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# Impact of AI and Big Data in Entrepreneurship: A Survey

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**Abstract:** The disruptive perspective artificial intelligence along with robotic technology plays a significant role. Research about contemporary entrepreneurship during the last few years shows that artificial intelligence alongside big data remains an unexplored area despite their important impact across fields This paper demonstrates how these technological features enhance productivity through advancements in entrepreneurial research methods. The document discusses ethical problems and paradoxes which emerge due to the difference between AI systems that follow rules and the unpredictable nature of entrepreneurial processes. The research guidelines offer both researchers and practitioners future research possibilities together with acknowledgment that technology may be abused for private gains.

**Keywords:** Entrepreneurship; Artificial Intelligence; Big Data; Machine Learning; Smart Entrepreneurship.

## 1. Introduction

The special issue on artificial. In fact, there is no correlation between the four phenomena: AI, big data, and entrepreneurship are not as a weak attempt at trying to give a comprehensive survey and prognosis of the extent and the possible effects which AI may bring as a guide to big data implications for future entrepreneurship research and application. What we write and other messages and actions. For instance, any predictions and explications of future scenarios may very soon turn into a rather slippery theme behave as absolute information due to the fast advancement in the fields as applied to AI and big data and with appreciable reaching throughout yet foreseeable repercussions quite difficult to accurately forecast, future consequences to the material real dad world [1]. But there is of course also continuous evolution in regard to the subject matter definition of entrepreneurship as a human activity within a specific social context. Dynamic and transforming external facilitators and structures [2]. However, as there is developing interest in AI and big data as one of the most frequently discussed topics in both research area and applications, employs and business management, but has received comparably little attention as for the aspects of entrepreneurial activity, we would like to suggest certain considerations, and thus is not unaware of the fact that this work is not entirely easy and predictable, especially as it pertains to the future, within such dynamic fields. In the writing of this article we also look from the angle/of lens of the main themes of entrepreneurship research, and we shall endeavor to center on here near future, for instance, in relation to research Losing or merely overemphasizing one faculty usually strengthens or bolster up the other five faculties[3]. The near future, for instance means it can happen anytime soon in the future In relation to research, for instance, it means it can happen at any time soon in the future of the research

strategies, structural developments and cooperative processes of the future research generation of entrepreneurship or as the outstanding British mathematician and computer scientist, one of the founders of artificial intelligence, Alan Turing. Famously put it: The only thing that we can get to see being held in these tanks is a limited amount of water in front of the eye which we are using [4]. There are a lot of both ahead of us but there is much to demolish there as well done. AI and big data have become more significant in the wider disciplines that are thought to be basic to research field's industry studies in the context of Antigone a construction site for humanity entrepreneurship research, including economics [5]. Likewise, this data revolution is also changing the application fields related to entrepreneurs such as industry, business management, and creativity.

The second machine age is opposed to first machine age, Machine- or Mechanical Age. So, this second modern world is not powered by coal and steam but with data and AI. Similarly, the AI practitioner and researcher, Andrew Ng has defined AI as some kind of electricity changing the industry and business in the same way that electricity disrupted [6]. AI is therefore also concerning the pragmatic position of individuals in this new world of work characterized by artificial intelligence in many ways. What is the meaning of AI and big data? While there are , apart from the different and evolving definitions available, AI can be largely as an intelligence of machines or put in academic discipline terms (which is usually perceived), within the framework of computer science (as a sub discipline), the analysis of how digital computers and algorithm do their tasks and allows solving such problems that otherwise would be solved by means of human, intelligence, reason, and prediction power required in the organization so as to be able to react to new stimuli. This modern definition has been in the process of evolution from a relatively long time now the first definition of AI given by computer scientist [7]. Ending the comparison of the AI terminology with other classification it possible to notice that the most widespread division is machine learning as its subset of deep learning such as deep neural network and concerns of AI subset of machine learning. From this perspective, the analysis of the research field of entrepreneurship can be referred to as the study of the emergence does not appear to be well equipped, and most likely feels overworked due to the rapid modernity in the area of AI and big data [8]. Indeed, as I have already mentioned earlier, entrepreneurship is not actually a sub discipline of computer science and vice versa. But, interestingly enough, even when the issue of AI/ big data has been discussed in the context of entrepreneurship: it takes us to essentials issues that include: reasonableness and unpredictability, knowledge, ideas, solutions, and ways to achieve them emotional intelligence and knowledge from behavioral and demonstrated learning – patterns and motifs that have been of prior interest to entrepreneurship researchers for many years [9]. Computer technology and program will not only provides ideas and supports a new generation of research for this functional area but will provide effective intelligent machines and algorithms as well them also influence the real actual phenomenon of entrepreneurship opportunities and business concepts, smart entrepreneurial processes [10], or the relationship between and amongst the two entrepreneurial strategies or the nexus and the interaction between the two communication taking place between entrepreneurs and machinery intelligence that are somewhat bold forecasts and thus only the future will in a position to say whether we will witness more of change and not stability at some point.

