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THE IMPACT OF AI AND DIGITAL TRANSFORMATION IN FIVE COUNTRIES THAT INFLUENCE MARK AND SOCIETY

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ABSTRACT

This paper aims to propose analytics as a solution to the potential impact of AI and digital transformation in five countries that impact markets and society. The paper uses qualitative methods to describe general application areas (contexts) and presents specific case studies, analysis, findings, and discussions for each application area. Findings: Many countries have participated in this technological revolution, but this study will focus on five countries experiencing the AI revolution and digital transformation. This study explains how artificial intelligence (AI) and digital transformation have rapidly transformed various aspects of life, from industry and economy to markets and society, in these five countries, despite many countries participating in this technological revolution. This study has limitations and opens up opportunities for future research. Practical implications: The context of AI and digital transformation supports this study, showing that countries and entrepreneurs are paying attention to exploring new technologies due to the importance of these sectors. The selected case studies highlight how companies in these five countries are addressing the challenges of AI and digital transformation. This study presents research findings on AI and digital transformation, focusing on the most relevant strategic decisions and the design of new relational governance systems that accompany them. We found that several countries are encouraging companies in the corporate sector to design their digital infrastructure. Originality: This study explores the disruptive potential of artificial intelligence (AI) technology, with the role of governments involved in creating new entrepreneurial and transforming the entrepreneurial process.



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I. INTRODUCTION

Artificial intelligence (AI) is a transformative force with profound implications across various industries [1], [2]. The term AI broadly encompasses computer systems that perform tasks typically requiring human intelligence [3]. With the rapid advancement of AI capabilities, businesses are increasingly leveraging this technology to innovate across products, services, operations, and customer experiences [4]. The impact of AI on business innovation has attracted significant attention from both practitioners and researchers. A growing body of literature examines how AI is applied to drive innovation across various business domains and its impact on outcomes [5]. AI is revolutionizing innovation across multiple sectors. The technology sector exemplifies this with AI-powered virtual assistants that have created new product categories and ecosystems, fundamentally changing customer interactions and service delivery [5]. Financial services are leveraging AI to create innovative products such as robo-advisors, which provide automated, low-cost investment advice, and AI-powered systems for fraud detection, credit scoring, and personalized financial recommendations [6]. The manufacturing sector is undergoing a transformation involving the use of AI-powered robots and computer vision systems that improve production efficiency and quality control. Predictive maintenance algorithms analyze sensor data to anticipate equipment failures, thereby reducing downtime. The impact of AI extends to supply chain management, where algorithms can optimize inventory levels, predict demand fluctuations, and improve logistics routing, as seen in Amazon's AI-based demand prediction approach. Even the service sector is being transformed by AI chatbots and virtual agents, which can handle a large number of customer inquiries and free up human agents to handle more complex issues [7].

Digital transformation (DT) has become a crucial factor driving organizational development and competitiveness in the modern business environment, with its dynamic and rapidly transforming structures [8], [9]. At the heart of this transformation is the rapid development of digital technologies such as the Internet of Things (IoT), cloud computing, artificial intelligence/machine learning (AI/ML), augmented reality (AR), and big data analytics [10]. These technologies have transformed the way businesses operate, interact with employees and customers, and manage their internal processes. The global shift to remote work and online collaboration has brought about drastic changes in traditional approaches to work [11]. This transformation is a temporary response to the global crisis but also has a long-term impact on business structures, accelerating the adoption of digital technologies to an unprecedented level. As organizations navigate the complexities of digital transformation, they face a variety of challenges, including data overload, the need for rapid decision-making, and the need for continuous innovation and improvement [12], recent research focuses on digital transformation [8], particularly but not limited to Human Resource Management [13]. Strategic management, education [14], knowledge management [15], [16], industry 4.0 [17], and entrepreneurship [9]. The rapid advancement of digitalization, manifested through the widespread adoption of smartphones and the meteoric rise of social media platforms, has triggered transformative changes in how individuals connect and share information [18]. Simultaneously, the digitalization of industries and the ensuing surge in e-commerce have not only transformed but fundamentally reshaped business models and consumer behavior, redefining commerce and trade dynamics [19].

This transformation has been further amplified by advances in data analytics and machine learning, which are driving revolutionary changes in decision-making processes across the healthcare and financial sectors [20]. The cumulative impact of this transformational journey has sparked a lively discussion about the profound impact of digitalization on the fundamental structures of society, individual behavior, and the very fabric of human existence [18]. The disruptive potential of artificial intelligence (AI) technology involves creating new entrepreneurial opportunities and transforming the entrepreneurial process. The impact of AI technology on entrepreneurial activity is also reflected in the high interest, which has led to existing fragmentation [21]. The advent of AI has created the greatest entrepreneurial opportunity in the history of civilization [22]. AI exemplifies how radical external change empowers and enables new economic activity [23]. AI has crucial implications for how entrepreneurs develop, design, and scale their businesses throughout the entrepreneurial process [24]. AI can enhance decision-making systems; increase the effectiveness, flexibility, and efficiency of processes; increase productivity; reduce costs; or produce high-quality, highly customized goods [25], [26]. Furthermore, AI solutions are now readily accessible to entrepreneurs at relatively affordable costs. The democratization of artificial intelligence allows entrepreneurs to compete even with large corporations, creating a level playing field for technology [27]. With increasing digital advances, the global economic landscape is reshaping marketing and entrepreneurship, creating new opportunities for growth and significant challenges for the corporate world. Rapid economic shifts, coupled with society's increasing reliance on digital technology, require organizations to continually adapt and modify their business models.

By analyzing digital transformation strategies through a combination of statistical and practical approaches, critical success factors as well as barriers to implementation, increase process automation, strengthen customer engagement, improve resource management, and ultimately increase productivity and profitability [28]. Digital entrepreneurship refers to business activity involving digital media, information, and communication technology. It includes entrepreneurial pursuits in fields such as artificial intelligence, blockchain, the internet of things, and augmented reality, among many others [29]. Through various digital platforms, digital entrepreneurship platforms have provided producers and marketers with the opportunity to use digital technology to achieve their marketing goals. The use of digital platforms has replaced traditional corporate methods with online marketing, app stores, online or smartphone purchases, e-transactions and e-commerce. It is widely stated that bringing businesses into the digital era and using digital platforms to offer goods and services will enhance their capabilities and increase sales, which will ultimately improve their performance [30]. The success or failure of marketing strategies for digital entrepreneurship depends on a variety of elements. The landscape of strategic marketing in digital entrepreneurship is characterized with both advantages and challenges in a "Web 2.0 networked world" [31]. The digitalization of companies is becoming increasingly important for their internationalization. Globalization causes digitalization to change companies all over the world. The rise of multinational companies such as Uber and Airbnb, among others, which maintain their globalization through technology and creative business model proposals, is evidence of the demand for the business world to experience dramatic changes in the last few decades [32]. Digitalization of collaborative procedures and tools can lead to effective integration [33]. In light of this, digital transformation (DT) is becoming increasingly important [34], and impacts almost every aspect of a company [35]. In the contemporary global economy, digital transformation is playing an increasingly important role in the expansion of companies on a global scale.

