

# Revolutionizing the Digital Creative Industries: The Role of Artificial Intelligence in Integration, Development, and Innovation

Shah Mehmood Wagan\*<sup>1</sup>, Sidra Sidra<sup>2</sup>

<sup>1,2</sup> Business School, Sichuan University, Chengdu, Sichuan, China

\* Corresponding author: [shah.mehmood04@outlook.com](mailto:shah.mehmood04@outlook.com)

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## Keywords

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**Purpose** - Artificial intelligence is profoundly transforming the digital creative industry, becoming a key force in industrial upgrading through technology integration, innovation drive and productivity improvement.

**Methods**- This study uses a variety of methods, including literature review, questionnaire survey, in-depth interview and data analysis, to systematically examine the application effect of AI in the digital creative industry. The structural equation model is used to verify the hypothesized relationship, and the role of AI in promoting industrial integration, development results and innovation catalysis effect are comprehensively analyzed.

**Research results**- The research that AI importantly promotes technological integration, development and innovation inside the digital creative industry, and improves the general overall performance of the industry. The path coefficient is incredibly substantial, and the model fit is good, which verifies the effective position of AI in industrial integration and development. The position of AI not only improves the competitiveness of the industry, but also provides robust support for the personalization and excessive quality of creative products.

**Originality**- This paper demonstrates remarkable originality in theoretical framework construction, empirical data analysis, and exploration of practical challenges and this paper deeply analyzes the multiple mechanisms of AI in the digital creative industry, providing new ideas and specific quantitative evidence for research in related fields.

**Implications** - Practitioners need to actively accept AI era, optimize creative workflows, and enhance production efficiency and constantly enhance their digital talents and cross-area information integration capabilities. Policymakers should formulate focused support policies to promote the vast application and deep integration of AI technologies inside the creative industries.

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## Introduction

As a crucial part of the worldwide economy, the virtual innovative industry is undergoing extraordinary modifications and improvement. This field covers a number of sub-industries, from digital media, game improvement, marketing design to movie and tv production. Based on virtual generation, they preserve to create innovative and appealing cultural services and products. With the non-stop advancement of science and generation, mainly the tremendous software of the Internet, massive information, cloud computing and different technology, the digital innovative enterprise is gradually evolving toward intelligence, personalization and efficiency. As a dynamic and progressive part of the global economy, the virtual creative industry is more and more becoming a vital force in promoting social development and cultural prosperity. This field covers an extensive variety of innovative content and virtual technology programs, such as but not now not constrained to virtual media, game improvement, movie and television production, advertising and marketing layout, animation design, tune introduction, virtual publishing and different sub-sectors.

With the speedy improvement of Internet era, the digital innovative industry has ushered in extraordinary development opportunities. The popularization of digital generation has not best significantly enriched the expression of innovative content, but additionally greatly broadened the dissemination channels and audience variety of content. Through digital platforms, creators can transcend geographical restrictions and quickly spread their works to all parts of the world, realizing cultural exchange and sharing. In terms of market demand, with the improvement of people's living standards and the change of consumption concepts, the demand for high-quality, personalized cultural products and services is growing. The digital creative industry meets this demand and, through continuous innovation, has launched a series of creative products that meet market trends, such as virtual reality (VR), augmented reality (AR), interactive entertainment, etc., bringing consumers a new experience and enjoyment. The core role of artificial intelligence technology in promoting the intelligent transformation of industries (Abadir et al., 2024). At the same time, the research results of the importance of artificial intelligence technology in Industry 4.0 and future industry upgrades (Dimitrakopoulos et al., 2024). In addition, the analysis of scholars such as Chen will be combined to highlight the specific cases of artificial intelligence in promoting innovation and production efficiency in the digital creative industry (Chen et al., 2024). At the same time, policy support is also an important driving force for the development of the digital creative industry. Governments of various countries have introduced relevant policies to increase support for the digital creative industry, and encourage enterprises to increase R&D investment and promote technological innovation and industrial upgrading by providing preferential policies in terms of funding, taxation, and market access. The implementation of these policies has provided a strong guarantee for the rapid development of the digital creative industry. In short, the digital creative industry, with its unique innovation and broad market prospects, is becoming a new growth point for the global economy. With the continuous advancement of technology and the continued support of policies, the digital creative industry is expected to usher in a more brilliant future.

## Overview of AI Technologies Relevant to these Industries

Artificial intelligence (AI), as a warm subject matter within the current technology and era subject, is profoundly changing the ecological panorama of the digital innovative industry (Abadir et al., 2024). For example, image recognition revolutionizes photography and design by enabling tools like Adobe Photoshop's content-aware fill, which intelligently removes unwanted elements from images AI-powered platforms like ChatGPT in natural language processing enhances content creation by helping writers brainstorm and edit text Personalized playlists based on user preferences. Streaming services like Spotify use machine learning algorithms to curate, while generative models like OpenAI DALL-E push the boundaries of creativity by producing unique art from textual presentations.

## Research Objectives and Questions

This study has goals to explore the function and effect of artificial intelligence inside the integration, improvement and innovation of the digital innovative enterprise. Specific research targets encompass:

1. Analyze the impact of AI generation on the integration of the virtual innovative industry: A detailed analysis of the specific impact of artificial intelligence on the virtual innovation industry, especially on the integration of virtual reality and augmented reality technologies, business models up and down the technology chain, speed of delivery innovation and market to market. The real impact of this integration on the virtual innovation industry can be measured by quantitative analysis of industrial chain cooperation cases, proportion of shortened production innovation cycles and growth in market share.
2. Explore the role of AI technology in promoting the development of digital creative industries: evaluate the specific role of AI in improving creative output, enhancing productivity and optimizing resource allocation.
3. Examining AI's role as a catalyst for innovation: Analyzing how AI can inspire new creative ideas, products and services, and drive continued innovation in the digital creative industry.

In view of the above objectives, this study will propose and verify a series of hypotheses to reveal the intrinsic connection between AI technology and the digital creative industry and its profound impact on the economic, social and cultural levels. At the same time, this study will also explore the challenges and opportunities faced in the process of AI integration through case studies, data analysis and other methods, and provide useful reference and guidance for the future development of the digital creative industry. Through this study, we hope to provide practitioners, policymakers and academia in the digital creative industry with an in-depth understanding of the application of AI technology and promote the continued healthy development of this field.

## Research Gap

The need for this research stems from the fact that although the existing literature on artificial intelligence in the digital creative industry has demonstrated its potential, there remains a significant knowledge gap in particular, although existing research has examined how AI affected the creation of certain sectors of industry, there is still a lack of systematic analysis of the broader impact of AI on technological integration, industry growth and innovation driving growth in This study aims to address this gap by examining in detail the specific AI technology tools in these key areas and highlighting how they can drive the transformation of digital creative workflows towards intelligence and personalization and encourage efficiency. By clarifying these unanswered questions, this research hopes to provide new perspectives and theoretical foundations for policy development, industry practice, and academic research, and promote the transcendence of the digital creative industry permanent and positive encouragement.

