

ADOPTION OF ARTIFICIAL INTELLIGENCE AND PERFORMANCE OF BUSINESS ORGANIZATION

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ABSTRACT

The application of artificial intelligence (AI) technology has evolved into an influential endeavor to improve firm performance, but little research considers the relationship among artificial intelligence capability (AIC), personal expertise (PE), and business organization performance. Based on the resource-based view (RBV) and existing findings. Artificial intelligent has information technology capabilities and personal expertise as dimensions while business performance was measured in terms of innovation and market performance. Efficiency and productivity gain, improved speed, better quality and reduction in human error were some benefits while; Hight cost, no creativity, no ethics, and make humans lazy were the non-benefits to mention but a few. This study concluded that artificial intelligence will help enterprises leverage improve business organization performance, achieve a competitive advantage, and contribute to theory and management practice. Finally, the study recommended studies using empirical approach and relating it to a particular organization

Keywords: artificial intelligence capability, firm performance, resource-based view, firm creativity, driven decision making, environmental dynamism, innovative culture

INTRODUCTION

The rapid evolution of artificial intelligence (AI) brings enterprises more business opportunities (Hughes et al., 2020; Obschonka and Audretsch, 2020; Shareef et al., 2021). Artificial intelligence is the machines (programs) that operates in the simulation of human intelligence (Łapińska et al., 2021) in technologies, such as machine learning, data mining, natural language processing, image recognition, etc. (Khalid, 2020). Artificial intelligence can bring efficiency gains, cost savings, product quality improvements, and customer service improvements (Bag et al., 2021c). Enterprise capabilities are critical for identifying business opportunities (Yao et al., 2021). While there is excellent potential for artificial intelligence capability (AIC) to improve a company's performance (Mikalef and Gupta, 2021), there are also significant challenges to these companies applying AI (Yu et al., 2021). Businesses can utilize AI to improve the customer service experience by offering more appropriate recommendations and less costly options (Payne et al., 2021). According to the resource-based view (RBV; Majhi et al., 2021); artificial intelligence's applied capability is an ensemble of implicit resources (Bag et al., 2021c). These resources include supporting resources, labor skills, and organizational coordination (Kim, 2019; Selz, 2020). Once a firm masters organizing resources that are impossible to copy effortlessly, it possesses a competitive advantage (Yasmin et al., 2020) and enhances firm performance (Chen and Lin, 2021). Therefore, there is an essential theoretical and practical value in exploring the mechanisms and critical factors of the impact of AIC on firm performance (Chen and Lin, 2021; Mikalef et al., 2021), especially in the e-commerce industry with direct customer contact (Wang and Fan, 2021).

A broad study of the impact of AI and its capability on business performance appears (Denicolai et al., 2021; Mikalef and Gupta, 2021). The existing literature dedicated to the study of the impact of AI on industries, such as banking and finance (Huynh et al., 2020), manufacturing (Bag et al., 2021c), automated retailing (Pillai et al., 2020), logistics (Chien et al., 2020), marketing (Keegan et al., 2022), coaching services (Kim et al., 2021b), and customer relationship management (Chatterjee et al., 2021a), among other areas. In comparison, these studies concentrated on the impact of AI on firm innovation processes and management practices, technological innovation (Liu et al., 2020a), and the relationship between AI learning and entrepreneurial performance (Khalid, 2020).

In e-commerce, technology applications of AI are also proliferating nowadays (Volkova et al., 2021). For example, e-commerce firms predict the most acceptable promotion targets (Giannoulakis, 2020) and pricing strategies (Shang et al., 2020) founded on consumers' recorded user profiles, trajectories, and consumption history. E-commerce firms' consumer product recommendations are built on robust data analysis (Li et al., 2021). The AI customer service can help customers solve problems quickly (Varsha et al., 2021). E-commerce companies can deepen exploration and analysis under past data to capture market trends to improve operational efficiency (Cui et al., 2021). However, little is known about the mechanism of AIC composition on a theoretical basis (research gap)

Aim and Objectives of the study

The study is aimed at examining the effect of adoption of Artificial Intelligence on performance of business. The study will be guided by the following specific objectives

- (i) To determine the effect of information technology (IT) Capabilities on innovation
- (ii) To determine the effect of IT capabilities on market performance
- (iii) To determine the effect of Personal Expertise on innovation
- (iv) To determine the effect of personal Expertise on market performance.

