In order to get the best possible work performance and efficient teaching and learning procedures, the research findings advise university administrators to give priority to training teachers in digital technologies. In order to make the most of digital technologies, we also advise cultivating a culture of learning.

2.3 Human Resource Management and Employee Dynamics

2.3.1 Digital HR Systems and Attitudes

(P and Lohani, 2024) found that the employee attitudes and competencies have a big impact on digital HR operations, which boosts employee knowledge and proficiency in HR systems.(Pea-Assounga and Bindel Sibassaha, 2024) found that organizations are more productive when they have access to information and communication technology policies and human resource management systems. This is due to the fact that HR practices are influenced by technical endeavors and factors related to employees' jobs**.** In other study, (Szukits, 2022) demonstrates little interest in investigating whether and how these developments affect the field of management accounting, with controllers' roles becoming smaller and other organizational functions developing their own analytical capabilities.

2.4 Digital Leadership and Innovation

2.4.1 Impact on Organizational Strategy

(Karafakioglu and Afacan Findikli, 2024) found that digital leadership and creative behaviors particularly in companies that are involved in generating technology played a somewhat mediating role when it came to work engagement in relation to the speed and competitiveness of the company, while innovative behavior had a dominant impact. This was particularly true for companies engaged in creating technology. According to the study on digital leadership, the main areas of focus for digital leadership include internal innovation, digital transformation, and company performance. By utilizing the Internet and specialized digital communication platforms, together with technological advancements, digital marketing has transformed international communication. In other study, (Salam, 2023) found that the relationship between innovative behavior and digital leadership is partially mediated by e-learning anxiety. Conversely, the association between e-learning anxiety and creative

productivity is moderated by psychological capital. Our knowledge of the connections among Lisbon, Portugal, IT workers' innovative behavior, psychological capital, e-learning anxiety, and digital leadership has significantly improved as a result of this study. Future studies could expand on these findings and broaden our comprehension of these significant topics, notwithstanding inherent drawbacks. (Saddique et al., 2023) found that the Pakistani smart cities are aggressively leveraging digital leadership and technology to enhance their capacity to conduct corporate operations in a sustainable manner. At the moment, the organization's total performance benefits from the adoption of digital leadership approaches. Organizations must prioritize digital leadership, foster a culture that supports digital initiatives, and advance digital technologies if they hope to foster innovation and sustainable performance in smart cities. Another previous study, (T, Djati and Tanti P., 2023) shows that digital leadership has a positive and insignificant direct impact on organizational performance. On the other hand, positive and significant digital competency, along with an organizational dedication to success, are characteristics of the direct influence. Furthermore, digital culture has a significant and negative direct influence on organizational performance at Indonesian Navy Headquarters. In earlier empirical study, (Braojos, Weritz and Matute, 2023) contributed to the corpus of knowledge on information systems by examining the mediators between digital capabilities and organizational commitment using data from Spain.

2.4.2 Support for Creative Behavior

(O'Callaghan, 2023) confirmed that emphasizes the impact of decision intelligence on employee intention to leave. The study comes to the conclusion that meaningful work and job attributes operate as mediators of this effect. There is still a lack of academic research on decision intelligence despite its increasing popularity.

2.5 Digital Transformation and Societal Impacts

2.5.1 Macro-level Digital Change:

(Ben Ghrbeia and Alzubi, 2024) found that due to its strategic location at the nexus of European and Asian cultural and economic influences, Turkey offers a distinctive setting for digital transformation (DGT). There are numerous ways in which this specific stance affects the digital transformation process of medium-sized and large organizations nationwide. In other study, (Chatterjee et al., 2023) found that improving an organization's IT capabilities in the digital workplace and its ability to innovate dynamically, as well as putting in place a digital workplace policy, may have a positive effect on the company's performance and the work-life balance of its employees. One advantage of this strategy is that it addresses the RQ1. The findings of the current study indicate that by sufficiently guaranteeing the support of digital leadership capabilities, the business can improve employee performance, work-life balance, and dynamic capacities.

2.5.2 Challenges

(Wang, 2024) found that past studies that have demonstrated the positive effects of AI related factors on both individual and organizational performance. It hasn't, however, adequately addressed the advancements in employee psychology, especially in relation to acceptance and job insecurity. Additionally, studies show that performance metrics and artificial intelligence have a positive relationship (Khan et al., 2022) found that over the last 20 years, corporate governance (CG) practices, economic growth, and major technology innovation (artificial intelligence) have had a big impact on companies, stakeholders, and shareholders worldwide.

