RESEARCH PAPER

Influence of Artificial Intelligence Technologies on the Organization Performance with Moderator Role of Technological Leadership Support on Construction Organization of Pakistan

Fahad Saddique[1] Nauman Mushtaq[2] Urenna Nwagwu[3] Belkadi Lamiaa[4]

[1-2] *Doctoral Researcher, (Management Sciences) Institute of Management Science, Lahore, Pakistan.*

[3] *University of the Cumberlands, USA.*

[4] *Doctoral Researcher, Laboratory of Economics and Management of Organization, Faculty of Legal, Economic and Social Sciences, The University Ibn Tofail Kenitra, Morocco.*
Corresponding Author: Fahad.Sadique@gmail.com

ABSTRACT

This study aims to investigate the influence of artificial intelligence technologies on organizational performance. Furthermore, the moderator role checks for technological leadership support. The study data was collected by survey questionnaire with 325 sample sizes of professionals from construction organizations in Pakistan. The study's results show that the influence of artificial intelligence plays a vital role in enhancing organizational performance, with a positive moderator role as a result of technological leadership support in construction organizations. The results suggested that implementing the latest technologies like artificial intelligence, robotics, and advanced technologies with the moderator effect of technological leadership positively impacts organizational performance within construction organizations. The present study is valuable to the existing knowledge of digitalization and technological advancement. Furthermore, it offers valuable insights for professionals and policymakers. The study results show technological advancements that facilitate more successful collaboration in the face of unanticipated challenges for better organizational performance.

Keywords: Geopolitics, Transnational organized crime, Russia, Cyprus, money laundering, globalization, international cooperation, treaty-signing measures.

INTRODUCTION

Latest technologies, like artificial intelligence, assemble information and communication knowledge that replicate intellect like humans to improve work efficiency and the growth of organizations (Arakpogun et al., 2021). Information is essential in artificial intelligence because it drives innovation and improves intelligent devices and platforms (Robbins et al., 2019). Intelligent agents (IA) from artificially intelligent (AI) systems have the skills to boost corporate efficiency and uncover new insights. As a deliberate strategy, the AI-driven approach uses artificial intelligence to provide workers with relevant information through technological platforms.

Through strategic knowledge-based activities, artificial intelligence has many capabilities that may boost an organization's innovation plans. Empirical evidence shows that competitive advantages in the industry are helpful for growth (Liebowitz et al., 2006). However, this development and successful involvement need a favorable artificial intelligence environment that identifies and tackles organizational issues (Huang et al., 2018). Thus, organizations need a supportive environment to develop, implement, preserve, and use knowledge and intelligent systems. Implementing information retrieval, collaborating, and re-use strategies is difficult. Thus, an alternative method that combines artificially intelligent and sharing information technologies with supportive behavior is needed in organizational performance. This mutually beneficial corporation aims to boost productivity by creating a knowledge-centric framework centered on employees (Malik et al., 2020). In the digital economy, an organization's ongoing competitive advantage and development depend on how well it generates, disseminates, and exploits knowledge. Intelligent information use influences it (Yilmaz et al., 2016). Knowledge is the primary driver of organizational success (Argote et al., 2016). Knowledge with supportive behavior gives the organization a competitive advantage when all requirements are satisfied. Thus, a commercial organization's planned strategy is constantly producing novel ideas that drive novelty across entire elements of their business and impact employee relationships to boost performance. Organizational decision-makers may use artificial intelligence (AI) to promote knowledge-sharing due to a supportive environment for initiatives that benefit personnel and the organization (Argote et al., 2013 & 2015). Determining artificial intelligence (AI) expertise may be complex when moving to a new situation. It must be created to deploy AI knowledge systems with the team's support successfully. Construction organizations require the latest technologies to improve their productivity. It is much more helpful to improve their production capacity with these latest technologies (Fahad et al., 2023). This study is to check the impact of artificial intelligence technology on firms' performance (Wang et al., 2016; Urena et al., 2023). The budget is moving from a traditional marketplace to a developed technological market that supports information as a feasible method of gaining market share and competitive advantage (Eilert et al., 2017). Artificial intelligence improves services and the economy through digitalization (Huang et al., 2018; Olan et al., 2021). Innovative goods and services are increasingly needed to increase performance. Organizations, groups, and teams must collaborate and continuously improve knowledge and skills to achieve sustainable development. Empirical research has shown that organizations rapidly use artificial intelligence technology to improve their competitive advantage and stimulate innovation in their operational structures (Parkes et al., 2015). Artificial intelligence technologies improve staff productivity through technological supportive behaviors. Thus, this study examines the following questions: Research Question 1: How can artificial intelligence influence organizational performance? Research Question 2: How does Digital technological support help as a moderator between Artificial intelligence and organizational performance?

