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THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING DIGITAL ENTREPRENEURSHIP AMONG UNIVERSITY STUDENTS AND FACULTY MEMBERS

ÜNİVERSİTE ÖĞRENCİLERİ VE ÖĞRETİM ÜYELERİ ARASINDA DİJİTAL GİRİŞİMCİLİĞİN GELİŞTİRİLMESİNDE YAPAY ZEKÂNIN ROLÜ

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ÖZET

Bu çalışma, yapay zekâ boyutlarının (uzman sistemler, akıllı sistemler ve veri analizi), üniversite öğrencileri ve öğretim üyeleri nezdinde dijital girişimciliğin (dijital liderlik, girişimcilik kültürü ve finansman kaynakları) geliştirilmesi üzerindeki etkisini belirlemeyi amaçlamaktadır. Araştırmada betimsel ve analitik yöntem benimsenmiş olup, değişkenleri ölçmek amacıyla geçerlilik ve güvenilirlik testleri yapılmış bir anket formu temel veri toplama aracı olarak kullanılmıştır. Söz konusu anket, 145 üniversite öğrencisi ve öğretim üyesinden oluşan bir örnekleme uygulanmıştır. SPSS istatistiksel paket programı ve hipotezlerin test edilmesine yönelik uygun istatistiksel yöntemler kullanılarak yapılan analizler sonucunda, yapay zekânın boyutları (uzman sistemler, akıllı sistemler ve veri analizi) aracılığıyla dijital girişimcilik üzerinde pozitif bir etkiye sahip olduğu tespit edilmiştir.

Anahtar Kelimeler: Yapay zekâ, dijital girişimcilik, uzman sistemler, akıllı sistemler, veri analizi.

ABSTRACT

This study aims to identify the impact of the dimensions of Artificial Intelligence (expert systems, intelligent systems, and data analysis) on enhancing digital entrepreneurship (digital leadership, entrepreneurial culture, and sources of financing) among university students and faculty members. The study adopted the descriptive and analytical approach and relied on a questionnaire as the primary tool for measuring the variables after verifying its validity and reliability. The questionnaire was distributed to a sample of 145 university students and faculty members. Using SPSS statistical software and a set of appropriate statistical methods to test the hypotheses, the study reached several important findings, most notably the existence of a positive impact of artificial intelligence, through its dimensions (expert systems, intelligent systems, and data analysis), on digital entrepreneurship.

Keywords: Artificial intelligence, digital entrepreneurship, expert systems, intelligent systems, data analysis

1. Introduction

Technological and scientific developments have generated a major scientific renaissance and a digital revolution that has transformed many fields, particularly information and communication technology. This transformation has been accompanied by rapid advances in artificial intelligence, which has become the backbone of digital development.

Artificial intelligence is considered one of the most prominent modern technologies because it plays a vital role in facilitating and accelerating business operations, selecting optimal alternatives, and responding to changes with flexibility and speed. It also provides relevant information according to different situations, thereby achieving highly efficient outcomes.

AI represents a simulation of human intelligence aimed at performing human activities intelligently. It enables the rapid management of big data, supports the development of personalized smart services and products, and enhances innovation across sectors. Furthermore, AI systems can learn from data and make accurate and rapid decisions based on reliable information and deep analytical insights. This creates new opportunities for improving processes and enhancing project management performance.

In today's competitive economic environment, digital entrepreneurship has emerged as a modern and essential concept in business and organizational management. It has become necessary for keeping pace with the continuously evolving labor market. Digital entrepreneurship provides a significant pathway for creating startups and developing large entrepreneurial institutions unrestricted by time and place.

Organizations increasingly integrate business operations with digital technologies to reach broader customer segments. Digital entrepreneurship also contributes to stimulating innovative business models, supporting entrepreneurial projects, and transforming creative ideas into digital products and services marketed online.

In this context, artificial intelligence has become a key tool for promoting digital entrepreneurship within universities. University students and faculty members therefore play a central role in spreading the culture of digital innovation. Through AI applications, they can improve their digital skills, analyze data accurately, and enhance their ability to adopt and develop entrepreneurial projects. AI also empowers entrepreneurs to transform innovative ideas into scalable projects capable of expanding locally and globally through internet technologies and digital platforms.

The comprehensive understanding of the specific mechanisms through which artificial intelligence contributes to enhancing digital entrepreneurship in the university environment is still very limited. While current research heavily focuses on the role of artificial intelligence in business processes and customer interfaces, critical issues such as digital literacy in AI for entrepreneurs, the entrepreneurial autonomy of AI, and the role of AI in enhancing digital entrepreneurship among students and university professors do not receive adequate attention. Therefore, the limited studies have moved from measuring the overall relationship between artificial intelligence and digital entrepreneurship to analysing the relationship between the sub-dimensions of artificial intelligence and digital entrepreneurship, especially when it comes to both students and faculty members. The current study seeks to fill the gap created by the scarcity of research on this relationship by

breaking down the variable of artificial intelligence into its fundamental dimensions and testing its connection with digital entrepreneurship among students and university professors (Barney, 1991). AI technologies can be viewed as dynamic technological resources that enable institutions and entrepreneurs to sense, seize, and reshape opportunities within turbulent conditions, contributing to achieving competitive advantage and developing innovative business models that support the growth of digital entrepreneurship (D. Chen et al., 2022). Furthermore, engaging in entrepreneurship builds self-efficacy by giving individuals hands-on experience in essential startup tasks like feasibility analysis, business planning, and execution, which is crucial when launching a new project (Wardana et al., 2020).