The impact of data analytics on decision support and decision-making was predicted by earlier research.

After analyzing the earlier findings, the research gaps were identified as not much research had been done on the relationship between artificial intelligence, digital competence, digital autonomy, and innovative work practices for IT professionals in Uttar Pradesh, India. Since this is the original work, research on the relationship between artificial intelligence, digital competence, digital autonomy, and innovative work behavior toward IT professionals in Uttar Pradesh, India, is urgently needed. These research gaps are clearly visualized by the conceptual research model below.

2.1 Conceptual Research Model

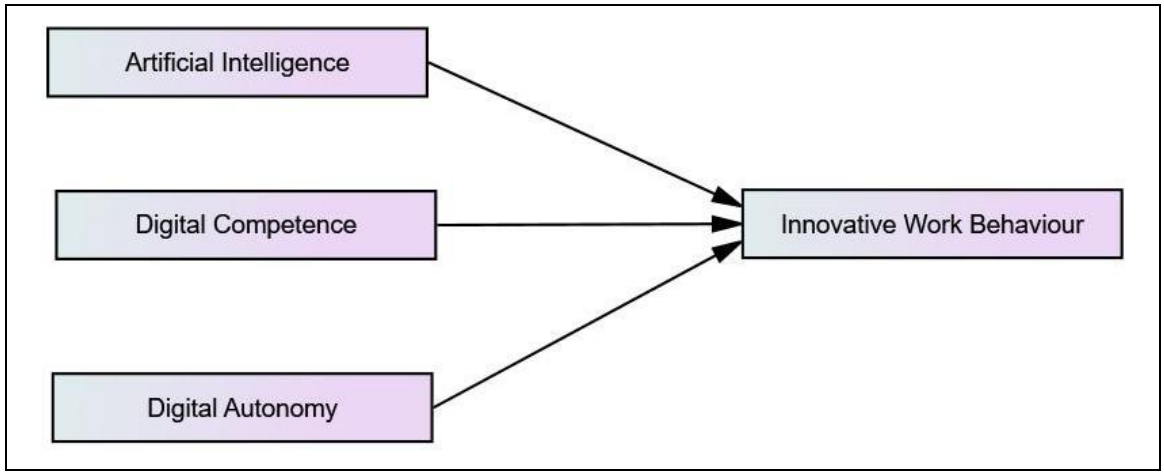

Figure 1. Conceptual Research Model

Source: AMOS 23.0

According to the conceptual research model depicted in figure 1, artificial intelligence, digital competence, digital autonomy are the independent latent constructs and innovative work behaviour is the dependent latent construct. Artificial intelligence construct having 5 items where as digital competence, digital autonomy, and innovative work behaviour each having six items.

The objectives of this study are as follows:

- To find the effect of the artificial intelligence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.
- To find the effect of the digital competence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.
- To find the effect of the digital autonomy on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.

The hypotheses of this study are as follows:

- H01: There is no significant effect of the artificial intelligence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.
- H02: There is no significant effect of the digital competence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.
- H03: There is no significant effect of the digital autonomy on the innovative work behaviour among the information technologies professionals in Uttar Pradesh

3. Methodologies

This study utilized an exploratory and descriptive research design. In exploratory research design new information and knowledge was explored as well as hypotheses were formulated and in a cross-sectional descriptive design hypotheses were tested using statistical tools. The correlation-regression analysis as well as structural equation model approach was used in this study. The reliability and validity of the questionnaire was checked using Cronbach's alpha, Bartlet test of significance and Kaiser-Meyer-Olkin (KMO) values. A convergent and discriminant validity was also checked for the four constructs as artificial intelligence, digital competence, digital autonomy and innovative work behavior using average variance extracted (AVE), composite reliability (CR) values, discriminant values. Principal Component Analysis (PCA) method was used to extract each factor loading under each construct.

3.1 Data

The primary data was collected during January 2024 to June 2024 using a web based (Google form) structured questionnaire. The study measured demographic variables such as age, gender, and education using a nominal scale, also referred to as grouping variables, and evaluated artificial intelligence, digital competence, digital autonomy, and innovative work behavior using a 5-point Likert scale stating as 1 code is strongly agree, 5 code is strongly disagree and 3 code is neither agree nor disagree.