Conceptual Framework

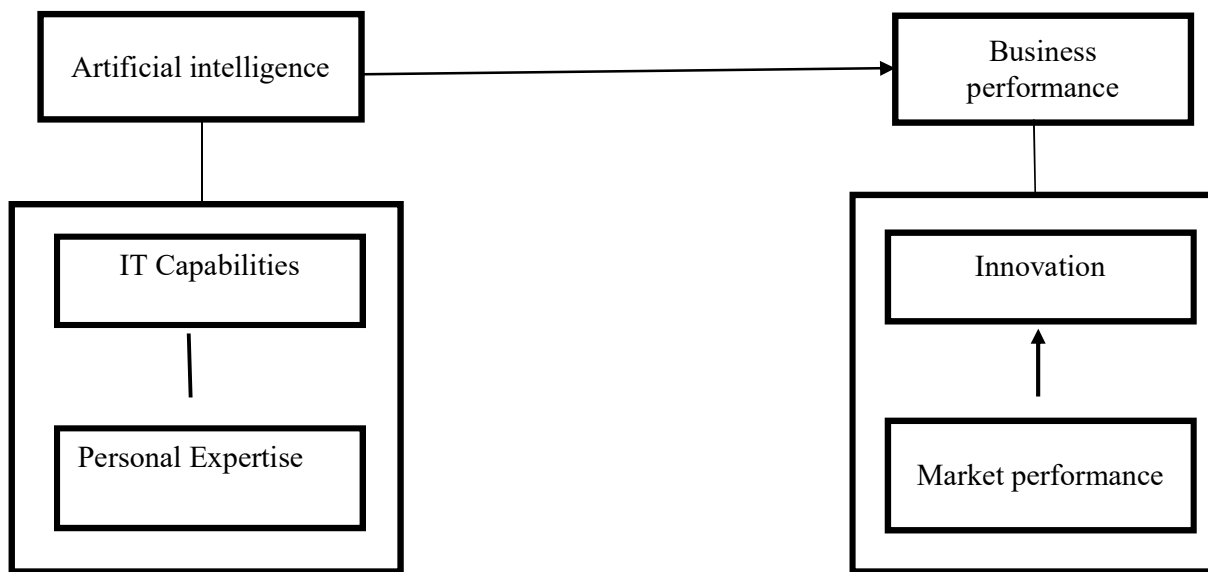


Fig. 1 is the conceptual framework showing the relationship between Artificial intelligence and business performance

Source: Adapted from Anand and Fosso Wamba (2013).

Artificial Intelligence Capability

Artificial intelligence has gained much attention as a potential to increase the competitive advantage of firms (Hughes et al., 2020; Obschonka and Audretsch, 2020; Shareef et al., 2021). Firm capabilities of applied AI also appear to be particularly valuable (Yu et al., 2021). Combined with RBV, we define AIC of e-commerce firms as the ability of firms to build, integrate, and utilize AI-based related resources (Łapińska et al., 2021; Mikalef and Gupta, 2021). Effective and efficient implementation of AI in firms, on the other hand, requires significant infrastructural resources (tangible resources; Bag et al., 2021c; Chatterjee et al., 2021a), which includes financial support (Łapińska et al., 2021), data (Herhausen et al., 2020; Hwang and Kim, 2021), hardware devices

and software (Zhang et al., 2020), and technical support (Rahman et al., 2021). The majority of the businesses across E-commerce companies are throughout the Internet, and thus they have a natural advantage in acquiring data resources (Wang and Fan, 2021). While the firm sets down the basic tangible resources, it is significant to efficiently employ the proclivity of using AI (intangible resources; Ashaari et al., 2021; Yu et al., 2021). If firms are not inclined to implement AI in planning, coordination, control, and implementation (Belhadi et al., 2021; Chen and Lin, 2021), even if they have access to very superior AI base resources will not help (Denicolai et al., 2021). With tangible resources (base resources) and intangible resources (proclivity), technical skills (human resources) should also be taken into account (Baldegger et al., 2020; Bag et al., 2021c). Employees' skills expertise would restrict the difficulty of spreading AI-related technologies (Chatterjee et al., 2021a; Chen and Chen, 2021). Understanding the scope of AI applications and acquiring skills and expertise in using AI systems are prerequisites for employees to apply AI shortly (Vrontis et al., 2021).