1.1 Research Problem

Artificial intelligence represents a new generation of intelligent systems and has become an urgent necessity due to the accelerating pace of technological development. AI contributes significantly to effective entrepreneurial decision-making, improving operational efficiency by reducing costs and accelerating processes, and analyzing vast amounts of data with speed and precision.

In the contemporary business environment characterized by intense competition and rapid change, entrepreneurial initiatives are essential for creating employment opportunities and enabling digital entrepreneurs among students and faculty members to implement innovative ideas that contribute to the growth of the digital economy.

One of the most important challenges today is the integration of artificial intelligence with digital entrepreneurship, which has become a new economic dynamic for dealing with modern business environments.

Accordingly, the research problem can be formulated as follows:

How does artificial intelligence influence digital entrepreneurship among university students and faculty members?

To answer the research problem, the following hypotheses were formulated:

H01: Artificial intelligence has a statistically significant effect on digital entrepreneurship among university students and faculty members at a significance level of 0.05.

H02: Expert systems have a statistically significant effect on digital entrepreneurship among university students and faculty members at a significance level of 0.05.

H03: Intelligent systems have a statistically significant effect on digital entrepreneurship among university students and faculty members at a significance level of 0.05.

H04: Data analysis has a statistically significant effect on digital entrepreneurship among university students and faculty members at a significance level of 0.05.

1.2 Research Objectives

This study aims to achieve the following objectives :

First, to identify the dimension of artificial intelligence that has the greatest impact on digital entrepreneurship. Second, to determine which dimensions of digital entrepreneurship are most influenced by artificial intelligence. Third, to examine the relationship between

artificial intelligence and digital entrepreneurship among university students and faculty members. Fourth, to highlight the contribution of artificial intelligence in supporting digital entrepreneurship. Finally, to provide recommendations and proposals for universities regarding the role of artificial intelligence in fostering the success of digital entrepreneurship and addressing various challenges efficiently and effectively.

1.3. Literature Review

1.3.1. Concept of Artificial Intelligence

Artificial Intelligence (AI) is a multidisciplinary field of computer science concerned with the development of systems capable of performing tasks that normally require human intelligence, such as learning, reasoning, perception, problem-solving, and decision-making (Russell & Norvig, 2021). AI systems are designed to simulate cognitive functions through algorithms, data processing, and computational models that enable machines to adapt and improve over time (Goodfellow et al., 2016).

In recent years, AI has evolved from rule-based systems to advanced machine learning and deep learning architectures that allow systems to process large-scale data and generate predictive insights (LeCun et al., 2015). According to (Kaplan & Haenlein, 2019), AI can be defined as a system's ability to correctly interpret external data, learn from such data, and use those learnings to achieve specific goals and tasks through flexible adaptation.

Moreover, AI is considered a key driver of the Fourth Industrial Revolution (Schwab, 2016), as it transforms industries through automation, robotics, and intelligent decision-making systems. (Brynjolfsson & McAfee, 2017), emphasize that AI enhances productivity by complementing human capabilities rather than replacing them entirely.

Recent studies highlight that AI plays a central role in digital transformation and entrepreneurship by enabling data-driven decision-making and innovation (Dwivedi et al., 2021; Wamba-Taguimdje et al., 2020). Furthermore, AI technologies such as natural language processing, neural networks, and predictive analytics have become essential tools in modern business ecosystems (Huang & Rust, 2021). Moreover, AI contributes to providing advanced capabilities for market analysis and software development, placing university students' as digital natives' a the forefront of adopting digital entrepreneurships (Nguyen et al., 2025).

1.3.2. Dimensions of Artificial Intelligence

Artificial Intelligence is composed of several interrelated dimensions that contribute to its functionality and application in different domains. In this study, three main dimensions are adopted: expert systems, intelligent systems, and data analysis.

1.3.2.1.Expert Systems

Expert systems are computer programs designed to replicate the decision-making ability of human experts by using knowledge bases and inference engines (Giarratano & Riley, 2005) These systems rely on rule-based logic to solve complex problems within specific domains.

Hayes-Roth et al. (1983) define expert systems as AI programs that embody specialized knowledge to provide advice or make decisions similar to a human expert. In organizational

contexts, expert systems are widely used for diagnosis, planning, forecasting, and decision support (Jackson, 1998).

Recent research highlights that expert systems enhance business efficiency by reducing uncertainty and standardizing decision-making processes (Negnevitsky, 2011; Turban et al., 2015). They are particularly valuable in entrepreneurship where quick and reliable decisions are required under uncertainty conditions (Duan et al., 2019).

1.3.2.2. Intelligent Systems

Intelligent systems refer to advanced AI systems capable of learning from data, adapting to new environments, and making autonomous decisions (Russell & Norvig, 2021). Unlike traditional systems, intelligent systems continuously improve performance through machine learning techniques.

Zhang (2025) argue that intelligent systems are essential for modern digital transformation because they enable predictive analytics and automation. Similarly, Jordan and (Jordan & Mitchell, 2015) emphasize that machine learning allows systems to identify patterns and make decisions without explicit programming.