3.2 Population & Sampling

The sampling population targeted 2000 to 3000 information technology professionals from Uttar Pradesh but has received only 324 responses from the web-based Google form survey. The primary data was collected using non-probability snowball sampling. This study included each individual information technology professional in Uttar Pradesh, India as the sampling unit.

3.3 Pilot Study

Pilot research was conducted as a preliminary investigation, using a sample size that represented approximately ten percent of the total sample size. The reliability test using Cronbach's alpha. An acceptable value for Cronbach's alpha must be greater than or equal to 0.700. We used the KMO test to assess a sufficient sample. We consider a KMO value of at least 0.60 as the minimum requirement for achieving optimal outcomes. The greater the quality of something, the more elevated its KMO value. We regard a KMO value of 0.848 as outstanding. We assessed the discriminant validity by calculating the AVE value, which represents the extracted average variance.

Table 1. Reliability and Validity Summary

Construct	Cronbach's Alpha	Kaiser-Meyer-Olkin (KMO) Test	% of Variance	Average Variance Extracted (AVE)	Composite Reliability (CR)	Discriminant Value (DV)	Number of Items
Artificial Intelligence	.718	.735	47.478	0.475	0.819	0.689	5
Digital	.784	.815	48.29	0.483	0.848	0.695	6

Competence			5				
Digital Autonomy	.772	.814	47.443	0.474	0.842	0.689	6
Innovative work Behaviour	.764	.801	46.474	0.465	0.838	0.682	6

Source: SPSS 23.0

The table 1 results indicate that all three constructs (artificial intelligence, digital competence, digital autonomy and innovative work behavior) fall within an acceptable range, thereby meeting the reliability and factor analysis conditions. The study also validated the convergent validity criterion, with composite reliability (CR) values exceeding 0.700 and the AVE value near to 0.500. Therefore, the discriminant validity condition was also satisfied, as the discriminant value exceeded the correlation coefficient value (Table 4). Some items under each construct are deleted whose Corrected item-total correlation (CITC) values are below 0.300 under the reliability testing. The component matrix displays the factor loading for each item across all four constructs as follows:

Table 2: Component Matrix**:** Artificial intelligence, Digital Competence, Digital Autonomy, and Innovative work behaviour

Artificial intelligence- Statements	**Loading**
PAI1.1 AI technologies enhance productivity and efficiency in my work tasks.	.717
PAI1.2 I feel comfortable working with AI-driven tools and applications.	.671
PAI1.3 AI systems are capable of making accurate decisions in complex situations.	.707
PAI1.4 AI technologies have the potential to positively impact the future of my career.	.679
PAI1.5 I believe AI technologies will replace human jobs in the near future.	.669
Digital Competence- Statements	
DC1.3 I regularly update my digital skills to keep pace with technological advancements.	.715
DC1.4 I am comfortable learning and adapting to new digital technologies as they emerge.	.655
DC1.5 I can efficiently troubleshoot and resolve technical issues related to digital tools and systems.	.770
DC1.7 I am confident in my ability to analyze data effectively using digital tools and software.	.695
DC1.8 I actively seek opportunities to enhance my digital skills through training and self-study.	.602
DC1.9 I feel equipped to leverage digital technologies to innovate and improve work processes.	.720
Digital Autonomy: Statements	
DA1.1 I have the freedom to choose the digital tools and platforms that best suit my work needs.	.695
DA1.2 I am encouraged to experiment with new digital technologies to improve my work processes.	.518

DA1.3 I feel empowered to make independent decisions regarding the use of digital resources in my work.	.749
DA1.5 I am given the flexibility to manage my digital workload and priorities effectively.	.769
DA1.7 My organization encourages a culture of digital innovation and experimentation.	.689
DA1.9 I feel supported in taking calculated risks when adopting new digital tools or methods.	.684
Innovative work behaviour: Statements	
IWB1.1 I actively seek out new and creative solutions to work-related challenges.	.704
IWB1.3 I regularly engage in brainstorming sessions or discussions to generate innovative solutions.	.696
IWB1.5 I actively collaborate with others to develop and implement innovative projects or initiatives.	.745
IWB1.7 I proactively seek out opportunities to learn about emerging trends and technologies relevant to my work.	.718
IWB1.8 I am comfortable with ambiguity and uncertainty when exploring innovative solutions.	.529
IWB1.9 I am resilient in the face of setbacks or failures encountered during the innovation process.	.678

Source: SPSS 23.0

According to the component matrix table 2, it is clear that all items under each construct is extracted using Principal Component Analysis (PCA) method. The factor loading of each item under each construct is above 0.5 which is acceptable for further statistical analysis.

