

Achieving Organizational Performance in Profit-Oriented Businesses Through the Use of Artificial Intelligence

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Abstract

Artificial Intelligence (AI) is undoubtedly one of the most evolving technologies, finding its application in almost every aspect of human activity. At the individual, business, and corporate organization levels, AI transforms lives and business processes and affects how people work. There is extensive literature on AI's potential positive contribution to organizational performance. However, there is a lack of research on how to leverage AI to effectively achieve organizational performance. This paper seeks to fill that gap by 1) identifying the AI components driving organizational performance and then 2) designing a conceptual framework for integrating AI into an organization to achieve higher performance. A significant limitation of this work is the lack of implementation and testing of the framework, which we will address in future research.

Keywords: Artificial intelligence, organizational performance, automation, decision-making, marketing, innovation.

Introduction

Artificial Intelligence (AI) aims to produce computer systems that perform tasks previously based only on human intelligence. It is one of the most evolving technologies and has been applied to almost every aspect of human activity. At the individual, business, and corporate organization levels, AI transforms lives and business processes and affects how people work. The most recent innovations are AI-enabled, and all industries seek to leverage AI for efficiency through automation, decision-making, system monitoring, and control (Makridakis, 2017). There is extensive literature on the positive impact of using AI to enhance organizational performance; however, there is a lack of effective leverage of AI to achieve that goal. The objectives of this paper are twofold: 1) identify the AI components that drive organizational performance, and 2) design a conceptual framework for integrating AI into an organization to achieve higher performance.

Organizational performance is critical for profit-oriented organizations. Many authors including Abualoush et al. (2018); Sangiorgi and Siboni (2017), have contributed to this topic. From the definition of the concept to the design of systems for measuring performance, abundant literature has addressed this topic. Automation (Shekhar, 2019), decision-making (Yao et al., 2018; Hyacinth, 2017), marketing (MR, 2021; Vlačić et al., 2021), and innovation (Verganti et al., 2020; Muhlroth & Grottke, 2022) are well covered in the literature. In summary, the existing literature has extensively explored the use of AI to improve organizational performance.

The framework proposed in this study differs from the existing literature in that it is more comprehensive and establishes the relationships between AI components and AI capabilities. A significant limitation of the solution proposed in this paper is that it does not address implementation issues that can be daunting for

some organizations. The remainder of this paper is organized as follows.

- Literature review: This section identifies relevant and recent literature that supports this study and presents gaps in the literature that justify this study.
- Conceptual framework: This provides an overview of the proposed conceptual framework and explains how it works. It also identifies AI techniques or methods leveraged into capabilities that lead to organizational performance.
- Discussion: Here, we briefly describe the work done and how it differs from previous similar works.
- Summary and conclusions: This section summarizes the study, recalls the main results, and introduces future research.

Literature Review

The literature review is organized into three subsections to identify the existing literature gaps in this study. First, it explores the literature on organizational performance, including the frameworks for its measurement. Second, we explore how artificial intelligence relates to organizational performance. The last section summarizes and addresses the gaps found in the existing literature.

Organizational Performance

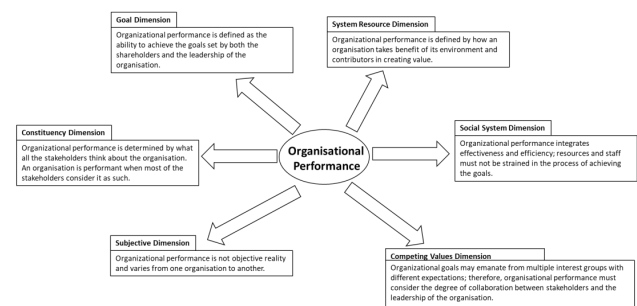
Definitions

Organizational performance measures how an organization’s results compare with its intended results, goals, or objectives. “A High Performance organization is an organization that achieves financial results that are better than those of its peer group over a longer period, by being able to adapt well to changes and react to these quickly, by managing for the long term, by setting up an integrated and aligned management structure, by continuously improving its core capabilities, and by truly treating the employees as its main asset” (de Waal, 2007, p.4). In an extensive literature review conducted by Demeke and Tao (2020) on organizational performance and its measurement,

the authors found no widely accepted definition of organizational performance among researchers and managers. However, they identified six main approaches to defining organizational performance. The six approaches are goal, system resource, social system, competing values, subjective, and constituency (Demeke & Tao, 2020, pp 90-92).