In business environments, intelligent systems are used in recommendation engines, autonomous systems, predictive maintenance, and financial forecasting (Agrawal et al., 2018). These systems support entrepreneurship by improving efficiency, reducing operational risks, and enhancing strategic decision-making (Huang & Rust, 2021).

Furthermore, intelligent systems contribute to innovation ecosystems by enabling real-time analytics and adaptive business models (H. Chen et al., 2012)

1.4. Data Analysis

Data analysis is a core component of artificial intelligence that involves extracting meaningful insights from large datasets using statistical and computational techniques (Provost & Fawcett, 2013). With the rise of big data, organizations increasingly rely on data analytics to support decision-making processes (Mayer- Shonberger & Cukier, 2013).

According to (H. Chen et al., 2012), big data analytics enables organizations to identify hidden patterns, trends, and correlations that improve business performance. Data-driven decision-making is now considered a critical competitive advantage in modern enterprises (Davenport, 2014).

In entrepreneurship, data analysis helps in customer behavior analysis, market segmentation, risk assessment, and innovation development (Wamba et al., 2017). Furthermore, predictive analytics allows firms to forecast future trends and optimize resource allocation (Shmueli & Koppius, 2010).

Recent studies confirm that data analytics significantly enhances digital entrepreneurship by improving decision accuracy and reducing uncertainty (Del Vecchio et al., 2018).

Digital entrepreneurship refers to entrepreneurial activities that rely on digital technologies to create, develop, and deliver products or services (Zaheer et al., 2019). It represents a new form of entrepreneurship driven by digital platforms, artificial intelligence, and online (Nambisan, 2017).

According to (Hull et al., 2007), digital entrepreneurship involves leveraging digital tools to create innovative business models that are scalable and globally accessible. (Elia et al., 2020) further emphasize that digital entrepreneurship transforms traditional business structures by enabling platform-based value creation.

Digital entrepreneurship is strongly linked to technological innovation and digital transformation (Sussan & Acs, 2017). It enables entrepreneurs to reach global markets, reduce operational costs, and enhance customer engagement through digital channels (Cannamor et al., 2019).

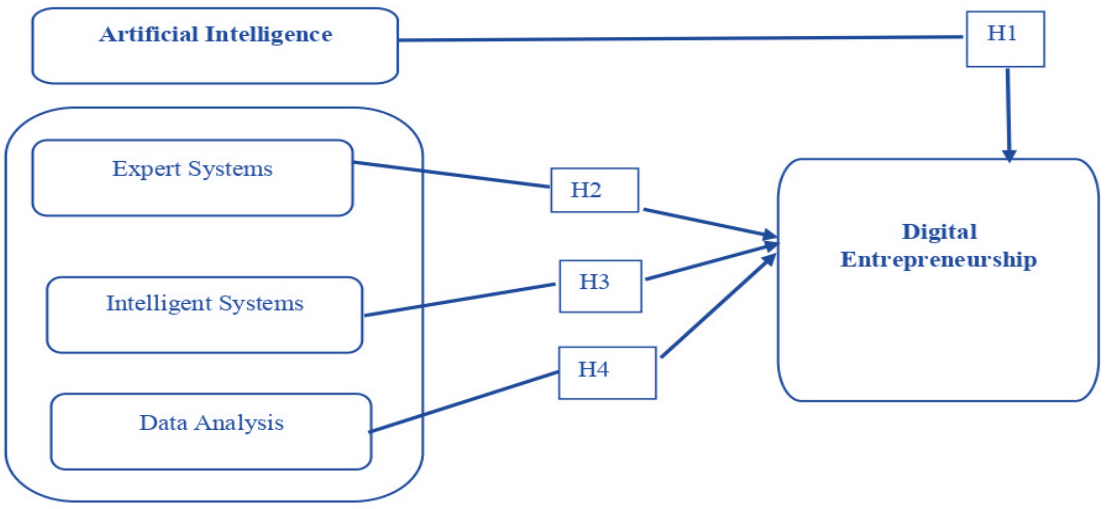
Moreover, AI plays a crucial role in digital entrepreneurship by supporting opportunity recognition, automation, and strategic decision-making (Wamba-Taguimdje et al., 2020). According to (Nambisan et al., 2019), digital entrepreneurship ecosystems are increasingly dependent on data-driven technologies and intelligent systems.

2. Method

2.1. Research Methodology

This study adopted the descriptive-analytical approach to develop the theoretical framework and analyze the relationships among the study variables through the construction of a research model and the formulation of its hypotheses. In addition, a quantitative approach was employed using a questionnaire as the primary data collection instrument. The data were collected from a sample of university students and faculty members and analyzed using SPSS version 26 to test the study hypotheses and validate the proposed model.

Figure 1
Transative Relationship



2.2. Sample of the Study

The study relied on a convenience sampling method. A total of 200 questionnaires were distributed to the study population, which consisted of university students and academic staff. Out of these, 145 questionnaires were returned and considered valid for analysis, while 55 questionnaires were not included due to either incomplete responses, unclear answers, or respondents' unwillingness to provide full information, which could have affected the reliability of the analysis.

2.3. Measurement Development

In this study, measurement scales were adopted from prior research to ensure reliability and measurement validity.

Specifically, the AI adoption scale was adapted from (Nguyen et al., 2025), (Negnevitsky, 2011),and was used to assess the extent to which individuals access, use, and integrate artificial intelligence tools to support learning and activity related to digital entrepreneurship. The digital entrepreneurship scale was adopted from (Nambisan et al., 2019) ; and (Wardana et al., 2020).

