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Correlation between Artificial intelligence and entrepreneurship in new ERA

Ermira SHEHU[1], Osman SEJFIJAJ[2*], Haris SEJFIJAJ[3], Alberta TAHIRI[4]
[1]University for Business and Technology, L. Calabria, Italy; ermira.shehu@ubt-uni.net (E.S.).
[2,3,4]Haxhi Zeka University in Peja/Pe**ć**, Kosovo; osman.sejfijaj@unhz.eu (O.S.) sejfijajharis@gmail.com (H.S.) alberta.tahiri@unhz.eu (A.T.).

Abstract: Today, sometimes a misunderstanding exists between Artificial Intelligence (AI) and technology, but evidence shows that they are helping each other succeed; however, they are not the same. This paper explores the interplay between Artificial Intelligence (AI) and entrepreneurship, examining how AI technologies are reshaping business operations, decision-making, and innovation processes. Through a hybrid approach combining a literature review and empirical data from a survey conducted in the Balkan region (Albania, Kosovo, and North Macedonia), the research analyzes AI adoption across different business sectors and organizational sizes. The findings reveal a strong correlation between AI integration and increased digitalization, encouragement of innovation, and enhancement of decision-making. With over 1,200 valid respondents, the study highlights both the opportunities and challenges associated with AI implementation, including the importance of staff motivation, strategic alignment, and data utilization. The impact of AI on our daily routines is well known, but significant transitions are also occurring in business with this virtual support. AI is often referred to as a personal owner consultant. This research contributes to the theoretical foundation of digital entrepreneurship and offers practical insights for leveraging AI to accelerate business growth and competitiveness in an evolving digital economy.

Keywords: *Artificial intelligence, Business success, Decision-making, Digitalization, Opportunity, Performance.*

1. Introduction

This paper's contribution is two dimensions. Firstly, the theoretical approach that this study aimed to provide for further research on entrepreneurship and AI.

Artificial Intelligence (AI) has become a transformative force in virtually every industry, and entrepreneurship is no exception. From developing the business plan, creating the marketing campaign, and automating mundane tasks to providing insights that were once unimaginable, AI is redefining how businesses are created, managed, and scaled. For modern entrepreneurs, understanding and leveraging AI is no longer optional—it's essential for staying competitive and innovative [1].

The importance of AI and entrepreneurship as a topic is reflected in three recent reviews. Despite these efforts, several gaps remain in the methodological and theoretical perspectives applied to understand entrepreneurs' growing interest in adopting AI-based technologies. Giuggioli and Pellegrini [2] performed a qualitative analysis of AI's impact on entrepreneurship, presenting a framework that emphasizes AI's role in enhancing decision-making and fostering business opportunities. Li, et al. [3] conducted a bibliometric analysis of AI in entrepreneurial management, identifying key research clusters, but the analysis was limited by its scope and methodology. Blanco-González-Tejero, et al. [4] conducted a descriptive bibliometric study on AI and entrepreneurship, highlighting key topics but lacking in-depth analysis and future research proposals.

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* Correspondence: osman.sejfijaj@unhz.eu

2. Literature Review

Artificial Intelligence (AI) is revolutionizing entrepreneurship by providing powerful tools for venture creation and management. Its ability to analyze large volumes of data enables entrepreneurs to integrate opportunity recognition with resource mobilization and strengthen their ventures' adaptive capacity [5].

AI has crucial implications for how entrepreneurs develop, design, and scale their businesses during the entrepreneurial process [6].

Artificial Intelligence (AI) has emerged as a transformative force in business and management, driving digital transformation and operational efficiency across various industries. For example, AI systems can enhance entrepreneurial decision-making by integrating customer preferences and industry benchmarks [7].

This enables faster, more flexible, and more efficient processes, producing higher-quality goods with advanced levels of customization, increasing manufacturing productivity, and, in turn, allowing an industrial growth [8].

In this new revolution, artificial intelligence (AI) plays a key role. It can be defined as intelligence demonstrated by machines – or, in terms of an academic field, the examination of how digital computers and algorithms perform tasks and solve complex problems that would normally require or exceed the human intelligence, reasoning, and prediction power needed to adapt to changing circumstances. This modern definition has been evolving since the first definition of AI was presented by computer scientist John McCarthy more than 60 years ago, considering AI as "the science and engineering of making intelligent machines" [9]. Within AI terminology, machine learning is frequently categorized as a subset of AI, with deep learning considered to be a subset of machine learning [10].

