

Navigating Advanced AI Innovation and Machine Learning in Entrepreneurship Opportunities

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ABSTRACT

Purpose

The study discussed an in-depth analysis of leveraging advance AI innovation in entrepreneurship opportunities. Emergence of dynamic trend of new technology innovation have orchestrate new dimensions in the entrepreneurship world to unlocked python, mega and gigantic opportunities with created advance competitive advantage as leading edge from the bleeding edge in various enterprise system, product, process and services.

Design/methodology/approach

A systematic literature review was used to analyze all relevant studies forging connections between AI and entrepreneurship. The cluster interpretation follows a structure that we called the "AI-enabled entrepreneurial process. With the application of multi-stage random sampling, sample size of 384 was drawn from the population of 9432 using Taro Yamane formula, two hypotheses were raised. The instrument was validated by experienced digital stakeholders on the concept of the study. The Cronbach Alpha techniques were utilized for the reliability for the study.

Findings

This study proves that AI and ML has profound implications when it comes to entrepreneurship opportunities and, in particular, positively impacts entrepreneurs in four ways: through opportunity, decision-making, performance, and education and research.

Practical Implications

The framework's practical value is linked to its applications for researchers, entrepreneurs and aspiring entrepreneurs (as well as those acting entrepreneurially within established organizations) who want to unleash the power of AI and ML in an entrepreneurial setting.

Originality/Value

This research offers a model through which to interpret the impact of AI and ML in entrepreneurship opportunities, systematizing correlation studies on the topic and arranging contributions into paradigms of entrepreneurial and managerial literature.

KEYWORDS: Innovation, AI, Decision making, Machine Learning, Deep Learning, Entrepreneurship Opportunities, IoT, Data Science, Big Data Analytics, Data Visualization, Decision Support System

INTRODUCTION

Entrepreneurship opportunities are everywhere at all times, places and seasons. The fundamental challenged is to identify those opportunities to triggered growth, development and positive dynamic changes, which could yield tremendous return on asset (ROA), return on interest (ROI), and return on equity (ROE). For entrepreneurs to identify an opportunities, there should be metrics and framework design to 'scan for the opportunity', 'pursuit for the opportunity', and 'grab the opportunity' to accomplished the predetermine goals for benefits (Ovharhe & Woko, 2024a,2024b; Ovharhe & Chibuike 2024a, 20204b). The best prevailing innovative option to achieve the metric and framework to grab entrepreneurship opportunity is the adoption of advance artificial intelligence (AI) technology innovation.

Emergence of dynamic trend of new technology innovation have orchestrate new dimensions in the entrepreneurship world to unlocked python, mega and gigantic opportunities with created advance competitive advantage as leading edge from the bleeding edge in various enterprise system, product, process and services. For entrepreneurs to boost their enterprise to be on the bleeding

edge of leadership position in the competitive parity, the advance AI innovation needs to be employed to power the drive in elevation of purpose on digital transformation.

The advance AI technology delves into entrepreneurship opportunities to focus, scan, identify pursuit and grab the venture with digital transformation in the entrepreneurial journey and mission. The advance AI innovation are OpenAI Chat-GPT, Chat Bots, internet of things (IoT), machine learning, deep learning, data science, big data analytics, data visualization among others.

Iqbal, Masoodi and Pandow (2024) revealed that AI innovation has boost the entrepreneurship opportunities in fast pace in enterprise progression in the banking, finance, marketing, production and telecoms from predictive analytics to algorithmic merchandizing functions.

In today's rapidly evolving business landscape, entrepreneurs face numerous challenges, from identifying market opportunities to navigating complex decision-making processes. However, with advancements in artificial intelligence (AI) and, specifically, machine learning (ML), entrepreneurs have access to powerful tools that can help them not only identify opportunities but also overcome various challenges. Therefore, this week, let's explore how entrepreneurs can leverage machine learning to enhance their businesses.

Before delving into how entrepreneurs can utilize machine learning, it's crucial to grasp what it entails. So, machine learning is a subset of AI that enables systems to learn from data and improve their performance over time without being explicitly programmed. Essentially, It involves the development of algorithms that allow machines to identify patterns and make predictions based on input data.

CONCEPTUAL REVIEW

Artificial Intelligence and Entrepreneurship Opportunities

In this new revolution Industry 4.0, Industry 5.0 and Industry 6.0 artificial intelligence (AI) plays a dynamic role of agile framework in digital entrepreneurship. AI can be expressed as digital intelligence orchestrated by machines or, demonstration of 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” (Giuggioli & Pellegrini, 2023). Within AI terminology, machine learning is frequently categorized as a subset of AI, with deep learning considered to be a subset of machine learning (Obschonka and Audretsch, 2020).