These approaches tend to define organizational performance from their views or angles, which are relevant, but limited to only some aspects of the concepts. We propose that a holistic definition of organizational performance should combine all aspects considered in all six approaches. In this paper, we offer a comprehensive definition of organizational performance in six dimensions (as shown in Figure 1) corresponding to the six approaches found in the existing literature.

Figure 1
Dimensions of Organizational Performance



A close study of the six dimensions defined in Figure 1, and in line with Peterson et al. (2003) and Franco-Santos et al. (2007), the six dimensions can be reduced to three: effectiveness, efficiency, and relevancy. Effectiveness is about achieving the organization’s goals, efficiency deals with minimizing the amount of resources used to fulfill the goals, and relevancy takes care of stakeholders’ satisfaction.

Measuring Organizational Performance

As with the diversity in definitions of organizational performance, there are also several approaches for measuring performance. The reviewed literature, including those by Demeke and Tao (2020), Bititci et al. (2012), and Hubbard (2009), concluded that there is

no reference measurement method or system for organizational performance accepted by all researchers. According to Bititci et al. (2012), the real challenge is to develop “an integrated and holistic understanding of performance measurement” (p. 319). “The question of what constitutes overall organizational performance and how to measure it remains unresolved since no one has yet successfully developed and tested a multi-dimensional model of performance that incorporates most of the dimensions of performance identified in the existing research literature” (Demeke & Tao, 2020, p. 94).

So far, we have seen from the literature that there is neither a consensus around the definition nor the measurement of organizational performance. However, three concepts—effectiveness, efficiency, and relevancy—have emerged as key elements that can be reliably used to capture organizational performance. In the remainder of this paper, we consider that anything that affects any of the three key elements affects organizational performance.

Artificial Intelligence and Organizational Performance

There is extensive literature on artificial intelligence and organizational performance across various industries. Kaur and Mahajan (2022) showed that artificial intelligence contributes to the organizational performance of healthcare service providers in three areas: clinical operations, medical diagnosis, and healthcare management systems. Bosco’s (2020) study reveals that artificial intelligence is being widely adopted by organizations for the following reasons: reduction in the cost of operational production and service, reduction of expenses, and increase in profit by implementing artificial intelligence into their sales, marketing, human resources, and corporate social responsibility activities. Olan et al. (2022) suggested that organizational performance is more sustainable when artificial intelligence is implemented and knowledge sharing occurs.

Artificial intelligence constantly impacts all businesses, including profit-oriented ones, at different levels. Among many other ways, this impact is noticeable; we can enumerate

business operations, workforce or human capital, leadership, decision-making, marketing, and innovation.

Business Operations. The key word about the impact of AI in business operations is efficiency, that is, achieving business objectives with the minimum possible resources. AI enables efficiency through two main functions: assistance/augmentation and automation.

AI’s assistive or augmentative role is probably the most prominent and well-known. AI is used to augment human capital in the workplace. Titareva (2021) refers to this as the enhancement perspective of AI. This assistive role is required to guide the human workforce in solving complex problems within a time-bound period. Dimiduk et al.(2018) explained that AI uses algorithmic artificial neural networks and data to deliver knowledgeable information that impacts businesses and their human capital. This view includes the advanced analytics capability of AI, where a massive amount of data can be analyzed and insights drawn within seconds. In addition, AI releases humans from repetitive replication and redundant actions (Burton, 2019).