LITERATURE REVIEW

Technologies Artificial Intelligence and Organization Performance

Organizational successes have emerged from adopting and integrating artificial intelligence (Arakpogun et al., 2021), and organizations are increasingly adopting artificial

intelligence. Several studies have investigated the pros and cons of using artificial intelligence (Arakpogun et al., 2021; Olan et al., 2021; Huang et al., 2018). Some studies examine the future effects of artificial intelligence on people, society, and organizations (Zahraee et al., 2016). This article reviews artificial theory. Knowledge with support activities enables managers to quickly and efficiently use digital leadership assistance from teams' knowledge and abilities (Zhao et al., 2016). Knowledge helps companies flourish in helping workers do their jobs well. Supportive culture implementation is complex, but its result seems positive (Lombardi et al., 2019; Olan et al., 2022). Organizational performance means meeting KPI-associated goals and objectives. KPIs measure progress toward the organization's objective (Obeidat et al., 2016). Artificial intelligence with a supportive culture improves many activities and corporate performance (Huang et al., 2016). Artificial intelligence, digital leadership assistance, and organizational performance will follow. This technology, with support, enables cognitive and intelligent activities in organizations. Business processes integrating intelligent and cognitive activities enhance innovation (Miller et al., 2019). Intelligence augmentation enhances cognitive capacities by fostering Organizational innovation through intuitive thinking. Experience-based cognition makes these phenomena a competitive advantage (Liebowitz et al., 2001).

Intelligent Automation (IA) has creative thinking, problem-solving, and intuition (Amershi et al., 2019; Robbins et al., 2019; Wright et al., 2018). Intelligent automation is essential to building robust artificial intelligence systems. It is based on human cognition and learning. Due to its ability to rapidly engage new ideas with awareness and additional aspects of the human intellect, artificial intelligence may be compared to a human (Chen et al., 2012). It is used in autonomous computer systems (Wooldridge et al., 1995). Intelligent Automation is a crucial computer system component that acts autonomously to achieve predefined objectives. Furthermore, this autonomy means a system can run without human intervention and efficiently govern its behavior and internal circumstances (Zhao et al., 2020; Padgham et al., 2002). (Asgari et al., 2017) emphasize the role of distinguishing data autonomy from object-oriented systems encapsulation. I can collect and handle object data. Data objects allow them to regulate data access and retrieval. Information systems that can automate, repeat, and share knowledge are needed for AI technologies (Miller et al., 2019). Information Systems may also analyze data, solve problems, and consider alternatives. These help people overcome learning and adaptation issues (Pavlou et al., 2018).

Thus, Information Systems have increased human capability for higher-level intellectual and mental operations, transcending support and efficiency in operation. Mining using Intelligent Systems (IS) improves communication and investigation for people and teams (Liu et al., 2020). As (Gretzel et al., 2011), Information Systems have evolved from understanding and copying natural phenomena to creating valuable inventions and discoveries. Computer system progress has enabled a successful combination of information systems with artificial intelligence methods, creating a knowledge-based system for consistent and effective performance. Information systems use autonomously learned operators to predict environmental effects and evaluate their value (De-Graaf et al., 2017). The unified theories relative to cognition explain that adapting intelligent systems to specific contexts structures the gap between the fundamental features of artificial intelligence methods and their effectiveness in including human comprehension (Hopgood et al.,