4. Results

4.1 Corelation and Regression

The cause-and-effect analysis was tested using corelation and regression analysis. The corelation analysis explored how each variable is correlated with other variable whether positive or negative or low or high. The regression analysis finds the cause-and-effect relationship with the magnitude and strength of the relationship between variables. The correlation and regression analysis are discussed as underusing SPSS 23.0 version software.

Table 3: Correlations

		Innovative Work Behaviour	**Artificial Intelligence**	**Digital Competence**	**Digital Autonomy**
Pearson Correlation	Innovative Work Behaviour	1.000	.622	.721	.578
	Artificial Intelligence	.622	1.000	.428	.485
	Digital Competence	.721	.428	1.000	.353
	Digital Autonomy	.578	.485	.353	1.000
Sig. (1-tailed)	Innovative Work Behaviour	.	.000	.000	.000
	Artificial Intelligence	.000	.	.000	.000
	Digital Competence	.000	.000	.	.000
	Digital Autonomy	.000	.000	.000	.

N	Innovative Work Behaviour	324	324	324	324
	Artificial Intelligence	324	324	324	324
	Digital Competence	324	324	324	324
	Digital Autonomy	324	324	324	324

Source: SPSS 23.0

According to the correlation table 3, it is clear that the Pearson Correlation coefficients are 0.622, 0.721, 0.578 for artificial intelligence, digital competence, and digital autonomy respectively, hence artificial intelligence, digital competence, and digital autonomy were positive moderate, high, and moderate significant (0.000, 0.000, 0.000) correlated with innovative work behaviour among information technology professionals in Uttar Pradesh.

First Regression Model
Y (innovative work behaviour) = a + b X (artificial intelligence)
Second Regression Model
Y (innovative work behaviour) = a + b X (digital competence)
Third Regression Model
Y (innovative work behaviour) = a + b X (digital autonomy)
Where a and b are the constants

Table 4: Variables Entered/Removed

Model	**Variables Entered**	**Variables Removed**	**Method**
1	Digital Autonomy, Digital Competence, Artificial Intelligence[b]	.	Enter
a. Dependent Variable: Innovative Work Behaviour			
b. All requested variables entered.			

Source: SPSS 23.0

According to the variables Entered/Removed table 4, it is clear that artificial intelligence, digital competence and digital autonomy are the independent variables whereas innovative work behaviour is the dependent variable. The enter regression method is used in this study.

Table 5: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Change Statistics**				
					R Square Change	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.832[a]	.692	.689	.21849	.692	240.062	3	320	.000
a. Predictors: (Constant), Digital Autonomy, Digital Competence, Artificial Intelligence									

Source: SPSS 23.0

According to the model summary table 5, the R square value is 0.692, hence 69.2% variance is explained the innovative work behaviour dependent variable by combined all the three independent variables as digital autonomy, digital competence, artificial intelligence.

Table 6: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.380	3	11.460	240.062	.000[b]
	Residual	15.276	320	.048		
	Total	49.657	323			
a. Dependent Variable: Innovative Work Behaviour						
b. Predictors: (Constant), Digital Autonomy, Digital Competence, Artificial Intelligence						

Source: SPSS 23.0

According to the ANOVA table 6, it is clear that F value is (240.062) and significant (0.000) , hence the selected model is highly significant for the further interpretation of the coefficient table which explained about the magnitude and strength of the relationship between independent and dependent variable.

Table 7: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	SiZ.	Results	Hypothesis
		B	Std. Error	Beta				
1	(Constant)	-.201	.182		-1.101	.272		
	Artificial Intelligence	.293	.040	.276	7.386	.000	Significant	H01 Rejected
	Digital Competence	.492	.034	.510	14.607	.000	Significant	H02 Rejected
	Digital Autonomy	.268	.037	.264	7.331	.000	Significant	H03 Rejected

Source: SPSS 23.0

According to the coefficient table 7, it is clear that for (Artificial Intelligence, Digital Competence, Digital Autonomy), the significant value is (0.000,0.000,0.000) respectively, hence it is safe to reject the all the three null hypothesis (H01: There is no significant effect of the artificial intelligence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh., H02: There is no significant effect of the digital competence on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.. and H03: There is no significant effect of the digital autonomy on the innovative work behaviour among the information technologies professionals in Uttar Pradesh) and it can be concluded that there was a significant effect of the artificial intelligence, digital competence and digital autonomy on the innovative work behaviour among the information technologies professionals in Uttar Pradesh. The regression equation can be formulated as