However, this revolution also requires changes to be made to the organizational dimensions of a firm (Manesh *et al.*, 2021). For example, thanks to the integration of AI processes, some of the most automated workplaces are experiencing a renaissance in terms of human work. In many cases, AI frees time, creativity and human capital, leaving people to work in a more human and less automatic way. AI empowers people with powerful tools to do more and act with superhuman abilities. In doing so, AI has the potential to re-humanize work, giving us more time to be human rather than working as machines (Daugherty and Wilson, 2018).

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 (Chalmers *et al.*, 2021).

Chibuike and Ovharhe (2022) posit that AI has lean approach speed and innovation in scanning, pursuit and grabbing entrepreneurship opportunity. This is a driven momentum as culture, risk assessment and growth which express long-run, short-run, long-term and short-term (Chibuike, Ovharhe & Abada, 2022).

In a nutshell, the main future challenge pertains to utilizing the advantages of availing AI technologies, in terms of new opportunities and productivity improvements, while avoiding the disadvantages in terms of job losses and greater wealth inequalities (Makridakis, 2017).

AI has the potential to offer both positive and negative consequences to society at large. Here, a prominent role will be played by entrepreneurs and the ways in which they are able to use these technologies. A variety of potential approaches, scenarios and contrasting findings still populate academic debates around AI, creating a “green field” (Lévesque *et al.*, 2020). We therefore

intend to perform a systematic literature review with regards to the relationship between AI and entrepreneurship, offering potential directions for further research.

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 (e.g. Chalmers *et al.*, 2021; Obschonka and Audretsch, 2020).

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 (Iansiti and Lakhani, 2020). This could have an exponential impact on developing entrepreneurship.

Third, although COVID-19 has sadly led to many causalities and deaths, the pandemic and its aftermath may serve to accelerate and advance the adoption and use of digital and modern technologies, such as AI (Amankwah-Amoah *et al.*, 2021). As a result of public health policies (e.g. lockdown), digitalization has been forced upon organizations, stimulating a jump in remote-controlled and automated processes (Ratten, 2020).

PARAMETRIC OF ADVANCE AI

Machine Learning

The term 'machine learning' (ML) is a mechanism for simplex algorithms that advanced leveraging human capital in entrepreneurship growth. Machine learning is often, incorrectly, interchanged with Artificial Intelligence, but machine learning is relatively a subset specialty of Artificial Intelligence (AI), which work systematically with algorithm. Machine learning is relatively known as predictive analytics, or predictive modeling, which was coined by American computer scientist Arthur Samuel in 1959. The term 'machine learning' is defined as a computer's ability and propensity to learn without being explicitly programmed (Wakefield, 2024). Machine learning could be annexed as the mechanism for simplex algorithms that advanced growth, which work systematically with algorithm and computer's ability and propensity to learn without being explicitly programmed

According to Joshi (2024), Artificial Intelligence (AI) has seen explosive growth in recent years, and the development of different types of Machine Learning (ML) has been a driving force behind it. The numbers speak for themselves: According to McKinsey, private equity and venture-capital funding in AI companies increased nearly fivefold from \$16 billion in 2015 to \$79 billion in 2022. It's clear that businesses are eager to adopt AI/ML and explore its potential. However, with so many different types of machine learning available, it can be challenging to understand which one is best suited for a particular application. In this article, let's take a closer look at the four main types of machine learning and their respective applications: supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning. Nevertheless, machine learning can also be observed in Stock market predictions, POS ATM, credit card, fraud detection, traffic predictions (When you use Google Maps to map your Commute), self-driving car technology and Virtual personal assistants (face recognition in face device).

Authentically, machine learning utilizes programmed algorithms that receive and analyze input data to predict output values within the capacity and ability to augment systematically. The process receptacle entail input of data the programmed algorithms, which learn and actualizes its operations to improve effective and efficient performance on developing 'intelligence' over time.

Wakefield (2024) argued categorically that there are four types of machine learning algorithms: supervised, semi-supervised, unsupervised and reinforcement.

Deep Learning

Deep learning in the entrepreneurship climate is projected on advancements in the spectrum of image recognition and natural language processing (NLP). This emanates to dual functional advancements in deep learning on convolutional neural networks (CNNs) and recurrent neural networks (RNNs).

