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The Framework for Measuring the Readiness of Mentors in Iranian Accelerators to Accept Artificial Intelligence in the Mentoring Process

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Abstract: Artificial intelligence as a great event in the history of mankind with the potential of transformation and disrupting all the rules and dimensions of human life, has also marked change and transformation in the fields of entrepreneurship; Therefore, the readiness to accept it by the actors of the entrepreneurial ecosystem, such as accelerators, mentors and startups, is considered an attractive research path. Mentoring, as one of the most important accelerator services for startups, is one of the significant areas for integration with artificial intelligence. According to the concern of the researchers for the combination of traditional mentoring in the accelerator with educational technology and artificial intelligence, the aim of this research is to provide a framework for measuring the readiness of the mentors in the accelerators of Iran to accept the integration of artificial intelligence in the mentoring process, which is in accordance with be Iran's entrepreneurship ecosystem. Rapid review was used to review the literature between 2022 and 2024 and related articles were analyzed to reach the framework. The proposed framework includes three main dimensions consist of intention, ability and utility.

Keywords: Artificial intelligence; mentoring; accelerator

1. Introduction

The emergence of artificial intelligence is considered a monumental phenomenon in human history, possessing the virtual potential to transform and disrupt all aspects of human life (Terblanche, 2020; Martinez et al, 2021) and today it is present in many industries such as manufacturing, supply chain, healthcare, and retail (Leone et al, 2021). Artificial intelligence is a computer process that aims to imitate human learning based on data to make decisions akin to human cognition (Boden, 2018).

One of the highly potential areas for the presence of artificial intelligence is entrepreneurship (Giuggioli & Pellegrini, 2022). Despite numerous studies in the field of entrepreneurship and also high technologies

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such as artificial intelligence, few studies have focused on the connection between these two areas (entrepreneurship-artificial intelligence) (Chalmers et al, 2020). Therefore, the necessity of studying and researching the understanding and recognition of the capabilities and potentials of high technologies in influencing entrepreneurs in the time of launching new ventures has attracted researchers' attention (Townsend & Hunt, 2019; Filieri et al. 2021). One of these is the application of artificial intelligence in assisting startups, with researchers emphasizing the need for further studies on the role of AI empowerment in the establishment of startups and the stimulation of innovation (anane-simon & Atiku, 2024). One of these applications is the concept of mentoring. The importance of mentoring services is clear (Lall et al, 2022) to the extent that it is considered one of the main reasons for startups to enter accelerator programs (Cuvero et al, 2019). Given that artificial intelligence can be beneficial in decisionmaking in complex and opaque goal-oriented business problems (Johnson et al, 2021), it can be used by accelerators to provide optimal mentoring to startups and overcome traditional mentoring barriers (Bagai & Mane, 2023). What can be inferred from literature is that the application of artificial intelligence in education has predominantly been in schools and in STEM subjects, and ultimately in the field of healthcare as assistants to doctors and nurses (Luckin et al, 2022), with very few studies on startups and artificial intelligence (Vijai & Wisetsri, 2021). However, what should be considered before the use of artificial intelligence by accelerators in the mentoring process is the level of readiness and acceptance of mentors; as AI-based technologies possess human cognitive capabilities such as knowing, learning, perceiving, feeling, acting, communicating, and reasoning, but their implementation has extensive implications for various ecosystem stakeholders such as salespeople, customers, producers, service providers, and other beneficiaries (Fernandes & Oliveira, 2021).

Overall, digital maturity is crucial for implementing emerging technologies (Talantis et al, 2020); on the other hand, Johnk and colleagues (2021) highlighted the difference between AI readiness and AI adoption (Johnk et al, 2021); therefore, the use of artificial intelligence in assisting specialties is considered a new area for research (Terblanche, 2020). With these descriptions, the present study aims to provide a framework for measuring mentors' readiness to integrate artificial intelligence into the mentoring process within accelerators, in order to assist Iranian accelerators in moving towards utilizing an AI-based mentoring platform to offer better mentoring services.