On the other hand, AI also holds critical consequences for organizations facing increased pressure in terms of productivity and the need to stay competitive. This situation may also lead to increases in unemployment and inequality, as it did in the first wave of mechanical automation, disrupting manufacturing and subsequently destroying retail in the second wave of digital innovation [6].

AI has the potential to offer both positive and negative consequences to society at large. It depends how the society are using the AI tools. The positive impact is when the innovation take place based on AI scenario. But we have also negative impact which is related with potential to re-humanize work in some key business field [2].

There are several reasons why this inquiry is appropriate and timely. First, in order to thoroughly capitalize on the results of pertinent academic literature, there is a need for systematization. To the best of our knowledge, this study is the first of its kind, although inspiring and brilliant contributions have already been produced. Second, the actual pervasiveness of AI offers new business opportunities like never before. Many entrepreneurs can access AI solutions easily, as these solutions are no longer futuristic or elitist innovations and are instead available at a relatively affordable cost. This implies that AI is no longer a privilege adoptable only by big firms [11]. This could have an exponential impact on developing entrepreneurship.

The importance of AI and entrepreneurship as a topic is reflected in three recent reviews. Despite these efforts, several gaps remain in the methodological and theoretical perspectives applied to understand entrepreneurs' growing interest in adopting AI-based technologies. Giuggioli and Pellegrini [2] performed a qualitative analysis of AI's impact on entrepreneurship, presenting a framework that emphasizes AI's role in enhancing decision-making and fostering business opportunities. Li, et al. [3] conducted a bibliometric analysis of AI in entrepreneurial management, identifying key research clusters, but the analysis was limited by its scope and methodology. Blanco-González-Tejero, et al. [4] conducted a descriptive bibliometric study on AI and entrepreneurship, highlighting key topics but lacking in-depth analysis and future research proposals. This study aims to address these gaps by presenting a comprehensive and rigorous review, employing a hybrid systematic review approach that combines quantitative and qualitative methods to provide a holistic understanding of AI's impact on entrepreneurship. Therefore, the study's central objectives are to synthesize existing knowledge,

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identify structural gaps, and establish theoretical frameworks to guide future research, thus fostering innovative research on AI technologies in entrepreneurial practice.

Since the entrepreneurship is complex combination of information, ideas, process, and innovation the support of AI is welcomed for all business owners. AI techniques can improve decision-making systems adopted by entrepreneurs, increasing the quality of the decisions made in terms of their effectiveness and efficiency, thus enhancing the operational performance [12].

However, integrating AI into entrepreneurship also requires overcoming barriers such as uncertainty, perceived inconvenience, and varying attitudes toward technology adoption [13]. For instance, the AI-enabled entrepreneurship ecosystem highlights the need for strategic actions to facilitate knowledge spillovers [14]. Understanding the implications of AI for management and strategy is essential for organizations to maintain a competitive edge in an increasingly digital world [10].

AI technologies such as machine learning (ML), the Internet of Things (IoT), automation, and natural language processing have made significant technological advances impacting virtually all industries and society. The emergence of the AI era has created the greatest entrepreneurial opportunity in the history of civilization [11]. Indeed, AI is an example of how radical external changes empower and enable new economic activities [10]. Moreover, AI has crucial implications for how entrepreneurs develop, design, and scale their businesses during the entrepreneurial process [6]. For example, AI can improve decision-making systems; improve process effectiveness, flexibility, and efficiency; increase productivity; reduce costs; or produce high-quality goods with high levels of customization [2, 15-18]. Furthermore, AI solutions are now easily accessible to entrepreneurs at a relatively affordable cost. The democratization of artificial intelligence enables entrepreneurs to compete even with large companies, thus levelling the technological playing field [19, 20].