First Regression Model
Y (innovative work behaviour) = -.201 + (.276) X (artificial intelligence)
Second Regression Model
Y (innovative work behaviour) = -.201 + (.510) X (digital competence)
Third Regression Model
Y (innovative work behaviour) = -.201 + (.264) X (digital autonomy)

Based on the above regression equation**,** it can be concluded that by increasing one unit in the artificial intelligence, then there was an increase of 0.276 unit in the innovative work behaviour, and by increasing one unit in the digital competence, then there was an increase of 0.510 unit in the innovative work behaviour, and by increasing one unit in the digital autonomy, then there was an increase of 0.264 unit in the innovative work behaviour, therefore it can be finally concluded that digital competence having the largest impact on the innovative work behaviour among the information technology professionals in Uttar Pradesh, India.

4.2 Structural Model
A structural model is a component of structural equation modeling (SEM) that specifies and tests the hypothesized relationships between latent constructs, capturing the causal pathways and interdependencies within a theoretical framework. Unlike the measurement model, which focuses on the relationships between observed variables and latent constructs, the structural model examines the direct, indirect, and mediating effects among latent variables. The structural model discusses the direct and mediation effects; the output of the AMOS 23.0 version looks like this:

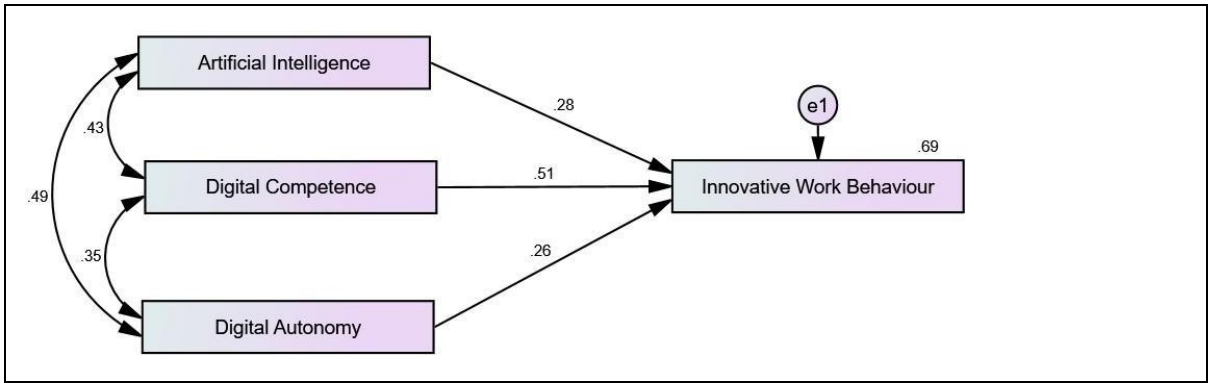

Figure 2: Structural Model: Standardized Estimate
Source: AMOS 23.0

The figure 2 depicts the standardized estimate of the structural model of the conceptual research model. The error variable is represented by the e1. The correlation coefficients (0.49, 0.43, 0.35) are shown among the three independent variables as artificial intelligence, digital competence and digital autonomy. The squared multiple correlation coefficient analogous top the R square is 0.69 that imply the 69.0% variance is explained towards the innovative work behaviour by all, the three independent variables. The standardized coefficient are 0.28, 0.51, and 0.26 for three independent variables towards dependent variable.