Businesses can increase cross-border customer engagement, increase supply chain resilience, and scale operations more effectively with the emergence of artificial intelligence, automation, cloud computing, and e-commerce [36]. Digital entrepreneurship and digital transformation are interrelated. To change the way a business functions and delivers value to its customers, digital transformation means integrating digital technology into every aspect of the company [37]. Digital entrepreneurship, on the other hand, is the process of starting and expanding new businesses that utilize digital technologies [38]. The emergence of digital entrepreneurship is greatly aided and supported by the digital transformation ecosystem [39]. The potential of digital technologies to help new companies gain billions of clients, create goods and services that have never existed before, and connect with people like never before is indicative of this trend [38]. As governments in many countries place great emphasis on developing digital infrastructure and services, digital transformation is becoming a more important factor in the global economy [40]. All these trends will undoubtedly have a significant impact on global trade as well as countries looking to gain competitive advantages from digital transformation across industries [41]. Today, it significantly influences consumer behavior and market demand, which in turn influences the way businesses interact with their target audiences [42]. Today's consumers are more empowered, aware, and connected than ever before [43]. Globalization has created a need for the business world, especially multinational companies, to shift to digital methods to generate long-term success. Digital transformation is the methodical application of digital technologies across all domains of a company, resulting in significant adjustments to the way a business manages its resources and provides customer service [44].

Therefore, the purpose of this article is to explore AI and digital transformation: How entrepreneurs engage in their impact on markets and society. This objective is guided by the following research questions:

RQ1. How do entrepreneurs engage in development AI and digital transformation within their companies?

RQ2. How do entrepreneurs engage in markets and society within their companies?

II. CONCEPTUAL FRAMEWORK

The disruptive potential of artificial intelligence (AI) technology involves the creation of new entrepreneurial opportunities and the transformation of entrepreneurial processes. The impact of AI technology on entrepreneurial activity is also reflected in the high interest, which has led to existing fragmentation [21]. The emergence of multinational companies such as Uber and Airbnb, among others, which maintain their globalization through technology and creative business model proposals, is evidence of the demands of the business world for dramatic change in recent decades [32]. The digitization of procedures and collaborative tools can lead to effective integration [33]. Given this, digital transformation (DT) is becoming increasingly important [34], and impacts nearly every aspect of a company [35]. Based on the business literature, we recognize the crucial role of several factors in AI, digital transformation, and business, which impact markets and society. Furthermore, our framework integrates the literature on AI, digital transformation, and business, with the market and society, recognizing the crucial role of each. By examining each, we gain deeper insights into how these identities shape business efforts in markets and society.

II.1 ENTREPRENEUR ARE DEVELOPMENT ARTIFICIAL AND DIGITAL TRANSFORMATION WITHIN THEIR COMPANIES

In recent years, artificial intelligence (AI) has emerged as a transformative force across various sectors of modern society, reshaping the economic landscape, social interactions, and ethical considerations. This exploration of AI's diverse impacts provides a comprehensive understanding of how AI is redefining human experiences and social norms, furthering the discourse on integration [45]. Organizations worldwide are leveraging AI's capabilities to improve productivity. Seventy-four percent of companies using AI say it has given them a competitive advantage. This figure rises to 79 percent among companies that are leaders in AI adoption. Many companies have begun using AI to automate administrative and engineering design tasks. For example, legal AI algorithms can find relevant legal cases, draft contracts from templates, and review language for issues. Financial AI detects credit or bank account abuse. Some design algorithms can suggest features for new products based on sales data and customer feedback. They can even create new product designs with fewer specifications [46]. AI has the potential to bring fundamental changes to humanity. For example, many decisions in a person's life can already be delegated to technology. As AI systems improve, more complex tasks can be handled by these systems. The risk is that much human judgment could be handed over to AI agents, leading humans to follow the intelligent agent's guidance without question. Independent human judgment allows for reflection on values, context, and long-term perspectives. Using AI to improve human-to-machine interactions will also occur in other areas, such as with healthcare robots or service robots [47]. With significant advances in artificial intelligence (AI) in recent years, the possibility of job displacement due to AI advancements has reignited interest in how technological change will impact the job market [48]. Overall, predictions about the speed and scale of job displacement caused by AI are highly pessimistic. As AI becomes more capable and widespread, these concerns will increase, and social anxiety will likely increase. In recent years, AI has transitioned from science fiction to a practical business tool [49]. ChatGPT, an AI chatbot, is now commercially available and can integrate text, edit summaries, and create presentations. AI has the potential to significantly enhance the skills of professional workers. Until now, spending time with smart machines has been limited to specific instances and short periods. It is indeed an unusual experience, requiring skills that not all users possess. Things have changed rapidly since the launch of the first mobile phone, competing for people's attention and curiosity [50].

A concept called “disintermediation” refers to a user viewing the bargaining power of masses as nearly infinite to a seller who focuses on individuals feeling exclusive and personally cared for. In this new smart economy—much smarter than Web 2.0 of the 2000s—a clear distinction exists between “smart” machines and “stupid” machines. The former enhance user cognition by providing information and fostering emotional and social connections; the latter transform resources and include physical mechanical machines (producing goods and infrastructure), telecommunication and transportation devices (delivering services), and algorithms and interface machines (collecting and analyzing data) [51]. Digital transformation (DT) has evolved from a mere technological opportunity to a genuine necessity to manage the needs and expectations of the world's growing population [32]. This development has brought about significant changes in many organizations, with DT introducing new processes and mechanisms that can impact key structures in how companies conduct their business. According to the primary goal of Digital transformation (DT) is to address challenges related to efficiency and effectiveness. [52]. That companies that do not develop and implement DT strategies quickly are less likely to keep pace and compete in the new digital reality [53], the transition to this new reality should not be underestimated because, like any change process, it carries several risks and challenges [54]. Digital transformation (DT) represents a substantial challenge not only for individual companies, but also for national economies [55]. To become a digital nation, i.e. a country in which citizens, governments, and companies live in a digital society that interacts and creates value benefitting all stakeholders, national governments can/must learn from the experiments conducted in smart cities [56], and the experiments of entrepreneurs in particular [32]. Reviewed relevant literature on digital marketing and B2B relationships [57]. Examined how digital technology facilitates business model innovation in the creative industries [58]. Systematic focus on digitalization in accounting. Existing reviews have in common, namely their primary focus on the very limited field of business and management; their perspective is very narrow. Furthermore, these reviews have not determined the evolution of the term Digital Marketing (DT) in the field of business and management [59].