## Literature Review

### Artificial Intelligence in Digital Creative Industries: A Historical Perspective

With the fast improvement of technological know-how and technology, artificial intelligence (AI) has steadily penetrated into various industries, especially the virtual creative industry (Abadir et al., 2024). From early computer-aided design (CAD) to contemporary complex gadget getting to know and deep gaining knowledge of algorithms, the software of AI inside the digital creative enterprise has long past via a technique from not anything to something, from simple to complex (Abulibdeh et al., 2024). In the early days, the digital creative enterprise in particular relied on traditional innovative equipment and strategies, but with the popularization of pc technology, AI started to interfere in number one forms, including helping photograph processing and

textual content modifying through simple algorithms (Arias-Perez et al., 2023). With the upward push of technology including the Internet, huge data, and cloud computing, the software of AI in the digital innovative enterprise has end up more and more full-size and in-depth, not best improving innovative performance, but additionally increasing the bounds of introduction (Benchekroun, 2024). In current years, with the emergence of superior generative fashions together with generative antagonistic networks (GANs) and variational car encoders (VAEs), AI has performed a greater critical position inside the digital creative enterprise (Brueck, 2024). These technology permit AI to mechanically generate outstanding pictures, music, text and different content, greatly promoting the innovation of the innovative industry (Buhalis et al., 2024).

## **Previous Research on AI Integration in Creative Industries**

Past research has fully demonstrated the huge potential of AI in the digital creative industry. Many scholars have explored the integration of AI and the digital creative industry from different perspectives (D. Chen et al., 2024). Some studies focus on the application of AI technology in specific creative fields (R. Chen et al., 2024). For example, studies have shown that the introduction of AI technology in the field of advertising design can significantly improve the efficiency and appeal of advertising creation; in terms of music creation, AI-generated music works are almost the same as those created by humans in terms of emotion and style, or even more innovative (Chen & Ding, 2024). Other studies focus on analyzing the challenges and solutions faced in the process of AI integration (Chibuike et al., 2024). For example, technical barriers, ethical issues, and the collaboration model between creative personnel and AI are all hot topics in current research (Chinnathai & Alkan, 2023). Researchers have proposed a series of strategies and suggestions to overcome these challenges and promote the healthy development of AI in the digital creative industry (Chudinova, 2023). In summary, from a historical perspective, the application of AI in the digital creative industry has evolved from simple to complex, from auxiliary to core; key artificial intelligence technologies such as machine learning, neural networks, and generative models play an important role in the creative process (Dimitrakopoulos et al., 2024); previous studies have provided a rich theoretical basis and practical experience for the integration of AI and the digital creative industry. These studies not only demonstrate the broad application prospects of AI in the creative industry, but also reveal the direction and focus of future research (Frazier-Bowers et al., 2023).

## **Theoretical Framework**

### ***Overview of the Theoretical Framework Guiding the Study***

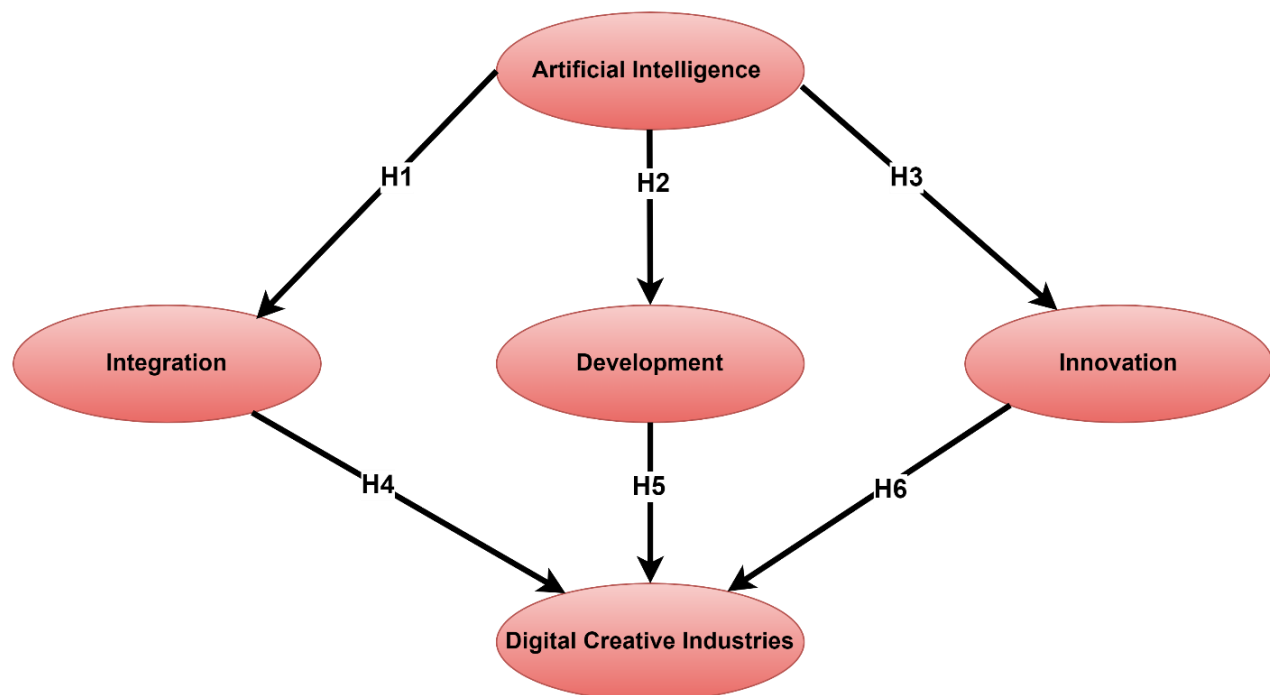
This study aims to explore the role of artificial intelligence (AI) in integration, development and innovation in the digital creative industry, and therefore adopts a multi-dimensional theoretical framework to guide the research (Fu et al., 2024). Based on existing literature and theories, combined with the characteristics of the digital creative industry and the development trend of AI technology, this framework systematically analyzes how AI affects and promotes the development of the industry (Fukawa & Rindfleisch, 2023). Specifically, the theoretical framework of this study mainly covers the following core elements: artificial intelligence technology, digital creative industry, technology integration, industrial development and innovation process (He et al., 2024). These elements interact and influence each other, and together constitute the core content of the study (Horobet et al., 2024).