All measurement items were adapted from validated scales in prior empirical research. Respondents evaluated each item using a 5-point Likert scale (1) strongly disagree, (2) disagree, (3) undecided, (4) agree and (5) strongly agree.

Table 1
Operationalization of Research Variables

Dimensions	source	No of Items
Expert Systems	(Giarratano & Riley, 2005)	04
Intelligent Systems	(Negnevitsky, 2011)	04
Data Analysis	(Davenport, 2014)	04
Artificial Intelligence	(Nguyen et al., 2025), (Negnevitsky, 2011)	12
Digital Entrepreneurship	(Wardana et al., 2020), (Nambisan et al., 2019)	12

As shown in Table 2, of the respondent, 55.9% were male, and 44.1% were female. Regarding age, the largest proportion of the respondents (35.9 %) belonged to the 41 to 55 age group, whereas the least represented age group was 25-40, accounting for 19.3%. The descriptive statistics also showed that the most prominent category level of respondents was the university faculty members (52.4%), accounting for the vast majority of the sample. The represented were also asked about their specialization, it was observed that the largest proportion represented business administration (37.2%). While Psychology accounted for the least represented specialization.

Table 2
Demographics characterization of sample

Characteristics	Contents	Frequency	Percent %
Gender	Male	81	55.9%
	Female	64	44.1%
Age	Below 25 years	33	22.8
	25-40 years	28	19.3
	41-55 years	52	35.9
	Over 55 years	32	22.1
Respondent Status	Student	69	47.6
	University Faculty Member	76	52.4
Specialization	Business Administration	54	37.2
	Psychology	4	2.8
	law	48	33.1
	Other	39	26.9

3. Methodology

3.1. Descriptive Analysis of Study Variables

This section presents the results obtained through the calculation of the means (arithmetic averages) and standard deviations for the study variables, as follows:

Table 3
Mean and Standard Deviation

No.	Dimensions	Mean	Std. Deviation
01	Expert Systems	3.7724	0.67567
02	Intelligent Systems	3.3483	0.95801
03	Data Analysis	3.4655	0.83366
04	Digital Leadership	2.3707	1.16745
05	Entrepreneurial Culture	3.0397	1.00029
06	Funding Sources	3.0862	1.00320
07	Artificial Intelligence	3.4530	0.44607
08	Digital Entrepreneurship	2.8322	0.98823

The results in Table (03) indicate that the overall mean score for the Artificial Intelligence dimensions reached 3.4530, with a standard deviation of 0.44607, reflecting a relatively high level of agreement among respondents. In contrast, the mean score for Digital Entrepreneurship was 2.8322, with a standard deviation of 0.98823, indicating a moderate level of agreement.

Overall, these findings suggest an acceptable perception among respondents regarding both Artificial Intelligence and Digital Entrepreneurship constructs.

3.2. Validity and Reliability of the Study Instrument

3.2.1. Validity of the Instrument (Construct Validity)

Construct validity was assessed using Pearson correlation coefficients, measuring the relationship between each dimension and the total score of the questionnaire.

Table 4
Construct Validity for Artificial Intelligence

Main Construct	Dimensions	Correlation (r)	Sig.
Artificial Intelligence	Expert Systems	0.445**	0.000
	Intelligent Systems	0.456**	0.000
	Data Analysis	0.473**	0.000

The results show that all Pearson correlation coefficients are statistically significant at the 0.05 level ($p < 0.05$). The correlations range between 0.445 and 0.473, indicating a positive and significant relationship between each dimension and the overall construct. This confirms the construct validity of the Artificial Intelligence scale.

Table 5
Construct Validity for Digital Entrepreneurship

Main Construct	Dimensions	Correlation (r)	Sig.
Digital Entrepreneurship	Digital Leadership	0.926**	0.000
	Entrepreneurial Culture	0.946**	0.000
	Funding Sources	0.935**	0.000

The results confirm statistically significant correlations at the 0.05 level, with values ranging from 0.926 to 0.946, indicating a very strong positive relationship. This provides strong evidence of construct validity for the Digital Entrepreneurship scale.

3.2.2. Reliability of the Instrument

Reliability was assessed using **Cronbach's Alpha** and the **split-half method** to examine the internal consistency of the questionnaire.

Table 6

Cronbach's Alpha and Split-Half Reliability

No.	Dimensions	No. of Items	Split-Half	Cronbach's Alpha
01	Expert Systems	4	0.662	0.816
02	Intelligent Systems	4	0.724	0.861
03	Data Analysis	4	0.704	0.759
04	Digital Leadership	4	0.856	0.930
05	Entrepreneurial Culture	4	0.774	0.863
06	Funding Sources	4	0.782	0.870
07	Artificial Intelligence	12	0.820	0.721
08	Digital Entrepreneurship	12	0.874	0.953
	Overall Questionnaire	24	0.851	0.938

Source: Authors' calculations based on SPSS V26

The results indicate that all reliability coefficients are acceptable and exceed the minimum threshold (0.60–0.70). Cronbach's Alpha for the overall questionnaire reached **0.938**, indicating very high internal consistency. Similarly, Digital Entrepreneurship recorded a very strong reliability value of **0.953**, confirming the stability and consistency of the measurement tool.