IT Capabilities

In a context of globalization and internationalization of markets, innovation, product/service quality and customer requirements have led companies to integrate IT into their managerial approach (Bolwijn, Casella, & Zhan, 2018; Rachinger, Rauter, Müller, Vorraber, & Schirgi, 2019; Stank, Esper, Goldsby Thomas, Zinn, & Autry, 2019). This evolution of the economic environment results in competitiveness requirements which imply a modernization of the information device of organizations. Organizations have always aspired to assign more tasks to machines in order to reduce costs and improve efficiency. It all started with assembly lines, which replaced human labor in mechanical and repetitive tasks previously known as "manual labor" (Dopico et al., 2016; Lee et al., 2018)

Nowadays, the challenge for 21st century organizations lies in their ability to innovate in the face of an extremely dynamic market in which competitive positions are constantly evolving (Stank et al., 2019). The globalization of the economy brings more and more competition and more information to be compiled to meet the challenge (Queiroz Maciel, Pereira Susana Carla, Telles, & Machado Marcio, 2019; Rachinger et al., 2019; Stank et al., 2019). But, in a world where information is a strategic asset (the key to value creation), it is clear that the organization's ability to manage this information is crucial to its competitiveness (is of strategic importance) (Kuusisto, 2017; Rachinger et al., 2019). Innovative IT is fundamentally reshaping organizations' business and organizational processes. They have already changed the overall relationship between IT and the rest of the organization. This new way of managing information has become both a challenge and a tremendous opportunity for organizations, but seizing this opportunity requires a "change in culture, mindset, and skills" (Devaraj & Kohli, 2003; Nwamen, 2006; Turulja & Bajgoric, 2018).

AI Personal Expertise (AIPE)

It is defined as the professional skills and knowledge of AI-related technologies, business functions and relational (or interpersonal) domains required by the organization's staff for modeling and/or using intelligent behavior in a computer or other technology to accomplish the tasks assigned to it (Ha & Jeong, 2010; Hamet & Tremblay, 2017; Jiang et al., 2017; Kim et al., 2011). It is important for an organization's IT staff to have a combination of skills—awareness, ownership, integration, management of AI technologies—knowledge of IT elements that would allow for more effective management of the AI resources at their disposal. Thus, the creation of business value by organizations depends on the effectiveness of AI strategic alignment with its strategy; and the latter improves if staff has the right combination of skills. However, the expertise of AI staff becomes an intangible asset for organizations when IT staff understands how the organization's strategies are mixed with IT and AI skills (Abijith & Wamba, 2012; Kim et al., 2011; Liu et al., 2013). As a result, organizations with competent AI staff are more likely to meet the requirements of everchanging

dynamic environments by aligning AI with strategies, developing reliable and cost-effective intelligent systems.

Innovation

Firm creativity (FC) is an essential driver of innovation and competitive advantage for firms (Kim et al., 2021a). This study defines firm creativity as the ability of a firm to create novel and valuable ideas (Ferreira et al., 2020). Today's business environment has become increasingly complex and fluid, and creative organizations tend to be more likely to experiment with new technologies and incorporate them into their daily operations (Liu et al., 2020b). Firms that appreciate creativity are also more willing to attempt the latest technologies, such as artificial intelligence, big data, and cloud computing to convert business processes and decision-making mechanisms (Mikalef and Gupta, 2021). Firm creativity is a necessary antecedent that influences firms to compose strategic thinking and decisions (Dixit et al., 2021). Artificial intelligence management (AIM) refers to a firm support management system assisting the implementation of artificial intelligence (Bag et al., 2021a; Łapińska et al., 2021). Such initiatives depend heavily on the commitment of firms to implement AI technologies (Haesevoets et al., 2021). AIC is firm competitiveness requiring multiple resources to complement each other but can only be guaranteed through long-term monitoring activities (Raisch and Krakowski, 2021). The system development and its updating for artificial intelligence management can improve firms' quality decisions (Saenz et al., 2020), thus driving better returns for firms (Blohm et al., 2020). The nature of artificial intelligence is a decision-making technique associated with artificial intelligence techniques (Verganti et al., 2020). Suggestions from artificial intelligence consulting systems can affect firms' decisions (Keding and Meissner, 2021), and firms that master AIC may be willing to choose AI to navigate their decisions (Ashaari et al., 2021)