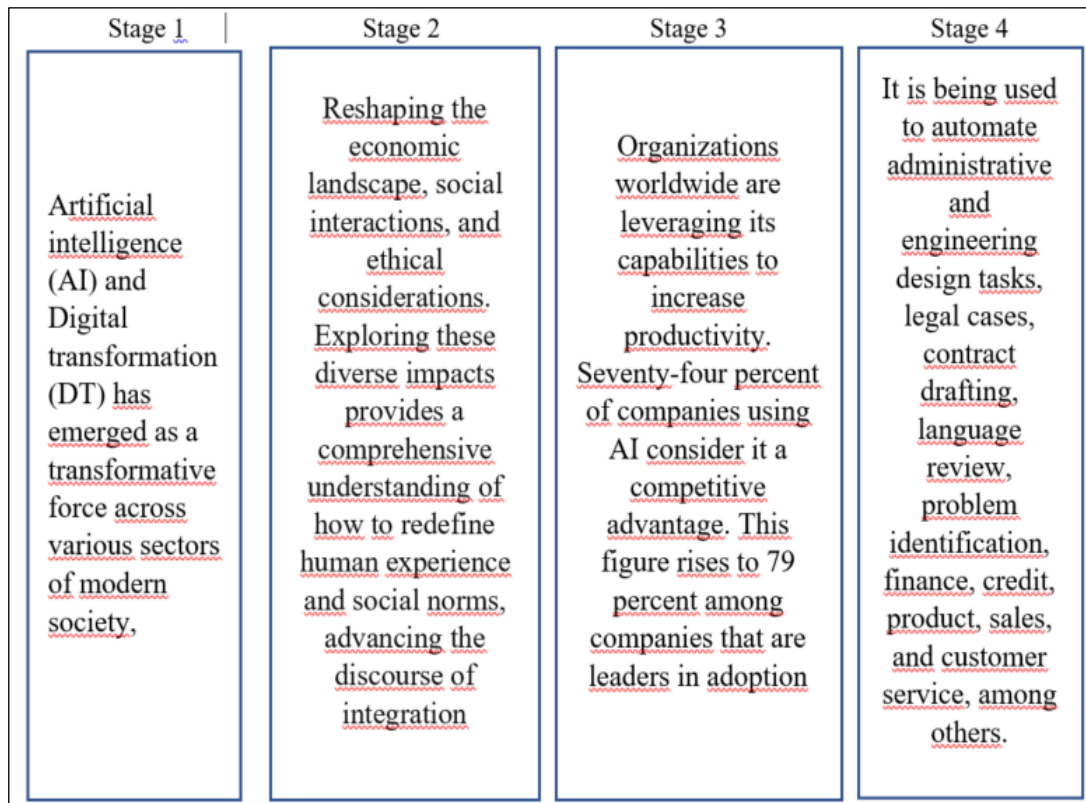


Figure 1: Process and Benefits of AI and Digital Transformation.
Source: Authors, (2026).

II.2 ENTREPRENEURS ARE INVOLVED IN MARKETS AND SOCIETY WITHIN THEIR COMPANIES

It is important to note that the overall impact of entrepreneurship on society is determined not only by the frequency of its citizens starting businesses, but also by the quality of their efforts. This includes the extent to which they create businesses from newly perceived market opportunities and businesses that offer unique and novel products and services to customers. Furthermore, it is important to recognize that entrepreneurship can be expressed not only in the form of startups but also in organizations [60]. Exploring whether these different types of entrepreneurship are related to environmental conditions. In our research, we were guided by two distinct and novel questions that address important gaps in previous research [61]. Market-based entrepreneurship is valuable to society because it provides business opportunities for those who recognize market gaps, as well as new and unique products and services for customers [62]. Therefore, understanding the factors that drive these valuable activities is crucial, especially considering that the quality of institutions varies across countries [63]. As more and more companies combine social missions with innovative market approaches to address social challenges [64], they often utilize flexible, hybrid organizational forms [65], [66], seeking to achieve profitability while balancing the objectives of traditional nonprofits and for-profit companies [67]. Nonprofit organizations promote social benefits while discouraging profit-seeking managerial behavior, which can lead to economic inefficiencies due to the non-distribution constraint, which prohibits nonprofit board members, staff, and directors from receiving any benefit from the organization's net profits. Standard nonprofits seek to maximize profits for their owners, which can incur social costs when profitable actions conflict with social values.

To be effective, social enterprises must achieve an optimal balance between two objectives: profit and market objectives [64]. Therefore, academics argue that integrating commercial and social welfare logics within a company is crucial, yet challenging, in addressing social issues [65], [68], as pursuing a social mission may be incompatible with exploiting profitable market opportunities. All companies operate on a spectrum, ranging from those focused purely on social impact (i.e., classic nonprofits) to those focused purely on profit maximization (i.e., classic for-profits). Social enterprises fall somewhere between these two primary objectives [69]. Despite the hybrid nature of these organizations, the emerging consensus is that social enterprises clearly value diverse stakeholders and demonstrate a willingness to create social value even if not maximizing shareholder interests. Therefore, the focus of differentiation lies largely in the social impact that social enterprises have on society by serving diverse stakeholders (both internal and external) beyond their shareholders [70]. Recognizing the challenges of integrating profit and purpose, entrepreneurs engage in founding activities with reflection on the meaning they attribute to the new venture. Take, for example, the unique aspirations of the entrepreneurs behind Method, a household cleaning products company that has become one of the fastest-growing companies in the US. The founders envisioned Method with a dual meaning: they sought to build a profitable company and improve the world [71]. They deliberately entered the household cleaning industry, one of the most environmentally polluting, and designed their innovative product to compete with existing brands in terms of higher environmental and health standards [72].

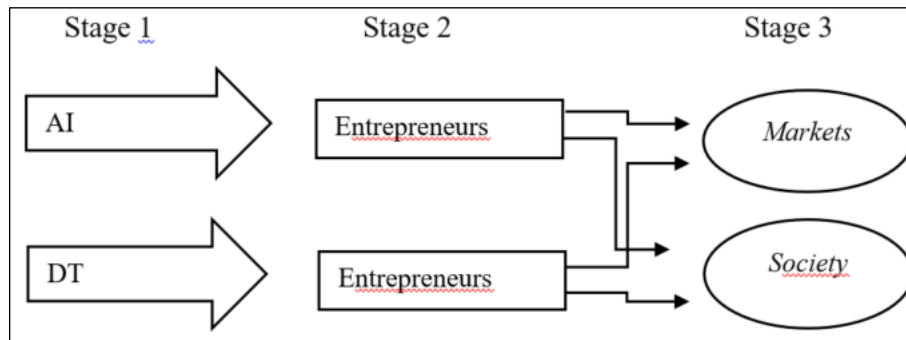


Figure 2: Conceptual Framework Development.
Source: Authors, (2026).

III. METHODOLOGY

To explore our topic, how AI and digital transformation in business evolve over time, we employed a qualitative approach through a multi-longitudinal case study [73]. Qualitative case studies allow for in-depth exploration of complex phenomena, offering insights into how they develop and how people construct meaning [74]. Given our focus on understanding how entrepreneurs engage with markets and society, a qualitative approach was deemed appropriate.

III.1 SELECTING AND COLLECTING THE EMPIRICAL MATERIAL

Artificial Intelligence (AI) and digital transformation have rapidly transformed many areas of our lives, from industry and the economy to societies worldwide. Many countries have participated in this technological game. However, only a few stand out as pioneers. I will discuss five of the top countries leading the AI revolution and digital transformation [75].

III.1.1 United States: The Center of Market-Driven Innovation

The United States stands as a key figure in the AI landscape, driven by market-oriented innovation and substantial private investment. Over the past five years, venture capital (VC) investment in AI in the US has reached an astonishing \$290 billion. This influx of capital has catalyzed transformative progress across various sectors, including autonomous vehicles, healthcare, and IT infrastructure. Furthermore, the US enjoys a highly competitive environment that fosters continuous innovation. Companies like Google, Microsoft, and Amazon are not only pioneers in AI research but also play a crucial role in the global application of AI technology. This market-driven approach has resulted in cutting-edge AI solutions. It also positions the United States as a leader in technology development and commercialization. In addition, the US government has supported the growth of AI by implementing policies that encourage research and development. This combination of private sector dynamism and government support ensures the US remains at the forefront of AI innovation.

III.1.2 China: A Giant in Growth and Modernization

China is another powerhouse in the AI space, driven by rapid growth and modernization efforts. The country's AI market is expected to exceed \$61 billion by 2025, reflecting its significant investment in the sector. According to data from the Organisation for Economic Co-operation and Development (OECD), Chinese venture capitalists have poured approximately \$120 billion into the AI ecosystem, focusing on areas such as autonomous vehicles, robotic sensors, and IT hardware. China has become the world's largest robot market, accounting for 52% of global robot installations. This dominance extends to service robots used in logistics, healthcare, and consumer applications. Furthermore, Chinese companies have expanded their influence globally, securing international contracts for surveillance, smart city solutions, and automation technology. Furthermore, the Chinese government has set an ambitious goal to become a leader in the AI revolution, as outlined in its Next-Generation AI Development Plan. This plan emphasizes the integration of AI into all sectors of society, aiming to make China a leading AI innovator globally by 2030. The combination of government-driven initiatives and a strong private sector ensures China continues to climb the AI hierarchy.