In particular, it will be quite insightful to examine if AI and big data will result in a paradigm shift in entrepreneurhip research and practice in terms of providing more or less incremental or radical innovations or whether it will indeed spur of revenue growth and consequently customer acquisition new direction change and merely an Explosion of knowledge that are revolutionary and alter the paradigm or the rule of the game. These two elements are closely connected and mutually influencing each [11]. As a

last step, we would now like to provide an initial conclusion and a forecast before presenting the special issue papers as précised examples of the already available already existing research projects in this field.

In Section 2, empirical studies regarding the AI and big data relations with entrepreneurship. Section 3 Results the influence of these technologies on entrepreneurship. Section 4 Discussion Case studies and examples of AI and Big Data in action while Section 5 The future of AI, Big Data, and entrepreneurship, along with challenges and ethical considerations.

**2. AI and Big Data**

AI and big data integration within entrepreneurship research shows no signs of newness since the field stands at the threshold of AI-enhanced research advancement. The potential and upcoming connections remain unclear when it comes to AI, big data and the various interdisciplinary fields of entrepreneurship research [12]. The data revolution provides brilliant opportunities to research and practice entrepreneurship yet generates challenges paired with unresolved research matters. The innovation of research techniques combined with new data sources and study protocols allows researchers to explore entrepreneurial phenomena with new discoveries [13]. Three main challenges emerge in this field concerning new statistical approaches while protecting privacy and employing ethical conduct and computational methods along with changing the entire research approach for entrepreneurship studies [14]. Future research needs better conceptual investigation and empirical studies regarding the AI and big data relations with entrepreneurship. The Several main concepts form the basis for conceptual work which should include:

- The potential for both productive and destructive entrepreneurship.
- Future entrepreneurship demands both predictive power and intelligence capabilities for operation.
- AI and big data systems should help professionals reach expert-level performance in business through the provision of deliberate practice support.
- The paper provides hands-on insights about technical requirements along with software solutions, smartphone tools, data mining methods and machine learning applications which serve as basic resources for carrying out big data and AI research in entrepreneurship [15].
- The debate between prediction and explanation, inductive, data-driven approaches versus deductive, theory-driven methods, and the tension between the size of data and its representativeness.
- The application of big data and artificial intelligence in research studies poses both safety threats and moral obstacles regarding data security standards and information confidentiality and extends to result generalization limitations and intrusive acquisition procedures [16].
- The analysis of entrepreneurial personality types and emotional states can be performed using computerized methods to evaluate language patterns.
- This research demonstrates methods to extract information from social media and Twitter and Facebook data for entrepreneurial investigations.
- The paper examines big data and artificial intelligence from perspectives involving rationality along with uncertainty and risk and their connection to entrepreneurship [17].
- Researchers should explore ways that AI and big data technology can enhance the training of future entrepreneurs and direct concepts taught in entrepreneurship classes.
- The entity works to teach both new entrepreneurship researchers and young entrepreneurs how to apply big data and AI techniques.