Artificial Intelligence and Business Activities

Since 2010, however, AI has been booming again, mainly due to considerable improvements in the computing power of computers and the access to massive amounts of data (CIGREF, 2018; Pwc, 2019). This rebirth of AI is the consequence of three (03) breakthroughs: (i) the introduction of a much more sophisticated class of algorithms; (ii) the arrival on the market of low-cost graphics processors capable of performing large amounts of calculations in a few milliseconds; and (iii) the availability of very large, correctly annotated databases allowing for more sophisticated learning of intelligent systems (Jain, Ross, Prabhakar, & technology, 2004; Khashman & Applications, 2009; Pwc, 2019).

AI and its technologies (machine learning, deep learning, chatbot, neural network, virtual assistant and others) are fundamentally reshaping the business and organizational processes of companies (CIGREF, 2018; Kuzey, Uyar, & Delen, 2014; Pwc, 2019). In fact, AI has already transformed the overall structure of organizations and the relation with their environment. AI has driven a new way of managing information, and this represents both a challenge and an immense opportunity for organizations; but seizing this opportunity requires a change in culture, mentality and skills (Di Francescomarino & Maggi, 2020; Lee et al., 2018; Sikdar, 2018). For example, IBM offers Watson solution (named after Thomas Watson [1913- 1994], former IBM manager), which is an AI computer program designed to answer natural language questions in a variety of real-world activities (marketing, management, justice, healthcare) (Kohn et al., 2014). One of its applications is the Watson Health service, which offers physicians the opportunity to jointly use current medical data and their patient data to personalize patient care, including the pros and cons of a patient (Kohn et al., 2014). Advances in AI research have made it an inescapable topic of trends in the current decade. Announced since the 1960s, AI has made important progress that was eventually confirmed since the 2000s with the emergence of "Machine Learning" (automatic learning: machines 'learn' from the datasets offered to them), whose latest development is "Deep Learning" (which relies on neural networks) (Buchanan, 2005; Pwc, 2019; Yoav Shoham, 2018). Indeed, machine learning algorithms are used to train the deep layers of neural networks. Rather than modeling vast amounts

of information (e.g., calculating all the possible moves in a chess game or replacing images in videos), neural networks learn by digesting millions of test data (medical diagnostics and efficacy of new drugs, estimates of energy reserves, price forecasts) (Pwc, 2019; Zemouri, Devalland, Valmary-Degano, & Zerhouni, 2019). Combined with big data, these types of AI perform operations and actions that exceed human actions in terms of speed and relevance.

Theoretical Review

The study will rely on Resource-Based theory by Barney (1991). The RBV believes that essential resources determine firm performance (Barney, 1991; Chatterjee et al., 2021b). Resources can be tangible and intangible assets within an organization (Mikalef and Gupta, 2021). According to this theory, valuable, rare, inimitable, and irreplaceable resources can build a competitive advantage by creating value and improving firm performance (Barney, 1991; Ghasemaghaei, 2021). Such an advantage can persist over a long period (Bag et al., 2021c). Businesses can raise the value of their resources because the combined value of the complementary resources is higher than the sum of each resource (Ghasemaghaei, 2021; Mikalef et al., 2021).

Artificial intelligence capability is increasingly a critical and intangible resource for business performance advancement (Belhadi et al., 2021; Lou and Wu, 2021; Mikalef and Gupta, 2021). It suggests that artificial intelligence may bring a competitive advantage to businesses (Chaudhuri et al., 2021). AIC can deliver businesses access to valuable, rare, inimitable, and irreplaceable resources (Ghasemaghaei, 2021). Many studies have deemed "firm capability" as a mediator between resources and firm performance (Belhadi et al., 2021; Lou and Wu, 2021; Mikalef and Gupta, 2021). Firm capabilities are vital attributes required for business operations (Yao et al., 2021). These capabilities help deploy other necessary resources to improve firm performance (Yao et al., 2021). We focus on the firm capability in creating value because AIC can enhance the firm's capabilities and improve firm performance (Chatterjee et al., 2021a). RBV is frequently used to demonstrate the association among firm resources, capabilities, and performance (Barney, 1991; Chen and Lin, 2021; Hossain et al., 2021; Rahman et al., 2021). Therefore, this study will utilize the RBV in the following processes.

