The role of employees' cognitive capabilities, knowledge creation and decision-making style in predicting the firm's performance

Hamzah Elrehail
Department of Leadership and Organizational Development, Abu Dhabi School of Management, Abu Dhabi, United Arab Emirates
Raed Aljahmani
Department of Business Management, Girne American University, Girne, Turkey
Abdallah Mohammad Taamneh
Department of Management, College of Business, Abu Dhabi University, Abu Dhabi, United Arab Emirates
Abdallah Khalaf Alsaad
Department of Business Administration, School of Business, Jadara University, Irbid, Jordan
Manaf Al-Okaily
Department of Accounting, School of Business, Jadara University, Irbid, Jordan, and
Okechukwu Lawrence Emeagwali
Department of Business Management, Girne American University, Girne, Turkey

Received 18 March 2022
Revised 29 September 2022
1 January 2023
Accepted 22 February 2023

Abstract

Purpose – This study explored the relationship between employees' cognitive capabilities and firm performance by exploring the moderating role of decision-making style and the mediating effect of knowledge creation. Understanding the role of cognitive capabilities in value creation is crucial for human resource management to achieve the anticipated organizational performance.

Design/methodology/approach – Structural equation modeling, cognitive skills theory, cognitive skills acquisition theory and a knowledge creation framework were applied.

Findings – The first finding suggests that only A-shaped skills predict higher knowledge creation, while T-shaped skills do not. Second, knowledge creation predicts higher financial performance and a lower level of financial uncertainty. Third, T-shaped skills have no indirect effect on financial performance or financial uncertainty. Fourth, A-shaped skills exerted significant indirect effects on financial performance and uncertainty. Fifth, the rational decision-making style did not moderate the link between knowledge creation and financial performance, as opposed to the intuitive decision-making style.

Originality/value – A review of existing research indicates a lack of studies examining the effect of cognitive skills on organizational outcomes and contingencies under which cognitive skills lead to superior outcomes. This study advances research on T-shaped and A-shaped skills and knowledge creation by empirically exploring their interrelationships with financial performance. Managerial implications and suggestions for future research are also highlighted.

Keywords T-shaped skills, A-shaped skills, Knowledge management, Decision-making style, Financial performance and uncertainty

Paper type Research paper

Introduction

Knowledge may be viewed as a key strategic resource in a turbulent environment characterized by complex strategies. Zack (1999) provided a recipe for organizational competitiveness as an

EuroMed Journal of Business

1450-2194
DOI 10.1108/EMJB-03-2022-0057

organization's ability to acquire, preserve, disseminate and appropriately apply knowledge to satisfy its objectives and goals. However, knowledge distribution is often asymmetric and requires proper management to be retained within an organization. As such, the knowledge management capabilities of organizations ensure that their knowledge is well-managed to create innovative products, commercialize new services and anticipate market dynamics. Although information technology enables knowledge management, and performance improvement and innovation require knowledge management, Qazi *et al.* (2017) argued that focusing on information technology alone to define knowledge management is not sufficient (Elrehail *et al.*, 2018). Human resource management also plays a significant role in capitalizing on the knowledge embedded in the workforce and is considered an umbrella under which knowledge can be managed in an organized and effective way (Crocitto *et al.*, 2005; Mert *et al.*, 2022). Employees possess cognitive capabilities that enable effective knowledge management to reap the benefits of this process, which necessitates the involvement of human resource professionals in building a perfect environment.

Cognitive ability is defined as individuals' ability to process information (Bardach and Klassen, 2020). This is the mechanism through which people acquire, process, transmit and use information (Sobkow *et al.*, 2020). Two primary forms of cognitive ability have been identified in the literature: A-shaped and T-shaped skills (Tsai and Huang, 2008). A-shaped individuals are often team leaders or managers with a great depth of cognitive skills in most fields, providing them with imaginary legs upon which their information processing rests (Lee and Choi, 2003). Conversely, T-shaped individuals have depth in a specific field and can understand their interactions with other fields (Hamdi *et al.*, 2016). Understanding the role of cognitive capabilities in value creation is crucial for human resource management to achieve anticipated organizational performance (Aggarwal and Woolley, 2019; Sadler-Smith, 1998; Santoro *et al.*, 2021; Srikanth, 2020). However, a review of existing research indicates a lack of studies examining the effect of cognitive skills on organizational outcomes and contingencies under which cognitive skills lead to superior outcomes (Abubakar *et al.*, 2019; Srikanth, 2020). Moreover, there is scant research exploring the mechanisms by which cognitive skills may affect organizational outcomes.