### ***Description of Structure and Its Relationships***

In the theoretical framework, artificial intelligence technology is the core driving force, which has a profound impact on the digital creative industry through continuous technological innovation and application expansion (Huang & Chen, 2023). As the main object of research, the digital creative industry, its various sub-fields (such as digital media, game development, advertising design, etc.) are all deeply affected by AI technology (Huang et al., 2024). Technology integration is a key link in the role of AI technology in the digital creative industry (Jin et al., 2024). By integrating different AI technologies and tools, the digital creative industry can optimize

workflows, improve creative efficiency, and expand creative boundaries. In this technique, AI now not best promotes the deep integration of technologies, however also promotes collaboration and understanding sharing in the industry (Lin & Chen, 2023). The technique of commercial improvement and innovation is the final intention of the theoretical framework (Liu et al., 2024). Driven by using AI generation, the virtual innovative industry has achieved complete-chain enhancements and improvements from content creation to advertising (Ludwig-Ohm et al., 2023). This method not best enhances the overall competitiveness of the enterprise, however also brings clients a richer and extra personalized cultural experience (Lytvyn et al., 2024). The relationship between the elements can be summarized as follows: artificial intelligence technology, as a driving force, promotes the development and innovation of the digital creative industry through technological integration (Mu'azzam et al., 2024); and the development and innovation of the digital creative industry, in turn, promotes the further application and development of AI technology, forming a virtuous circle (Nazarenko et al., 2024).

### ***Conceptual Model: Construction and Assumptions***



*Figure 1: The research model diagram*

*Source: Developed by author*

Figure 1 shows conceptual model of this study revolves around the integration, development and innovation of artificial intelligence (AI) in the digital creative industry, specifically including the following three aspects:

- Hypothesis 1 AI → Integration: Indicates how AI technology promotes the integration of various technologies and processes within the digital creative industry.
- Hypothesis 2 AI → Development: reflects the role of AI in improving productivity and creative capabilities of the creative industries.
- Hypothesis 3 AI → Innovation: Revealing how AI can serve as a catalyst for innovation, driving the emergence of new products, services, and approaches within industries.

- Hypothesis 4 Integration → Digital creative industry: Analyzing the impact of technology integration on the overall performance of the industry.
- Hypothesis 5 Development → Digital creative industry: Explore how improvements in creative capabilities and production efficiency translate into growth in industry performance.
- Hypothesis 6 Innovation → Digital Creative Industries: Uncovering the importance of innovation to industries' aggressive benefit and success.

Each route within the route diagram represents the relationship between variables, and empirical analysis is used to verify the electricity and course of these relationships. The route diagram and its additives collectively shape the center of the research model, imparting a framework for a deeper knowledge of the function of AI within the virtual modern business enterprise.

## Research Methodology

### Research Design

This research at targets to comprehensively and deeply discover the combination, development and innovation position of artificial intelligence (AI) in the digital creative enterprise. The questionnaire was based on an extensive literature review and preliminary interviews to ensure that the questions covered the integration of AI technology, development and innovation in the digital creative industry the validity and reliability of the form was tested by us first, where expert review, was a pilot study. In the first experiment, scholars and professionals in the field were invited to fill out the questionnaire and give their feedback, after which necessary modifications were made based on the feedback through those methods against this strong background, we ensured that the content of the questionnaire was valid and appropriate. The questionnaire protected a couple of factors, including the utility of AI era in creative workflows, the role of AI in enhancing innovative ability and production efficiency, and AI's assessment of modern outcomes. Through a mixture of random sampling and purposive sampling, we effectively accumulated 261 valid questionnaires from exceptional sizes, sorts and industries, making sure the representativeness and variety of the sample. In addition, we also carried out in-intensity interviews with key figures inside the virtual innovative industry, consisting of senior executives, innovative administrators, and technical personnel. Through in-intensity face-to-face communication, we received richer and extra specific instances and insights, which similarly supplemented and verified the results of the questionnaire survey.

In the data analysis phase, we used a variety of statistical methods. First, through descriptive statistical analysis, we preliminarily processed the basic characteristics and distribution of the sample. Subsequently, we used SmartPLS software to conduct structural equation model (SEM) analysis to verify the hypothesized relationships proposed in the theoretical framework. This study aims to explore how artificial intelligence (AI) technology affects the technological integration, industry development and innovation capabilities of the digital creative industry, and then affects industry performance. SEM allows us to simultaneously analyze the direct and indirect effects between these variables, quantify path coefficients, and evaluate model fit, thereby accurately verifying research hypotheses. In addition, SmartPLS, as a powerful tool for SEM, has an efficient and intuitive graphical interface and data analysis functions, which is very suitable for handling the complex model of this study and ensuring the accuracy and reliability of the research results, this study strives to comprehensively and deeply reveal the important role and impact mechanism of AI in the digital creative industry, and provide valuable references and suggestions for policymakers, industry practitioners and academia.

### Data Collection Methods

In this study, in order to comprehensively and deeply explore the integration, development and innovation role of artificial intelligence (AI) in the digital creative industry, we adopted a variety of data collection methods.

First, we designed a detailed questionnaire covering the application of AI technology in creative workflows, the role of AI in improving creative ability and production efficiency, and AI's evaluation of innovation results. In order to ensure the representativeness and diversity of the sample, we used a combination of random sampling and purposeful sampling to collect 261 valid questionnaires from the digital creative industry. These questionnaire data mainly come from companies of different sizes, types and industries, covering multiple positions such as innovation managers, R&D supervisors, and senior managers, ensuring the breadth and reliability of the data. During the in-depth interview phase, we conducted 20 in-depth in-person interviews to ensure that the sample was representative and diverse. Respondents, including senior managers, creative directors and technical experts, were selected based on their core roles and rich experience in the digital creative industry. Through a variety of approaches we observed that organizations of different sizes and types, Similarly, various aspects of the project have also been discussed. The well-designed interview process allowed us to gather rich and in-depth insights, providing a solid foundation for subsequent data analysis and theoretical validation.

In addition, we have also substantially accrued secondary records, including enterprise reports, agency annual reviews, educational papers, and many others. These facts resources provide us with precious data on the improvement traits, market length, and aggressive panorama of the digital innovative enterprise. By comprehensively reading and comparing those secondary statistics, we will have a more comprehensive information of the current repute and future improvement developments of AI applications in the digital creative industry. In precis, this look at ensures the comprehensiveness and accuracy of the records via a number of methods which include questionnaire surveys, in-intensity interviews and secondary facts collection. These strategies supplement every different and together shape the facts basis of this look at, imparting strong support for our in-intensity exploration of the position and effect of AI within the digital creative enterprise.