Benefits of Artificial Intelligence to business performance

Enterprise creativity is a key to generating new ideas, products, and services (Yao et al., 2021) and is a potential factor simulating business performance (Mikalef and Gupta, 2021). Big data can enhance AIC (Ghasemaghaei, 2021) and decision-making for more profitable business outcomes (Denicola et al., 2021). The AI-related business management systems are essential factors in optimizing business performance (Rahman et al., 2021).

Enterprises can cultivate firm AIC through three aspects: tangible resources (basic), intangible resources (proclivity), and human resources (skills). This study proves that e-commerce firms AIC is formed by three first-order variables: basic, proclivity, and skills, and the data analysis results indicate that AIC is a well-constructed second-order model. Firms need to make the real business value of AI technology to improve firm performance and cannot rely on either hardware devices or software, technical resources (Rahman et al., 2021), and data resources (Chaudhuri et al., 2021). Nevertheless, these complementary resources should be allowed to construct the superior competitiveness of the firm organically.

Use artificial intelligence to enhance firm creativity. Companies can adopt artificial intelligence technologies to perform repetitive tasks in business operations, release more human resources, and reduce costs (Mikalef and Gupta, 2021). In addition, businesses can also attempt to employ AI for innovative work, using deep mining of internal and external data to discover where the current needs of firm customers are going, thus giving them more time to optimize processes, products, and services. For example, AI technology can integrate solutions that consumers likely favor and record current browsing data, click data and sales data in time to predict the higher quality products and services to meet consumers' needs.

Foster an internal culture of innovation and keep an eye on external environmental changes. This paper affirms the positive moderating role of an innovation culture and environmental dynamism present in the research model. E-commerce firms should cultivate a culture of innovation that incorporates the employees' views at all levels within the firm and should also consider the opinions of external experts. Firms can also establish fault-tolerance mechanisms to allow new ideas and solutions, providing more opportunities to improve performance. Changes and unpredictability in the external environment can also affect business operations (Haftor et al., 2021). Firms can use AI technologies to observe changes in the external environment in real-time and recommend intervention strategies to give them insight into business opportunities in a highly competitive market.

CONCLUSION

The importance of AI becomes apparent as the contours of digital transformation become clearer. Organizations have become aware of the value of the data they have at their disposal. They now need tools to better exploit them. The emergence of AI is thus encouraged by a double movement: the digitization of the economy and the automation of existing processes, on the one hand, and a disruption in the supply of services based on the exploitation of this deposit on the other hand.

The use of AI is subject to contrasting judgments. On the one hand, this set of new techniques/technologies seems very promising for the future of organizations. On the other hand, its concrete applications still face many unresolved challenges. There are currently no regulations governing the functioning of AI and ensuring that it does not violate ethical rules (Dignum, 2018; Hooker & Kim Tae, 2019; Pwc, 2018). Besides, many organizations (IEEE, CERNA) have initiated discussions and published recommendations for researchers and developers to build intelligent ethical systems (Davis John, 2005; Hooker & Kim Tae, 2019; Schweitzer & Puig-Verges, 2018). The question of the morality of their actions is beginning to arise. Those that rely on artificial neural networks (Deep Learning) are particularly criticized for being opaque, for not showing the reasoning that allows algorithms to arrive at the final result (Davis John, 2005; Hooker & Kim Tae, 2019; Schweitzer & Puig-Verges, 2018). But how can we trust decisions about AI if we are not able to understand them.

RECOMMENDATIONS

This Opinion Paper contributes to current theoretical developments and AI practices, but it solely a theoretical study. It recommends that further study should be carried out using empirical approach and relating it to a particular organization.

Further studies should be carried out to focus on the use of cross-sectional data involving different organization.

Future research could focus on other firm characteristics, such as risk-taking, R&D capability, market development capability, and productivity.

Future studies will explore more organizational characteristics variables to improve the model presented in this model.

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