
Artificial Intelligence-Entrepreneurship: Future Research and Opportunities for New Business Model

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ABSTRACT

Artificial Intelligence (AI) is a capability related to intelligent creatures in the form of artificial robots which are fully controlled by digital computers. The presence of Artificial Intelligence (AI) certainly changes the structure of human life which affects the effectiveness of human performance such as in the field of entrepreneurship. The main scope in artificial intelligence technology is gaining strategic advantage in digital business, human resources, market research, customer relations, accounting and finance, sales, marketing, and others. The focus of the study of this paper is to understand more about Artificial Intelligence, opportunities for using Artificial Intelligence for entrepreneurship, perspectives that support AI technology as part of the new model of business, perspectives against the development of artificial intelligence, as well as future opportunities from artificial intelligence technology.

Keywords: Artificial Intelligence; Entrepreneurship; Opportunities

Article Info

Accepted : 18-06-2024

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Revised : 03-03-2024

Published Online : 25-06-2024



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1. INTRODUCTION

We are in a new era of the industrial revolution where everything has adapted from traditional to modern. The use of technology is no longer a taboo in the industrial era 4.0 which prioritizes artificial intelligence technology to facilitate all its main activities in entrepreneurship and the application of the latest business models which must include advanced technology in it. Current technology has gone through several refinements or has evolved where technological evolution and futuristic models are able to create intelligent, automated and completely digital systems [1]. The emergence of artificial intelligence seems to lead to the growth of new opportunities in the concept of entrepreneurship, especially in acquiring new business models.

In general, Artificial Intelligence creates changes and attitudes in the scope of entrepreneurial activity [2]. The technology inherent in Artificial Intelligence has an influence on all aspects of the digital activities that we do. Artificial Intelligence is capable of witnessing all verifiable positives. The existence of Artificial Intelligence will be a great opportunity for entrepreneurs to expand their business market. Artificial Intelligence is formed, one of which is to imitate human behavior. The potential for Artificial Intelligence is enormous to respond to different inputs. Artificial Intelligence is less susceptible to selection dissonance than people. In fact, if the results are opposite to our point of view as humans, Artificial Intelligence can find the difference. Artificial Intelligence is highly capable of dealing with any nonlinear relationships, including dynamic exponential equations, geometric series and binomial probabilities. It can be seen that this technological

advancement can simplify human life as a whole because Artificial Intelligence can replace the human position in doing work, processing data, and finding solutions primarily in the entrepreneurial aspect.

Artificial Intelligence and Entrepreneurship

Artificial intelligence is the ability to perform tasks normally associated with intelligent beings in the form of robots controlled by computers or digital computers. It refers to a type of software that involves human activities such as planning, solving problems, finding meaning, generalizing, and past experiences [3]. The existence of Artificial Intelligence changes the meaning of human life to be more specific with the help of digital computers with artificial intelligence technology. This also refers to the current scope of entrepreneurship which requires smart technology as the front guard in overcoming problems that can hinder transactions and trading activities. Artificial Intelligence does not refer to any specific technology but rather a technology made up of related technologies, including machine learning, deep learning, and natural language processing or image recognition.

Artificial Intelligence can be understood as a label that includes technologies that rely on the exponentially growing capacity of machines to imitate and reproduce human cognition to carry out certain routine tasks [4]. There are various kinds of understanding of Artificial Intelligence, but in this article we define that Artificial Intelligence is an artificial technology that resembles humans which is inspired by human intelligence in doing everything. The rapid evolution of Artificial Intelligence-based technology, this definition directly accommodates various possibilities that may occur in the future in terms of decision making in the field of entrepreneurship. Artificial Intelligence is able to assist entrepreneurs in reasoning and decision making through several entrepreneurial processes that go through several phases.

In general, the entrepreneurial process consists of several phases, including the discovery phase and the exploitation phase [6]. The discovery phase consists of entrepreneurial reasoning and activities to identify business opportunities that generate ideas effectively. The exploitation phase consists of entrepreneurial reasoning and decisions to transform the accumulated business ideas into action [6] proposes that there is a third phase, namely the entrepreneurial phase, which consists of organizing the activities of a new entity that is sustainable after being established and has survived for more than three years in its competitive environment.