III.1.3 Japan: Innovating to Address Demographic Challenges

Japan stands out for its unique approach to AI and digital transformation, leveraging these technologies to address pressing demographic challenges. With an aging population and shrinking workforce, Japan has turned to AI and digital transformation to fill the gap. The country has increased collaboration with foreign startups and small and medium-sized enterprises (SMEs) to enhance its AI capabilities. A key aspect of Japan's AI strategy is the concept of "Society 5.0," which aims to integrate advanced technology into every aspect of life. This initiative promotes connectivity, automation, and personalization, which are expected to drive innovation and spur economic growth. Japan's AI and digital transformation market is divided into hardware, software, and services, with the software segment experiencing the highest growth. This growth is driven by advances in data storage capacity, advanced computing, and parallel processing capabilities. Japan's focus on AI and digital transformation also extends to healthcare, where AI-based and digital transformation technologies are being developed to support the elderly, such as robotics for caregiving and AI and digital transformation systems for medical diagnostics. By addressing demographic challenges through AI and digital transformation, Japan can solve internal challenges. They can also serve as a global example of how technology can be used to address social issues.

III 1.4 India: AI-Driven Productivity and Digital Transformation on the Rise

India is rapidly emerging as a significant player in the AI and digital transformation arena, driven by a combination of increased corporate technology spending and a vast and growing talent pool. This statement highlights the rapid growth of the Indian AI market, projected to reach \$17 billion by 2027, with an impressive annual growth rate of 25-35% between 2024 and 2027. Driving this expansion is India's large internet user population, estimated at 881 million. This large user base creates a strong demand for personalized experiences, which in turn drives the growth of AI technology in the country. AI and digital transformation in India operate through task automation, enabling businesses to streamline activities such as campaign setup and customer inquiry responses. Furthermore, AI and digital transformation facilitate content personalization, tailoring marketing materials to individual preferences, and enhancing the customer experience. This technology also plays a crucial role in optimizing websites for better performance and predicting customer behavior. This enables businesses to design targeted campaigns with higher levels of effectiveness. The Indian government has recognized the importance of AI and digital transformation, launching initiatives such as the National AI Strategy to encourage the adoption and development of AI and digital transformation technologies. These efforts, coupled with growing private sector interest in AI and digital transformation, position India as a rising star in the global AI and digital transformation landscape.

III 1.5 Germany: A Hub for Artificial Intelligence, Digital Transformation, and Science

Germany is renowned for its AI and digital transformation innovations, attracting significant attention and investment from global tech giants. Companies like Microsoft have committed substantial resources to Germany's AI and digital transformation infrastructure, with a planned investment of \$3.2 billion. This investment underscores Germany's role as a key hub for AI and digital transformation development in Europe. Furthermore, Germany's vibrant AI and digital transformation ecosystem has attracted the attention of major companies like Apple, which recently acquired German AI startup Bitbot. This interest from global players highlights the attractiveness of Germany's AI capabilities. Germany's commitment to AI and digital transformation goes beyond corporate investment. The country is focused on advancing AI and digital transformation research, particularly in the study of brain data, with the European Union allocating its single largest funding source to this field. Furthermore, Germany has ambitious plans to double its AI and digital transformation funding. It aims to compete with global technology leaders like the US and China to become a leading country in AI and digital transformation. Furthermore, the German government has established a comprehensive AI strategy, encompassing the development of innovation, the enforcement of ethical standards, and the promotion of the use of AI and digital transformation across various sectors. This approach ensures Germany remains a key player in the global AI and digital transformation ecosystem, driving scientific and technological progress.

III 2 ANALYSING THE MATERIAL AND REPORTING THE FINDING

United States: As a global leader in the digital economy, the United States has achieved significant strategic success, with its digital economy reaching \$17.2 trillion in 2022, accounting for approximately 74.7% of its GDP. Through decades of continuous development, the United States has accumulated rich experience and established systemic advantages in research and development of essential technologies, digital technology innovation, industrial ecosystem development, market mechanism optimization, and other aspects, solidifying its dominant position in the global digital economy. However, existing research has largely focused on a single dimension, such as the technological innovation pathway, the development of the platform economy, or talent development mechanisms. Some scholars have explored the development pathway of the US digital industry from the perspective of technological innovation [76], [77], while others have focused on aspects such as the platform economy and higher education to analyze the driving factors and competitive advantages of the US digital economy development [78], [79]. However, the complexity of the digital economy requires a multidimensional and comprehensive analytical framework, especially in the current new phase characterized by deep integration between digital technologies and industries and the accelerated merging of digital and physical spaces. There is an urgent need to develop a more integrative and dynamic analytical framework to uncover the internal logic and evolutionary patterns of the development of the US digital economy, and to periodically evaluate how policy direction, institutional coordination, and talent development interact to maintain leadership in the digital economy [80], [81]. In particular, how the US government balances strategic industrial competitiveness and digital security, effectively coordinates various stakeholders, and programs digital talent development has not been comprehensively addressed in the existing international literature.

China: The essence of China's modernization is the modernization of the people, a modernization that strives for the entire people, and a modernization that brings about a population unprecedented in the world. General Secretary Xi Jinping pointed out that there is no fixed model for the path to modernization, and that a suitable model will be beneficial; cutting feet to fit shoes will not achieve results. China's modernization, particularly its educational modernization, has contributed significantly to its transformation from a "poor" country to a "prosperous and powerful" one [82]. China, the world's most populous country, had a total population of 1.41 billion in 2020, exceeding the combined population of 1.37 billion among the 38 OECD member countries (38 countries) and equivalent to 4.3 times the population of the United States. In 2020, China successfully built a moderately prosperous society in all respects, benefiting 1.4 billion people. Its GDP reached 101.35 trillion yuan, equivalent to 23.02 trillion international dollars (calculated based on PPP, constant 2017 international dollars, or 18.3% (4) of the world's total GDP). China recorded a per capita GDP of 16,316 international dollars, surpassing the world's per capita GDP of 16,178 international dollars [82], and equivalent to 27.2% of the United States' per capita GDP (59,920 international dollars). China is the country with the largest labor resources in the world, consistently ranking first in the world. Education is the foundation of long-term national development. Developing education at all levels and utilizing human resources has always been one of the long-term tasks of China's economic development.

China's modernization is modernization for all, which essentially means that through educational modernization, continuous investment in human resources, will be made for all, which in turn will increase education levels (years of schooling per capita) and development capacity (labor productivity) for all, create various types of assets (economic, social, cultural, ecological, etc.), and build a human resource foundation for realizing China's modernization [82]. Focusing on modernization with Chinese characteristics and the Great Leap Forward in human resource development, we explore how China, since its founding, has transformed itself from the world's largest illiterate country to the world's largest in terms of human resources, and why modernization with Chinese characteristics is a modernization of education for all. all its people, how China will modernize its education and develop into a world-leading country in human resources by 2035, so as to facilitate the contribution of human resources to fundamentally realize socialist modernization [82].