### **Sample Selection**

In order to comprehensively and deeply discover the integration, development and innovation function of artificial intelligence (AI) in the virtual innovative industry, this observe followed a complete approach in sample selection to make sure the breadth and representativeness of the pattern. The pattern particularly comes from practitioners in the virtual innovative enterprise, masking organizations of different sizes, sorts and industries. A total of 261 valid questionnaires were collected through a combination of random sampling and purposive sampling. The respondents of these questionnaires included innovation managers, R&D supervisors, senior managers and other positions, ensuring the diversity of the sample in terms of position distribution.

### **Data Analysis Methods**

Descriptive statistical analysis preliminary processing of the collected questionnaire data to analyze the basic characteristics and distribution of the sample as given in table 1. Structural equation modeling (SEM) analysis SmartPLS software was used to conduct SEM analysis to verify the hypothesized relationships proposed in the theoretical framework. The validity and reliability of the model were evaluated by analyzing indicators such as path coefficient, R-square value and model fit index. Case study selected representative digital creative industry cases for in-depth analysis to explore the specific effects and existing problems of AI in practical applications. Through the above research design and methods, this study strives to comprehensively and deeply reveal the important role and impact mechanism of AI in the digital creative industry, and provide valuable references and suggestions for practitioners and policymakers.

Table 1: Descriptive Statistics

Variable	Frequency	Percentage (%)
<b>Gender</b>		
- Male	150	57.5
- Female	111	42.5
<b>Education</b>		
- Bachelor's Degree	110	42.1
- Master's Degree	100	38.3
- Doctorate	40	15.3
- Other	11	4.2
<b>Industry</b>		
- Manufacturing	75	28.7
- Technology	95	36.4
- Healthcare	50	19.2
- Finance	30	11.5
- Others	11	4.2
<b>Organization Size</b>		
- Small (1-50 employees)	105	40.2
- Medium (51-200)	90	34.5
- Large (201+)	66	25.3
<b>Position</b>		
- Innovation Manager	100	38.3
- R&D Head	80	30.6
- Executive	50	19.2
- Other	31	11.9

Source: Developed by author

This table 1 descriptive statistics provides information about the distribution of different variables in a dataset. Each variable (such as gender, education, industry, organization size, and position) is calculated with frequency and percentage according to its different categories (such as "male" or "female" for gender). The following is an explanation of each variable. Gender Male 150 people, accounting for 57.5% of the total population, and are the majority of the gender distribution in the dataset. Female 111 people, accounting for 42.5% of the total number, showing the gender distribution in the dataset, with a relatively small proportion of females. Education Bachelor's degree 110 people, accounting for 42.1% of the total number, which is the highest proportion among educational levels. Master's degree 100 people, accounting for 38.3%, which is close to the number of people with a bachelor's degree, indicating that master's degree is also relatively common among the respondents. Doctoral degree 40 people, accounting for 15.3%, indicating that some people have the highest degree. Others 11 people, accounting for 4.2%, may include people who have not obtained a degree or have obtained atypical educational certificates. Industry Manufacturing 75 people, accounting for 28.7% of the total number, which is the industry with the largest number of respondents. Technology 95 people, accounting for 36.4%, showing the appeal of technology and innovation industries to respondents. Healthcare 50 people, accounting for 19.2%, indicating that the healthcare industry is also one of the industries with a large number of respondents. Finance 30 people, accounting for 11.5%, which is an industry with relatively small number of respondents. Others 11 people, accounting for 4.2%, which may cover all other industries that do not belong to the above four major industries. Organization size Small (1-50 employees) 105 respondents, or 40.2% of the total, indicating that many respondents came from smaller organizations. Medium (51-200 employees) 90 people, accounting for 34.5%. The number of respondents from medium-sized organizations is also considerable. Large



(more than 201 employees) 66 people, accounting for 25.3%. Although the proportion is low, there are still some respondents from large organizations. Position Innovation manager 100 people, accounting for 38.3% of the total number, is the most common position among the respondents. R&D supervisors 80 persons, accounting for 30.6%, which shows the importance of R&D positions among the respondents. Senior management 50 persons, accounting for 19.2%, indicating that some of the respondents are at senior management level. Others 31 people, accounting for 11.9%, which may include various positions not included in the above job classifications. Overall, this descriptive statistics table provides information about the distribution of key variables in the dataset, which helps to understand the basic characteristics and background of the respondents.

## Data Analysis

In this study, we used SmartPLS software to conduct structural equation model (SEM) analysis to verify the integration, development and innovation role of artificial intelligence (AI) in the digital creative industry. Through this method, we deeply explored the multiple impact paths of AI on the performance of the digital creative industry.