While the assistance or augmentation function leads to cooperation between the human worker and AI, automation involves removing human intervention and leaving the task solely to be performed by machines. Eliminating human intervention is what Titareva (2021) calls the replacement perspective of AI. People often see automation as a threat to human job availability. In their attempt to resolve the tension between job loss and the need to automate, Moldenhauer and Londt(2019) advised that management must design training strategies for new fields of advancement, taking into consideration the need for human job satisfaction and the need to implement roles for AI. From a pure business perspective, automation reduces the human workforce and time required to perform business processes. The overall outcome is an increase in performance, reduction in cost, and therefore, high efficiency.

Workforce or Human Capital. Titareva (2021) introduces three perspectives of AI as to how it relates to leadership, and these perspectives are

equally valid for the entire workforce of any organization. The three perspectives are 1) the enhancement perspective, 2) the replacement perspective, and 3) the skeptical perspective.

The enhancement perspective sees “AI as an additional assistance to current leadership functions” Titereva (2021, p. 9). According to this viewpoint, AI is currently taking over tasks that consume the time and energy of its managers/leaders. As stated by Plastino and Purdy (2018), “AI can augment labor productivity by taking on low value-added or supporting tasks and thus enable workers to focus on high-value work” (p. 19). From this perspective, AI augments or assists humans in their work and leadership. AI’s outstanding contribution is helping leaders in their decision-making through its capacity to deal with massive amounts of data and analyze them much faster than humans can.

The replacement perspective suggests that with the development of AI, machines will become more powerful and take human roles in business and organization operations and decision-making. Holtel (2016) puts it this way “Machines with highly sophisticated mental competencies will turn upside down the knowledge work in every company department, be it marketing, human resources, research and development, customer service, or even the board of directors. Moreover, this time, intelligent machines will outperform human brain power” (p. 171). Many other authors, including Samani et al.(2012) and Smith and Green(2018), support the replacement perspective of AI.

The skeptical perspective argues that the benefits and impact of AI are exaggerated and should be critically reevaluated. De Cremer (2019) has the same view: “AI should not be considered to replace humans in their leadership role” (p. 82). Watkins (2018) shares this skeptical view.

In summary, despite the skeptical perspective and negative perceptions of AI, it has a clear-cut impact on the human workforce. It revamps the skill set required for humans in the workplace.

A close study of the existing literature shows that automation, decision support, marketing, and innovation are the key AI capabilities

that primarily impact organizations and their performance. Therefore, they are considered in the framework presented in the next section.

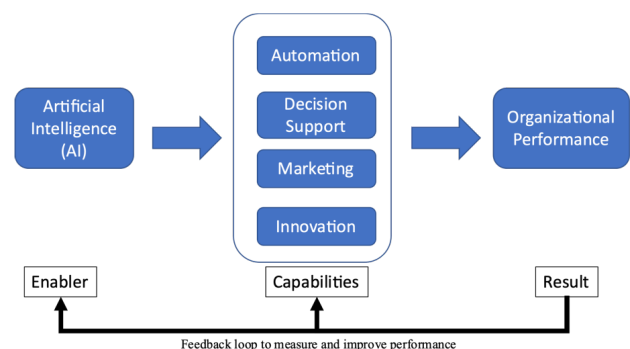
Summary

In summary, the literature review shows that despite the lack of a commonly accepted definition of organizational performance and how it should be measured, there is a clear consensus that artificial intelligence contributes to its improvement, especially in the context of a profit-oriented organization, where effectiveness, efficiency, and relevancy are crucial elements that characterize organizational performance. While many studies on artificial intelligence and organizational performance focus on specific industries, there is no general study on how artificial intelligence improves organizational performance for profit-oriented organizations. Therefore, this study proposes a framework for how artificial intelligence improves organizational performance in a profit-oriented organization.

Conceptual Framework

The proposed conceptual framework (Figure 2) is inspired by Patrick Mikalef, Siw Olsen Fjortoft, and Hans Y. Torvatn (Mikalef et al., 2019) and adapted to suit the goal of this study.

Figure 2
Conceptual Framework



The framework is organized into three blocks: enabler capabilities and result.