For example, the applications of deep learning in the healthcare institutions are numerous forms of varieties, such as algorithms can analyze retinal images to detect diabetic retinopathy, predict cardiovascular risks from electronic health records, or assist in the early detection of cancerous tumors through imaging. Deep learning gives a competitive edge and ability to evaluate growth which orchestrates the sustainability, survival and success of the enterprise (Ovharhe, Okolo, Woko, & Igbokwe, 2022; Ovharhe, Woko, & Ogolo, 2021).

The difference between Machine Learning and Deep Learning in Medicine

Machine learning is the subfield of artificial intelligence in which computers have the ability to learn and iteratively improve their performance without being explicitly programmed. Deep learning algorithms learn by processing the data with increasing levels of abstraction in each layer (Ovharhe, 2025c).

Machine learning and deep learning are both types of AI. In short, machine learning is AI that can automatically adapt with minimal human interference. Deep learning is a subset of machine learning that uses artificial neural networks to mimic the learning process of the human brain

A large language model called ChatGPT is based on deep learning, specifically a type of neural network called a transformer. ChatGPT's transformer architecture uses attention mechanisms to focus on the most important parts of the input, allowing it to process and comprehend a large amount of text data.

Data science, in simple words, is the field of study that involves collecting, analyzing, and interpreting large sets of data to uncover insights, patterns, and trends that can be used to make informed decisions and solve real-world problems

Data Science

Data science is an interdisciplinary academic field that uses statistics, scientific computing, scientific methods, processing, scientific visualization, algorithms and systems to extract or extrapolate knowledge and insights from potentially noisy, structured, or unstructured data

Data science combines math and statistics, specialized programming, advanced analytics, artificial intelligence (AI) and machine learning with specific subject matter expertise to uncover actionable insights hidden in an organization's data. These insights can be used to guide decision making and strategic planning (Ovharhe, 2025b).

The accelerating volume of data sources, and subsequently data, has made data science is one of the fastest growing field across every industry. As a result, it is no surprise that the role of the data scientist was dubbed the "sexiest job of the 21st century" by Harvard Business Review (link resides outside ibm.com). Organizations are increasingly reliant on them to interpret data and provide actionable recommendations to improve business outcomes (Ovharhe, 2025c).

The data science lifecycle involves various roles, tools, and processes, which enables analysts to glean actionable insights. Typically, a data science project undergoes the following stages:

- **Data ingestion:** The lifecycle begins with the data collection—both raw structured and unstructured data from all relevant sources using a variety of methods. These methods can include manual entry, web scraping, and real-time streaming data from systems and devices. Data sources can include structured data, such as customer data, along with unstructured data like log files, video, audio, pictures, the Internet of Things (IoT), social media, and more.
- **Data storage and data processing:** Since data can have different formats and structures, companies need to consider different storage systems based on the type of data that needs to be captured. Data management teams help to set standards around data storage and structure, which facilitate workflows around analytics, machine learning and deep learning models. This stage includes cleaning data, deduplicating, transforming and combining the data using ETL (extract, transform, load) jobs or other data integration technologies. This data preparation is essential for promoting data quality before loading into a data warehouse, data lake, or other repository.
- **Data analysis:** Here, data scientists conduct an exploratory data analysis to examine biases, patterns, ranges, and distributions of values within the data. This data analytics exploration drives hypothesis generation for a/b testing. It also allows analysts to determine the data's relevance for use within modeling efforts for predictive analytics, machine learning, and/or deep learning. Depending on a model's accuracy, organizations can become reliant on these insights for consciousness, mindfulness, spirituality, business decision making, allowing them to drive more scalability (Ovharhe, 2025d).
- **Communicate:** Finally, insights are presented as reports and other data visualizations that make the insights and their impact on business easier for business analysts and other decision-makers to understand. A data science programming language such as R or Python includes components for generating visualizations; alternately, data scientists can use dedicated visualization tools.

Big Data Analytics

Big data analytics describes the process of uncovering trends, patterns, and correlations in large amounts of raw data to help make data-informed decisions. These processes use familiar statistical analysis techniques like clustering and regression and apply them

to more extensive datasets with the help of newer tools. This clustering and regression are the architect for growth in sustainability, survival and success in the enterprise (Ovharhe & Ahunanya, Woko, 2022; Ovharhe, Chibuike & Abada, 2023).

DSS

Ovharhe and Abada (2023) expression demonstrates that AI and machine learning creates opportunity for entrepreneurial entry instead of business exit. In the long run and short run.

AI-powered data-driven insights and predictive capabilities can be a game-changer for entrepreneurs in many ways, from mitigating financial, operational and compliance risks to identifying market trends and opportunities, assessing competitive threats, forecasting demand and making predictions (Ovharhe & Igbokwe, 2021; Ovharhe & Okolo, 2022).