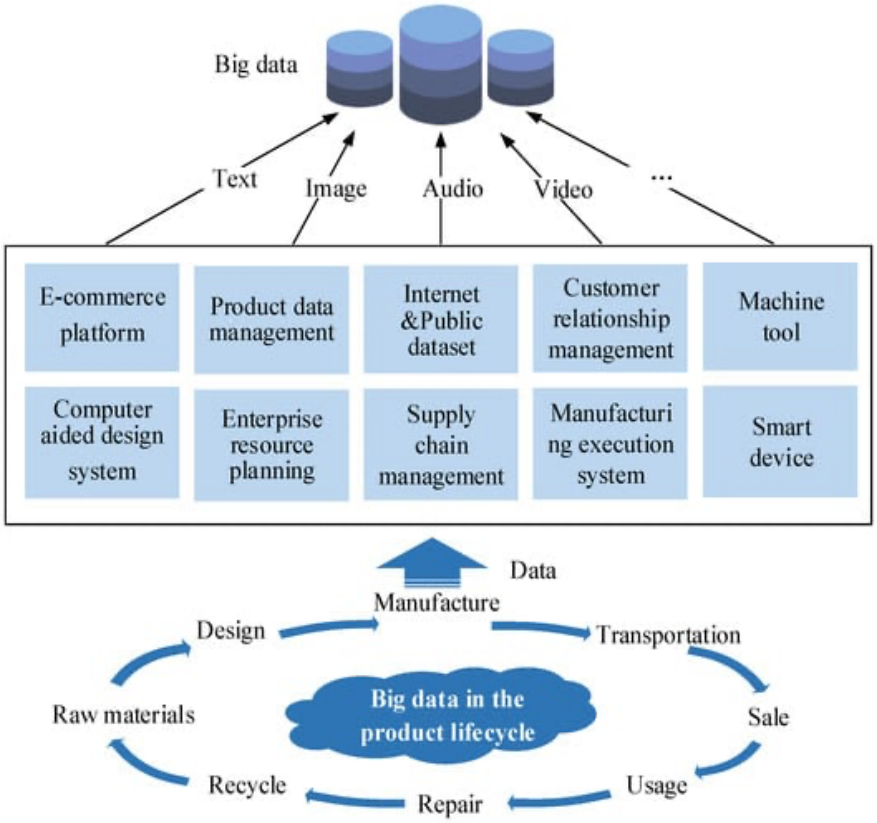


**Figure 1.** Big Data and AI-Driven Product Design: A Survey [18].

- Developing new metrics based on big data to measure entrepreneurial activity and quality Empirical studies that can fully harness the potential of social media and other digital footprints for entrepreneurship research.
- Identifying and predicting entrepreneurial characteristics and performance outcomes for individuals, teams, and organizations [19].
- Investigating the formal and informal institutions in entrepreneurial regions analyzing entrepreneurship policy.
- Studying entrepreneurial education and training programs.
- Research on entrepreneurial networks.
- Analyzing entrepreneurial finance, including crowd funding, investment analyses, and the selection processes for high-potential startup projects [20].
- Conducting simulation studies related to entrepreneurship.
- Investigating underrepresented populations in entrepreneurship research, such as those from non-Western countries or individuals from unconventional entrepreneurial backgrounds [21].
- Studying business model processes critical to entrepreneurial organizations and growth Research on stress, well-being, health, and social behaviors of entrepreneurs and their teams, utilizing smartphone technologies [22].
- Exploring the biological factors and processes that influence entrepreneurship, such as genetics.
- Investigating the ecological sustainability of entrepreneurship and the environmental/energy costs associated with AI and big data in entrepreneurial practices.

Examining the long-term societal and individual effects of an AI-driven entrepreneurial economy [23], akin to the studies of the Industrial Revolution and its cultural and psychological consequences.

**3. Technologies on Entrepreneurship**

The integration of AI and big data systems is transforming entrepreneurship research by providing both supplementary functions and revolutionary capabilities. These technologies have contributed to the development of real-world phenomena such as e-commerce and new crowdfunding methods, which are now central topics in entrepreneurship studies [24]. The application of AI and big data in entrepreneurial research influences both the investigative approaches used by researchers and the specific research targets they choose to focus on [25]. This fusion of real-world trends and academic inquiry is leading to the creation of an AI-integrated entrepreneurial practice, highlighting parallel developments in both domains.