3.3. Hypotheses Testing Results

To test the study hypotheses, **Pearson correlation**, **simple linear regression**, and **ANOVA** were applied. The results are presented in the following table :

Table 7

Hypotheses Testing Results

Hypothesis	R	R^2	(B)	Std. Error	F-value	Sig.	t-value	Sig.
Main Hypothesis 1	0.670	0.448	1.484	0.73649	116.265	0.000	10.783	0.000
Main Hypothesis 2	0.472	0.222	0.690	0.87452	40.885	0.000	6.394	0.000
Main Hypothesis 3	0.573	0.328	0.591	0.259	69.857	0.000	8.358	0.000
Main Hypothesis 4	0.528	0.279	0.626	0.84225	55.245	0.000	2.212	0.000

Source: Authors' calculations based on SPSS V26

The results indicate that all hypotheses are statistically significant at the **0.05 level ($p < 0.05$)**. The correlation coefficients and regression results confirm meaningful relationships between the study variables, with acceptable explanatory power (R^2 values ranging from 0.222 to 0.448).

Hypothesis One:

The table shows that Pearson's correlation coefficient is 0.670, indicating a positive relationship between independent and dependent variables. The coefficient of determination (R^2) is 0.448, meaning that 44.8% of the variation in digital entrepreneurship is explained by artificial intelligence, while the remaining 55.2% is attributed to other variables not included in the model.

The regression coefficient (B) is 1.484, indicating a strong effect of the independent variable. The calculated F-value is 116.265, which is higher than the critical value and statistically significant at a level below 0.05. This is further confirmed by the t-test value of 10.783 with a significance level of 0.000. Therefore, the model is statistically significant, and the first hypothesis is accepted.

Hypothesis Two:

The correlation coefficient is 0.472, indicating a positive relationship between expert systems and digital entrepreneurship. The coefficient of determination is 0.222, meaning that 22.2% of the variation is explained by expert systems, while 77.8% is due to other variables.

The regression coefficient (B) is 0.690, indicating that a one-unit increase in expert systems leads to an increase of 0.690 units in the dependent variable. The ANOVA results show an F-value of 40.885 and a t-value of 6.394, both statistically significant at the 0.05 level. Therefore, the model is significant, and the second hypothesis is accepted.

Hypothesis Three:

The results show a correlation coefficient of 0.573, indicating a positive relationship between intelligent systems and digital entrepreneurship. The coefficient of determination is 0.328, meaning that part of the variation in digital entrepreneurship is explained by intelligent systems.

The F-value is 69.857 and the t-value is 8.358, both statistically significant at a level below 0.05. Therefore, the model is significant, and the third hypothesis is accepted.

Hypothesis Four :

The correlation coefficient is 0.520, while the coefficient of determination is 0.279, meaning that 27.9% of the variation in digital entrepreneurship is explained by data analytics, while 72.1% is due to other factors.

The regression coefficient (B) is 0.626, meaning that a one-unit increase in data analytics leads to a 0.626 increase in the dependent variable. The T-value is 2.212 and the significance level is 0.000, which is below 0.05. Therefore, the model is statistically significant, and the fourth hypothesis is accepted.

4. Conclusion

The findings indicate that artificial intelligence has become an essential and rapidly evolving technology across various fields. It is no longer merely a supportive tool but a strategic partner for students and academics, due to its ability to accurately analyze problems, predict trends, and improve decision-making processes.

Artificial intelligence also facilitates data analysis and accelerates information collection and access, significantly improving efficiency compared to traditional methods.

With the rapid development of AI technologies, new opportunities for digital entrepreneurship have emerged, requiring the adoption of digital transformation, innovation support, enhanced digital services, and stronger backing for startups and investment attraction.

5. Key Findings

Artificial intelligence has a positive impact on digital entrepreneurship by enabling entrepreneurs to operate efficiently at both local and global levels, analyze customer behavior, and reduce costs while increasing speed and operational efficiency. The results of this study aligns with previous research, such as (Nguyen et al., 2025), which highlights the significant role of advanced digital tools and emerging technologies in enhancing students

digital entrepreneurship and entrepreneurial outcomes in higher education. In the same vein, expert systems further strengthen this impact by providing continuous access to knowledge, supporting decision-making processes, improving performance, and storing expertise within structured knowledge bases that facilitate innovation and effective project management. Similarly, intelligent systems play a critical role in enhancing decision-making due to their accuracy, objectivity, autonomy, and predictive capabilities, which contribute to reducing errors and improving organizational adaptability in dynamic environments. The results align with the findings of the study by (Wardana et al., 2020), as it emphasized that the entrepreneurial mindset and self- efficacy align with intelligent systems, where modern cognitive and smart technologies play a crucial role in enhancing students' . Moreover, data analytics significantly enhances competitiveness by improving resource allocation, deepening customer understanding, fostering innovation, and enabling the identification of new market opportunities. Taken together, these technologies form an integrated digital ecosystem that collectively supports and accelerates the development of digital entrepreneurship.