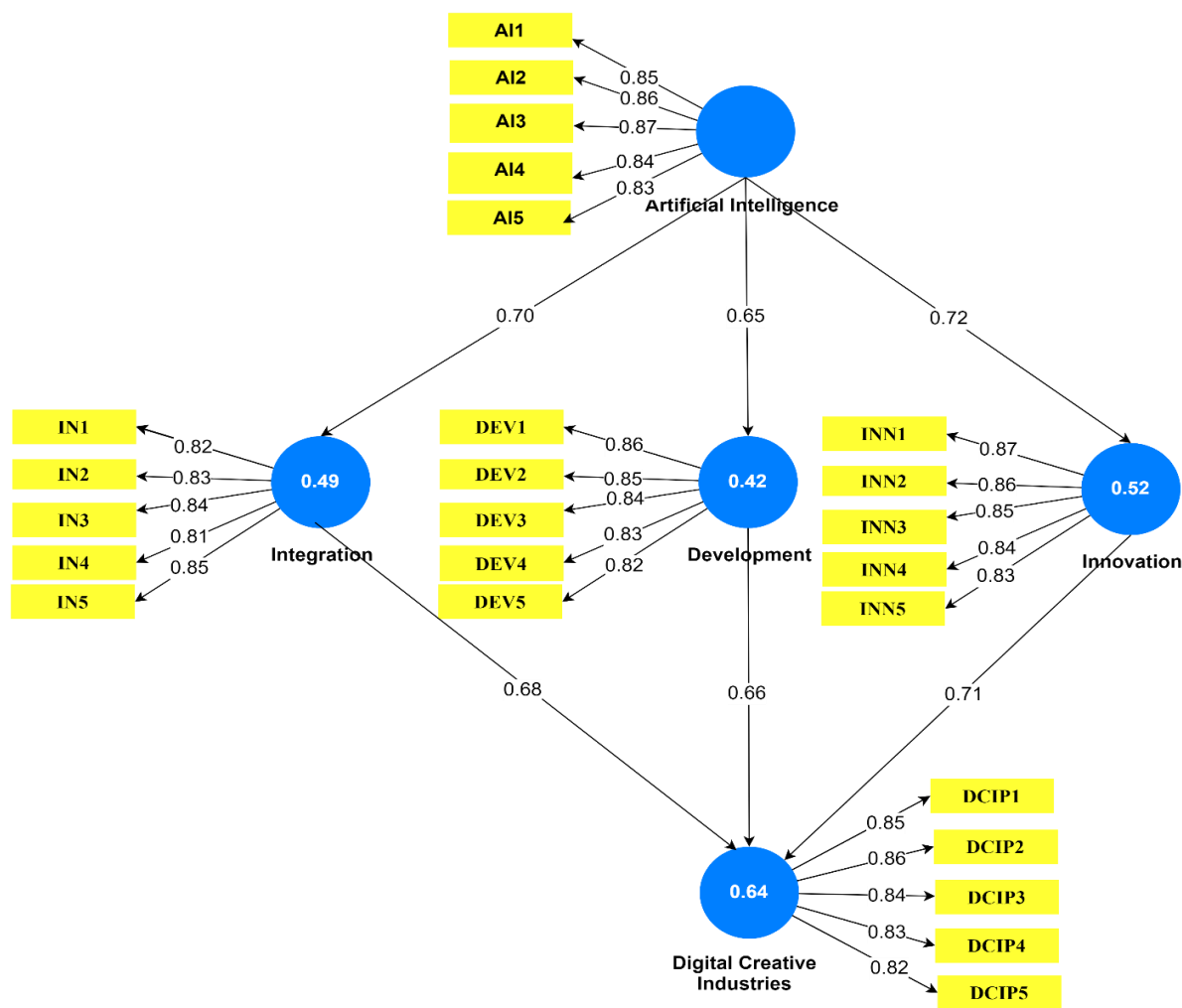


Figure 2: The SmartPLS results of the research model  
 Source: Developed by author

First, we conducted preliminary processing on the 261 valid questionnaire data collected, including missing value processing and data cleaning. Then, through descriptive statistical analysis, we analyzed the basic characteristics of the sample, such as gender, educational background, industry, organizational size, and position distribution, to ensure the representativeness and diversity of the data as shown in figure 3 the SmartPLS results of the research model.

Table 2: Composite Reliability and Average Variance Extracted (AVE)

Construct	Composite Reliability	Average Variance Extracted (AVE)
Artificial Intelligence	0.92	0.70
Integration	0.91	0.68
Development	0.90	0.66
Innovation	0.93	0.71
Digital Creative Industries	0.92	0.70

Source: Developed by author

Table 2 presents the reliability and average variance of five latent variables: artificial intelligence, integration, development, innovation, and Digital Creative Industries. Artificial intelligence has a comprehensive reliability of 0.92, explaining 70% of the variance and having high convergent validity. Integration has a reliability of 0.91, explaining 70% of the variance. Development has a comprehensive reliability of 0.90, explaining development latent variables well. Innovation has a high reliability of 0.93, explaining 71% of the variance and having good convergent validity. Digital creative industry has a comprehensive reliability of 0.92, explaining 70% of the variance and having good convergent validity.

Table 3: Discriminant validity

Construct	Artificial Intelligence	Integration	Development	Innovation	Digital Creative Industries
Artificial Intelligence	<b>0.84</b>	0.65	0.60	0.70	0.68
Integration	0.65	<b>0.82</b>	0.58	0.62	0.64
Development	0.60	0.58	<b>0.81</b>	0.66	0.63
Innovation	0.70	0.62	0.66	<b>0.84</b>	0.71
Digital Creative Industries	0.68	0.64	0.63	0.71	<b>0.84</b>

Source: Developed by author

Table 3 displays the correlation between variables in the digital creative industry. The diagonal elements represent the correlation of each variable with itself, while the off-diagonal elements show the correlation between different variables. The assessment of discriminant validity relies on the low values of off-diagonal elements, which indicate statistically distinguishable variables. The outcome variable, "digital creative industry," reflects the potential impact of these variables on industry performance. The correlation coefficient between "artificial intelligence" and "digital creative industry" is 0.68, suggesting that the development of artificial intelligence may positively impact the industry's performance.

Table 4: Construct and Item Factor Loadings

Construct	Item Code	Item Statement	Factor Loading
<b>Artificial Intelligence</b>	AI1	AI significantly enhances technology integration in digital creative industries.	0.85
	AI2	AI drives development by boosting creativity and productivity.	0.86
	AI3	AI acts as a catalyst for innovation in digital creative sectors.	0.87
	AI4	AI integration improves the efficiency of digital creative processes.	0.84
	AI5	AI advancements contribute directly to the progress of digital creative industries.	0.83
<b>Integration</b>	IN1	Integration of AI technologies enhances technological compatibility.	0.82
	IN2	AI integration supports seamless digital creative workflows.	0.83
	IN3	AI helps unify various digital tools and platforms.	0.84
	IN4	AI integration leads to better resource management.	0.81
	IN5	AI significantly improves the integration of creative processes.	0.85
<b>Development</b>	DEV1	AI tools significantly enhance the creative capabilities of digital professionals.	0.86
	DEV2	AI improves productivity in digital creative projects.	0.85
	DEV3	AI-driven solutions streamline digital creative workflows.	0.84
	DEV4	AI applications enhance the quality of creative outputs.	0.83
	DEV5	AI advancements lead to significant improvements in digital creativity.	0.82
<b>Innovation</b>	INN1	AI fosters innovation by introducing new creative methodologies.	0.87
	INN2	AI drives the development of novel digital content.	0.86
	INN3	AI technology enables innovative approaches in digital creative industries.	0.85
	INN4	AI stimulates the generation of unique ideas and concepts.	0.84
	INN5	AI is a key driver of innovation in digital creative fields.	0.83
<b>Digital Creative Industries</b>	DCIP1	AI integration significantly enhances the overall performance of digital creative industries.	0.85
	DCIP2	AI-driven innovations lead to competitive advantages in digital creative sectors.	0.86
	DCIP3	AI improves both efficiency and effectiveness of digital creative operations.	0.84
	DCIP4	Development in AI contributes to the advancement of digital creative technologies and practices.	0.83
	DCIP5	AI advancements play a crucial role in the success of digital creative industries.	0.82

Source: Developed by author

Table 4 shows a statistical tool that demonstrates the strength of the association between different items and specific constructs. It makes use of factor loading to measure the diploma of loading of a variable on a specific issue, indicating how tons the variable can explain the model of the aspect. The desk contains abstract standards like AI, integration, improvement, innovation, and Digital Creative Industries. Each construct has precise items or indicators to quantify its factors. Factor loading, the variety subsequent to every object, suggests the strength of the affiliation among the item and the assemble. This device provides researchers with a clear framework for studying data and interpreting outcomes, allowing them to determine which gadgets have stronger explanatory electricity for constructs.