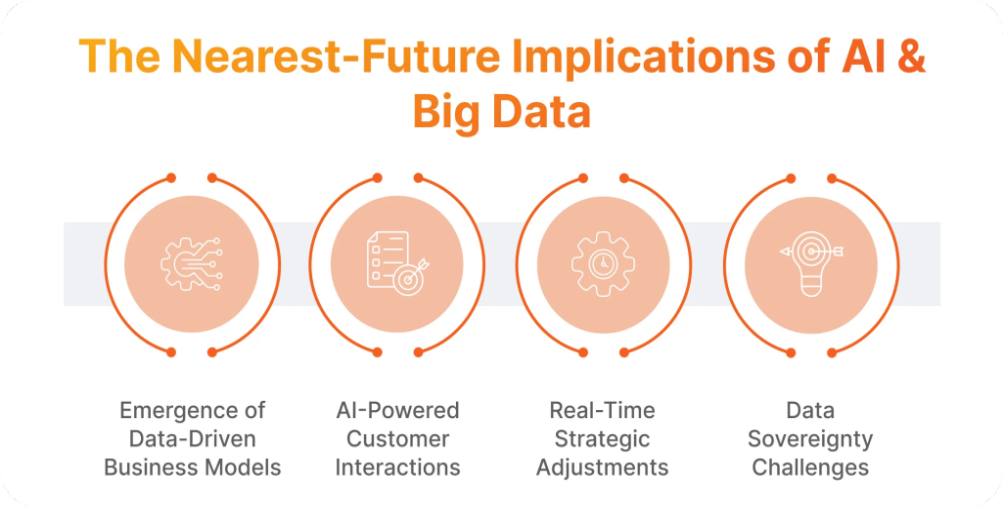


**Figure 2.** Big-Data-and-Its-Business-Impacts [26].

The proposed interlinked frameworks and contributing sub architectures in this paper could implement such standard AI components to bridge the research gap between entrepreneurship and practice according to research [27] while findings easily move between practice and research. The potential effects of Artificial Intelligence combined with big data analysis exist on how entrepreneurship begins and ends (such as failure or success rates for startups and entrapper neural initiatives) What defines the ramifications that result from this forward development?

3.1. External Enablers

First, of course, such technological change can serve New Business Creation from an outside-in perspective as an external enabler for new entrepreneurial activity. It might actually be a prime example of radical external changes that can effect positive change that empower [28]. Enable new growth that yields new economic action that is novel products and services through entrepreneurial motivation (for other AI start-ups like AI Brain, Banjo, Deep Mind and so forth. especially when large firms with established market position fail to capitalize all of them as potential financial instruments. attempt to captivate new technologies, also participating in social entrepreneurship projects such as; for instance, Open AI, in which participates, and which has been created, among other things, by the potential of AI the related, and existentially dangerous, tasks for humanity). On the other hand, companies at a starting stage in this area especially [29], if they are limited by general resources constraints (for instance, for example, access tool big data and great power Anyone using cloud computing, might also be confronted, challenged and to some extent overwhelmed by the sheer culture in terms of its speed in client technology adoption a pace of technological progress that transforms society and its institutions and by the technological and, the larger culture that embraces them; by technology and, the societal context which it encompasses [30]. technical knowhow requirements which always have to be fulfilled have been updated to be on the forefront of this development. From this perspective, organizations and big firms adopting artificial

intelligence and big data to support entrepreneurial approaches were the second time often something that gives him or her certain measure of protection against competition from novice companies [31]. they might have better Economic muscles and opportunity to acquire infrastructural and know-how capital that enables it to take part in, to gain from, and even shape the continuous generation advancements (some of these are Amazon Web Services (AWS)) or Google.ai).

3.2. AI and Big Data Plus Humans

AI and big data impact how entrepreneurial people and teams participate in the entrepreneurial pathway [32] although external enablers represent objective open opportunities from the external environment. The partnership between entrepreneurs and new technology stands as a critical question since the possibilities between automation and human entrepreneurial roles remain unclear. When machines totally supplant entrepreneurs during the entrepreneurial process the result would be an extensive transformation of business principles. Experts conduct discussions with similar themes throughout different occupational fields and human performance sectors despite finding this scenario improbable. Such a situation would cause fundamental disruption to individual–entrepreneurship connections by potentially removing human agency and subjectivity from entrepreneurship which would impact related research areas especially psychology of entrepreneurship and entrepreneurship education and training. The question arises regarding the motivations behind abandoning entrepreneurship activities to powerful AI since these central functions of discovery and innovation analysis and business creation should rely on human traits rather than artificial intelligence capabilities [33]. That could outperform humans. Scientists presently ask similar questions regarding inventions together with innovation as well as scientific development. Springer Nature issued its inaugural publication of a scientific book which AI computers created entirely by themselves. AI technology already revolutionizes astrophysical research and genetic scientific fields as well as healthcare systems and it may transform how people practice entrepreneurship moving forward [34]. AI likely will not eliminate human participation from entrepreneurial functions throughout the upcoming years.