- Enabler: Artificial Intelligence is an enabling technology that can be leveraged to produce capabilities. AI can be used for automation, decision-making, marketing,

and innovation. The next section of this paper will elaborate on how AI can be activated to produce these capabilities.

- **Capabilities:** Capabilities are possible applications of AI that positively impact organizational performance. Performance improvement results when these applications are used within an organization.
- **Result:** The expected output or outcome of the process is organizational performance.

The feedback loop enables some adjustments to the capabilities and AI components involved in improving the result. The framework suggests that the process can be iterative until the organization reaches the desired level of performance.

Artificial Intelligence (AI)

The literature provides many definitions of AI, but for this study, we adopted the definition by Ida Arlene Joiner, which states that artificial intelligence is both the theory and development of computer systems that can perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (Joiner, 2018). This definition is relevant to this study because it encapsulates some essential elements of organizational performance. Computer systems perform repetitive tasks quickly, accurately, and endlessly without getting tired to desire breaks. When such systems can perform tasks once only executable by humans, the performance potential is outstanding. Humans can be augmented and assisted, sometimes replaced by AI systems, resulting in better organizational performance.

AI is used in a broader sense to include various techniques and sub-fields such as Machine Learning (ML), Expert Systems (ES), Computer Vision (CV), Image Processing (IP), and Natural Language Processing (NLP). The following subsections establish the relationships between these AI techniques, sub-fields, and AI capabilities.

Capabilities

Four elements out of several AI capabilities, namely “Automation”, “Decision Support”, “Marketing”, and “Innovation”, are considered by the authors as essential means of achieving organizational performance. Below, we describe these capabilities in relation to organizational performance.

Automation. Automation transforms manual tasks or activities so that machines or systems can execute them without human intervention. The direct results of automation are the gain in time, accuracy, reliability, and operational cost reduction. When several manual tasks are automated within an organization, the human workforce can be relegated to other tasks that require more creative skills and critical thinking.

Thus, the relationship between automation and organizational performance is established. The question now is how does AI contribute to automation? Before answering this question, it should be noted that not all automation is AI-based, because many are based on explicitly programmed computer systems unrelated to AI. However, with recent developments in AI techniques, a new level of automation that we can qualify as smart automation is emerging. Sarmah Simanta Shekhar in Shekhar (2019) identifies three components or sub-fields of AI that enable smart automations; these are Computer Vision (CV), Natural Language Processing (NLP) and Machine Learning (ML).

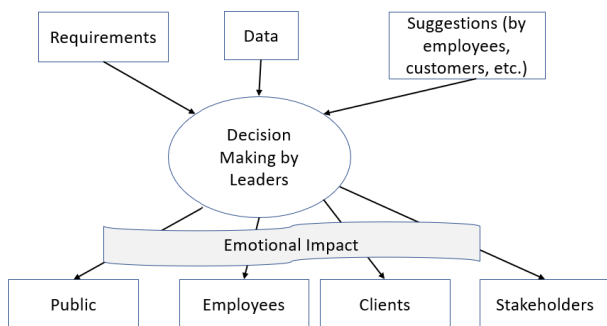
- **Computer Vision (CV):** CV is used to identify an object from a visual input. For example, face recognition is an application of a CV. In manufacturing, CV can automatically put produced things into specific boxes as they are recognized and classified by CV. CV is also being used to implement automatic gates that control access to restricted areas.
- **Natural Language Processing (NLP):** NLP aims to produce systems that can understand and interpret human languages, such as English. Applications of NLP include voice/text recognition, text translation, and voice-to-text conversion. Examples of automation through NLP include using

chatbots in customer service to perform checks on reports, documents, and financial statements.

- **Machine Learning (ML):** ML is the technology that enables computer systems to learn from data or past experiences and make intelligent decisions. ML is frequently used for prediction and forecasting. Automation samples through ML include fraud detection, intrusion detection in computer networks, loan-request processing, and recommendation systems in e-commerce.

Decision Support. Decision-making is undeniably one of the areas where the contribution of AI is much felt and perceived. As Jones (2018) indicates, decision-making is critical to leadership. Jones describes the leadership decision-making process as summarized in Figure 3.