Japan: Japan is aggressively developing artificial intelligence and digital transformation. The government is leading discussions on a comprehensive AI and digital transformation strategy. This strategy aims to establish Japan as a leader in AI innovation and digital transformation. This effort directly addresses ethical issues. This strategy will boost Japan's technology industry and businesses by encouraging AI and digital transformation research [83]. Government AI and Digital Transformation Strategy. On September 12, 2025, Japan launched its historic national AI and digital transformation strategy. The government collaborated on this plan just months after passing a landmark AI law in May. Prime Minister Shigeru Ishiba emphasized the importance of AI in maintaining national security and driving economic growth. The goal is to build a society where AI benefits society. This plan encourages innovation and minimizes risks. The government plans to finalize the strategy by the end of the year, demonstrating Japan's strong commitment to leading AI in various fields [83]. Impact on the Japanese Tech Industry. Japan's tech industry is set to grow. The government is taking decisive action. Investing more in AI and digital transformation research will drive growth and spark innovation. This space will foster teamwork among startups, tech companies, and schools. This will create a culture of shared growth. Focusing on ethical AI aligns progress with social values. This helps build public trust [83]. Implications for Businesses in Various Sectors. Japan's AI and digital transformation strategy will impact more than just tech companies.

Industries such as manufacturing, healthcare, finance, and education will benefit from the use of AI and digital transformation. AI automation and digital transformation increase manufacturing efficiency. Predictive analytics enhance financial services. Personalized learning is transforming education. Companies that leverage AI and digital transformation effectively will have an advantage. Companies that don't may struggle to stay relevant [83]. Challenges and Considerations. AI and digital transformation are evolving rapidly. They will bring benefits and challenges. We must address data privacy, job losses, and ethical issues head-on. The government's plan takes bold action to address these challenges. It ensures the responsible development of AI and digital transformation. Policymakers, industry leaders, and the public must work together to shape the future of AI and digital transformation. Japan's push for a comprehensive AI and digital transformation strategy is a major step toward becoming a global leader in AI and digital transformation. The growth of technology and its impact on various business sectors demonstrate the importance of this step. Japan strives to balance innovation and ethics. In this way, the potential of AI and digital transformation can be harnessed for the benefit of society. Japan is taking ambitious steps, and the world will be watching closely. Japan offers useful ideas for other countries in utilizing AI and digital transformation in their economies and societies. Japan's success could set a standard for the integration of AI and digital transformation worldwide [83].

Artificial Intelligence In The Digital Transformation Strategy Of Japanese Enterprises. In these digital transformation eras, Japanese enterprises embrace AI in their production process. From implementing predictive maintenance solutions in manufacturing to automating complex tasks using AI-driven algorithms, companies are not only reducing operational costs but also enhancing the quality and precision of their products. Japan Digital Transformation Trends. AI adoption continues to play a vital role. The Japanese AI market is projected to grow substantially, reaching approximately \$4.5 billion as organizations across sectors increasingly integrate AI technologies into their operations. Key industries such as smart cities, healthcare, manufacturing, and finance are leading this transformation, with AI applications set to expand significantly in the coming years (Trade.gov). Furthermore, a report from IDC anticipates that by 2028, 80% of CIOs in the Asia-Pacific region, including Japan, will utilize AI to enhance operational efficiency. This reflects a broader shift towards digital-first strategies, underscoring AI's critical role in reshaping business practices and driving future innovation compliance [84]. Automation is a cornerstone of Japan's future. Automation through RPA is crucial for Japan's societal and economic challenges. The RPA market is projected to grow rapidly, with an expected compound annual growth rate (CAGR) of 41.20% from 2024 to 2032 (imarc). This growth is fueled by rising demand for automation in manufacturing, a shrinking workforce, heightened awareness among businesses, increased digital transformation efforts, and the adoption of advanced technologies (Statista). Big data to data-driven decision making.

According to McKinsey, the rise of data literacy and technological advancements fundamentally transform how businesses harness data for informed decision-making. In Japan, improving data-driven strategies is essential for fostering innovation and maintaining a competitive edge in the global market. This cultural shift ensures that data insights are integrated into the organizational fabric, driving collective growth and innovation compliance [84]. How Japanese enterprises can benefit from AI solution. A comprehensive end-to-end solution that integrates AI technologies is hyperautomation. This transformative approach leverages AI to optimize business operations on a broad scale. By combining RPA, AI, and machine learning, hyperautomation enables organizations to automate complex processes beyond routine tasks. This method enhances efficiency and fosters collaboration between humans and machines, facilitating seamless workflow integration. Key components include: Transforming all business processes into automation while incorporating advanced AI technologies. Encouraging every department within the organization to automate to maximize the potential benefits of hyperautomation. Enabling collaboration between humans and robots to enhance customer service delivery, making it faster and more efficient. Managing the entire automation lifecycle at scale, from identifying automation opportunities to measuring ROI for selecting the best automation solutions compliance [84]. Benefits of AI & Hyperautomation. Enhanced Decision-Making: AI can analyze vast amounts of data quickly and accurately, providing insights that help businesses make informed decisions.

Operational Efficiency: Automating routine tasks through AI, such as RPA, reduces manual workloads and increases productivity. **Cost Savings:** Implementing AI can lead to significant cost reductions by minimizing errors, decreasing operational costs, and streamlining processes. Estimates suggest that organizations can reduce operational expenses significantly by adopting AI solutions. **Risk Management and Compliance:** AI systems can monitor transactions in real time to detect fraud and ensure regulatory compliance [84].

India: India stands at the cusp of a new era powered by Artificial Intelligence (AI), and digital transformation where technology is transforming lives and shaping the nation's progress. AI is no longer limited to research labs or big corporations. It is reaching citizens at every level. From improving healthcare access in remote areas to helping farmers make informed crop decisions, AI is making daily life simpler, smarter, and more connected. It is revolutionising classrooms through personalised learning, making cities cleaner and safer, and enhancing public services through faster, data-driven governance. Initiatives such as the India AI and digital transformation Mission and the Centres of Excellence for AI are at the heart of this transformation. They are expanding access to computing power, supporting research, and helping startups and institutions create solutions that directly benefit people. India's approach focuses on making AI and digital transformation open, affordable, and accessible, ensuring that innovation uplifts society as a whole [85]. This inclusive vision is also reflected in NITI Aayog's report, AI and digital transformation for Inclusive Societal Development (October 2025). The report shows how AI and digital transformation can empower India's 490 million informal workers by expanding access to healthcare, education, skilling, and financial inclusion. It highlights how AI-driven tools can boost productivity and resilience for millions who form the backbone of India's economy. The report also stresses that technology can bridge deep social and economic divides, ensuring that the benefits of AI and digital transformation reach every citizen. AI and digital transformation ecosystem in India at Present: India's technology sector is expanding rapidly, with annual revenues projected to cross USD 280 billion this year [85].

Over. 6 million people are employed in the tech and AI ecosystem. The country hosts 1,800+ Global Capability Centres, including more than 500 focused on AI. India has around 1.8 lakh startups, and nearly 89% of new startups launched last year used AI in their products or services. On the NASSCOM AI Adoption Index, India scores 2.45 out of 4, showing that 87% of enterprises are actively using AI solutions. Leading sectors in AI and digital transformation adoption include industrial and automotive, consumer goods and retail, banking, financial services and insurance, and healthcare. Together they contribute around 60 percent of AI's total value. About 26% of Indian companies have achieved AI maturity at scale, according to a recent BCG survey. Ecosystem in India at Present: India's technology sector is expanding rapidly, with annual revenues projected to cross USD 280 billion this year. Over. 6 million people are employed in the tech and AI and digital transformation ecosystem. The country hosts 1,800+ Global Capability Centres, including more than 500 focused on AI and digital transformation. India has around 1.8 lakh startups, and nearly 89% of new startups launched last year used AI and digital transformation in their products or services. On the NASSCOM AI Adoption Index, India scores 2.45 out of 4, showing that 87% of enterprises are actively using AI solutions. Leading sectors in AI and digital transformation adoption include industrial and automotive, consumer goods and retail, banking, financial services and insurance, and healthcare. Together they contribute around 60 percent of AI's total value. About 26% of Indian companies have achieved AI and digital transformation maturity at scale, according to a recent BCG survey [85].