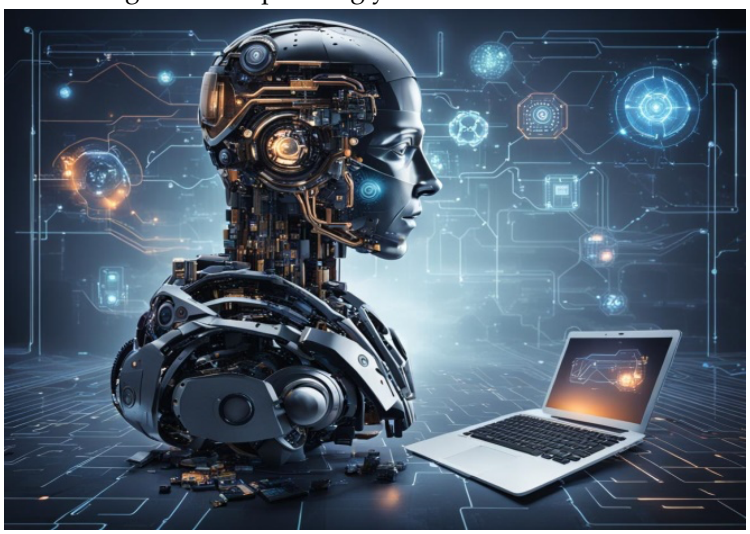

**Figure 3.** big-data-ai-tokens-blockchain [35].

Interestingly, research suggests that occupations like business management, which could include entrepreneurship, are less likely to be replaced by machines soon, because generalist roles requiring human heuristics, as well as specialist roles focused on creating novel ideas and artifacts, are less susceptible to automation [36]. Indeed, "prototypical" entrepreneurship is often considered a form of generalist work that incorporates human heuristics while also relating to the specialized creation of new ideas and innovations.

In a less extreme and more likely near-term scenario, AI and big data are expected to support entrepreneurs rather than replace them, aiding them in accomplishing entrepreneurial tasks and achieving their goals. In this case, it would be less about humans versus machines, and more about humans working alongside machines in a symbiotic, collaborative relationship. This view is gaining traction in contemporary business and management literature and it appears to offer a promising direction for the future of entrepreneurship as well. AI and big data have long been integral to supporting various business functions such as finance, marketing, distribution, business planning, information systems, production, and operations [37]. However, the ways in which humans and machines can interact and collaborate in this context might be evolving identify five key areas where AI and humans can collaborate for business process improvement: flexibility, speed, scale, decision-making, and personalization, argue that the competitive edge lies in mastering AI and big data, suggesting that over the next decade, AI won't replace managers, but managers who use AI will replace those who don't [38]. This concept could extend to entrepreneurs as well, especially in fields where AI can help them scale their businesses effectively.

At least three primary questions must be addressed which explore the bond between artificial intelligence systems and entrepreneurial activity. The initial part deals with the definition of intelligence [39]. The concept of AI as a form of intelligence using human defined intelligence standards leads to a fundamental question about entrepreneurship benefits from maximum levels of intelligence. The scientific field has yet to confirm whether high intelligence leads to entrepreneurial success. Traditional intelligence does not determine entrepreneurial success since certain traits specifically bolster entrepreneurial analytical and creative and practical capabilities [40]. The support of AI for entrepreneurship needs to focus on specific areas but additional research must establish how human intellect collaborates with artificial intelligence to influence entrepreneurial development. The partnership between intelligence and social along with emotional abilities shows signs of influencing this business dynamics. While some experts maintain that prediction represents the most important area where AI can transform business operations over traditional intelligence capabilities.

The second question concerns uncertainty. Entrepreneurial decisions usually take place in unpredictable conditions [41]. Uncertainty differs from risk as it involves making decisions without access to dependable data that can lead to successful modeling outcomes. Intuition plus creativity along with cognitive biases within entrepreneurship creates doubts about AI capability to imitate or boost unexpected entrepreneurial behaviors [42]. The creation of predictable results through rule-based systems fits well within AI capabilities while its support for entrepreneurship requires imaginative and intuitive function. Active researchers and developers continue their efforts to apply artificial intelligence in uncertain conditions though such work presently influences business strategy while shaping game theory concepts.