Grounded in cognitive skill acquisition theory (VanLehn, 1996), the resource-based view (Barney, 1991) and decision-making styles (Bullini Orlandi and Pierce, 2020), this study tests and examines a conceptual model linking cognitive skills to a firm's financial outcomes (financial performance and financial uncertainty) through the knowledge creation process. First, we propose that cognitive skills are associated with the integration and development of new knowledge within teams, building innovative visions and directions for the organization through the integration of specialized knowledge from several fields (Barile *et al.*, 2012; Bhatti *et al.*, 2023; Hansen and von Oetinger, 2001; Madhavan and Grover, 1998; Tsai and Huang, 2008). As a critical resource that generates new perspectives and knowledge, cognitive skills can contribute to the knowledge creation process. Second, the contribution of cognitive skills to organizational performance may partly result from their ability to create new knowledge. Accordingly, in this study, the knowledge-creation process is understood as a mechanism that links cognitive skills to organizational performance. Third, we suggest that attaining performance, either financial productivity or reduction of financial uncertainty, requires managers and employees to make decisive decisions at crucial points. Research indicates that leaders and managers adopt and implement different decision-making styles according to the organizational culture, personality, the situation they are challenged with, the nature of the decision itself and the personalities of their team members or employees (Abubakar *et al.*, 2019; Estelami and Nejad, 2017). Thus, decision-making styles, whether rational or intuitive, may alter or influence the nature of the impact of other predictive variables on performance. Hence, this study investigates the contingent role of basic rational and intuitive decision-making styles in the influence of knowledge creation on firm performance.

Putting it all together, this study focuses on understanding how the relationship between employees' cognitive skills, knowledge creation and decision-making styles affect organizational outcomes. This study makes several contributions to the literature. First, it considers the main actors in organizational service delivery (i.e. employees and the organization itself) when analyzing the issue of performance. With the understanding that firm performance is a broad concept, through the perspective of the employees and firm-level indicators, it aims to determine the causal relationship between employees' cognitive abilities, knowledge creation and decision-making styles in predicting the firm's performance (Del Missier *et al.*, 2012; Jackson *et al.*, 2017). To the best of our knowledge, previous studies have always considered these actors separately when investigating organizational performance, and the current study shows that financial performance and financial uncertainty can be predicted and altered based on the cognitive capabilities of the leaders and employees of service organizations. We also extend the impact of cognitive skills theory to include knowledge creation and management. Thus, the findings of this study provide important insights into the role of knowledge management in establishing the mechanism through which employees' cognitive skills impact firms' financial performance as well as their financial uncertainty.

The remainder of the article is structured as follows: literature review and hypothesis development, methods and industrial background, data analysis, discussion, theoretical implications and practical implications, as well as limitations and future research.

Literature review and hypothesis development

Scholarly articles exploring learning in groups and organizations have drawn awareness of the crucial role (Anderson and Ausubel, 1965; Huang *et al.*, 2015; Rowe and Healy, 2014). Anderson and Ausubel (1965) defined cognition as information processing and storage in the human mind; Reed (1982) defined cognition as the information-processing mechanism. Huang *et al.* (2015) believe that the socio-cognitive perspective proffers a unique theoretical angle to better understand human information processing within groups. This socio-cognitive stance proposes that learning involves different information-processing undertakings, which, according to Duarte *et al.* (2014) and Huang *et al.* (2015), include information procurement, construal, transmission, storage, retrieval and usage.

According to Hockerts (2015) and Capel (2014), observing how people participate in information-processing activities in multifarious social interactions is the main strength of the socio-cognitive approach. Cui *et al.* (2014) and Chasanidou *et al.* (2016) believe that this perspective has contributed significantly to the investigation of learning activities that take place within groups, such as project teams. As there is a perpetual need to integrate new knowledge when designing a product (Hussinki *et al.*, 2017), the process of new product development, according to Cui *et al.* (2014), involves a sequence of information processing activities. This encompasses the talents, behaviors, beliefs, and motivations of all human capital and effectiveness, resulting in a learning community with human potential. Human resource management leadership's dedication is needed to create, empower and maintain human capital, and is crucial to the organization's ability to develop and remain intact (Ortega-Parra and Sastre-Castillo, 2013).

The scientific roots of Skill Acquisition Theory can be traced to various branches of psychology, from connectionism to behaviorism and cognitivism (Taie, 2014). This theory was drawn from the Adaptive Control of Thought (ACT) model by Anderson (1982), which is also a type of cognitive stimulus-response theory (Ellis and Shintani, 2013). Parziale and Fischer (1998) opined that Skill Acquisition Theory is a neo-Piagetian theory with elements of both behavioristic and cognitive theories amalgamated. Several theories have been developed for (SLA) based on skill acquisition models in cognitive psychology. These

theories are said to fall under the general human learning category, emphasizing "language learning as a process of human learning" (Chapelle, 2009, p. 741). The proponents of these theories believe that practice plays a vital role in learning.

(1) A-shaped, T-shaped skills and knowledge creation

Personal cognitive capabilities have been confirmed to influence performance (Tziner and Eden, 1985). These cognitive capabilities are associated with coordination with others within a team. Importantly, team members in knowledge-focused organizations usually possess skills and knowledge from various sources. The T-shaped cognitive skill, as defined by Iansiti (1993), signifies the extent of an individual's cognitive capabilities rooted in his expertise and knowledge of others. As is widely accepted in the literature, T-shaped individuals possess a significant level of knowledge in a major field and a certain understanding of others' fields.