2012). Thus, information systems vary when defining tasks, distributing resources, considering contextual needs, and setting performance metrics. Do domains and IA work successfully because they have widespread traits like human behavior (Bryson et al., 2018) (Pearl et al., 2014) state that artificial intelligence technology components for awareness, acquiring information, and cognition are hierarchical. Data is acquired, abstracted, and filtered before transmission for action (Gregor et al., 1999). Cognition processes directly affect knowledge acquisition through coordinated procedures, whereas knowledge acquisition requires applying processed facts through external actions (Gregor et al., 1999). Artificial intelligence is helping companies solve issues. Real-time, well-informed judgments for decision-makers are the goal (Husain et al., 2013; Chen et al., 2012 & 2013; Martínez et al., 2013; Pavlou et al., 2018; Soriano et al., 2013). These organizations struggle to apply business knowledge with a supportive culture (Patnai et al., 2015). Performance management has concentrated on operational and financial factors affecting a competitive strategic choice (Neider et al., 1988; Grinyer et al., 1988; Scholz et al., 1988). Operational success includes low-cost and Process Management and control of quality systems for sustainable competitive advantage (Davis et al., 1993; Priem et al., 1994).

The financial viewpoint evaluates an organization's assets, liabilities, and income generation processes to appropriately depict its financial status (Lin et al., 1997; Roland et al., 1997). Technology's role in refining the efficiency of operations performance is vital to achieving administrative goals, including effective excellence, revenue targets, and customer happiness (Darlington et al., 1996; Alessandri et al., 2006; Drew et al., 1997) found that reliable resource allocation to artificial intelligence and other information technologies improves business processes and provides employees with knowledge and ongoing training. Scholars agree that organizational performance can grow when performance measurement is aligned with business methods (Alessandri et al., 2006; Drew et al., 1997; Darlington et al., 1996; March et al., 1997; Ghosh et al., 2017; Lin et al., 1997). Strategic performance assessment also aligns organizational and operational goals to create efficient company processes that boost employee productivity. Zhu et al., 2016) evaluate how IT solutions may improve employee attitudes. Thus, the company must efficiently manage and detect elements affecting workers' attitudes toward their duties. It can boost performance. To improve performance, organizations should integrate performance measurement units and employee attitudes (Gorane et al., 2017; Kundu et al., 2017; Jourdan et al., 2017). In recent decades, IT breakthroughs have forced organizational tactics to change, resulting in new ways that intensely disturb corporate plans. According to (Tzabbar et al., 2017; Azar et al., 2017), these unique business tactics improve organizational performance, including business systems that track workers' activity. Informal systems linked with performance measuring systems help. Furthermore, measuring methods and business processes have been studied. This convergence is essential since deploying a new system provides insights into organizational goals (Zidane et al., 2016). As per the above discussion. Hypothesis 1: There is a positive association between artificial intelligence and the organization's performance.

Moderator Role of Digital Technology Leadership Support from Team

Digital supportive culture is essential today. A company's digital age is crucial to properly leveraging digitalization in new endeavors, and organizational leaders shape it (Deuze et al., 2006;

El Sawy et al., 2016; Nylen et al., 2015; Al Ariss et al., 2016; Fahad et al., 2023). Ethical principles define a new company's culture (Punnett et al., 2015). Digital supportive cultures encourage innovation and product development via a minimal framework and decentralized decision-making (Nylen et al., 2015; Sawhney et al., 2000). Due to the uncertainty of the digital world, digital leaders must also motivate people to use new technologies that may or may not be embraced. Developing a digitally supportive culture encourages creativity and knowledge acquisition, which helps create new products (Duerr et al., 2018). It causes all financial performance metrics. Technological supportive culture also significantly impacts organizational behavior changes caused by technology. The culture may have adaptable and valuable abilities for learning digital skills. In new firms, quick and adaptable working methods, data, and digital processes are prioritized (El Sawy et al., 2016). An organization's culture of learning does not mediate leadership empowerment and creativity (Naqshbandi et al.,2018). Another study (Proksch et al., 2021) suggested that digitally supportive values affect digital planning and innovation. Digital leaders should help develop a supportive organizational culture and business expertise to integrate digital capabilities (Rudito et al., 2015). Digital culture may help organizational success. A supportive digital culture helps internal and external digitization and communication. Thus, our hypothesis, H2: Digital leadership support from teams has a positive moderate relationship with artificial intelligence and Organization performance.
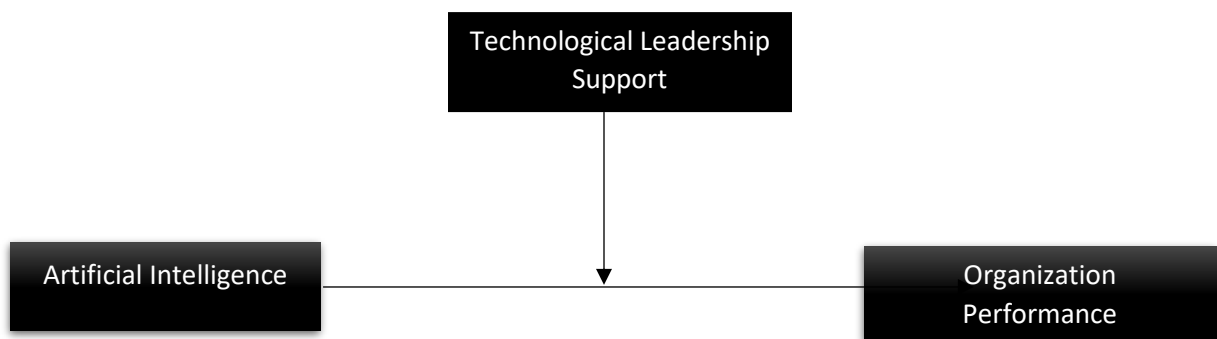
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Fig 01: Conceptual Framework