AI and Entrepreneurship

Micro-entrepreneurs are also using AI for assisting with grant applications/funding requests and creating advertisements or social media posts. The value of AI-related resources lies in understanding how to effectively utilize them to save time, energy, and money and further boost productivity.

AI-driven decision support systems have emerged as an essential tool for entrepreneurs, helping them with various decision-making tasks, such as opportunity identification, resource allocation, and risk management (Ovharhe, Woko & Ezeocha, 2021; Ovharhe & Chukwuemeka, 2023).

AI plays a fundamental role in digital transformation by automating processes, analyzing data for insights, and enabling informed decision-making. It enhances efficiency, innovation, and adaptability, driving transformative changes across industries (Ovharhe & Igbokwe, 2021; Ovharhe & Okolo, 2022).

Identifying Entrepreneurship Opportunities

One of the primary challenges for entrepreneurs is identifying viable entrepreneurship opportunities. However, machine learning can be instrumental in this process. It helps in analyzing vast amounts of data to uncover trends and patterns that may not be immediately apparent to humans. Here's how entrepreneurs can leverage ML to identify market opportunities:

- **Data Analysis:** ML algorithms can sift through large datasets, including consumer behavior, market trends, and competitor activity, to identify emerging opportunities.
- **Predictive Modeling:** By utilizing predictive modeling techniques, entrepreneurs can forecast future market trends and anticipate consumer demand, allowing them to capitalize on opportunities before competitors.
- **Sentiment Analysis:** ML-powered sentiment analysis can analyze customer feedback, social media discussions, and online reviews. It helps gauge public sentiment towards specific products or services, assisting entrepreneurs to identify areas for improvement or new market niches.
- **Price Optimization:** ML can analyze pricing data and consumer behavior to determine optimal pricing strategies, maximizing revenue and profit margins.
- **Location-Based Insights:** ML algorithms can analyze geographic data to identify regions with high demand for certain products or services, helping entrepreneurs more effectively target their marketing efforts.
- **Emerging Technologies:** ML can help entrepreneurs stay ahead of the curve by identifying emerging technologies and trends that could help them create new market opportunities (Ovharhe & Chibuike, 2024a,b; Ovharhe, 2022a)..

Machine Learning

Machine Learning (ML) isn't just another buzzword; it's an artificial intelligence revolution reshaping the business landscape. Experts are already speculating that machine learning will change the future of the workforce. As decision-makers and thought leaders, understanding ML isn't just about technological curiosity—it's about strategic advantage. For example, 35% of companies currently report using AI in their businesses, while 42% are exploring AI's potential uses.

Machine learning has implications for many business types. But just what *is* machine learning, and how might it impact your future work? This article provides a beginner's tutorial on machine learning, explains how it works, and reveals some fields it's expected to impact.

Machine learning (ML) is a comprehensive term that refers to any computer science technologies that use algorithms to imitate the way the human brain learns information.

ML is a subset of AI, where computers are trained to learn from data, imitating human cognitive processes. In a business context, this means harnessing vast amounts of data for actionable insights, operational efficiency, and enhanced customer experiences. Its distinction from broader AI is crucial for leaders to comprehend, ensuring focused and meaningful adoption.

How Machine Learning Works

Regardless of the method, ML's underlying principle for executives remains consistent: the extraction of actionable insights from data. Leaders must comprehend the iterative nature of ML: algorithms make predictions, assess their accuracy, and then refine. Overfitting and underfitting akin to over-specializing or being too generic are pitfalls to be avoided.

The machine learning system uses an automation error function to gauge prediction accuracy, aiding in model optimization. Through continuous evaluation and updates, the system minimizes errors in an ongoing validation process, enhancing accuracy (Ovharhe, 2022b).

Gradient descent optimizes the algorithm within the system, helping prevent overfitting or underfitting of the training data. Overfitting occurs when a model precisely matches its training data, while underfitting happens when it fails to capture the input-output relationship in a dataset, both impacting accuracy adversely.

Human intervention in machine learning varies; supervised machine learning needs humans for labeled datasets, unlike unsupervised machine learning. Some subsets, like deep machine learning systems, autonomously categorize data, reducing human intervention, and expediting data mining and data analysis.

Leveraging AI Innovation in Entrepreneurship Opportunities

Iman Khamis in Ovharhe (2024) explored dynamic feasible trend on “applications of artificial intelligence, deep learning and big data”, which orchestrates frugality strategic alliance with artificial intelligence (AI) could boost social innovator strength to be the giant that mitigate constraints to advantageous environment munificence for community wellness, wellbeing and livelihood. Murphy in Ovharhe (2024) ignites the spirit of innovator giant like the social extrapreneur and ultrapreneurs to delve into full capacity of frugality in the environment.