The term "Industry 4.0" was coined by Kagermann, et al. [21] combining the virtual and the real world with an emphasis on engineering applications, such as robotics, digitalization and automatization. Researchers have dealt with automation using AI technology since the 1950s with theoretical machine learning models, but the recent advancements of revolution 4.0 have provided them with a platform to actualize these theoretical models [22]. In this revolution, AI is considered a dominant research area and its applications are expected to spread into any domain requiring human intelligence [23]. AI is central to all Industry 4.0 technological paradigms. It is used in smart factories, which are fully connected manufacturing systems, mainly operating without human intervention thanks to the generation, transfer and analysis of the flowing data required to perform inherent tasks for production [24]. AI maintains intelligent control over the entire system, specifically scheduling interventions for the automated machines, designing working flows of operations, controlling the quality of outcomes, and automatically programming and performing maintenance activities [25, 26]. Similarly, AI is integral to the Internet of things (IoT), which is an extended and connected network of physical devices that can interact and communicate amongst themselves and can be controlled or monitored remotely [27]. For IoT, AI processes and transforms vast volumes of data to create useful outcomes, interconnecting the software languages that IoT devices enforce [28]. AI is also used in the augmented reality (AR) paradigm, which is a human-computer interaction system that blends real and virtual 3D objects in real time [29]. AI improves the accuracy and robustness of image processing and its correlated tasks [30].

The democratization of artificial intelligence enables entrepreneurs to compete even with large companies, thus levelling the technological playing field [19, 20]. This impact of AI on entrepreneurial activity has also attracted considerable interest from researchers in the field. However, existing studies are fragmented, making it challenging to generate a comprehensive and systematic overview. Hence, there is a strong need for a systematic literature review that considers evolution and the need for the establishment of theoretical frameworks to provide guidance and generalizability (when applicable) in research on entrepreneurs' growing interest in adopting AI-based technologies [31].

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With the rapid technological advances in predictive AI, the increasing ease of its use and the growing availability of large datasets, we invite entrepreneurship scholars to use their creativity and entrepreneurial spirit by adopting predictive AI methods by actively engaging in the "data game" and discovering, and harnessing, the vast amounts of data that already exist on, among other things, nascent and new entrepreneurs, their startups, entrepreneurial ecosystems, their culture, and their policies [32]. This may also involve the process of generating synthetic data [33].

3. Methodology

The aim of this paper is to present the results from collected data in Republic of Kosovo, in order to understand the correlation between AI and entrepreneurship.

In the beginning our intension was to elaborate via systematic literature review both concepts: one related to Artificial Intelligence and second related to entrepreneurship by identified potential correlation between them. The review was limited in journal articles published between 2020 and 2024, across Scopus, Web of Science, EBSCO and Google Scholar.

During the initial search around 40 papers have been study in depths to understand the linkages between AI and entrepreneurship. All the information's gathered from the study have inspired us to prepare a questionnaire and to compare the data with Kosovo entrepreneurship reality.

The sample conducted in Balkan region (Albania, Kosovo and North Macedonia) during the period August 2024 – March 2025. The questioner was spreads online to more than 5700 business owners, which has a registered business in Agency of Businesses Registration. The total number of respondents was 1217.

The data were analyzed with SPSS.

3.1. Analysis

Since the study was focus in data gathered from the survey, which were conducted in Balkan region, in this section we will analyze all the responds in details.

The Table 1, presents the frequency distribution of responses to the question "Did your staff/colleagues use the AI during the working day?", disaggregated by business field. Responses are categorized into three options: "Yes, usually", "No", and "I didn't notice". The data comprises a total of 1,182 observations across six business fields: Services, Manufacture, Distribution, Retail, Public Institution, and Private Institution.

Table 1.
Crosstabulation analyse "Business field * Using AI during working day".

		Did your staff/colleagues use the AI during the working day?			
		Yes, usually	**No**	**I didn't notice**	**Total**
Your business field	Services	362	58	0	420
	Manufacture	18	74	0	92
	Distribution	14	0	36	50
	Retail	154	0	68	222
	Public institution	18	18	53	89
	Private institution	217	70	22	309
Total		783	220	179	1182

The "Services" sector reported the highest frequency of affirmative responses (n = 362), indicating a high prevalence of AI usage during the working day.

In contrast, the "Manufacture" field shows a relatively low number of positive responses (n = 18) and a high number of negative responses (n = 74), suggesting limited AI adoption.

"Distribution" displays a unique pattern with a complete absence of negative responses and a high incidence of "I didn't notice" (n = 36), indicating potential uncertainty or lack of awareness regarding AI usage.

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The "Retail" sector exhibits a moderate level of AI usage (n = 154) with a substantial proportion of respondents unaware of its use (n = 68).

"Public institutions" show an even distribution between affirmative (n = 18) and negative (n = 18) responses, with the highest proportion reporting lack of awareness (n = 53).