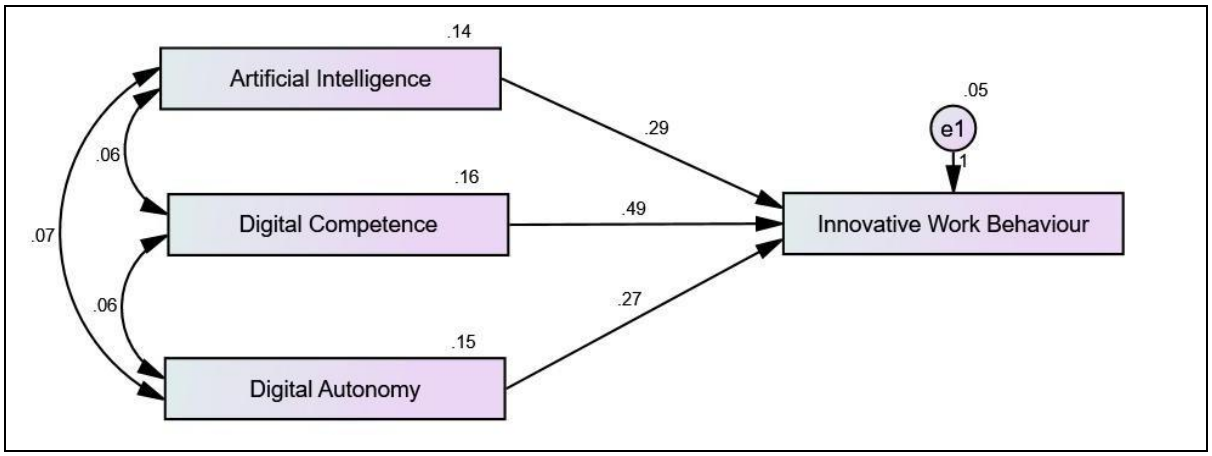

Figure 3: Structural Model: Unstandardized Estimate
Source: AMOS 23.0

The figure depicts the unstandardized estimate of the structural model of the conceptual research model. The error variable is represented by the e1. The covariance coefficients (0.07, 0.06, 0.06) are shown among the three independent variables as artificial intelligence, digital competence and digital autonomy. The variance is 0.17, 0.16, 0.15, 0.05 for all, the three independent variables and error variables. The unstandardized coefficient is 0.29, 0.49, and 0.27 for three independent variables towards dependent variable.

Table 8: Unstandardized Regression Weights

Direct Path			**Estimate**	**S.E.**	**C.R.**	**P**	**Result**	**Hypothesis**
IWB	<---	AI	.293	.040	7.420	***	Significant	H01 Rejected
IWB	<---	DC	.492	.034	14.676	***	Significant	H02 rejected
IWB	<---	DA	.268	.036	7.365	***	Significant	H03 Rejected

Source: AMOS 23.0
According to the unstandardised regression weight table 8, it is clear that for the direct path (IWB <---AI, IWB <--- DC, IWB<---DA), the significant value is (0.000, 0.000, 0.000) is less than 0.05, hence it is safe to reject the all three null hypotheses, therefore it can be concluded that that there was a significant effect of the artificial intelligence, digital competence and digital autonomy on the innovative work behaviour among the information technologies professionals in Uttar Pradesh.

Table 9: Standardized Regression Weights

Direct Path			**Estimate**
IWB	<---	AI	.276
IWB	<---	DC	.510
IWB	<---	DA	.264

Source: AMOS 23.0

According to the unstandardised regression weight table 9, it is clear that for the direct path (IWB <---AI, IWB <--- DC, IWB<---DA), the unstandardised regression coefficients are (0.276, 0.510, 0.264) , hence it can be concluded that by increasing one unit in the artificial intelligence, then there was an increase of 0.276 unit in the innovative work behaviour, and by increasing one unit in the digital competence, then there was an increase of 0.510 unit in the innovative work behaviour, and by increasing one unit in the digital autonomy, then there was an increase of 0.264 unit in the innovative work behaviour, therefore it can be finally concluded that digital competence having the largest impact on the innovative work behaviour among the information technology professionals in Uttar Pradesh, India.

Table 10: Covariances

Covariance Path			**Estimate**	**S.E.**	**C.R.**	**P**	**Label**
AI	<-->	DC	.064	.009	7.073	***	Significant
DC	<-->	DA	.055	.009	5.981	***	Significant
AI	<-->	DA	.069	.009	7.846	***	Significant

Source: AMOS 23.0

According to the covariance table 10, it is clear that for all three covariance paths (AI <-->DC, DC<--> DA, AI<-->DA) are significant (0.000. 0.000, 0.000) with correlation coefficient estimates are (0.64, 0.55, 0.69) , and standard error (0.009, 0.009, 0.009) with critical ratio (7.073, 5.981, 7.846) which is within the acceptable range.

Table 11: Correlations

Corelation Path			**Estimate**
AI	<-->	DC	.428
DC	<-->	DA	.353
AI	<-->	DA	.485

Source: AMOS 23.0

According to the Correlations table 11, it is clear that correlation coefficients are 0.428, 0.353, 0.485 for the correlation path (AI <-->DC, DC<--> DA, AI<-->DA), hence artificial intelligence, digital competence, and digital autonomy were positive moderate, high, and moderate significantly correlated with innovative work behaviour among information technology professionals in Uttar Pradesh.