2. RESEARCH METHOD

This study uses a literature review method involving researching, reading, analyzing, evaluating, and summarizing scholarly literature (typically journals and articles) about a specific topic. Literature review in this study is carried out in several stages consisting of determining PICO questions (Problem, Intervention, Comparison, Outcome), searching for articles, evaluating relevant articles, analyzing, and synthesizing articles. Relevant articles were searched through an electronic database, namely Publish or Perish using the keywords "artificial intelligence" and "entrepreneurship" in Indonesian and English which are academic and open access journals. Eleven articles were selected based on criteria with publication dates within the last 5 years. Content analysis was carried out using the elaboration of research results.

Table 1. Content Analysis

No	Authors	Title	Findings
1	Priyanka Kaushik	Role and Application of Artificial Intelligence in Business Analytics: A Critical Evaluation	Artificial intelligence play role in marketing, advertising, client administration, inventory, and computerized operations. There are many positive sides of artificial intelligence in helping economic growth and protecting online privacy and security.
2	Krzysztof Wach, Cong Doanh Duong, Joanna Ejdys, Rūta Kaziauskaitė, Pawel Korzynski, Grzegorz Mazurek, Joanna Paliszkiwicz, Ewa Ziemia	The Dark Side of Generative Artificial Intelligence: A Critical Analysis of Controversies and Risks of ChatGPT	Artificial Intelligence is critical to ensuring the level of competition, promoting fair competition, protecting intellectual property rights and privacy, and preventing potential geopolitical risks. To avoid social manipulation and undermine ethics and good faith, it is important to adopt responsible Artificial Intelligence practices and ethical guidelines: transparency in data use, bias mitigation techniques, and monitoring of generated content for harmful or misleading information.
3	Christoph Gerling, Philip Meier, Charlotte Köhler	AI Meets Digital: A Critical Review on Artificial Intelligence in Digital Entrepreneurship	The relationship between agency, processes and outcomes of digital entrepreneurship and the Artificial Intelligence aspects of autonomy, learning and obscurity. A savvy integration between Artificial Intelligence technology and