As India builds an inclusive AI and digital transformation ecosystem, its growing global recognition reflects this progress. Rankings such as the Stanford AI Index place India among the top four countries in AI skills, capabilities, and policies. The country is also the second-largest contributor to AI projects on GitHub, highlighting the strength of its developer community. With a strong STEM workforce, expanding research ecosystem, and growing digital infrastructure, India is positioning itself to harness AI for economic growth, societal progress, and the long-term vision of Viksit Bharat by 2047. NITI Aayog's report, AI and digital transformation for Inclusive Societal Development (October 2025), sets a roadmap for using technology to empower India's informal workforce. It asks a key question: how can the world's most advanced technologies reach the most overlooked workers so they can overcome constraints and claim their place in India's growth story? The report draws on real-life experiences of informal workers. It reflects the challenges and aspirations of a home healthcare aide in Rajkot, a carpenter in Delhi, a farmer, and many others. These stories show persistent barriers, but also the immense potential that thoughtfully deployed technology can unlock. For these millions, technology must not replace their skills, it must amplify them [85]. The roadmap discusses how Artificial Intelligence, Internet of Things, blockchain, robotics, and immersive learning can remove systemic barriers faced by India's 490 million informal workers. It envisions a future where, by 2035, voice-first AI interfaces overcome language and literacy barriers. Smart contracts will ensure timely and transparent payments. Micro-credentials and on-demand learning will allow workers to upskill at the pace of their ambition. At the heart of this vision is the Digital ShramSetu Mission, a national initiative to deploy frontier technologies at scale for India's informal sector. The mission focuses on persona- or sector-led prioritisation, state-driven implementation, regulatory enablement, and strategic partnerships to ensure affordability and wide adoption. It will mobilise government, industry, and civil society, guided by a robust multi-level impact evaluation framework [85].

Germany: Germany has unveiled ambitious plans to revitalize its ailing economy, leveraging artificial intelligence (AI) and a range of digital solutions to drive mainstream growth across key sectors. Germany's digitalization push. Germany's race to AI adoption. Trust in generative AI rises. GenAI systems' issues. According to a report, German Chancellor Friedrich Merz unveiled the plans during a press conference at the Borsig Palace in Berlin, highlighting 23 major projects aimed at growing the economy. Under the "modernization agenda," Merz disclosed that the projects will achieve their aim by cutting bureaucracy while making public services more efficient. At the top of the list is a platform that enables companies to be registered within 24 hours, which German authorities say is a significant step in attracting international players. Furthermore, Merz's plan will involve the introduction of a centralized online vehicle registration service and a plan to accelerate the recognition of foreign medical qualifications [86]. AI features prominently in Germany's modernization agenda, with the government keen on introducing AI-based tools for visa and court processing. The government unveiled plans for an AI-based digital agency to promote trade and foster development cooperation, while supporting the integration of emerging technologies across key sectors of the economy. Leaning on next-gen solutions, Merz's modernization agenda includes a direct payment mechanism for federal aid to citizens, sidestepping traditional intermediaries in the value chain.

In terms of infrastructure, the plan will back the development of a nuclear fusion reactor while prioritizing hydrogen as an energy resource. Still the largest economy in Europe, Germany has faced significant headwinds in recent years, aggravated by high energy costs and labor shortages. Excessive bureaucracy has since cost Germany nearly \$175 billion over the last year, while a rising dependency on exports has earned it the tag as the “sick man of Europe.” “We are of course aware of the problems facing the German economy at the moment, but we aspire to return to the top,” said Merz. “We are now going to the German Bundestag with some very concrete legislative proposals.” Merz disclosed that the government will seek legislative backing for the 23-point digitization plan, eyeing a passage before the end of the year. Germany plays catch-up to industry first-movers. Before the ambitious digitization plan, Germany ranked lower than the U.S. and the U.K. in terms of AI adoption and development. The German-based state-owned development bank KfW disclosed in a report that the country is falling behind global artificial intelligence leaders, with real-world applications failing to match policy enthusiasm [86]. To close the gap, Germany’s financial regulator BaFin urged stakeholders to introduce policies to avoid “unnecessary bureaucracy” for AI. Meanwhile, the country has devised an AI investment plan to match the U.S., while regulators are ramping up enforcement actions against data protection violations. Trust in generative AI spikes despite leaks in guardrails. A new report by SAS has revealed that consumers are indicating significant trust levels in generative AI systems over other forms of AI despite gaps in safeguards. The report, titled “The IDC Data and AI Impact Report: The Trust Imperative,” noted that generative AI systems, such as OpenAI’s ChatGPT and Google’s (NASDAQ: GOOGL) Gemini, have earned the trust of a majority of users. However, the report noted that the social familiarity of generative AI systems is a major factor in growing trust levels despite the sector having the lowest investment in trustworthiness. Apart from generative AI, 33% of respondents indicated complete trust in agentic AI systems, such as AutoGPT. Meanwhile, only 18% confirmed total trust in traditional AI systems despite hefty investments in trustworthiness and reliability. “Our research shows a contradiction: that forms of AI with humanlike interactivity and social familiarity seem to encourage the greatest trust, regardless of actual reliability or accuracy,” said Kathy Lange, executive at IDC. “As AI providers, professionals and personal users, we must ask: GenAI is trusted, but is it always trustworthy?” [86].

The SAS-backed study noted that companies that prioritize AI trustworthiness are 60% more likely to double their return on investment (ROI) over those without significant investments in the guardrails. Despite the benefits of prioritizing trust, the report noted that only 40% of AI companies are committed to making their systems trustworthy through governance and other ethical safeguards. Per the report, only 2% of companies are keen on developing an AI governance framework, while less than 10% have a clearly defined AI policy. As consumers increasingly question data handling processes of AI service providers, analysts note that a lack of investment in trustworthiness will affect the profitability of AI companies in the near future. However, the report highlighted a streak of concerns among organizations keen on prioritizing AI trustworthiness. 49% of respondents said that data foundations are not centralized and non-optimized cloud data environments as a major barrier, while 41% of respondents are pointing to a lack of skilled specialists within their organizations. “For the good of society, businesses and employees – trust in AI is imperative,” said SAS CTO Bryan Harris. “In order to achieve this, the AI industry must increase the success rate of implementations, humans must critically review AI results, and leadership must empower the workforce with AI.” [86]. GenAI systems are prone to sycophancy. Several studies have revealed that AI systems have traits of sycophancy, accentuated by a tendency to provide answers based on users’ desires rather than the truth. While the reports did not disclose a solution, researchers have suggested new training systems for large language models (LLMs). Apart from sycophancy, LLMs are also prone to hallucination, with several responses by leading models containing misleading information presented as fact. Global regulators are tightening the screws for service providers over claims of hallucination as researchers unveil new tools with emerging technologies to detect the problem in AI models. In order for artificial intelligence (AI) to work right within the law and thrive in the face of growing challenges, it needs to integrate an enterprise blockchain system that ensures data input quality and ownership—allowing it to keep data safe while also guaranteeing the immutability of data. Check out CoinGeek’s coverage on this emerging tech to learn more why Enterprise blockchain will be the backbone of AI [86].