Figure 3
Leadership Decision-making Process

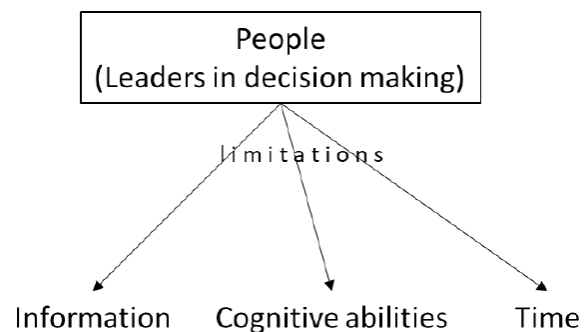


As depicted in Figure 3, data is one of the inputs to the decision-making process. According to Yao et al. (2018), AI allows machines to employ algorithms with data to make decisions as humans would. Referring to the role of AI in decision-making, Hyacinth (2017) stated that in the near future, AI will not replace chief executives. Still, top executives who leverage AI will surpass those who do not. In the same line of thought, “data and analytics combined with experience, and subject to the caveat of quality is the right mix of fuel for a leader’s decision-making engine” (Unhelkar & Gonsalves, 2020, p. 61). However, in elaborating on the contribution of AI to decision-making, Peifer et al.(2022) stated that leaders can base their decisions on AI results (p. 1028). Therefore,

we can conclude that the output of AI systems provides the necessary information and insight for effective decision-making. Naqvi (2017) affirmed the central importance of decision-making in leadership and suggested that decision-making is the key to artificial intelligence. Other authors, including Moldenhauer and Londt (2019) and Ballamudi (2019), have addressed the impact of AI on leadership decision-making.

Figure 4 shows Naqvi’s exciting point of view (2017), according to which human leaders are limited in decision-making by three factors: information, cognitive abilities, and time. AI can assist humans in surpassing these limitations and in making faster and better decisions. Organizations improve their performance by optimizing tens or hundreds of decisions using AI.

Figure 4
Human Limitations in Decision-making



The key components that make AI efficient for decision-making are machine learning, data analytics, and data visualization.

Marketing. For profit-oriented organizations, revenue, more precisely, an increase in revenue, is one of the most important performance indicators. The marketing function aims to ensure that the basis for income, that is, customers, is maintained and extended. Through various techniques, AI can enable marketing to fulfill its functions efficiently. The key elements that make AI successful in assisting marketing are Big Data, Machine Learning, and Natural Language Processing.

- **Big Data and Machine Learning (ML):** Big data refers to the technology that

enables the management of a massive volume of data generated at high speed and is valuable for creating value for the organization. The combination of big data and ML is a powerful marketing tool. The outcome of this combination includes, but is not limited to, customer segmentation, customized marketing content for customers, recommendation systems, sales forecasting, evaluation, and establishment of better marketing strategies.

- Natural Language Processing (NLP): NLP serves marketing through the following techniques: sentiment analysis; chatbots to communicate with customers or prospective customers; and text, image, and voice processing.

Dimitrieska et al. (2018) predicted that “in the following years, marketers can expect greater AI impact through more intelligent searches, smarter ads, refined content delivery, relying on bots, continued learning, preventing fraud and data breaches, sentiment analysis, image and voice recognition, sales forecast, language recognition, predictive customer service, customer segmentation, etc.” (p.298). This statement captures how AI impacts and will impact the marketing function more.

Innovation. Innovation is about developing more efficient ways of solving problems; it provides better solutions to replace existing ones and creates a competitive advantage for organizations. Therefore, innovation intrinsically improves the organizational performance of businesses.

The impact of AI on innovation operates at two levels: AI, enabling innovation, and AI, improving the innovation process.