RESEARCH METHODOLOGY

The study is based on the primary basis of construction organizations in Pakistan (Fahad et al., 2023; Numan et al., 2023). Respondents keep personal information confidential (Saddique et al., 2021). The study surveys variable data on digital technological support from teams, artificial intelligence, organization performance, and demographics. The sample population of the respondent's base on 325 construction employees.

Variable	Items	Sample	Reference
Artificial Intelligence	6	"Is Artificial intelligence helps to possess the infrastructure and skills to improves organization.	Dubey et al. (2020).

		performance"	
Digital Technological Leadership	4	"I believe that leadership team support is essential to improve performance"	(Chatterjee et al, 2022)
Organization Performance	5	"With technology the company is more successful"	(Jinkyo et al, 2023)

Table 01: Measure

Study Results

This study covers descriptive, inferential, reliability, correlation, and regression analyses that shown below.

"Characteristics"	"Frequency"	"Percentage"
Gender		
Male	240	73.8
Female	85	26.2
Age Group Less than 25		
26-40	29	8.90
Above 40	187	57.5
	109	33.6
Matric		
Intermediate	32	09
Graduation	73	22.5
Post Graduation	161	49.5
	59	18.2

Table 2: Descriptive Analysis

Explanation: The research was based on 324 construction employees in Pakistan, as shown in Table 02. The data for this study have been categorized based on gender, with a total of 240 male participants and 85 female participants. The data is categorized into age groups: 29 employees under 25, 187 employees aged 26-40, and 109 employees above 40. The data are classified according to the qualifications of the individuals, with the following breakdown: 32 individuals possess qualifications below the intermediate level, 73 individuals possess

intermediate qualifications, 161 individuals possess graduation qualifications, and 59 individuals possess postgraduate qualifications. Presented below is the inferential analysis.

"Variable"	"Mean"	"Standard Deviation"
Artificial Intelligence (AI)	3.85	0.962
Organization Performance	3.82	0.912
Technological Leadership Support	3.73	0.835

Table 3: Study Inferential Analysis

Explanation: The standard deviation and mean values for artificial intelligence, organization performance, and technological leadership support were calculated in Table 03 Artificial intelligence's "mean" value was 3.85, with a "standard deviation" of 0.962. The "mean" value for organization performance was 3.82, with a "standard deviation" of 0.9612. Lastly, the "mean" value for technological leadership support from employees was 3.73, with a "standard deviation" of 0.835. The values above were employed to conduct further analysis and facilitate a discussion on the attributes associated with appreciation.

"Variable"	"Items"	"Cronbach's Alpha"
Artificial Intelligence (AI)	6	0.831
Organization Performance	4	0.854
Technological Leadership Support	6	0.843

Table 4: Study Reliability

Explanation: The reliability of all scales is indicated in Table 4. This finding suggests that all scales exhibit satisfactory levels of reliability and can be deemed appropriate for subsequent analysis.

Sr. No.	"Items"	"Values"	"Values"
1	Artificial Intelligence	1	
2	Organization Performance	0.647**	
3	Technological Leadership Support	0.788**	0.646**

Table 05: Study Correlation Analysis

"**. Correlation is significant at the 0.01 level. *Correlation is significant at the 0.05 level".