"Private institutions" indicate strong AI usage (n = 217) with fewer respondents unaware or negative.

Across all sectors, the total number of positive responses is 783, representing 66.2% of the overall sample. The number of negative responses is 220 (18.6%), while 179 respondents (15.1%) did not notice AI usage.

This descriptive data highlights sectoral differences in AI adoption and awareness, with notable contrasts between public and private sectors, as well as between service-oriented and industrial domains.

The Table 2, presents a cross-tabulation of two categorical variables related to the use of artificial intelligence (AI) in business management and motivational practices toward AI adoption within organizations.

Table 1.
Crosstabulation anaylse "AI for managing the business * Motivating staff to use AI".

		Do you motivate your staff/colleagues to use the AI, in order to find solutions and enhance ideas/innovation?	
		Yes, usually	**No, we need real ideas for our business**
		Count	Count
Did you use the AI for managing your business?	Yes, most of the time	616	161
	No, never	140	130
	Sometimes	131	21

Among those who use AI most of the time, a large majority (616 out of 777, or 79.3%) report actively motivating their staff to use AI. Conversely, among those who never use AI, motivational practices are more evenly split (140 yes vs 130 no), indicating a limited organizational push toward AI use in this group. Respondents who use AI sometimes tend to motivate staff as well (131 yes vs 21 no), suggesting occasional users are still inclined toward encouraging innovation via AI. These results suggest a strong positive association between the organizational use of AI in management and the cultural encouragement of its use for idea generation and innovation. A high frequency of internal motivation appears to coincide with high levels of AI integration in business operations.

The question "Is your company fully digitalized?" table 3, aimed to have a better understanding of the real situation in business, from management perspective.

Table 3.
Is your company fully digitalized?.

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Yes	923	75.8	77.0	77.0
	Main departments	258	21.2	21.5	98.5
	In the beginning of the digital transformation	18	1.5	1.5	100.0
	Total	1199	98.5	100.0	
Missing	System	18	1.5		
Total		1217	100.0		

From the results, the following conclusions are made:

High Digitalization Rate:

- A majority of companies (923 out of 1199 valid responses) reported being fully digitalized, accounting for 77.0% of valid responses.

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This suggests that digital transformation has been widely adopted across most organizations.
Partial Digitalization:

- 21.5% of companies (n = 258) indicated that only their main departments are digitalized.
- These organizations may be in an intermediate stage of transformation, where core functions are automated or digitized, but full integration is pending.

Early-Stage Digitalization:

- A small proportion (1.5%, n = 18) of respondents stated that they are only at the beginning of digital transformation.
- This highlights a minority still lagging in adopting digital technologies, possibly due to resource constraints, lack of awareness, or sector-specific challenges.

Data Completeness:

- Out of 1,217 total cases, 1,199 were valid responses (98.5%).
- Only 1.5% (n = 18) were missing responses, which indicates a high level of data completeness and reliability for interpretation.

The data demonstrates a strong trend toward digital maturity in the surveyed companies. However, about 23% are either partially or minimally digitalized, indicating a gap that could be addressed through targeted support, funding, or digital training initiatives. The distribution also underscores the importance of understanding barriers for those still in early or partial stages of transformation.

Table 2.
Crosstabulation analysis "Enhance innovation * Valuable part of AI?".

Did the company enhance innovation coming from bottom management levels? * Is the company oriented in staff trainings for digitalization? * What do you consider the most valuable part of using AI? Crosstabulation

Count

What do you consider the most valuable part of using AI?			Is the company oriented in staff trainings for digitalization? Yes	Is the company oriented in staff trainings for digitalization? No	Total
Creation of new ideas	Did the company enhance innovation coming from bottom management levels?	Yes	255	109	364
		No	22	71	93
	Total		277	180	457
Increasing the performance	Did the company enhance innovation coming from bottom management levels?	Yes	147	63	210
		No	0	36	36
	Total		147	99	246
The speed to information/respond	Did the company enhance innovation coming from bottom management levels?	Yes	150	54	204
		No	0	18	18
	Total		150	72	222
More professional approach	Did the company enhance innovation coming from bottom management levels?	Yes	53	35	88
		No	14	17	31
	Total		67	52	119
Support in decision making process	Did the company enhance innovation coming from bottom management levels?	Yes	82	26	108
	Total		82	26	108
Total	Did the company enhance innovation coming from bottom management levels?	Yes	687	287	974
		No	36	142	178
	Total		723	429	1152

Based on data gathered from the survey table 4, Decision-making support (75.9%) and Speed to information (73.5%) had the strongest association with perceived innovation enhancement. "Increasing

performance" and "Creation of new ideas" both had ~70% "Yes" rates, suggesting a moderate but consistent relationship. "Increasing performance" and "Speed to information" had zero "No" responses in some subcategories. "More professional approach" had the highest proportion of "No" responses (39.8%), meaning companies perceived as more "professional" were less likely to enhance bottom-up innovation.