6. Theoretical Contribution

Our studies perhaps provide the most comprehensive understanding of the dimensions related to artificial intelligence that students and university professors take into account when engaging in digital entrepreneurship. The current study views the university as an environment where digital technologies can interact with human skills in digital entrepreneurial work, with university professors playing an important role in guiding and transferring entrepreneurial knowledge, while students represent a source of ideas and digital entrepreneurial initiatives. In addition, previous studies have not sufficiently distinguished between artificial intelligence and digital entrepreneurship, nor have they simultaneously understood their relationships with each other or how they operate independently or together. By theoretically and empirically distinguishing between these concepts, we affirm that we have provided important insights that benefit future entrepreneurs, as well as additional empirical evidence that the importance of artificial intelligence in the entrepreneurial environment is not limited to the technical aspect but extends to supporting the capabilities and activities related to developing digital initiatives and businesses.

7. Practical Implications:

These results help higher education institutions integrate artificial intelligence technologies into digital entrepreneurship education programs and practices, support digital infrastructure, or encourage the creation of digital entrepreneurial projects within the university environment. Additionally, it is important to develop the skills of students and university professors in using artificial intelligence technologies to generate innovative digital project ideas, rather than limiting their focus to the theoretical aspects of these technologies. This can be achieved through training programs and practical workshops that help both students and faculty understand how to use artificial intelligence technologies in educational and entrepreneurial activities.

8. Limitations and Directions for future Research:

Participants were selected using a non-probability sample, which limits the generalizability of the results to all students and university professors. The sample was also

focused on university students and professors, so it is recommended in future research to expand the model to include the university administrative staff and business incubator managers.

The study relied on a cross-sectional design by collecting data at a single point in time, which limits the ability to assert direct causal relationships or track changes in outcomes over time. Therefore, it is recommended in future research to adopt longitudinal procedures to track how the dimensions of artificial intelligence evolve in digital entrepreneurship among students and university professors.

Integrating modern technological dimensions: Incorporating additional variables into future models such as digital maturity and cybersecurity to examine the impact of these technologies on artificial intelligence and digital entrepreneurship.

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Genişletilmiş Özet

Yapay zekâ, dijital dönüşümün temel unsurlarından biri olarak eğitim, işletme ve girişimcilik gibi birçok alanda önemli değişimlere yol açmaktadır. Özellikle bilgiye erişimin hızlanması, büyük miktardaki verinin analiz edilebilmesi, karar alma süreçlerinin desteklenmesi ve dijital hizmetlerin geliştirilmesi, yapay zekânın üniversiteler ve girişimcilik ekosistemleri açısından önemini artırmaktadır. Dijital girişimcilik ise dijital teknolojilerden yararlanılarak yeni iş fikirlerinin, girişimlerin, ürünlerin ve hizmetlerin geliştirilmesini ifade etmekte ve günümüzde üniversitelerin girişimcilik faaliyetleri açısından giderek daha fazla önem kazanmaktadır. Üniversite öğrencileri yeni iş fikirlerinin ve girişimcilik girişimlerinin geliştirilmesinde önemli bir potansiyel taşırken, öğretim elemanları bilgi, deneyim ve akademik birikimleri aracılığıyla bu sürecin desteklenmesine katkı sağlayabilmektedir. Bu çerçevede yapay zekâ ile dijital girişimcilik arasındaki ilişkinin üniversite öğrencileri ve öğretim elemanları bağlamında incelenmesi önem taşımaktadır. Bu araştırmanın temel amacı, yapay zekânın farklı boyutlarının üniversite öğrencileri ve öğretim elemanlarının dijital girişimcilik düzeyleri üzerindeki etkisini belirlemektir. Araştırmada yapay zekâ; uzman sistemler, akıllı sistemler ve veri analizi olmak üzere üç boyutta ele alınırken, dijital girişimcilik dijital liderlik, girişimcilik kültürü ve finansman kaynakları boyutları üzerinden değerlendirilmiştir. Bunun yanı sıra araştırmada yapay zekâ ile dijital girişimcilik arasındaki ilişkinin ortaya konulması, hangi yapay zekâ boyutunun daha belirgin bir etkiye sahip olduğunun belirlenmesi ve üniversitelerin dijital girişimcilik faaliyetlerini geliştirmelerine yönelik çıkarımlar oluşturulması amaçlanmıştır.

Araştırmada nicel araştırma yaklaşımı benimsenmiş ve betimsel-analitik yöntem kullanılmıştır. Araştırmanın evrenini üniversite öğrencileri ve öğretim elemanları oluşturmuş, veriler anket tekniği aracılığıyla toplanmıştır. Örneklemin belirlenmesinde kolayda örnekleme yöntemi kullanılmıştır. Araştırma kapsamında toplam 200 anket dağıtılmış, eksik, açık olmayan veya katılımcıların isteksizliği nedeniyle kullanılamayan 55 anket değerlendirme dışında bırakılmış ve 145 geçerli anket analizlere dâhil edilmiştir. Verilerin analizinde SPSS 26 programından yararlanılmıştır. Katılımcıların 81'i erkek (%55,9), 64'ü kadın (%44,1) olup, katılımcıların %47,6'sını öğrenciler, %52,4'ünü ise öğretim elemanları oluşturmaktadır. Yaş dağılımında 25 yaşın altında olanların oranı %22,8, 25–40 yaş grubunun oranı %19,3, 41–55 yaş grubunun oranı %35,9 ve 55 yaş üzerindekilerin oranı %22,1'dir. Katılımcıların uzmanlık alanları incelendiğinde işletme alanının %37,2, hukuk alanının %33,1 ve psikoloji alanının %2,8 oranında temsil edildiği; diğer alanların ise %26,9 oranında olduğu görülmektedir.