Ovharhe (2025a) accelerated emerging technology innovator giant in entrepreneurship, redeemed that “innovators will miss the mark without AI”. This dramatized while AI has championed industrial tactics to develop insight, enabling foresight, pursuit and kneel resource constraints for betterment environment munificence in emerging market structure (Ovharhe & Woko, 2024a; Ovharhe, & Odepeli, 2024; Ovharhe & Woko, 2024b).

Purposefully for the betterment of communities, the synergy among artificial intelligence (AI) and the Internet of Things (IoT) adopted by social entrepreneurs brain players such as ultrapreneurs and social extrapreneurs has create tremendous transformation in the quality of mankind livelihood by addressing the threats and challenges in resource-constrained conditions, mostly in developing and under developing countries (Giuggioli & Pellegrini, 2023).

Micro-entrepreneurs are also using AI for assisting with grant applications/funding requests and creating advertisements or social media posts. The value of AI-related resources lies in understanding how to effectively utilize them to save time, energy, and money and further boost productivity.

AI-driven decision support systems have emerged as an essential tool for entrepreneurs, helping them with various decision-making tasks, such as opportunity identification, resource allocation, and risk management (Ovharhe & Chibuike, 2024; Ovharhe & Chibuike, 2024; Ovharhe & Akandu, 2024; Ovharhe & Abada, 2024).

AI plays a fundamental role in digital transformation by automating processes, analyzing data for insights, and enabling informed decision-making. It enhances efficiency, innovation, and adaptability, driving transformative changes across industries

Data Science

Data science, in simple words, is the field of study that involves collecting, analyzing, and interpreting large sets of data to uncover insights, patterns, and trends that can be used to make informed decisions and solve real-world problems.

Data science is an interdisciplinary academic field that uses statistics, scientific computing, scientific methods, processing, scientific visualization, algorithms and systems to extract or extrapolate knowledge and insights from potentially noisy, structured, or unstructured data. Data science combines math and statistics, specialized programming, advanced analytics, artificial intelligence (AI) and machine learning with specific subject matter expertise to uncover actionable insights hidden in an organization's data. These insights can be used to guide decision making and strategic planning.

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Big Data Analytics

Big data analytics describes the process of uncovering trends, patterns, and correlations in large amounts of raw data to help make data-informed decisions. These processes use familiar statistical analysis techniques like clustering and regression and apply them to more extensive datasets with the help of newer tools.

AI-powered data-driven insights and predictive capabilities can be a game-changer for entrepreneurs in many ways, from mitigating financial, operational and compliance risks to identifying market trends and opportunities, assessing competitive threats, forecasting demand and making predictions.

AI and ChatGPT used in Entrepreneurship

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AI plays a fundamental role in digital transformation by automating processes, analyzing data for insights, and enabling informed decision-making. It enhances efficiency, innovation, and adaptability, driving transformative changes across industries.

The spectrum of entrepreneurship has experienced unprecedented growth in AI technology innovation that ignites new dimensions, which orchestrate to an enterprise paradigm shift in the industry 5.0. This has tremendous influence on the ChatGPT by OpenAI, Chatbots, big data analytics, data visualization, data science, machine learning, deep learning, internet of things (IoT) among others.

Entrepreneurs being the business giant of innovation metamorphosis are closely knit with AI advancement. Entrepreneur for robust ideas has navigated all branching network affiliated and collaborated with AI such as ChatGPT,

Even five years before the AI boom, McKinsey reported AI could automate almost half of U.S. jobs. Today, the opportunities are even greater, especially in the business management domain.

While the proliferation of AI tools offers great possibilities for businesses, it also poses a challenge for entrepreneurs hoping to navigate the dynamically growing AI landscape and efficiently adopt AI solutions. To help entrepreneurs on their AI adoption journey, this article will review a few best practices for leveraging AI efficiently.

Evolutional Trend of Innovation Technology and Entrepreneurship

We stand at the beginning of a new era of the industrial revolution from diversity of paradigm in the dimension of Industry 3.0; Industry 4.0; Industry 5.0; Industry 6.0.. All industry transformation is embedded with revolution in Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DP), Internet of Things (IoT), Data Science (DS), Data Visualization (DV) and Big Data Analytics (BDA) (Ovharhe, 2024, 2025). While the third revolution focused on the emerging of automated computers in production and manufacturing, with the new paradigm (i.e. Industry 4.0), technological evolutions and futuristic models create smart and intelligent systems with automation and completely digitalized production methods (Muhuri *et al.*, 2019, Giuggioli, & Pellegrini, 2023; Ovharhe, 2025).