- AI as an innovation enabler: The three other AI capabilities—automation, decision support, and marketing—have already shown how AI can be used to innovate.
- AI in the innovation process: AI can be used to improve the innovation process; Verganti et al. (2020) argue that the fundamental principle behind innovation is “the way people create ideas and solve

problems” (p. 212). They continue to say that AI brings data and algorithms to the core of innovation processes. As an active participant in the innovation process, AI intervenes at two levels: the design level and the problem-solving loop execution level. At the design level, AI effectively carries out design-thinking activities; for example, AI makes design choices. AI can concurrently apply multiple problem-solving loops at the problem-solving loop execution level and determine the most effective and efficient. Other studies that acknowledge the contribution of AI to the innovation process include that of Sharma et al. (2019), Paschen et al. (2020), and Muhlroth & Grottke (2022).

In summary, AI can efficiently support innovation either by being used to create new, more efficient solutions to replace existing ones or to enhance the innovation process itself. In the latter case of AI, it is worth noting that many designers are now using input provided by AI to come up with new ideas for their work-related activities. All the components or sub-fields of AI introduced so far can potentially contribute to innovation.

Result: Organizational Performance

According to Abualoush et al. (2018, p. 285), “Organizational performance is one of the most studied topics in administrative research and business. It is a vital issue for all profit-making and non-profit organizations.” The authors further said that “improving organizational performance is a prerequisite for strategic management of the organization that seeks maximum performance.” (p. 285). Sangiorgi and Siboni (2017) define organizational performance as the ability to access and handle various corporate resources to achieve its goals and objectives. This is essential, and much research has acknowledged the need for a performance measurement system.

Traditionally, organizational performance is measured using Key Performance Indicators (KPIs). These KPIs vary from business to business and are difficult to define. Franco-Santos et al. (2007) elaborate on the challenges related to Business Performance Measurement

(BPM) and provide guidelines for establishing a BPM system. Their system is based on three key pillars: 1) features of the BPM system, 2) role of the BPM system, and 3) processes of the BPM system. Businesses could use this methodology to design and implement meaningful KPIs.

The framework proposed in this study does not develop any set of KPIs. However, to use the framework, an organization must develop its own KPIs and, conversely, define the desired levels for each KPI, meaning that there should be a goal or target for each KPI.

Discussions

Organizational performance is crucial to businesses, particularly profit-oriented organizations. This paper proposed an artificial intelligence-based framework for achieving organizational performance. The contribution of this work lies in identifying the AI components and capabilities and how they relate to organizational performance. The main difference between the work presented in this paper and similar research is its completeness. It covers four AI capabilities: automation, decision support, marketing, and innovation. However, similar studies are less comprehensive and generally involve one of these capabilities. Combining multiple capabilities and concurrently applying them magnifies the outcome (organizational performance).

Establishing a performance measurement system through key performance indicators (KPIs) is a prerequisite to using the proposed framework. The paper did not develop a performance measurement system; each organization or business can refer to existing work to define its KPIs measurement system.

One major limitation of this paper is the lack of implementation of the proposed framework, which will be part of our future work.

Summary and Conclusion

Through an extensive literature review, this paper has shown great interest in applying artificial intelligence and its capabilities to achieve organizational performance, especially in profit-oriented organizations. Four AI capabilities—automation, decision support, marketing,

and innovation have significantly impacted organizational performance. The conceptual design of a framework organized in three blocks—AI (enabler), AI capabilities, and organizational performance (result)—has been introduced and explained. The specific contributions of this work include incorporating the four AI capabilities to provide a more comprehensive enabling power of AI and establishing the relationships between the capabilities and the AI components that enable them. The overall outcome is designing a system that can be used as a management tool for integrating AI into organizations to achieve organizational performance.

In conclusion, this research has provided a tool for businesses seeking to improve their performance to achieve their goals and objectives. This paper clarifies which AI components should be activated to produce automation, decision support, marketing, and innovation capabilities. These capabilities, in turn, deliver the desired outcomes of better performance.

A major limitation of this work is the lack of implementation of the proposed framework. The framework established the following: 1) Connection between capabilities and AI components for implementation. 2) Connection between AI capabilities and performance. However, implementing a framework without further guidance can challenge organizations. Our future work will address these implementation issues and provide a ready-to-use tool.

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