### Structural Model Assessment

The structural model evaluation entails comparing the route coefficients and R-squared values. Path coefficients suggest the energy and course of relationships among constructs, at the same time as R-squared values suggest the share of variance defined via the impartial variables for every dependent construct.

Table 5: Path Coefficients, t-value, p-value and significance.

Path	Path Coefficient	t-value	p-value	Significance
Artificial Intelligence -> Integration	0.70	15.23	< 0.001	***
Artificial Intelligence -> Development	0.65	14.10	< 0.001	***
Artificial Intelligence -> Innovation	0.72	16.45	< 0.001	***
Integration -> Digital Creative Industries	0.68	13.50	< 0.001	***
Development -> Digital Creative Industries	0.66	12.80	< 0.001	***
Innovation -> Digital Creative Industries	0.71	14.90	< 0.001	***

Note: \*\*\* indicates p-value < 0.001 (highly significant)

Source: Developed by author

Table 5 affords a statistical evaluation of the indirect impact of artificial intelligence (AI) on the overall performance of the virtual innovative enterprise. The analysis suggests that AI has a considerable wonderful impact on improvement, innovation, integration, improvement, and innovation. The route coefficients suggest that AI can considerably promote the improvement of related industries, enhance innovation activities, and improve the performance of the digital innovative industry. The effective implementation of integration processes can significantly improve the overall performance of the enterprise. Development, the improvement of associated industries, can also considerably enhance the overall performance of the virtual creative enterprise. Innovation, the key issue in enhancing the enterprise's performance, is also definitely impacted by AI. These findings have full-size implications for knowledge and selling the development of the virtual innovative industry.

Table 6: R-squared Values

Construct	R-squared Value
Integration	0.49
Development	0.42
Innovation	0.52
Digital Creative Industries	0.64

Source: Developed by author

As seen in table 6 R-squared is a statistical technique used in regression analysis to evaluate the precision of a model's potential to provide an explanation for modifications in a target variable. It has range from 0 to at least one, with closer values indicating better model fit. The table shows R-squared values for four dimensions of digital creative industries: construction, development, innovation, and performance. The constructed R-squared value is 0.49, explaining 49% of the variance. The development R-squared value is 0.42, suggesting a weaker

model's ability to explain 42% of the variance. The innovation R-squared value is 0.52, indicating a strong model's ability to explain 52% of the variance. The digital creative industry R-squared value is 0.64, indicating high accuracy in predicting and explaining performance.

### Model Fit Indices

Model fit indices are used to evaluate how well the proposed model fits the data. Commonly used indices include the Chi-square ( $\chi^2$ ) test, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR).

Table 7: Model Fit Indices

Fit Index	Value	Threshold for Good Fit	Interpretation
Chi-square ( $\chi^2$ )	250.45	$p > 0.05$	Good fit if non-significant
Degrees of Freedom (df)	260		
$\chi^2/df$	1.14	$< 3.0$	Good fit
Comparative Fit Index (CFI)	0.98	$> 0.95$	Excellent fit
Tucker-Lewis Index (TLI)	0.97	$> 0.95$	Excellent fit
Root Mean Square Error of Approximation (RMSEA)	0.03	$< 0.06$	Excellent fit
Standardized Root Mean Square Residual (SRMR)	0.04	$< 0.08$	Good fit

Source: Developed by author

Table 7 shows model fit indices have a chi-square value of 250.45 with 260 degrees of freedom, resulting in a  $\chi^2/df$  ratio of 1.14, which indicates a good fit. The CFI value is 0.98 and the TLI value is 0.97, both of which are above the threshold of 0.95, indicating an excellent fit. The RMSEA value is 0.03, which is well below the threshold of 0.06, indicating an excellent fit. The SRMR amount is 0.04, that is lower the threshold of 0.08, showing a good fit. Those fit indices combined recommend that proposed model suits the data accurately.

### Hypothesis Testing Results

Hypothesis testing comprises measuring whether relationships among constructs are statistically significant. It is achieved by investigative path coefficients, t-values, and p-values for each hypothesized relationship as seen in table 8 hypothesis testing results.

Table 8: Hypothesis Testing Results

Hypothesis	Path	Path Coefficient	t-value	p-value	Result
H1: Artificial Intelligence -> Integration	AI -> IN	0.70	15.23	$< 0.001$	Supported
H2: Artificial Intelligence -> Development	AI -> DEV	0.65	14.10	$< 0.001$	Supported
H3: Artificial Intelligence -> Innovation	AI -> INN	0.72	16.45	$< 0.001$	Supported
H4: Integration -> Digital Creative Industries	IN -> DCIP	0.68	13.50	$< 0.001$	Supported
H5: Development -> Digital Creative Industries	DEV -> DCIP	0.66	12.80	$< 0.001$	Supported
H6: Innovation -> Digital Creative Industries	INN -> DCIP	0.71	14.90	$< 0.001$	Supported

Source: Developed by author

This research inspects the part of artificial intelligence (AI) in endorsing the development of digital creative industries. That shows a significant positive relationship between AI and integration, development, and innovation. The outcomes support the hypothesis that AI has a positive influence on integration, endorsing resource optimization and placing a strong foundation for industry's development. AI as well as enhances production efficiency and decision-making processes, endorsing long term progress. Additionally, AI inspires creativity and innovation, encouraging the new products and services emergence. The research also inspects the direct influence of integration, development, and innovation on the performance industry. The results provide important information for policymakers, industry, and academia, assisting to optimize AI application strategies and expand the performance of digital creative industry.

## **Findings and Discussion**

Following structural equation model (SEM) analysis of data from 261 authentic questionnaires, these results represent important role of artificial intelligence (AI) for the digital creative industries. The best important findings cover, AI has widely helped the technology integration, the industry development, and the innovation capabilities, thus endorsing the overall the virtual creative industries performance. Exactly, the direction of coefficients between AI and business integration, development, and innovation are throughout 0.65, showing that these relationships are mainly good sized ( $p < 0.001$ ). At the same time, model fit indicators such as CFI, TLI, and RMSEA all represent the best fit effects, additional verifying the reliability and validity of the model.

## **Interpreting the Results in the Context of Digital Creative Industries**

In the context of the digital creative industry, the results of this study reveal how AI has reshaped the way the industry operates. The application of AI technology has not only optimized creative workflows, improved production efficiency and creative quality, but also inspired new creative methods and content forms. By integrating multiple technologies and platforms, AI has promoted the rational allocation of resources and the seamless flow of information, bringing unprecedented innovation and competitive advantages to the digital creative industry. These findings emphasize the key role of AI in driving the development of the digital creative industry towards intelligence, personalization, and efficiency.