Industry 4.0 is the revolutionary transformation to ironized shift from a manufacturing paradigm, where simplicity of machines garnished to digitalization of operational innovative product, services, administration and marketing with accurate merchandizing function (Oztemel and Gursev, 2018).

This emerges faster, more flexible, creative, innovated and more efficient processes, producing higher-quality goods with advanced levels of customization, increasing manufacturing productivity, and, in turn, allowing an industrial growth (Zhang, Wu, Tian, Zhang & Lu, 2021).

In this new dimensional revolution, artificial intelligence (AI) orchestrates significant role as new paradigm shift in the entrepreneurship world which navigates merchandizing opportunities. AI in entrepreneurship intelligence can be express as intelligence determinate by machines or, in terms of an academic field, automated devices like digital computers and algorithms perform complex tasks and resolved problems to simplicity world 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 is application and innovation of the science and engineering of making intelligent machines quotient. Within AI terminology, machine learning is frequently categorized as a subset of AI, with deep learning considered to be a subset of machine learning (Obschonka and Audretsch, 2020).

More so, Karthik (2024).identify various ways intrapreneurs, serial entrepreneurs and ultrapreneurs can leverage AI by considering emergence of technology innovation with revolution of Industry 3.0; Industry 4.0; Industry 5.0; Industry 6.0. as formation and transformation on Machine Learning (ML), Deep Learning (DP), Internet of Things (IoT), Data Science (DS), Data Visualization (DV) and Big Data Analytics (BDA).

However, this revolution also requires changes to be made to the organizational dimensions of a firm (Manesh *et al.*, 2021). For example, thanks to the integration of AI processes, some of the most automated workplaces are experiencing a renaissance in terms of human work. In many cases, AI frees time, creativity and human capital, leaving people to work in a more human and less automatic way. AI empowers people with powerful tools to do more and act with superhuman abilities. In doing so, AI has the potential to re-humanize work, giving us more time to be human rather than working as machines (Daugherty and Wilson, 2018).

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 (Chalmers *et al.*, 2021).

In a nutshell, the main future challenge pertains to utilizing the advantages of availing AI technologies, in terms of new opportunities and productivity improvements, while avoiding the disadvantages in terms of job losses and greater wealth inequalities (Makridakis, 2017).

AI has the potential to offer both positive and negative consequences to society at large. Here, a prominent role will be played by entrepreneurs and the ways in which they are able to use these technologies. A variety of potential approaches, scenarios and contrasting findings still populate academic debates around AI, creating a “green field” (Lévesque *et al.*, 2020). We therefore intend to perform a systematic literature review with regards to the relationship between AI and entrepreneurship, offering potential directions for further research.

Theoretical Paradigm

Cluster Opportunity Paradigm

Ovharhe (2025) posit that entrepreneurship is pointed on scanning, chasing and grabbing opportunities in emerging market that yield transformation via creativity and innovativeness. Talented entrepreneurs utilize the services of AI, ML, IoT and Big Data analytic to innovate new entrepreneurship world which grab opportunities (Ovharhe, 2024). In the “opportunity” phase of our framework, the entrepreneur is engaged in operating digital transformation through AI. Different efforts power a new range of business opportunities. As new opportunities emerge, the entrepreneur faces new strategic options and, in light of these, is offered the opportunity to re-shape his/her own business models (Ovharhe & Chibuike, 2024; Ovharhe & Chibuike, 2024; Ovharhe & Akandu, 2024; Ovharhe & Abada, 2024). In this phase, the entrepreneur looks at traditional approaches to understand how they could be enhanced by AI.

The first stream of studies that emerges from our analysis reveals positive outcomes in terms of the introduction of new products/services and business models. AI and big data can function as external enablers of new entrepreneurial activities. This could be considered an example of the radical external changes that empower and enable new economic activities that introduce new products or services via entrepreneurial means (Obschonka & Audretsch, 2020).

This has crucial implications when it comes to our thoughts on how entrepreneurs develop, design and scale their companies. This technology will influence whether or not individuals decide to set up companies in the first place and may dictate their quality of life if they choose to do so (Chalmers *et al.*, 2021).

The AI revolution is predicted to come into full force within the next twenty years. It will have a greater impact than both the Industrial and Digital revolutions combined. The speed of the technological change emerging as a result of the AI revolution will open up huge opportunities for growth and profitability but, at the same time, will bring about challenges and fresh competition from new garage-style startups. Breakthrough ideas can come from anywhere, and their development will be rendered simpler through venture capital and crowdsourcing (Makridakis, 2017).