Another significant area is AI's potential role in the early stages of entrepreneurship, such as idea generation and opportunity discovery. Can AI help identify and co-create new business opportunities? [43]. While this seems far-fetched today, the rapid advancements in AI, such as reinforcement learning programs that outperform human experts in complex tasks like Go and chess, suggest that AI could play a role in entrepreneurial discovery. AI programs are also making strides in creating art and aiding in discovery and invention.

The third question concerns the limitations and risks of AI and big data. It will be crucial to address ethical issues, regulate access to data and technology, and maintain a critical perspective. There are concerns that AI may not always produce the best or most reliable solutions [44]. In health research, scholars warn that data mining, if disconnected from clinical understanding, may lead to misguided

conclusions. If entrepreneurs rely on AI without critically evaluating its outputs, it could result in biased decisions and missed opportunities.

3.3. Entrepreneurship education and training

Third and last, in addition to bearing the role of the objective outside world within their mind, these characters Sons, and possibly others are also authors as enablers and as support for self-employment individuals and teams, it might also complement the practice through the use of AI and big data context of development of the field of entrepreneurship education and training in a New way [45]. In the worse-case scenario, using algorithms and Machines take over (some) aspects of entrepreneurship from the capitalist enterprises from humans, this could mean, somewhat ironically that these algorithms and machines themselves enlist us into doing more work. At least receive some sort of entrepreneurship education and training (for example, in the form of reference information which facilitate them to learn). On the other hand, educators might want to apply AI and big data to improve their educational practices in the classroom settings and beyond [46]. This could of course also mean that again, this is not without potential consequences for other system parts or for the entire get Service really educating AI/Big Data related to entrepreneurship strategies for enhancing the ability of aspiring generations of businessmen in this new age (for instance to critically assess and explain AI results). This might include, in addition to technology and also such the knowhow aspects, but ethical, social and ecological problems [47]. To address this we need to predetermine how or if AI and big data will indeed change the way entrepreneurs think and act, the fields of education [48]. Another implication is that education and training should be the key strategic priories of organizational development. This could also extend to other structures in society that are promoting an entrepreneurial entire.

**Table 1.** Studies on AI and Big Data in Entrepreneurship

| Author(s) | Proposed Method | Working Method | Limitations |
|---|---|---|---|
| S. Peng et al. [49] | How AI analytics enhance startup decision-making in their study | Strong data-driven approach and statistical analysis. | Limited scope; focuses on only one aspect of entrepreneurship. |
| S. Ramoglou et al. [50] | Explores AI tools for market prediction in entrepreneurial ventures. | Real-world implementations of AI tools in entrepreneurial businesses. | Contains language that might challenge audiences who lack training in the field. |
| S. Robledo et al. [51] | Analysis of Big Data's role in identifying business opportunities. | Comprehensive analysis of data mining techniques. | No exploration of ethical concerns with Big Data usage. |
| P. Schade et al. [52] | Focus on AI in automating small business operations for better efficiency. | Highlights AI's potential to increase operational efficiency. | Ignores long-term sustainability concerns of AI integration. |
| D. Schonthal et al. [53] | Study on Big Data's influence on consumer behavior prediction for startups. | Strong empirical data backing the research. | Limited generalizability beyond the selected case studies. |
| D. Shepherd et al. [54] | Investigating AI-powered customer service solutions for small enterprises. | Focuses on cost-effectiveness and customer satisfaction. | The research lacks focus on data privacy issues. |
| A. Shore et al. [55] | Application of Big Data analytics in identifying entrepreneurial trends. | In-depth statistical analysis of emerging business trends. | A narrow focus on one region, reducing the global applicability. |

| | | | |
|---|---|---|---|
| K. Thoring et al. [56] | Research on integrating AI with Big Data to foster innovation in entrepreneurship. | Clear connection between AI, Big Data, and entrepreneurial success. | Lacks discussion on the challenges of AI implementation. |
| M. Townsend et al. [57] | Examining how entrepreneurs leverage AI and Big Data for scaling businesses. | Well-rounded approach with interviews and surveys. | Overlooks challenges faced by smaller startups in adoption. |
| P. Manocha et al. [58] | The role of Big Data in enhancing strategic decisions for business owners. | Strong theoretical framework and case analysis. | Limited focus on how small firms can access Big Data. |
| T. Liu et al. [59] | Study on the ethical implications of Big Data usage in entrepreneurship. | Provides a balanced view of ethical concerns. | Does not suggest practical solutions for overcoming ethical challenges. |
| E. Burget al. [60] | Examining AI's role in optimizing supply chains in entrepreneurial ventures. | Includes real-world examples of AI applications. | The scope is limited to one industry. |