The general summary of this analysis, is as follows:

- Most respondents (62.8%) believe their company enhances bottom-up innovation.
- AI's role in decision-making and speed of response is most strongly linked to perceived innovation.
- Professionalism-focused companies seem less likely to foster bottom-up innovation.

Table 3.
Crosstabulation "Advance entrepreneurship research * AI business accelerater?".

Did your company use advance entrepreneurship research? * Did AI supports your business to accelerate the digitalization? Crosstabulation				
Count				
		Did AI supports your business to accelerate the digitalization?		
		Yes	No	Total
Did your company use advance entrepreneurship research?	Yes	118	31	149
	No	466	522	988
Total		584	553	1137

Data shown in the table 5, present information that, most companies did not use advanced research. Companies using advanced research reported much higher AI support (79.2%) compared to those not using it (47.2%), but also no-research companies had nearly balanced responses (466 Yes vs. 522 No), suggesting weaker perceived AI impact. The table suggests a potential positive relationship: Companies using advanced entrepreneurship research are more likely to perceive AI as accelerating digitalization.

Table 4.
"AI business accelerater * Valuable part of AI".

Did AI supports your business to accelerate the digitalization? * What do you consider the most valuable part of using AI? Crosstabulation							
Count							
		What do you consider the most valuable part of using AI?					
		Creation of new ideas	**Increasing the performance**	**The speed to information/respond**	**More professional approach**	**Support in decision making process**	**Total**
Did AI supports your business to accelerate the digitalization?	Yes	317	116	67	52	49	601
	No	174	112	155	85	27	553
Total		491	228	222	137	76	1154

Based on the responds of 1154, table 6, respondents, the general take aways are as follows:

- Creation of new ideas (64.6%) and Decision-making support (64.5%) were most associated with perceived AI-driven digitalization.
- Speed to information (30.2%) had the weakest link to AI-supported digitalization.
- Increasing performance (50.9%) and Professional approach (38.0%) showed moderate or weak relationships.

We need to highlight that "Speed to information" had a reversed trend: Most respondents (155/222, 69.8%) who valued this aspect reported no AI support for digitalization, but "Decision-

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making support" had a small sample size (n=76) but a high support rate (64.5%), suggesting a strong localized association.