In fact, the real power of AI lies in its propensity to bring about new opportunities for entrepreneurs when it comes to solving specific problems with applications and verticals, such as messaging bots and intelligent virtual assistants. However, the design of business models is fundamental when taking useful technologies into the marketplace (Garbuio & Lin, 2019).

The second stream of studies focuses specifically on the IoT and is strongly connected with AI in terms of data. Nowadays, digital technologies and knowledge digitalization are changing technology entrepreneurship and new venture creation processes as a whole. The concept of digital entrepreneurship is accentuating the emergence of a new entrepreneurial paradigm which is focused and/or enabled by the adoption of Internet and digital technologies. This leverages the innovation potential embedded into both large groups and dispersed individuals from different backgrounds participating in entrepreneurial activities (Elia *et al.*, 2020).

Leveraging AI transformation boils in scanning, searching and grabbing opportunities which enhances the GDP, GNP and National Income on entrepreneurship innovation while opening up new opportunities for companies. Enterprise are in fix to navigate business intelligence and innovative platform to boost and grab entrepreneurship opportunities in emerging markets (Ovharhe, 2025)

The torrent of passively sensed data by the IoT, combined with big data technology, is creating a new type of entrepreneurship: sensor-based entrepreneurship. This can be considered a subcategory of digital entrepreneurship, in which products or services are derived from data collected from sensors and relative devices. IoT will change how we interact with objects and how we interact with each other. In particular, this new data will change how companies interact with their customers, as it can be used to help them build better relationships (Brown, 2017).

The IoT presents new opportunities and threats that companies are unable to address using existing business models. In fact, the IoT unlocks information from the manufacturing process, shows its impact on transaction costs and thereby lowers the bar for non-ownership business models. The IoT therefore impacts upon the systematic design of business models (Ehret and Wirtz, 2017).

Big data analytics promises to enhance a number of digital technologies in tourism and hospitality that heavily rely on data, such as AI and the IoT. A new digital entrepreneurship field could be formed within this industry. The development of AI, when applied to data mining and predictive analytics, could lead to the development of effective digital business models to support product, process and business model innovation (Mariani, 2019).

METHODOLOGY

The study adopted the cross-sectional research design. Research design focused on the structure of an enquiry, which leads to the minimization of the chance of drawing inferences from the data. Also, ex-post facto design was integrated because the data or samples cannot be manipulated.

The total population of the study is nine thousand, four hundred and thirty-two (9432) from Abuja, Delta, Lagos and Port Harcourt regions of entrepreneurs niches with AL and ML. The population figures were generated from the selected clusters responses. Additionally, proportionate stratified random sampling technique was used to select reasonable percentages from each of the categories of the clusters. While simple random sampling technique without replacement was used to select the potential respondents.

However, because it is not possible to cover the entire element of the total of 9432.. However, the Taro Yamane formula was employed to ascertain the sample size.

Table A: Distribution according to Clusters

S/N	Responses	Township	Niche	Metropolis	
1	Cluster A	330	69	28	427
2	Cluster B	687	152	60	899
3	Cluster C	6074	1368	515	7957
4	Cluster D	110	28	11	149
GRAND TOTAL		7201	1617	614	9432

Source: field work, 2025

The sample size was determined using the Taro Yamane's (1967) formula as shown below:

$$n = \frac{N}{1 + N(e)^2}$$

Where, n = sample size sought
 e = level of significance or (acceptable sampling error)
 N = population

Applying the above formula:

$$\begin{aligned} n &= \frac{9432}{1 + 9432(0.05)^2} \\ &= \frac{9432}{1 + 9432(0.0025)} \\ &= \frac{9432}{1 + 23.58} \\ &= \frac{9432}{24.58} \end{aligned}$$

= 384

This means that the sample size for this study is 384 of the respondents. Thus, Bowley's proportionate analytical technique was used to identify the % sample size.

Table: B: Distribution of Respondents according to Clusters

S/N	Responses	Town	Niche	Metropolis	Total
1	Cluster A	23	3	2	28
2	Cluster B	61	11	4	76
3	Cluster C	190	58	21	269
4	Cluster D	8	2	2	12
Grand Total		282	28	28	384

Source: Researcher's Field Survey (2025)

A test re-test method was used to establish the reliability of the questionnaire. Twenty stakeholders comprising of twenty abused victims knowledgeable in experience of the concept. To empirically evaluate the relationship between the independent and dependent variables of this study (including their components), the Pearson Product Moment Correlation Co-efficient and the Partial correlation co-efficient were employed, using the Statistical Package for Social Sciences (SPSS) IBM 25 version and Eview-10. The Pearson Product Moment Correlation Co-efficient was used to test the relationship between the dimensions of the independent variable and the measures of the dependent variable hypotheses. On the other hand, the partial correlation analysis used to test the moderating role of health challenges on the relationship between the independent and dependent variables of this study. The choice of the Pearson Product Moment Correlation Co-efficient is informed by its amenability to the type or level of data that was collected. The Partial correlation is appropriate for our analysis because it allows us to examine how multiple independent variables are related to a dependent variable.