2. Literature Review

The term "Artificial intelligence" is coined by Marvin Minsky and John McCarthy in 1956 (Haenlein & Kaplan, 2019). In a general view, artificial intelligence is considered as the scientific field that focuses on studying systems and acting intelligently from an observer's perspective (Bernardini et al, 2018). There are various definitions of artificial intelligence in the literature, but some researchers believe that due to the complexity of it and its continuous development, there is no consensus on a single definition (Wang, 2019; Luckin et al, 2022). For example, Bughin and Hazan (2017, p 4) define it as a wide range of technologies such as computer vision, language processing, robotics, robotic process automation, and virtual agents that are capable of imitating human cognitive functions. Another definition refers to human thinking, human acting, logical thinking, or logical acting (Tussyadiah, 2020). Boucher (2020, p. 3) also defines AI as systems that exhibit intelligent behavior by analyzing the environment and taking actions - with varying degrees of autonomy - to achieve specific goals. An element seen in all definitions is AI's simitation of intelligent human behavior (Kok et al, 2002, p. 2).

Terblanche (2020) by quoting Siau and Yang (2017) explains that there is a distinction between artificial general intelligence (Strong AI) and artificial narrow intelligence (Weak AI). Strong AI is embodied by

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a machine that exhibits consciousness, sentience and the ability of learning beyond what was initially intended by its designers, and can apply its intelligence in more than one specific area. Weak AI focuses on specific and narrow tasks, such as virtual assistants and self-driving cars (Terblanche, 2020). AI include various technological domains such as reasoning, planning, learning, communication, perception, integration and interaction, services, ethics, and philosophy (Samoili et al, 2020). At a high level, AI is composed of reasoning, learning, perception, planning, communication, robotics, and social intelligence, and at a lower level, there are a myriad application that combine these capabilities with many other components, not necessarily in AI, from driverless cars to chatbots (Martinez et al, 2021). AI is increasingly penetrating all human domains. Technological advancements in AI have brought about significant transformations in service delivery (Flavian et al, 2020) and product offerings (Martinez et al, 2021; Kohnke et al, 2023). AI-based systems, despite many other technologies, operate autonomously or with minimal manual intervention (Dekeyser et al, 2019).

With these descriptions, the readiness of individuals and stakeholders to accept such products and services based on AI, which have significant differences from other recent technologies, has been very important (Luckin et al, 2022; Flavian et al, 2020) and has attracted researchers' attention (Holmstrom, 2021). For example, research in Australia has shown that a lack of skills in implementing AI is a recognized barrier to the acceptance of AI (Alsheiabni et al, 2019). Table 1 summarizes some recent researches on readiness to accept AI-based systems in various domains.

Finding(s)	Reference
The AI readiness model is a descriptive and	Nortje and Grobbelaar (2020)
comprehensive model that encompasses many factors	
and dimensions of readiness and is designed to assist	
in implementing AI in business structures. By using	
factors such as perceived usefulness and willingness	
to accept, they introduce seven dimensions, including:	
organizational leadership and governance, employees	
and culture, technology management, strategy,	
information and knowledge management, security and	
infrastructure.	
Technology readiness is consists of four factors,	Flavian et al (2020)
including technological optimism, technological	
innovation, technological discomfort and	
technological insecurity.	
Training, trust, and security are of great importance	Kushwaha and Kar (2020)
for the adoption of artificial intelligence.	
The readiness of AI is limited to (1) areas that use and	Martinez et al (2021)
produce a sufficient amount of data and have clear	
objectives about what the business is trying to	
achieve; (2) Scenarios in which algorithms,	
approaches and software nave been developed to	
make it fully functional into their relevant fields; and (2) situations, whose post of deployment are	
(5) situations whose cost of deployment are	
The framework of AI readiness encompasses four	Holmstrom (2022)
dimensions including technology entions	Holmstrom (2022)
boundaries and goals	
Five factors for AI readiness include strategic	Hradacky at al (2022)
alignment resources knowledge culture and date	Inducery et al (2022)
In this research an index for AI readiness in Africa at	Baguma at al (2022)
the national level is presented, which is the result of a	Dagunia et al (2022)
systematic literature review and includes dimensions	
systematic literature review and includes dimensions	

Table 1. A Review	of Researches on	Artificial I	Intelligence	Readiness
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such as vision, governance and ethics, digital capacity,	
technology sector size, research and development,	
education, infrastructure, data availability, general	
level of employment, employment in data science and	
AI roles and ultimately Gross Domestic Product- per	
capita purchasing power parity.	

3. Method

The rapid review approaches

This paper is applied research in terms of its objective, and a systematic rapid review has been used to carry it out. According to Tricco et al (2015, p. 2), a rapid review is "a type of knowledge synthesis in which components of the systematic review process are simplified or omitted to produce information in a short period of time". Therefore, this method focuses on the rapid review and synthesis of recent studies and their key findings (Lo, 2023). Hamel and colleagues (2021) investigate eight key themes through a review of definitions provided for this method, which include accelerated/rapid process or approach, variation in method shortcuts, focus/depth/breadth of scope, compare and contrast to a full traditional systematic approach, stakeholder rationale, resource efficiency rationale, systematic approach and bias/limitation (Hamel et al, 2021).