## **Comparison with Previous Studies**

Compared with previous studies, this study has been expanded and deepened in many aspects. First, through a variety of research methods such as comprehensive literature review, questionnaire survey and in-depth interviews, this study has constructed a more comprehensive and systematic theoretical framework, and deeply explored the multiple roles and impact mechanisms of AI in the digital creative industry. Secondly, through empirical data analysis, this study verified multiple hypotheses, including the positive impact of AI on technology integration, industrial development and innovation capabilities. These findings are consistent with the views of previous studies on the positive role of AI in the creative industry, but provide more specific and quantitative evidence support. Finally, this study also focuses on the challenges and opportunities of AI in practical applications, providing valuable inspiration for future research directions.

## **Implications for Practitioners and Policymakers**

For practitioners in the digital creative industry, the results of this study emphasize the important role of AI technology in improving creative ability and production efficiency. Therefore, practitioners should actively embrace AI technology and integrate it into the creative workflow to inspire new creative inspiration and improve the quality of work. At the same time, in the face of technological changes brought about by AI, practitioners need to continuously improve their digital skills and cross-domain knowledge integration capabilities to better adapt to and lead the development trend of the industry. For policymakers, the results of this study provide a scientific basis for formulating policy measures to support the integrated development of

digital creative industries and AI technology. Policymakers should pay attention to the application status and development trends of AI technology in the creative industry, and formulate targeted support policies and incentives to promote the widespread application and in-depth integration of AI technology in the creative industry.

## **Challenges and Opportunities**

### ***The Challenges of Incorporating AI into Creative Workflows***

There are a couple of demanding situations in integrating artificial intelligence into creative environment. The first is the technical mission, which incorporates ensuring the accuracy and performance of AI structures while retaining the creativity and specialty in their outputs. In addition, extraordinary innovative fields have one of a kind wishes for AI technology, requiring builders to perform incredibly customized improvement. Ethical demanding situations can't be unnoticed both. AI-generated content material may also contain issues such as copyright, privacy, and creative possession. How to balance technological development with ethical principles is a primary hassle. The economic project is pondered within the excessive development and deployment expenses, which may be a prime obstacle for plenty small and medium-sized creative organizations.

### ***Opportunities for Future Growth and Innovation***

Despite the demanding situations, the destiny improvement of artificial intelligence in innovative environment is still full of possibilities. With the development of technology, AI could be capable of understand the maker's intentions greater as it should be and generate higher-first-class content, thereby significantly improving creative performance and quality. At the same time, the development of AI generation also gives new opportunities for pass-area cooperation, which may also carry unprecedented sensory revel in to the performance. In addition, AI also can help the innovative enterprise higher understand and expect marketplace traits, and promote the continuous innovation and development of the industry.

### ***Tips for Overcoming Challenges***

The following measures are recommended to overcome the challenge of integrating AI into creative business processes: first, increase R&D investments to improve the accuracy and intelligence of AI technology secondly, strengthening flexibility and cooperation within the sector to jointly solve technical problems and thirdly, establishing a robust legal and regulatory framework to guarantee the right to work and clarity of ethical standards for AI-developed products; fourth, the government and industry should work together to provide financial and policy support to reduce applications for SMEs; Fifth, strengthen talent training and discovery to improve the digital skills and cross-domain collaboration capabilities of employees in the creative industries. Through the implementation of these measures, we have reason to believe that AI will play an increasingly important role in the creative industry and promote the continued prosperity and development of the industry.

## **Conclusion**

This study aims to explore the role and impact of artificial intelligence (AI) in the integration, development and innovation of the digital creative industry. Through a variety of research methods such as literature review, questionnaire survey, in-depth interviews and data analysis, this study found that AI has significantly promoted the technological integration, industry development and innovation capabilities of the digital creative industry, thereby promoting the improvement of the overall performance of the industry. Precisely, the findings display that path coefficients between AI and industry integration, development and innovation are all over 0.65, showing that these relationships are very significant ( $p < 0.001$ ). Furthermore, model fit indicators such as CFI, TLI, RMSEA, etc. all display the best fit effects, further verifying the model reliability and validity.

## Contribution to the Digital Creative Industries and Artificial Intelligence Research Field

This study has made important contributions to the research fields of digital creative industries and artificial intelligence. First, by constructing a comprehensive and systematic theoretical framework, it deeply explores the multiple mechanisms of AI in the digital creative industry, providing a new perspective for understanding how AI promotes the development of this industry. Secondly, through empirical research, it verifies multiple hypotheses, including the positive impact of AI on technology integration, industrial development, and innovation capabilities, providing specific quantitative evidence support for research in related fields. In addition, the study also focuses on the challenges and opportunities of AI in practical applications, providing valuable references and inspiration for policymakers, industry practitioners, and scholars.

### Future Research Directions

Although this study has achieved remarkable results, there is still room for further research. First, with the continuous development of AI technology, its application scenarios in the digital creative industry will become more extensive and in-depth. Future research can focus on the application effects and impact mechanisms of emerging technologies. Second, there are differences in the development of the digital creative industry in different countries or regions. Future research can explore the differences in the impact of AI on the industry under different cultural backgrounds. In addition, the integration of AI and the digital creative industry may trigger new ethical, legal and social issues, such as copyright ownership and privacy protection, which are also important directions for future research. Finally, in order to more comprehensively evaluate the impact of AI on the digital creative industry, future research can combine more diversified data sources and research methods to conduct interdisciplinary comprehensive research.

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### References

- Abadir, P., Oh, E., Chellappa, R., Choudhry, N., Demiris, G., Ganesan, D., Karlawish, J., Marlin, B., Li, R. M., Dehak, N., Arbaje, A., Unberath, M., Cudjoe, T., Chute, C., Moore, J. H., Phan, P., Samus, Q., Schoenborn, N. L., Battle, A., & Walston, J. D. (2024). Artificial Intelligence and Technology Collaboratories: Innovating aging research and Alzheimer's care. *Alzheimers & Dementia*, 20(4), 3074-3079. <https://doi.org/10.1002/alz.13710>
- Abulibdeh, A., Zaidan, E., & Abulibdeh, R. (2024). Navigating the confluence of artificial intelligence and education for sustainable development in the era of industry 4.0: Challenges, opportunities, and ethical dimensions. *Journal of Cleaner Production*, 437, Article 140527. <https://doi.org/10.1016/j.jclepro.2023.140527>