DATA PRESENTATION, ANALYSIS AND RESULTS

Hypotheses Testing

The study focuses of the desire to examine the explanatory variable and response variable

Test of Hypothesis one

HO₁: There is no significant relationship between AI transformation and entrepreneurship opportunities with allied health challenges in south-south, Nigeria.

Table A: Pearson Test

Correlations

		AI	Entrepreneurship
AI	Pearson Correlation	1	.678**
	Sig. (2-tailed)		.000

Entrepreneurship	N	317	317
	Pearson Correlation	.678**	1
	Sig. (2-tailed)	.000	
	N	317	317

** . Correlation is significant at the 0.05 level (2-tailed).

Source: Author's Field Survey- SPSS version 25 output

Using the output in table A, it can be observed that the Pearson correlation (PC) coefficient is 0.678 which shows a strong and positive orientation of the relationship between AI transformation and entrepreneurship opportunities in allied health challenges in south-south, Nigeria. The significance value of 0.000 which is less than the 5% significance level ($p = 0.000 < 0.05$) leads to the rejection of the null hypothesis. This therefore reinforces the findings and on this basis, the null hypothesis is rejected while the alternate form of the hypothesis is accept therefore concluding that there is a significant relationship between AI transformation and entrepreneurship opportunities in allied health challenges in south-south, Nigeria.

Test of Hypothesis Two

HO₂: There is no significant relationship between machine learning and entrepreneurship opportunities in allied health challenges in south-south, Nigeria.

Table B: Pearson Test

Correlations

		ML	Entrepreneurship
ML	Pearson Correlation	1	.772**
	Sig. (2-tailed)		.000
	N	317	317
Entrepreneurship	Pearson Correlation	.772**	1
	Sig. (2-tailed)	.000	
	N	317	317

** . Correlation is significant at the 0.05 level (2-tailed).

Source: Author's Field Survey- SPSS version 25 output

In table B it can be observed that the Pearson correlation (PC) coefficient is 0.772 which shows a strong and positive orientation of the relationship between machine learning and entrepreneurship opportunities in allied health challenges in south-south, Nigeria. The significance value of 0.000 which is less than the 5% significance level ($p = 0.000 < 0.05$) leads to the rejection of the null hypothesis. This therefore reinforces the findings and on this basis, the null hypothesis is rejected while the alternate form of the hypothesis is accept therefore concluding that there is a significant relationship between machine learning and entrepreneurship opportunities in allied health challenges in south-south, Nigeria.

CONCLUSIONS, RECOMMENDATIONS AND CONTRIBUTION TO SCHOLARSHIP

Conclusions

In conclusion, machine learning offers tremendous opportunities for entrepreneurs to identify market opportunities, optimize operations, enhance decision-making, and overcome various challenges. By leveraging AI and ML effectively, entrepreneurs can

gain a competitive edge in today's dynamic business environment and drive sustainable growth and innovation. However, it's essential to approach AI and ML implementation thoughtfully, considering factors such as data quality, talent acquisition, and ethical considerations. With the right strategy and mindset, entrepreneurs can harness the power of machine learning to transform their businesses and unlock new possibilities for success. AI by considering emergence of technology innovation with revolution of Industry 3.0; Industry 4.0; Industry 5.0; Industry 6.0. as formation and transformation on Machine Learning (ML), Deep Learning (DP), Internet of Things (IoT), Data Science (DS), Data Visualization (DV) and Big Data Analytics (BDA).

Recommendations

In light of the conclusions the recommendations were established.

1. Entrepreneurs should adopt the complex mission in pursuit of AI and ML to grab business opportunities.
2. ML should be develop to MSMEs growth and opportunities
3. AI innovation should integrated with process, product, market, service and technology innovation to have total devotion on digital entrepreneurship.

Contribution to Scholarship

In the contributory essences the following knowledge were discover.

1. Metric of measuring digital entrepreneurship opportunities.
2. Long-term, short-term, long-run and short-run identification of entrepreneurship opportunities.

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