Explanation: This analysis was performed, as depicted in the fifth table. There is a noteworthy significant correlation between artificial intelligence and organizational performance, as shown in the "r value" 0.647, and the significance level is below 0.05. There is a positive association between artificial intelligence and technological leadership support from employees (r = 0.788, p =< 0.05). Additionally, a notable association (r = 0.646, p < 0.05) exists between technological leadership support and organizational performance in the workplace. The study's results demonstrate that all variables examined yielded statistically significant outcomes.

"Variable"	"R2"	"β"	"t"	"F- sign"
Artificial Intelligence (AI)	0.621	0.84	23.02	0.00

Table 6: Study Regression Analysis

Dependent Variable: "Organization Performance p<0.05"

Explanation: Table 06 shows regression analysis as artificial intelligence on organization performance. The ANOVAa sig value is "0.00 < 0.05," showing a fit model. The R-squared value is 0.621, showing that 1 unit of change in artificial intelligence will cause a 6.2 % change in organizational performance. The sig value of the coefficient is "0.000 < 0.05", showing that the association between artificial intelligence and organizational performance is positive and significant. The beta value is $\beta = 0.84$, representing artificial intelligence's significant impact on organization performance. So, H1 is accepted.

Variables	B	R^2	P
Artificial Intelligence (AI)	0.604	0.610	0.00
Technological Leadership Support (TLS)	0.847	0.680	0.00
(AI x TLS)	0.119	0.602	0.00

Table 07:   Moderation-Analysis

Note: Dependent Variable = Organization Performance.

Explanation: As shown in Table 3.7, During the process of moderation analysis, it was observed that artificial intelligence significantly impacted the results of organization performance ("β= 0.607, p<0.01") and R2 = 0.610. Similarly, the reorganization of the moderator's technological leadership support has a significant and positive influence on firms' performance ("β= 0.847, p<0.01"), with the illumination of 68% variance (R2 = 0.680). The statistical analysis reveals that the interaction between artificial intelligence and technological leadership support culture is highly significant ("β= 0.119, p<0.01"). The study finding indicates that technological support influences the relationship between artificial intelligence and organizational performance. Consequently, our hypothesis H2 is also deemed valid.

DISCUSSION

The present section aims to engage in a discussion regarding the topic at hand. In this research, the linkages between three associations, as well as those associations' potential contributions to the innovativeness and performance of organizations, are investigated. The study uses data gathered from a representative sample of organizations. The utilization of association

testing involves the application of causal conditions within the framework of qualitative analysis used to explain the relationships. According to (Woodside et al., 2013), the data show that there is a consistent pattern in the prominent linkages, which results in relationships that are easier to understand. The findings support most of these connections and provide evidence that the outcomes of high correlations give trustworthy insights into the links between TLS, AI, and OP. It is supported by the findings that strong correlations give accurate information about the associations between AI and OP. As a result, the incorporation of moderator sharing (TLS) and artificial intelligence (AI) into the structure of an organization has the potential to boost both innovative output and the organization's overall productivity. Organizations should be able to deploy artificial intelligence with a supportive culture along their existing business procedures, keeping their competitiveness and effectively achieving their defined goals. This implication can be gained from this study demonstrating the potential for doing so. This obstacle can be overcome by applying artificial intelligence (AI) in the form of organizational performance. Artificial intelligence in boosting organizational competitiveness (Lombardi et al., 2019).

The results of this research may give significant insights for organizational decision-makers looking to capitalize on chances for increasing efficiency and encouraging innovation in their organizations. Specifically, implementing AI-enabled knowledge-sharing activities with a supportive culture within business processes can serve as a strategic lever for achieving these objectives. Our results also highlight the relevance of worker's attitudes when incorporating an AI system inside the organization as it is now structured. Therefore, organizations should prioritize developing a focused effort to analyze the staff members properly for organizational performance (Argote et al., 2015), positing that in addition to recognizing the importance of knowledge for gaining a competitive edge. Organizations can make a smooth shift away from traditional ways of thinking and towards knowledge-based activities to maintain their operations and increase their level of productivity. Implementing new advances through knowledge engagements is one way an organization may successfully ensure a continuous commitment to performance and the achievement of competitive advantages, even though the organization's future may be uncertain.