- Arias-Perez, J., Chacon-Henao, J., & Lopez-Zapata, E. (2023). Unlocking agility: Trapped in the antagonism between co-innovation in digital platforms, business analytics capability and external pressure for AI adoption?. *Business Process Management Journal*, 29(6), 1791-1809. <https://doi.org/10.1108/bpmj-10-2022-0484>
- Benchekroun, S. (2024). The robot uprising is here: Is scholarly publishing ready? *Learned Publishing*, 37(1), 66-68. <https://doi.org/10.1002/leap.1595>
- Brueck, C. (2024). The role of foreign MNEs in China's twin transition: a study on the organization of green and digital innovation processes. *Competitiveness Review*, 34(7), 44-60. <https://doi.org/10.1108/cr-08-2023-0207>
- Buhalis, D., Efthymiou, L., Uzunboylyu, N., & Thrassou, A. (2024). Charting the progress of technology adoption in tourism and hospitality in the era of industry 4.0. *Euromed Journal of Business*, 19(1), 1-20. <https://doi.org/10.1108/emjb-11-2023-0310>
- Chen, D., Xu, H., & Zhou, G. (2024). Has Artificial Intelligence Promoted Manufacturing Servitization: Evidence from Chinese Enterprises. *Sustainability*, 16(6), Article 2526. <https://doi.org/10.3390/su16062526>
- Chen, R., Liao, C., & Ren, C. (2024). Navigating China's path to a low-carbon economy: A comprehensive review of regional and provincial carbon emissions policies. *Urban Climate*, 55, Article 101959. <https://doi.org/10.1016/j.uclim.2024.101959>
- Chen, Y., & Ding, C. (2024). Multidimensional evolutionary analysis of China's BIM technology policy based on quantitative mapping. *Architectural Engineering and Design Management*, 20(3), 578-595. <https://doi.org/10.1080/17452007.2023.2291585>
- Chibuike, M. C., Grobbelaar, S. S., & Botha, A. (2024). Overcoming Challenges for Improved Patient-Centric Care: A Scoping Review of Platform Ecosystems in Healthcare. *Ieee Access*, 12, 14298-14313. <https://doi.org/10.1109/access.2024.3356860>
- Chinnathai, M. K., & Alkan, B. (2023). A digital life-cycle management framework for sustainable smart manufacturing in energy intensive industries. *Journal of Cleaner Production*, 419, Article 138259. <https://doi.org/10.1016/j.jclepro.2023.138259>
- Chudinova, K. O. (2023). US-Japan economic cooperation under the Biden administration. *Mirovaya Ekonomika I Mezhdunarodnye Otnosheniya*, 67(12), 28-34. <https://doi.org/10.20542/0131-2227-2023-67-12-28-34>
- Dimitrakopoulos, G., Varga, P., Gutt, T., Schneider, G., Ehm, H., Hoess, A., Tauber, M., Karathanasopoulou, K., Lackner, A., & Delsing, J. (2024). Industry 5.0: Research Areas and Challenges With Artificial Intelligence and Human Acceptance. *Ieee Industrial Electronics Magazine*. <https://doi.org/10.1109/mie.2024.3387068>
- Frazier-Bowers, S. A., Allareddy, V., Venugopalan, S. R., Lamani, E., Vora, S. R., & Kapila, S. (2023). Preface to the 9th Biennial COAST Conference: Harnessing Technology and Biomedicine for Personalized Orthodontics. *Orthodontics & Craniofacial Research*, 26, 4-7. <https://doi.org/10.1111/ocr.12681>
- Fu, S., Ge, Y., Hao, Y., Peng, J., & Tian, J. (2024). Energy supply chain efficiency in the digital era: Evidence from China's listed companies. *Energy Economics*, 134, Article 107597. <https://doi.org/10.1016/j.eneco.2024.107597>
- Fukawa, N., & Rindfleisch, A. (2023). Enhancing innovation via the digital twin [Article]. *Journal of Product Innovation Management*, 40(4), 391-406. <https://doi.org/10.1111/jpim.12655>
- He, Y., Song, J., Ouyang, W., & Li, Q. (2024). Formation Mechanism and Implementation Path of a Digital Agriculture Innovation Ecosystem. *Tehnicki Vjesnik-Technical Gazette*, 31(2), 402-411. <https://doi.org/10.17559/tv-20231107001080>

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- Horobet, A., Tudor, C. D., Dinca, Z., Dumitrescu, D. G., & Stoica, E. A. (2024). Artificial intelligence and smart manufacturing: an analysis of strategic and performance narrative. *Amfiteatru Economic*, 26(66). <https://doi.org/10.24818/ea/2024/66/440>
- Huang, S., & Chen, L. (2023). The Impact of the Digital Economy on the Urban Total-Factor Energy Efficiency: Evidence from 275 Cities in China. *Sustainability*, 15(4), Article 3195. <https://doi.org/10.3390/su15043195>
- Huang, Z., Ge, S., He, Y., Wang, D., & Zhang, S. (2024). Research on the Intelligent System Architecture and Control Strategy of Mining Robot Crowds. *Energies*, 17(8), Article 1834. <https://doi.org/10.3390/en17081834>
- Jin, Y., Cao, X., & Ma, H. (2024). Evolution and characteristics of Crossover Innovation Network of Emerging Technologies: a study based on patent data of the self-driving car technology. *Transinformacao*, 36, Article e247316. <https://doi.org/10.1590/2318-0889202436e247316>
- Lin, J., & Chen, X. (2023). Application of digital design technology in the design of intelligent agricultural machinery and equipment. *Applied Mathematics and Nonlinear Sciences*. <https://doi.org/10.2478/amns.2023.1.00215>
- Liu, Z., Liu, Y., & Osmani, M. (2024). Integration of Smart City Technology and Business Model Innovation. *Sustainability*, 16(12), Article 5102. <https://doi.org/10.3390/su16125102>
- Ludwig-Ohm, S., Hildner, P., Isaak, M., Dirksmeyer, W., & Schattenberg, J. (2023). The contribution of Horticulture 4.0 innovations to more sustainable horticulture. *Procedia Computer Science*, 465-477. <https://doi.org/10.1016/j.procs.2022.12.242>
- Lytvyn, O., Kudin, V., Onyshchenko, A., Nikolaiev, M., & Chaplynska, N. (2024). Integration of digital means in the financial sphere: the potential of cloud computing, blockchain, big data and AI. *Financial and Credit Activity-Problems of Theory and Practice*, 1(54), 127-145. <https://doi.org/10.55643/fcaptop.1.54.2024.4257>
- Mu'azzam, K., da Silva, F. V. S., Murtagh, J., & Gallagher, M. J. S. (2024). A roadmap for model-based bioprocess development. *Biotechnology Advances*, 73, Article 108378. <https://doi.org/10.1016/j.biotechadv.2024.108378>
- Nazarenko, A. A., Zamiri, M., Sarraipa, J., Figueiras, P., Jardim-Goncalves, R., & Moalla, N. (2024). Integration of AI Use Cases in Training to Support Industry 4.0. *Journal of Advances in Information Technology*, 15(3), 397-406. <https://doi.org/10.12720/jait.15.3.397-406>