Araştırmada kullanılan ölçüm araçları daha önceki araştırmalardan uyarlanmıştır. Yapay zekânın benimsenmesine ilişkin ölçek Nguyen ve arkadaşlarının 2025 tarihli çalışması ile Negnevitsky'nin çalışmasından, dijital girişimciliğe ilişkin ölçek ise Nambisan ve arkadaşları ile Wardana ve arkadaşlarının çalışmalarından yararlanılarak oluşturulmuştur. Ölçeklerde beşli Likert tipi derecelendirme kullanılmıştır. Yapay zekâ ölçeği uzman sistemler, akıllı sistemler ve veri analizi olmak üzere üç boyutta toplam 12 maddeden; dijital girişimcilik ölçeği ise dijital liderlik, girişimcilik kültürü ve finansman kaynakları olmak üzere üç boyutta toplam 12 maddeden oluşmaktadır. Ölçeklerin yapı geçerliliğine ilişkin korelasyon sonuçları, yapay zekâ boyutlarının yapay zekâ toplam puanıyla anlamlı ve pozitif yönde ilişkili olduğunu göstermiştir. Uzman sistemler ile toplam yapay zekâ puanı

arasındaki korelasyon katsayısı 0,445, akıllı sistemler ile 0,456 ve veri analizi ile 0,473 olarak hesaplanmıştır. Dijital girişimcilik boyutları ile toplam dijital girişimcilik puanı arasındaki korelasyonlar ise dijital liderlik için 0,926, girişimcilik kültürü için 0,946 ve finansman kaynakları için 0,935 olarak bulunmuştur. Söz konusu ilişkilerin tamamı istatistiksel olarak anlamlıdır.

Ölçeklerin güvenilirlik analizleri de araştırmada kullanılan ölçüm araçlarının yüksek düzeyde güvenilirlik gösterdiğine işaret etmektedir. Cronbach Alfa değerleri uzman sistemler için 0,816, akıllı sistemler için 0,861 ve veri analizi için 0,759 olarak hesaplanmıştır. Dijital girişimciliğin boyutlarına ilişkin Cronbach Alfa değerleri ise dijital liderlik için 0,930, girişimcilik kültürü için 0,863 ve finansman kaynakları için 0,870'tir. Yapay zekâ ölçeğinin toplam Cronbach Alfa değeri 0,721, dijital girişimcilik ölçeğinin toplam değeri 0,953 ve araştırmada kullanılan genel soru formunun toplam değeri 0,938 olarak belirlenmiştir. Bu sonuçlar, araştırmada kullanılan ölçeklerin ilgili yapıları ölçmede yeterli iç tutarlılığa sahip olduğunu göstermektedir.

Betimsel istatistikler incelendiğinde yapay zekâ boyutlarının genel olarak orta-yüksek düzeyde değerlendirildiği görülmektedir. Uzman sistemlerin ortalaması 3,7724, akıllı sistemlerin ortalaması 3,3483 ve veri analizinin ortalaması 3,4655 olarak bulunmuştur. Yapay zekâ değişkeninin genel ortalaması 3,4530'dır. Buna karşılık dijital girişimcilik değişkeninin genel ortalaması 2,8322 olarak belirlenmiştir. Dijital girişimcilik boyutları arasında dijital liderliğin ortalaması 2,3707, girişimcilik kültürünün ortalaması 3,0397 ve finansman kaynaklarının ortalaması 3,0862'dir. Bu sonuçlar, araştırmaya katılan öğrenciler ve öğretim elemanlarının yapay zekâ kullanımına ilişkin değerlendirmelerinin dijital girişimciliğe ilişkin değerlendirmelerinden daha yüksek olduğunu göstermektedir. Özellikle uzman sistemler yapay zekânın boyutları arasında en yüksek ortalamaya sahipken, dijital girişimcilik boyutları içerisinde dijital liderliğin daha düşük bir ortalamaya sahip olduğu görülmektedir.

Araştırmanın hipotezlerini test etmek amacıyla Pearson korelasyon analizi ve basit doğrusal regresyon analizleri gerçekleştirilmiş, modellerin anlamlılığı ANOVA sonuçları üzerinden değerlendirilmiştir. Birinci hipotez, yapay zekânın dijital girişimcilik üzerinde istatistiksel olarak anlamlı bir etkisinin bulunduğu varsayımına dayanmaktadır. Analiz sonucunda yapay zekâ ile dijital girişimcilik arasındaki korelasyon katsayısı R=0,670 olarak bulunmuş, modelin açıklama gücü R^2=0,448 olarak hesaplanmıştır. Regresyon katsayısı B=1,484, F değeri 116,265 ve t değeri 10,783 olarak belirlenmiş ve model istatistiksel olarak anlamlı bulunmuştur. Buna göre yapay zekâ değişkeninin dijital girişimcilikteki değişimin önemli bir bölümünü açıklayabildiği görülmektedir. Bu sonuç doğrultusunda araştırmanın birinci hipotezi kabul edilmiştir.