			humans requires assistance in the development of entrepreneurial ventures.
4	Navaneetha Krishnan Rajagopal, Naila Iqbal Qureshi, S. Durga, Edwin Hernan Ramirez Asis, Rosario Mercedes Huerta Solo, Shashi Kant Gupta, S. Deepak	Future of Business Culture: An Artificial Intelligence-Driven Digital Framework for Organization Decision-Making Process	The conventional perspective of devices as tools as opposed to Artificial Intelligence. To efficiently utilize technology, human decision makers must transition into interpreters and interpreters of results, not just manage devices.
5	Nick Drydak	Artificial Intelligence and Reduced SMEs' Business Risks. A Dynamic Capabilities Analysis During the COVID-19 Pandemic	Mitigating business risk by the presence of Artificial Intelligence applications in London where Artificial Intelligence can be used in marketing, sales, communications, predictions, pricing and cash flow, detection of fake reviews, cyber security, recruitment and legal services. Artificial Intelligence applications can help SMEs to adapt to unprecedented conditions during the COVID-19 pandemic.
6	Siemon Dominik, Strohmann Timo, Michaike Siemon	Creative Potential Through Artificial Intelligence: Recommendations for Improving Corporate and Entrepreneurial Innovation Activities	Artificial Intelligence has the potential to act not only as an autonomous technology that works automatically using modern algorithms and generates ideas independently. It has the potential to foster creative potential in interactions with humans, so that it becomes part of a hybrid intelligence that has the ability to complete creative tasks. The use of Artificial Intelligence in the creative process will fundamentally change the way humans work in the future.
7	Yann Truong, Dirk Schneckenberg, Martina Battisti, Rachid Jabbouri	Guest Editorial: Artificial Intelligence as An Enabler for Entrepreneurs: An Integrative Perspective and Future Research Directions	An integrative perspective of essential dimensions and future research avenues for the topic of Artificial Intelligence as an enabler for entrepreneurial venturing.
8	John Ughulu	The Role of Artificial Intelligence (AI) in Starting, Automating and Scaling Businesses for Entrepreneurs	The impact of using Artificial Intelligence on businesses that can save time, as well as achieve efficiencies in increasing marketing for profit. The use of AI in sales, marketing, customer support, accounting, human resources, contact centers, and operations.
9	Guglielmo Giuggioli, Massimiliano Matteo Pellegrini	Artificial Intelligence as An Enabler for Entrepreneurs: a Systematic Literature Review and An Agenda for Future Research	Artificial Intelligence as an enabler entrepreneur has profound implications for entrepreneurship. There are four positive influences as a phase of the "AI-enabled entrepreneurial process". These phases include; Opportunity phase, decision-making phase, performance phase, education and research phase.
10	Latha Lavanya, Hemavati Mattaparti, S. Ramesh Babu. Ambreen Aisha	Implementation of Artificial Intelligence in Entrepreneurship: An Empirical Study	There are statistically significant differences in the views of manufacturers and service entrepreneurs towards Artificial Intelligence for decision making. Marketing decisions, supply chain decisions, refunds and replenishment returns, and competitive analysis are all different aspects of business in which manufacturing and service entrepreneurs in Bangalore have statistically significant different perspectives.
11	Siti Marsrichah	Ancaman dan Peluang Artificial Intelligence (AI)	Artificial Intelligence has great potential in dealing with existing threats and opportunities. The use of AI in the collection and analysis of personal data can threaten individual privacy, potentially replace some types of human work, and can improve medical diagnosis and healthcare with accurate data and more informed decision making. AI can also be used to optimize the operation of renewable energy systems and increase the efficiency of energy use. The use of AI can be a powerful tool to overcome challenges and take advantage of opportunities in various fields.

3. RESULTS AND DISCUSSION

Based on the literature that has been reviewed, it can be described as follows:

Ease of Presence of Artificial Intelligence

The availability of efficient services that facilitate all scope activities both in terms of daily routines by the humans themselves certainly greatly influences the reliability of information. The existence of Artificial Intelligence raises several conveniences as several researchers have discovered through their research results, the point is that Artificial intelligence play role in many fields such as marketing, advertising, client administration, inventory, computerized operations, pricing and cash flow. It even can helps human to make a decision through predictions. In fact that Artificial Intelligence applications can help SMEs to adapt to unprecedented conditions during the COVID-19 pandemic. There are also several findings in another field beside of economy and business regarding the ease of presence of artificial intelligence such as:

1. Rajkomar et al in 2019 conducted research focusing on the huge potential of Artificial Intelligence in improving medical diagnostics and healthcare. According to this context, Artificial Intelligence is used in analyzing data to make a decision that can make a significant contribution in increasing the accuracy of diagnoses and personalizing treatment for patients [7]. AI has great ability to process large amounts of data with high accuracy and precision. In addition, AI can personalize healthcare by taking into account individual patient characteristics. AI can provide suggestions that can adjust the patient's condition, both medical conditions, medical history, response to treatment that has been done, and risk factors. This is certainly able to provide efficiency in health care and optimize clinical outcomes for patients. The potential that AI can generate in the health-related business sector is enormous. An example of AI application in the health world is the use of MRI or CT which can be used to detect potential cancer, heart disease, and to identify disease risk or response to therapy.
2. A study by Luo 2020 [8], states that AI has great opportunities in analyzing and predicting weather patterns. AI can understand the difference between weather and renewable energy production, so AI is said to be able to combine historical and real-time weather data with machine learning techniques. Therefore, AI can provide accurate predictions about the future production of renewable energy. The use of Artificial Intelligence (AI) in a renewable energy management system can help increase the efficiency of energy use, optimize the allocation of resources, and reduce operational costs. The implementation of Artificial Intelligence (AI) also has the potential to facilitate a more rapid and effective transition to renewable energy sustainability. Artificial Intelligence (AI) in its easy application to perform big data analysis and has a machine learning basis, the AI system can easily identify patterns of energy consumption and provide recommendations regarding practices that can increase energy efficiency, especially at the individual level and the infrastructure level.