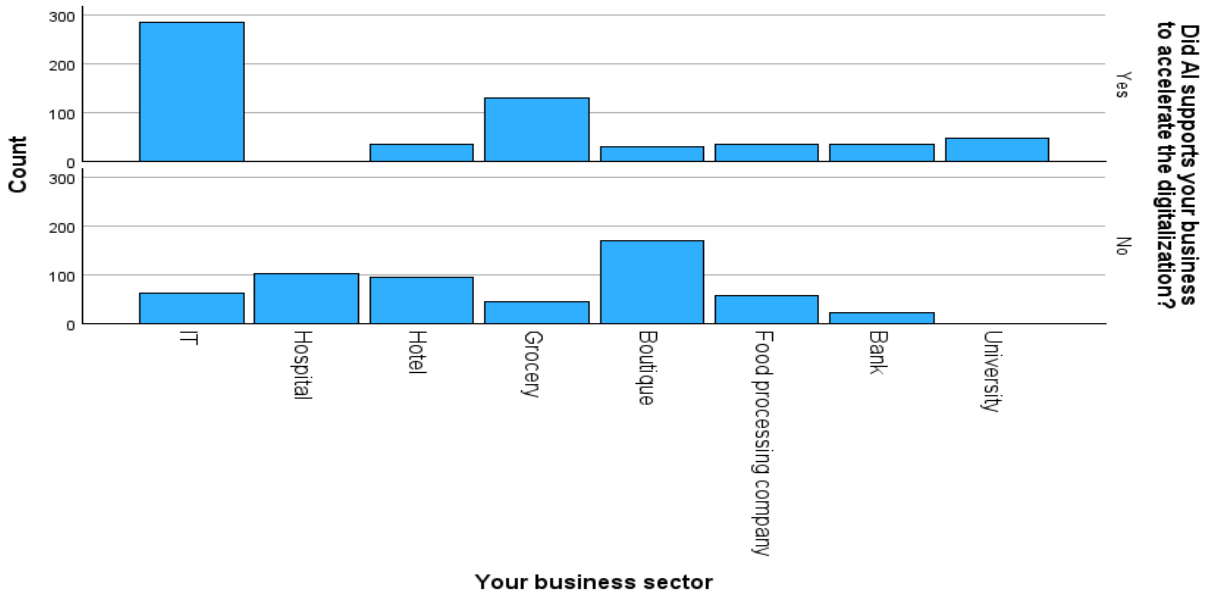

Figure 1.
"Business sector * AI Business accelerator".

If we analyze the data per sector, we have these results, Figure 1.

- IT and Banking sectors likely dominate in AI-supported digitalization (Yes).
- Grocery/Boutique sectors show minimal AI adoption (smaller "Yes" segments).
- Hospitals/Universities may have moderate adoption.

Table 5.
Crosstabulation "Ai for managing business * Number of employees"

Did you use the AI for managing your business? * Number of employees Crosstabulation					
Count					
		Number of employees			**Total**
		1-9 employees	**10-49 employees**	**50+ employees**	
Did you use the AI for managing your business?	Yes, most of the time	381	208	175	764
	No, never	131	36	121	288
	Sometimes	0	14	138	152
Total		512	258	434	1204

Resources: Authors calculation.

This Table 7, will be explained based on company categories:
Small Businesses (1-9 Employees):

- Highest "Most of the time" usage (74.4%), but zero "sometimes" responses (potential data entry issue).
- Lowest resistance ("No, never" = 25.6%).
  Mid-Sized Businesses (10-49 Employees):
- Strong AI adoption ("Most of the time" = 80.6%), minimal intermittent use.
  Large Businesses (50+ Employees):
- Mixed usage: ~40% "most of the time," ~32% "sometimes," ~28% "never."

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- Suggests partial integration or departmental disparities in AI adoption.

Based on the data, AI adoption is highest in small/mid-sized businesses (1-49 employees), possibly due to agility and scalability needs. Large firms (50+ employees) exhibit polarized adoption, suggesting challenges in enterprise-wide implementation.

4. Conclusions

Based on the research conducted, the following findings were listed:

- High AI Adoption in Small and Medium Businesses.
- AI is a super tool to enhance the business digitalization.
- The staff is well prepared to use the AI, but sometimes have doubt in implementation.
- AI Motivates Innovation and Performance
- All the entrepreneurs use AI at least to be motivated for new projects in the company.
- The operational excellence is a key factor that can be improved by AI.
- Reduction of manual work is the most valuable hint from AI.
- AI's Most Valuable Contributions: Creation of new ideas (64.6%), Decision-making support (64.5%), Operational efficiency and performance enhancement, Faster access to information,
- AI is worth if we use the proper data to create ideas and decisions. The AI did not understand the core values of the business including mission and vision, so is part of the management to create a strong correlation between these components.
- AI forecasting is the best solution that AI offer.
- AI empowers people with powerful tools to do more and act with superhuman abilities if they understand how to use these tools to achieve the goal.

5. Recommendations

The key recommendations gathered from the research are as follow:

Define a Clear AI Strategy: Businesses should establish a digital strategy before AI implementation to ensure alignment with core values, mission, and vision.

Promote Organizational Readiness: Invest in staff training, motivation, and change management to ensure smooth AI integration and maximize its impact.

Leverage AI as a Digital Consultant: Entrepreneurs, especially in SMEs, should treat AI as a cost-effective, always-available personal advisor to stimulate innovation and support operational decisions.

Prioritize Data Quality: AI tools are only as effective as the data they process—businesses must ensure structured, clean, and contextually relevant datasets to gain accurate insights.

Focus on Forecasting and Strategic Decision-Making: AI's forecasting ability is among its most powerful features and should be prioritized for business planning and risk management.

Support Partial Digitalizes: Policymakers and support institutions should provide targeted assistance (training, funding, infrastructure) to help partially digitalized businesses complete their transformation.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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