İkinci hipotez uzman sistemlerin dijital girişimcilik üzerindeki etkisine yöneliktir. Analiz sonucunda R=0,472, R^2=0,222 ve B=0,690 olarak bulunmuştur. Modelin F değeri 40,885 ve t değeri 6,394'tür. Elde edilen sonuçlar uzman sistemler ile dijital girişimcilik arasında pozitif ve istatistiksel olarak anlamlı bir ilişki bulunduğunu göstermiş ve ikinci hipotez kabul edilmiştir. Üçüncü hipotez akıllı sistemlerin dijital girişimcilik üzerindeki etkisini incelemektedir. Bu modelde R=0,573, R^2=0,328, B=0,591, F=69,857 ve t=8,358 olarak hesaplanmıştır. Sonuçlar akıllı sistemlerin dijital girişimcilik üzerinde istatistiksel olarak anlamlı bir etkisinin bulunduğunu ortaya koymuş ve üçüncü hipotez kabul edilmiştir.

Dördüncü hipotez ise veri analizinin dijital girişimcilik üzerindeki etkisine ilişkindir. Bu modelde R^2=0,279 ve B=0,626 olarak belirlenmiş, modelin F değeri 55,245 ve t değeri 2,212 olarak raporlanmıştır. Sonuçlar veri analizinin de dijital girişimcilik üzerinde istatistiksel olarak anlamlı bir etkisinin bulunduğunu göstermiş ve dördüncü hipotez kabul edilmiştir.

Araştırmanın bulguları genel olarak değerlendirildiğinde yapay zekânın üniversite öğrencileri ve öğretim elemanlarının dijital girişimcilik faaliyetleriyle anlamlı biçimde ilişkili olduğu görülmektedir. Uzman sistemler, bilgiye erişim ve karar verme süreçlerinin desteklenmesine katkı sağlarken, akıllı sistemler doğruluk, öngörü ve daha bağımsız karar süreçlerinin geliştirilmesini destekleyebilmektedir. Veri analizi ise kaynakların daha etkili biçimde kullanılmasına, kullanıcı ve müşteri davranışlarının anlaşılmasına, yeni pazar fırsatlarının belirlenmesine ve yenilikçi fikirlerin geliştirilmesine katkıda bulunabilmektedir. Bu bağlamda yapay zekânın üniversite ortamındaki rolü yalnızca teknik uygulamalarla sınırlı olmayıp, öğrencilerin ve öğretim elemanlarının dijital girişimcilik becerilerini ve faaliyetlerini destekleyen bir unsur olarak değerlendirilmektedir.

Araştırmanın teorik katkısı, üniversite ortamında yapay zekâ ile dijital girişimciliğin birbirleriyle ilişkili iki farklı yapı olarak ele alınmasına dayanmaktadır. Üniversiteler dijital teknolojiler ile insan becerilerinin bir araya geldiği önemli bir ortam oluşturmakta; öğretim elemanları girişimcilik bilgisinin aktarılmasına, öğrenciler ise yeni fikirlerin ve girişimcilik girişimlerinin geliştirilmesine katkıda bulunmaktadır. Araştırma, yapay zekânın dijital girişimcilik açısından yalnızca teknolojik bir araç olmadığını, aynı zamanda bilgi, karar verme, analiz ve yenilik geliştirme kapasitesini destekleyen bir unsur olduğunu ortaya koymaktadır. Uygulama açısından ise yükseköğretim kurumlarının yapay zekâ teknolojilerini dijital girişimcilik eğitimi ve uygulamalarıyla bütünleştirmesi, dijital altyapıyı geliştirmesi ve öğrenciler ile öğretim elemanlarının dijital girişimcilik projelerine katılımını teşvik etmesi önerilmektedir. Ayrıca eğitim programları, uygulamalı çalışmalar ve atölyeler yoluyla yapay zekâ ve dijital girişimcilik becerilerinin geliştirilmesi önem taşımaktadır.

Araştırmanın bazı sınırlılıkları bulunmaktadır. Öncelikle kolayda örnekleme yöntemi ve örneklemin yalnızca üniversite öğrencileri ile öğretim elemanlarından oluşması, sonuçların farklı üniversitelere ve farklı paydaş gruplarına genellenebilirliğini sınırlamaktadır. Gelecekteki araştırmalarda üniversite yöneticileri, idari personel, girişimcilik merkezi veya kuluçka merkezi yöneticileri gibi farklı grupların araştırmaya dâhil edilmesi önerilmektedir. Ayrıca araştırmanın kesitsel bir tasarıma sahip olması, değişkenler arasındaki ilişkilerin zaman içerisindeki gelişiminin ve doğrudan nedensel etkilerin değerlendirilmesini sınırlandırmaktadır. Bu nedenle gelecekte boylamsal araştırmaların gerçekleştirilmesi, dijital olgunluk ve siber güvenlik gibi değişkenlerin de modele dâhil edilmesi önerilmektedir. Sonuç olarak araştırma, yapay zekânın uzman sistemler, akıllı sistemler ve veri analizi boyutlarının üniversite öğrencileri ve öğretim elemanlarının dijital girişimcilik düzeyleriyle anlamlı biçimde ilişkili olduğunu ortaya koymakta; yükseköğretim kurumlarında yapay zekâ destekli dijital girişimcilik eğitimlerinin ve uygulamalarının geliştirilmesi açısından ampirik bir temel sunmaktadır.

Additional Information

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Ethical approval information: Studies conducted on individuals by experimental, clinical, or other scientific methods were conducted in a process that complies with institutional, national, or comparable ethical standards.

Consent form information: Informed consent form (voluntary participation) was obtained from all individuals participating in the study.