Table 12: Variances

Independent Construct and Error Variable	**Estimate**	**S.E.**	**C.R.**	**P**	**Label**
AI	.135	.011	12.708	***	Significant
DC	.165	.013	12.708	***	Significant
DA	.149	.012	12.708	***	Significant
e1	.047	.004	12.708	***	Significant

Source: AMOS 23.0

According to the variance table 12, it is clear that for all three independent variable and error variable paths (AI, DC<DA, and e1) are significant (0.000. 0.000, 0.000) with estimates are

(0.135,0.165,0.149, and 0.047), and standard error (0.011, 0.013, 0.012, 0.004) with critical ratio (12.708, 12.708,12.708, 12.708) which is within the acceptable range.

5. Discussion and Conclusion

The innovative work behavior of the Uttar Pradesh IT professionals is significantly influenced by key factors such as digital competence, digital autonomy, and artificial intelligence. In a rapidly evolving technological landscape, these elements play a crucial role in shaping the way professionals approach their work, driving innovation, and enhancing productivity. Among these factors, digital competence stands out with the highest significant effect on the innovative work behavior of IT professionals in this region. Digital competence refers to the skills, knowledge, and ability to effectively use digital technologies. As the IT industry continues to grow and evolve, professionals must be equipped with the necessary digital skills to keep pace with new developments and expectations. This includes not just technical proficiency, but also an understanding of how to leverage digital tools for creativity and problem-solving. The findings suggest that for every one-unit increase in digital competence, there is a corresponding increase in innovative work behavior by 0.510 units. This underscores the importance of ongoing education and training in fostering an environment where innovation can thrive. Digital autonomy also plays a critical role, with a significant impact of 0.264 units increase in innovative work behavior for every one unit increase in autonomy. Digital autonomy refers to the degree to which professionals can make independent decisions regarding the use of digital tools and processes in their work. This independence enables IT professionals to experiment, explore new ideas, and implement solutions without the constraints typically imposed by rigid organizational structures. When individuals have the freedom to exercise their judgment and creativity, they are more likely to engage in innovative behaviors that contribute to their organization's success. Artificial intelligence (AI) is another influential factor in shaping innovative work behavior, with a 0.276-unit increase observed for every unit increase in AI integration. (Tang et al., 2023) found that AI has a significant effect on the worker productivity. The introduction of AI technologies in the workplace can enhance decision-making, automate mundane tasks, and provide insights that drive innovation. As IT professionals become more adept at using AI tools, they can leverage these technologies to improve their work processes and generate new ideas. The synergistic relationship between AI and human creativity can yield transformative results, pushing the boundaries of what is possible in the IT sector. In conclusion, the interplay between digital competence, digital autonomy, and artificial intelligence forms a foundational pillar for fostering innovative work behavior among IT professionals in Uttar Pradesh. (Carvalho et al., 2023) also found the similar findings. As organizations seek to remain competitive in a digital-first economy, investing in the development of these competencies is essential. Training programs aimed at enhancing digital skills, promoting autonomy, and integrating AI technologies can create a conducive environment for innovation to flourish. The implications of this research extend beyond individual professionals to encompass organizational strategies. Companies that encourage a culture of digital fluency and autonomy are likely to see a more engaged workforce that is motivated to innovate. By prioritizing these areas, organizations can harness the full potential of their IT teams, driving not only improved performance but also contributing to the overall advancement of the industry in Uttar Pradesh and beyond. Ultimately, as we navigate the complexities of the digital era, understanding and enhancing the innovative capabilities of IT professionals will be pivotal for their growth and the growth of the industry at large. The findings from this study serve as a critical reminder that fostering a skilled, empowered, and technologically savvy

workforce is essential for success in the increasingly competitive landscape of information technology.

Ethical considerations

The questionnaire included a 'Consent Form to Data Confidentiality', requiring respondents to sign a confidentiality agreement to keep their data confidential for the research work only. The study methods were conducted in accordance with the university's approved guidelines.

Consent to participate

The information technology professionals / participants provided their written informed consent to participate in this study.

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Data availability

The study's original contributions are included in the article/supplementary material, and inquiries can be directed to the corresponding author.

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