3.1. Search Strategies

The first step in any research is to clarify the research question. In this study and based on the researchers' concern, the main question is what is the framework of measuring the readiness of mentors in Iranian accelerators to integrate and utilize artificial intelligence in the mentoring process. To answer this question, authentic research papers from the WOS database were selected for a rapid review and analysis in the subsequent stages. During the time period of 2022 to 2024, the search database timeframe has been considered in light of the emergence of ChatGPT as the first AI chatbot and researchers' focus on the application of AI in various fields. Many AI-based tools were introduced during this timeframe and have attracted worldwide attention in all human life dimensions, leading to the publication of numerous research and articles. Key search terms include various combinations of "Artificial Intelligence readiness" and "AI readiness" alongside the key term "Mentoring". By conducting a search, 308 papers were obtained for the next stages.

Inclusion and exclusion criteria

For the completion of the next steps and screening of articles, the following criteria have been used for inclusion or exclusion:

- 1. Scientific research papers
- 2. English language
- 3. Relevance of the paper's objectives to main objective of this research
- 4. Focus on presenting a readiness assessment/measurement framework for AI readiness/acceptance.

For applying these criteria, research papers were initially selected, leading to the removal of 44 papers. Subsequently, papers in English were selected, resulting in the removal of 4 papers, leaving 260 papers. For the third criterion, fields such as medical, health, treatment, ergonomics, robotics, water engineering, and unrelated topics were excluded, and the filter was only applied to fields related to management,

business, startups, and education. In this step, 195 papers were deleted and 65 papers remained. General information like title, abstract, author(s), publication date and journal associated with each of the selected papers was saved in an Excel file. After reviewing the title and abstract, 30 papers were removed and 35 papers remained. To apply the fourth criterion in the next step, the papers were carefully studied, focusing mainly on the results/findings section. In this step, 15 papers were also removed and finally 20 papers were selected to proceed to the analysis step.

Content analysis

After selecting papers for entry into the content analysis stage, the full text of all papers was read and coded based on the main objective and in line with the researchers' framework. The focus was mainly on the results section as well as the discussion and conclusion. After coding each of the papers separately, to achieve an overall insight and present the final framework, the results were combined and visually presented with the aim of visualization. A table was used for presenting the results and better understanding of the framework.

4. Findings

After studying selected papers and coding, and finally analyzing the results, various aspects in the literature for measuring the readiness of mentors to accept AI were identified. On the other hand, considering the research objective in presenting a framework for assessing the readiness of mentors in accelerators for accepting and integrating AI in the mentoring process, these aspects and insights obtained from it were analyzed and categorized to reach the desired framework of the researchers, the final results of which are shown in the table. Three main categories are proposed for this framework, as shown in Table 2, including intention, ability and utility.

Main Category	Dimensions	Main Category
Intention	Digital maturity	Talantis et al, 2020
	Technological Awareness	Hradecky et al, 2022
	Perceived Usefulness	Holmstrom, 2021
	concern about job security	Nortje & Grobbelaar, 2020
	objective alignment	Baguma et al, 2022
		Filieri et al. 2021
		Du & Gao, 2023
		Wang et al, 2021
		Flavian et al, 2020
		Khamis, 2023
		Luckin & Cukurova, 2019
		shepherd & Majchrzak, 2022
Ability	Training by accelerator	Alsheibani et al, 2019
	Skill	Kushwaha & Kar, 2020
		Baguma et al, 2022
Utility	Ease of Use	Holmstrom, 2021
	Cost of Use	Nortje & Grobbelaar, 2020
		Martinez et al, 2021
		Flavian et al, 2020
		Choi et al, 2022; Zhang et al, 2023
		Porcher, 2020

Table 2. Accelerator Mentors'	Readiness Measurement Framework for Accepting AI in the Mentoring
Process	