**4. Discussion**

However, we expect that due to all the troubles, enterprising researchers will start new and contribute to dialogues that were already existent on discussions regarding the possibility and actual use-cases of Artificial Intelligence and big data. This fact, at present discussed in the vein of the journal Nature Machine Intelligence, didn't exist that not only was founded a major scientific journal but which is exclusively dedicated to AI and big data but also seeks: encourage interdisciplinary cooperation, it states: Bit The endeavor to attain intelligent machines will keep on encouraging in many ways, guides us in our understanding of human intelligence as well as provoking total up to date technological and scientific advancement that may be a possible benefit in positive societal change transformations [61]. It's time for one to be part of the Conversation. In our view, the subject of entrepreneurship research can and should be. It is a part of that larger movement. This could entail both Increased inter professional focus, for example, computer science and information systems) and revised up to 3 percent identify research structures within entrepreneurship research [62], therefore it new forms of constructions for instance new developing research centers and for obtaining the newest and potent technologies and media applications and popular culture (tacit type of knowledge or knowhow) about information sources and feedback upon which to rely learning format (creation of novel forms of a conference and workshops [63]. The opportunities of data depositories and sharing, and, perhaps even in academic journals; Finally, to remain in the positive-terms approach to entrepreneurship research, as called Bathe study of sources of opportunities; discovering and-selection processes of opportunities.

Artificial intelligence and big data in entrepreneurship: a new era has begun 535 assessment, and utilization of opportunities; and the set concerning the character aspects of individuals who find, assess, and benefit from them. To stress the positive promise factor that also posited a next concrete step were concern with the sources, processes, and actors connected with opportunities for new entrepreneurship scholarship on machine-based intelligence and its application.

**5. Conclusions**

The primary aim of the special issue titled "Rethinking the Entrepreneurial (Research) Process: Opportunities and Challenges of Big Data and Artificial Intelligence for Entrepreneurship Research" was

to create an interdisciplinary platform for both conceptual and empirical papers exploring the opportunities and challenges presented by AI and big data in the field of entrepreneurship research. In this issue, we present seven articles that provide concrete examples of research in this area. These works highlight not only the potential of innovative perspectives and methods but also the challenges and open questions faced by entrepreneurship researchers when integrating AI and big data into their studies. All the articles underwent a rigorous double-blind peer review process.

The articles by present empirical studies that apply AI and big data techniques to revisit phenomena and mechanisms previously explored using traditional methods in entrepreneurship research. Article focuses on predicting high-growth firms, using a big data approach to identify significant predictors from a large set of potential candidates. However, they highlight that, despite the new method, predicting high-growth firms remains difficult, with only 10% explanatory power. Focus on entrepreneurial regions, measuring and validating regional differences in entrepreneurial personality by leveraging large individual-level datasets and AI techniques that extract psychological patterns. They show that AI-based measures of regional entrepreneurial personality, derived from publicly available social media data, are similarly valid indicators of actual entrepreneurial activity in a region as traditional self-report measures.

They are conceptual papers that contribute to advancing theoretical understanding of methods and data sources in the context of AI and big data in entrepreneurship explore how both behavioral and non-behavioral cues can be utilized in entrepreneurial decision-making through big data and AI. Subfield of AI, in entrepreneurship research, combining a design science perspective with effectuation theory.

Finally, the empirical studies by  apply AI and big data techniques to investigate relatively new research questions, analyze crowd funding campaign data (text, speech, and videos) using neural networks and language processing techniques, offering valuable insights into what makes crowd funding campaigns successful study demand dynamics for entrepreneurial skills by analyzing data from million job vacancies, identifying which skills are most important for specific professions, with an emphasis on digital skills. Explore the link between media coverage of entrepreneurship and regional entrepreneurial activity, both conceptually and empirically.

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