IV. RESULTS

This section will outline the themes identified in our study, which revolve around the role of AI and digital transformation in empowering entrepreneurs to engage in their impact on markets and society. These themes are then correlated with the functions of developing that potential, including providing recognition, differentiation, and added value to stakeholders. The theoretical underpinnings of these themes are fully detailed in the Selection and Collection of Empirical Material section, which explains the systematic analysis and relationship of our empirical data to relevant theoretical themes.

IV 1. ENTREPRENEUR ARE INVOLVED IN DEVELOPMENT AI AND DIGITAL TRANSFORMATION WITHIN THEIR COMPANIES

This research shows that entrepreneurs in the United States, China, Japan, India, and Germany are responding strongly to the challenges of AI development and digital transformation. We understand this process as a company-building process in each country. This research shows that entrepreneurs in the United States, China, Japan, India, and Germany are responding strongly to the challenges of AI development and digital transformation. We understand this process as a process of company development in each country. United States is a key player in the AI landscape, driven by market-oriented innovation and substantial private investment. Over the past five years, venture capital (VC) investment in AI in the US has reached an astonishing \$290 billion. This capital influx has catalyzed transformative progress across sectors, including autonomous vehicles, healthcare, and IT infrastructure. China is another powerhouse in the AI space, driven by rapid growth and modernization efforts. The country's AI market is expected to exceed \$61 billion by 2025, reflecting its significant investment in the sector. According to data from the Organisation for Economic Co-operation and Development (OECD), Chinese venture capitalists have poured approximately \$120 billion into the AI ecosystem, focusing on areas such as autonomous vehicles, robotic sensors, and IT hardware. Japan has turned to AI and digital transformation to fill this gap. The country has increased collaboration with foreign startups and small and medium-sized enterprises (SMEs) to enhance its AI capabilities.

A key aspect of Japan's AI strategy is the "Society 5.0" concept, which aims to integrate advanced technology into every aspect of life. This initiative promotes connectivity, automation, and personalization, which are expected to foster innovation and spur economic growth. Japan's AI and digital transformation market is divided into hardware, software, and services, with the software segment experiencing the highest growth. This growth is driven by advances in data storage capacity, edge computing, and parallel processing capabilities. Japan's focus on AI and digital transformation also extends to the healthcare sector, where AI-based technologies and digital transformation are being developed to support the elderly, such as robotics for caregiving and AI systems and digital transformation for medical diagnostics. By addressing demographic challenges through AI and digital transformation, Japan can overcome internal challenges. Japan can also serve as a global example of how technology can be used to address social issues. India is rapidly emerging as a key player in the AI and digital transformation space, driven by a combination of increased corporate technology spending and a vast and growing talent pool. This statement highlights the rapid growth of the Indian AI market, projected to reach \$17 billion by 2027, with an impressive annual growth rate of 25-35% between 2024 and 2027. Driving this expansion is India's large internet user population, estimated at 881 million. This large user base creates a strong demand for personalized experiences, which in turn drives the growth of AI technology in the country. AI and digital transformation in India operate through task automation, enabling businesses to streamline activities such as campaign setup and customer inquiry responses.

Furthermore, AI and digital transformation facilitate content personalization, tailoring marketing materials to individual preferences, and enhancing the customer experience. These technologies also play a crucial role in optimizing websites for better performance and predicting customer behavior. This enables businesses to design targeted campaigns with higher effectiveness. Germany is renowned for its AI and digital transformation innovations, attracting significant attention and investment from global tech giants. Companies like Microsoft have committed substantial resources to Germany's AI infrastructure and digital transformation, with a planned investment of \$3.2 billion. This investment underscores Germany's role as a major hub for AI and digital transformation development in Europe. Furthermore, Germany's vibrant AI and digital transformation ecosystem has attracted the attention of major companies like Apple, which recently acquired German AI startup Bitbot. This interest from global players highlights the attractiveness of Germany's AI capabilities. Germany's commitment to AI and digital transformation extends beyond corporate investments. The country is focused on developing AI and digital transformation research, particularly in the study of brain data, with the European Union allocating its largest single source of funding to this field. Furthermore, Germany has ambitious plans to double its funding for AI and digital transformation. The integration of entrepreneurs from the United States, China, Japan, India, and Germany for AI and Digital Transformation is in line with research, which is supported by other studies such as [32], [46-55], [59].

IV 2. ENTREPRENEURS ARE INVOLVED IN MARKETS AND SOCIETY WITHIN COMPANIES

United States: As a global leader in the digital economy, it has achieved significant strategic success. Through decades of continuous development, the United States has accumulated rich experience and established systemic advantages in essential technology research and development, digital technology innovation, industrial ecosystem development, market mechanism optimization, and other aspects, strengthening its dominant position in the global digital economy as a driving force and competitive advantage for the development of the United States digital economy. There is an urgent need to develop a more integrative and dynamic analytical framework to uncover the internal logic and evolutionary patterns of the US digital economy's development, and to periodically evaluate how policy direction, institutional coordination, and talent development interact to maintain leadership in the digital economy. In particular, how the United States government balances strategic industrial competitiveness and digital security, effectively coordinates various stakeholders, and programs digital talent development has not been comprehensively addressed in the existing international literature.

China: The essence of China's modernization is the modernization of the people, a modernization that promotes the well-being of all people, and a modernization that produces a population unprecedented in the world. China's modernization, especially its educational modernization, has contributed significantly to its transformation from a "poor" country to a "prosperous and powerful" country. China is the country with the largest labor resources in the world, consistently ranking first in the world. Education is the foundation of long-term national development. Developing education at all levels and utilizing human resources has always been one of the long-term tasks of China's economic development. China's modernization is a modernization for all, which essentially means that through educational modernization, continuous investment in human resources will be made for all, which in turn will increase the level of education (years of schooling per capita) and development capacity (labor productivity) for all, create various types of assets (economic, social, cultural, ecological, etc.), and build a human resource foundation for realizing China's modernization. Focusing on Chinese-style modernization and the Great Leap Forward in human resource development, we explore how China, since its founding, has transformed from the world's most literate nation to one with the world's most human capital.

Japan is aggressively developing artificial intelligence and digital transformation. This strategy aims to establish Japan as a leader in AI innovation and digital transformation. This effort directly addresses ethical issues. This strategy will boost Japan's technology industry and businesses by promoting AI research and digital transformation. Japan launched a historic national strategy for AI and digital transformation. The Japanese government emphasized the importance of AI in maintaining national security and driving economic growth. The goal is to build a society where AI benefits society. This plan encourages innovation and minimizes risks, demonstrating Japan's strong commitment to leading AI in various fields. Impact on the Japanese Technology Industry. Entrepreneurship in the Japanese technology industry is expected to grow. Investing more in AI research and digital transformation will drive growth and spark innovation. This space will encourage teamwork among startups, technology companies, and schools. This will create a culture of shared growth. Focusing on ethical AI aligns progress with social values. This helps build public trust. Implications for Businesses in Various Sectors. Japan's AI and digital transformation strategy will impact more than just technology companies. Industries such as manufacturing, healthcare, finance, and education will benefit from the use of AI and digital transformation. AI automation and digital transformation are improving manufacturing efficiency. Predictive analytics are enhancing financial services.

Personalized learning is transforming education. Companies that effectively leverage AI and digital transformation will have an advantage. Those that don't will likely struggle to stay relevant.