5. Intention

Intention to accept and use AI is a result of the mentor's insight toward AI in general and integration into the mentoring process. In fact, intention is an assessment of the mentor's insight towards AI, which includes concepts that sometimes form outside the accelerator boundaries and refer to the mentor's experiences. Perhaps it can be said that this insight, which shapes the mentor's intention, has its roots in the mentor's personal characteristics and experiences that have taken form beyond the boundaries of the accelerator. Digital maturity, technological awareness, understanding usefulness, concern about job security, and objective alignment are critical factors that influence mentors' intention to accept AI and provide a basis for its measurement. Digital maturity is vital for implementing any emerging new technology (Talantis et al, 2020). AI for individuals without expertise in the field is like a black box (Andrada et al, 2023), therefore, technological awareness plays a crucial role in its acceptance and the more AI is utilized, the more awareness about its benefits and applications increases (Luckin & Cukurova, 2019). When users perceive technologies as useful, choose them and develop a positive attitude towards them (Wang et al, 2021). Since individuals must have a useful understanding of a new technology for its acceptance, this factor is also applicable for measuring the readiness of mentors for AI acceptance in the mentoring process (Nortje & Grobbelaar, 2020; Khamis, 2023). AI with better understanding and recognition takes actions required to perform roles and also identifies potential opportunities compatible with their objective to assist individuals (shepherd & Majchrzak, 2022). Concerns generally have a significant impact on the adoption of new technologies by mentors and teachers (Wang et al, 2021), and it is true regarding AI as well because this technology has the potential to replace mentors and can lead to losing mentor control over the mentoring process, reducing interpersonal communications with them, and most importantly, the mentor's job (Bagai & Mane, 2023; Du & Gao, 2023).

Ability

The ability of mentors in using from AI as an emerging technology in the mentoring process is an important aspect for measuring their readiness, which in fact is an measurement of the mentor's abilities. Two key dimensions have been identified in the literature to determine the level of mentor ability, which include the level of mentor training by the accelerator and the mentor's skill in using AI. For example, in a study conducted in Australia, skills are identified as a significant factor in the adoption and lack of it as a barrier to the acceptance of AI in individuals (Alsheibani et al, 2019). Kushwaha and Kar (2020) also consider training to be very important in individuals' acceptance of AI. In addition, these two factors, together, measure the mentor's ability, and training also enhances this ability.

5.1. Utility

The use of AI and its implications for mentors, including usage costs, ease of use, is another key dimension in literature. This category actually serves as a basis for how AI implementation by accelerators, as well the functions and the outcomes it entails for mentors. Therefore, to measure the readiness level of mentors for accepting AI in the mentoring process, these factors should also be examined and measured from the mentor's perspective. Ease of use is the most important factor in accepting AI among mentors. In addition, Martinez and colleagues (2021) argue that the readiness of AI is limited to cases where the cost of use and deployment is cost-effective (Martinez et al., 2021), which in this study, the cost of use from the mentor's perspective and the cost of deployment from the accelerator's perspective are measurable and examined.

6. Conclusion and Future Research

Artificial intelligence-based technologies have increasingly entered human daily life and offered alternative approaches for thinking, behavior, and interaction with each other (Chen et al., 2020). They have taken on many complex human actions in various domains (Shepherd & Majchrzak, 2022). One of these domains is mentoring at all levels. In this study, considering the importance of accelerators in the entrepreneurial ecosystem on one hand (Sharma & Meyer, 2019) and the significance of mentoring among various accelerator services on the other hand (Pauwels et al, 2016), the integration and utilization of AI in the mentoring process within accelerators has been emphasized; However, since every emerging technology must be accepted by its users (Flavian et al, 2020) and this acceptance largely depends on their readiness level, measuring the readiness of mentors in accelerators for integrating AI into the mentoring process is important. The framework proposed in this study, through reviewing the literature and identifying key factors, includes three categories of intention, ability and utility. The intention category refers to factors such as digital maturity, technological awareness, perceived usefulness, job security concerns, and objective alignment, which actually point to the mentor' s perspective on this century's wonder. The second category includes the training and skills factors that, alongside each other, shape the mentor's ability and influence their readiness level. The outcome of these factors shapes the mentor's ability, the assessment of which significantly impacts their correct understanding of readiness. The third category also includes the cost and ease of using AI for the mentor, which actually refers to the consequences that the mentor perceives in using AI and relates to how it is implemented and its context.

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The novelty of AI and this paper topic clarify the necessity of future researches. Examining variables such as age, gender, income level, and mentor's field of expertise in readiness to accept AI in the mentoring process can help complement the results of this research. The examination of emotional and sentimental aspects in the use of AI in the mentoring process also clarifies this path. Extracting measurement models from this framework and testing them in accelerators is also a subject of future research. Alongside all of these, assessing the readiness of startups to integrate AI into the mentoring process, and the readiness of accelerators to deploy such systems also require further research.

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