What role does artificial intelligence play in supporting organizational knowledge management, and why is it important?

Within the context of the resource-based knowledge framework, the main objective was to emphasize the relevance of social notion by elaborating on its contextual nature and the dynamic qualities that characterize it. There is a general agreement among employees within the organization regarding adopting and utilizing collective knowledge in their interactions. Due to the continual changes in the design and implementation of technologies, the pace of technological progress inside organizations is inclined to continuous variations. These changes may be attributed to both internal and external factors. In addition, the continuous development of technology like artificial intelligence is extraordinary and impacts how firms reevaluate their objectives. Therefore, the execution of a firm's information activities depends on innovations, like artificial intelligence, to enable the integration of information outputs into corporate procedures (Tsui et al., 2000). It is because these technologies make incorporating information into business processes easier. There is a favorable association between using artificial intelligence (AI) technology and the continuity

of support for AI and sharing information with support endeavors. Using AI technology makes it easier to handle complex knowledge exchanges, especially those that include activities utilizing tacit-to-tacit knowledge (Olaisen et al., 2018) assert that artificial intelligence (AI) technologies are crucial in facilitating organizational knowledge activities. These technologies successfully manage sophisticated shared information, often presenting personnel with obstacles to implementation and integration into corporate operations. These issues may be overcome, however, by using these technologies. AI technology is becoming more critical in improving organizational knowledge activities, which leads to enhanced organizational efficiency and competitive advantages.

How does integrating AI and supportive culture impact organizational performance?

The organizational strategy depends on financial results, marketplace analysis, and shareholder returns (Ho et al., 2008). Information as a valuable asset has redefined organizational assets. Employees improve organizational performance; therefore, building processes that nurture intellectual capital or organizational knowledge is vital. The AI system organizes information according to firm processes to advance efficiency. Artificial intelligence improves the economy, product marketplace, and shareholder return performance. Employee efficiency, knowledge, and time awareness improve it. AI systems provide strategic value for organizations in supporting knowledge-related operations. The AI system's deployment in employee engagement shows that organizational knowledge networks are incorporated into business operations. The AI system helps personnel and the firm exchange knowledge resources, connecting unutilized resources to improve performance. The implications and conclusion of the study are discussed in this section.

Theoretical Significance

The current work used fuzzy set-theoretic analysis to evaluate similar connections across three viewpoints: organizational activities, AI technology, and organizational performance. Due to the preceding, three theoretical areas backed by research were investigated. Thus, resource-based theory was used to create a complete conceptual framework. Thus, this research examines artificial intelligence's (AI) function in the organization's operations and its effects on performance. The effects of AI systems on organizational performance are examined in this study.

Implications for the Industry

Business processes segment an organization by providing the foundation for everyday work. These techniques help analyze employee duties and tasks. Employee knowledge and a supportive culture help companies establish competitive strategies. This work supports AI system practicality with further literature. This study's three steps significantly impact practical applicability. This research is based on organizational and technological support, artificial intelligence, and performance. Our conceptual paradigm suggests that AI systems benefit organizations. AI technology interactions also build trust among workers, boosting successful interaction and implicit information sharing and, finally, using artificial intelligence to improve organizational performance. After identifying complex procedures, the revolutionary solution improves organizational business operations. This study uses a resource-based technique to extract

information using artificial intelligence to manage organizational knowledge activities relative to construction organizations in Pakistan.

CONCLUSION

The study findings show that Artificial intelligence-driven cutting-edge technologies improve corporate processes. Many organizations require process assistance. Organizations need help integrating new and old data into AI learning, the leading cause of these issues. Organizations must have A suitable atmosphere for intelligent system development and knowledge conveyance, retention, and use. Thus, artificial intelligence's benefits in organizational performance are limited. This work uses a fuzzy set-theoretic technique based on AI, TLS, and OP concepts to fill this knowledge gap. Data study shows that AI technology improves organizational effectiveness. AI technologies improve the performance and efficiency of projects. The study suggests that organizations deploying a TLS improve the sustainability of their organizational performance plan in a dynamic digitized world. The study article enriches technological help and helps knowledge management expertise through this activity. It emphasizes the ability of artificial intelligence (AI) to support organizational knowledge-related operations. This study is helpful for the sustainable performance of organizations.

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