Threats to the Presence of Artificial Intelligence

There are several studies that have been conducted by researchers regarding the threats to the presence of Artificial Intelligence. Basically about social manipulation and undermine ethics and good faith and potential geopolitical risks. It is important to adopt responsible Artificial Intelligence practices and ethical guidelines: transparency in data use, bias mitigation techniques, and monitoring of generated content for harmful or misleading information. There are some critical points as follows:

1. Research by Dwork et al in 2016 stated that there are privacy threats related to the use of Artificial Intelligence in the collection and analysis of personal data. In this regard, it is explained that Artificial Intelligence is intended to identify patterns in personal data that can reveal sensitive information without the consent of the individual concerned [9]. Artificial Intelligence brings a lot of concern because Artificial Intelligence can find out very detailed information, even those that include privacy, such as; financial information, personal preferences, health and personally identifiable data. However, this can be overcome by taking an approach that might be taken by strictly implementing the principles of personal data privacy such as the principle of privacy by design and default. In addition, an important step that needs to be taken in order to prevent leakage of personal data by Artificial Intelligence systems is personal awareness and increased literacy regarding Artificial Intelligence in order to prevent risks due to the sophistication of Artificial Intelligence.
2. The study that was carried out by Frey and Osborne in 2017 showed an extraordinary threat to the human workforce which was starting to be threatened by the presence of Artificial Intelligence. The research conducted by them highlights several types of work by humans that several sectors of work will begin to be displaced by the existence of Artificial Intelligence technology. This can happen because the technology provided by Artificial Intelligence is very sophisticated and can perform the basic functions of humans themselves to perform routine and repetitive tasks with high efficiency [10]. Due to the threat of the presence of Artificial Intelligence, there are several approaches that can

be taken, including by increasing abilities or skills that are oriented towards complex problem solving, in-depth analysis, human collaboration, leadership related to decision-making management. In addition, there is a need for hard efforts in the field of education and training to increase the readiness of the workforce in facing the changing times.

Future Challenges by Artificial Intelligence (AI)

The sophistication of technology can pose challenges in the future. Artificial Intelligence (AI) in its implementation is inseparable from technical, ethical and security challenges that need to be given full attention. The following are some of the main challenges that must be considered [11]:

1. Technical Challenges: includes data processing that has good quality, algorithm reliability and accuracy, as well as sufficient computing capacity. Then, AI requires adequate computing resources including fast processing and sufficient storage capacity to handle complex and large tasks.
2. Ethical Challenges: Engaging AI creates significant ethical challenges. There are issues related to fairness and bias. AI algorithms can reflect biases in training data or apply unfair decisions. In addition, privacy and personal data protection are covered under ethical considerations.
3. Security Challenges: Implementing AI can present security challenges that must be overcome. Attacks and manipulation are very vulnerable to attacking AI systems either through cyber-attacks or data manipulation. The priority of AI that must be addressed is related to security.

In order to overcome some of the challenges in the emergence of Artificial Intelligence (AI) systems, it is necessary to have a holistic approach involving experts, researchers and related regulators.

4. CONCLUSION

With the challenges that can arise from the existence of Artificial Intelligence (AI) which are starting to emerge and become rampant, it is important to have protection as well as specific actions to overcome them by increasing opportunities for individual skills, future research, as well as increasing expertise in all aspects of work, especially for individuals who do not want their activities to be replaced by Artificial Intelligence (AI) technology. It is important for entrepreneurs to consider whether one day Artificial Intelligence technology can influence company performance systems or be able to shift the need for human resources and replace it with AI technology.

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