India is on the verge of a new era powered by Artificial Intelligence (AI) and digital transformation, where technology is transforming lives and shaping the nation's progress. AI is no longer confined to research laboratories or large corporations. It reaches citizens at every level. From improving access to healthcare in remote areas to helping farmers make informed crop decisions, AI is making everyday life simpler, smarter, and more connected. AI is revolutionizing classrooms through personalized learning, making cities cleaner and safer, and improving public services through faster, data-driven governance. Initiatives such as the India AI and Digital Transformation Mission and the AI Centers of Excellence are at the heart of this transformation. Expanding access to computing power, supporting research, and helping startups and institutions create solutions that directly benefit society. India's approach focuses on making AI and digital transformation open, affordable, and accessible, ensuring that innovation uplifts society as a whole. This inclusive vision is also reflected in the NITI Aayog report, AI and Digital Transformation for the Development of an Inclusive Society (October 2025). The report demonstrates how AI and digital transformation can empower India's 490 million informal workers by expanding access to healthcare, education, skills, and financial inclusion. It highlights how AI-based tools can increase productivity and resilience for the millions of people who form the backbone of the Indian economy. It also emphasizes that technology can bridge deep social and economic divides, ensuring that the benefits of AI and digital transformation reach every citizen.

Germany has launched an ambitious plan to revitalize its ailing economy, leveraging artificial intelligence (AI) and digital solutions to drive mainstream growth across key sectors. Germany's digitalization push. Germany's race towards AI adoption. Trust in generative AI is growing. GenAI system issues. Highlights 23 major projects aimed at growing the economy. Under the "modernization agenda," it reveals that the projects will achieve their goals by cutting bureaucracy while improving the efficiency of public services. Topping the list is a platform that allows companies to be registered within 24 hours, which German authorities say is a significant step in attracting international players. Read more. AI is a key feature of Germany's modernization agenda, with the government eager to introduce AI-based tools for visa processing and courts. The government has announced plans to establish an AI-based digital agency to promote trade and foster development cooperation, while also supporting the integration of new technologies across key sectors of the economy. Based on next-generation solutions, the Merz modernization agenda includes a direct payment mechanism for federal aid to citizens, bypassing traditional intermediaries in the value chain. In terms of infrastructure, the plan will support the development of nuclear fusion reactors by prioritizing hydrogen as an energy source. Germany, still Europe's largest economy, has faced significant challenges in recent years, exacerbated by high energy costs and labor shortages.

The integration of entrepreneurs from the United States, China, Japan, India, and Germany for markets and society is in line with research, which is supported by other studies such as [60-68], [70].

V. CONCLUSIONS

Research on Artificial Intelligence (AI) and digital transformation has rapidly transformed various aspects of our lives, from industry and the economy to societies worldwide. Many countries have participated in this technological revolution. However, only a few stand out as pioneers. This discussion focuses on the top five countries leading the AI revolution and digital transformation [75].

United States: As a global leader in the digital economy, the United States has achieved significant strategic success. Through decades of continuous development, the United States has accumulated rich experience and established systemic advantages in research and development of essential technologies, digital technology innovation, industrial ecosystem development, optimization of market mechanisms, and other aspects, strengthening its dominant position in the global digital economy. Some studies examine the development of the US digital industry from the perspective of technological innovation [76], [77], while others focus on aspects such as the platform economy and higher education to analyze the drivers and competitive advantages of the US digital economy's development [78], [79].

The essence of China's modernization is the modernization of the people, a modernization that champions all its people, and a modernization that has produced a population unprecedented in the world. China's modernization, particularly its modernization of education, has significantly contributed to its transformation from a "poor" country to a "prosperous and powerful" one. Focusing on modernization with Chinese characteristics and the Great Leap Forward in human resource development, we explore how China, since its founding, has transformed itself from the world's largest illiterate country to the world's largest in terms of human resources, and why modernization with Chinese characteristics is a modernization of education for all its people, how China will modernize its education and develop into a world-leading country in human resources by 2035, so as to facilitate the contribution of human resources to fundamentally realize socialist modernization [82].

Japan is aggressively developing artificial intelligence and digital transformation. The government is leading discussions on a comprehensive AI and digital transformation strategy. This strategy aims to establish Japan as a leader in AI innovation and digital transformation. This effort directly addresses ethical issues. This strategy will boost Japan's technology industry and businesses by encouraging AI and digital transformation research. Impact on the Japanese Tech Industry. Japan's tech industry is set to grow. The government is taking decisive action. Investing more in AI and digital transformation research will drive growth and spark innovation. This space will foster teamwork among startups, tech companies, and schools. This will create a culture of shared growth. Focusing on ethical AI aligns progress with social values. This helps build public trust. Implications for Businesses in Various Sectors. Japan's AI and digital transformation strategy will impact more than just tech companies. Industries such as manufacturing, healthcare, finance, and education will benefit from the use of AI and digital transformation [83].

As India builds an inclusive AI and digital transformation ecosystem, its growing global recognition reflects this progress. Rankings like the Stanford AI Index place India among the top four countries in AI skills, capabilities, and policies. The country is also the second-largest contributor to AI projects on GitHub, highlighting the strength of its developer community.

With a strong STEM workforce, a thriving research ecosystem, and a growing digital infrastructure, India is positioned to leverage AI for economic growth, societal progress, and the long-term vision of Viksit Bharat by 2047. The NITI Aayog report, AI and Digital Transformation for Inclusive Societal Development (October 2025), lays out a roadmap for using technology to empower India's informal workforce [85].

Germany has unveiled ambitious plans to revitalize its ailing economy, leveraging artificial intelligence (AI) and a range of digital solutions to drive mainstream growth across key sectors. Germany's digitalization push. Germany's race to AI adoption. Trust in generative AI rises. GenAI systems' issues. According to a report, German Chancellor Friedrich Merz unveiled the plans during a press conference at the Borsig Palace in Berlin, highlighting 23 major projects aimed at growing the economy. Under the "modernization agenda," Merz disclosed that the projects will achieve their aim by cutting bureaucracy while making public services more efficient. At the top of the list is a platform that enables companies to be registered within 24 hours, which German authorities say is a significant step in attracting international players. Furthermore, Merz's plan will involve the introduction of a centralized online vehicle registration service and a plan to accelerate the recognition of foreign medical qualifications [86].

VI. LIMITATIONS AND FUTURE RESEARCH

This study has limitations and opens up opportunities for future research. First, it focused on AI and digital transformation impacting markets and societies in five countries. Future research should consider including other countries. Second, we encourage future research to explore broader areas, support researchers in uncovering additional insights, and demonstrate the applicability and effectiveness of more diverse methods. Third, while this qualitative approach is promising, further empirical research and methodological experimentation would be beneficial in identifying optimal applications across research contexts. A general limitation of this study is its exclusive use of qualitative methods, and it is worth considering the use of other methods for more thorough textual reading and comprehension, as well as to address its challenges in capturing the full context of word relationships and minimizing its inability to interpret linguistic ambiguities independently. Future research could use these methods, for example, to investigate other experiences and phenomena, such as how product and sales integration influences consumer decision-making processes, or to investigate how consumers narrate their physical consumption practices in relation to specific discourses or lifestyles, such as sustainability. In general, we hope that others will join this effort in the future by identifying and elaborating further.

VII. AUTHOR'S CONTRIBUTION

Conceptualization: Sonny Indrajaya, Tine Yuliantini, Sri Marti Pramudena.

Methodology: Sonny Indrajaya, Tine Yuliantini, Sri Marti Pramudena.

Investigation: Sonny Indrajaya, Tine Yuliantini, Sri Marti Pramudena.

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Approval of the final text: Sonny Indrajaya, Tine Yuliantini, Sri Marti Pramudena.

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