According to the knowledge-based view (KBV), acquiring and using appropriate knowledge is critical to corporate success (Martin *et al.*, 2019). Furthermore, a knowledge-based view and management are essential for creating value for both employees and consumers (Ur Rehman *et al.*, 2022). As such, knowledge practices within an organization may significantly affect its outcome of the organization (Aljuhmani *et al.*, 2022). Moreover, the effective use and deployment of resources requires decision-making. However, this is important for integrating knowledge, skills and competencies from other fields into a specific area or field. Leonard-Barton (1995) and Schilling (2005) argue that T-shaped skills are essential for stimulating shared or collaborative efforts within teams. Therefore, such capabilities are expected to foster knowledge creation in an organization. Madhavan and Grover (1998) suggested that T-shaped skills are positive antecedents of teams' ability to create knowledge. Similarly, the synergetic power of individuals with T-shaped skills promotes knowledge development and improvement (Brown *et al.*, 2015).

T-shaped skills can be understood by explaining the "T" shape. The vertical and horizontal parts represent depth and breadth, respectively. The focus of this breadth is essentially on collaboration with professionals from other disciplines, assisting in the knowledge-gathering phase of knowledge creation. The focus of the depth section is related to professionals in a specific field. T-shaped individuals possess unique skill sets for knowledge creation because of their ability to incorporate varied knowledge assets, explore new knowledge domains and appropriate available knowledge (Leonard-Barton, 1995).

More importantly, T-shaped individuals understand how practical and theoretical knowledge can be merged to deliver optimal outcomes. They understand how knowledge assets in their fields interact with those of other disciplines. Madhavan and Grover (1998) stress that T-shaped skilled individuals are creators of new knowledge because they can easily extend their skills to several operational fields. T-shaped skilled employees are team players who aid and influence technical and market knowledge to the advantage of their team (Johannessen *et al.*, 1999).

A-shaped skills are equally important for organizations. Leonard-Barton (1995) explained that A-skilled individuals are noted for their ability to harness resources, information, and knowledge from various disciplines and graft them into one. A-shaped individuals are highly conceptual and tend to possess a great understanding of phenomena and concepts. A-shaped skills are expensive to develop and are often required at the team leadership level of organizations to coordinate T-shaped team members towards effectiveness and more remarkable performance.

Specifically, A-shaped skills are associated with integrating and developing new knowledge within teams (Madhavan and Grover, 1998). With A-shaped skills, leaders can build innovative visions and directions for the organization by integrating specialized knowledge from several fields. Furthermore, a-shaped individuals create new perspectives on

value, knowledge sharing and harmonization. Thus, A-shaped skills are expected to positively influence knowledge creation. A-shaped individuals create knowledge through sharing and harmonizing, whereas T-shaped individuals create knowledge through creative collaboration. Based on these views, we propose that cognitive skills, as operationalized through T- and A-shaped skills, will positively impact knowledge creation ability in an organization. Hence, hypotheses 1 and 2 were developed as follows:

H1. T-shaped skills are positively related to knowledge creation.

H2. A-shaped skills are positively related to knowledge creation.

(2) Knowledge creation and financial performance

Knowledge management encompasses every aspect of an organization, including its contextual peculiarities, creating interpersonal interactions, emphasizing knowledge sharing and managing tacit knowledge (Al-Adaileh and Al-Atawi, 2011; Alzghoul *et al*., 2018; Kianto *et al*., 2014). According to Nonaka and Takeuchi (1995, p. 3), organizational knowledge creation is "the capability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services, and systems." Knowledge creation can also emanate from "knowledge activists who can be a group, an individual or a department that coordinates knowledge creation endeavors in the organization" (Von Krogh *et al*., 1997, p. 475). Sound practices can influence knowledge management capacity building in human resource management through innovation, team development, teamwork and problem-solving (Gope *et al*., 2018).

Scholars, including Liebeskind (1996) and Nonaka (1991), agree that creating new knowledge is essential for firms because knowledge is a crucial resource, and the degree of uniqueness or distinctiveness of a firm's knowledge base is the degree to which that firm is competitive. Organizations that understand the value of knowledge in market positioning and performance often invest heavily in research and development (R&D), because knowledge creation is widely accepted as a direct result of R&D efforts (Elrehail *et al*., 2016). Holsapple and Joshi (2000) opined that the efficiency of knowledge, quantity of knowledge created, and quality are all associated with the financial resources available to pursue knowledge-creation activities.

More recently, knowledge creation has become the center of many management and organizational studies because today's organizations are becoming more knowledge oriented in achieving competitiveness. According to Kao and Wu (2016), knowledge creation is all-encompassing, cutting across several fields, such as management, human behavior, strategic thinking, leadership, organizational behavior, technology and leadership. Scholars such as Gold *et al*. (2001) and Kogut and Zander (2003) have highlighted the importance of knowledge creation on performance outcomes in organizations. However, the main activities of HRM and knowledge-based management are complementary and have interrelationships with intangibles, the main strategic tools of the company. Human resource management implies employee engagement, information sharing and company growth (Al-Tit and Hunitie, 2015; Elrehail *et al*., 2020).

Knowledge creation means that "embedding new ideas, cognitive frames, and manners of thinking in organizations requires adaptation (i.e. translation) to the specific practices and socio-cultural context of the target organization" (Calabretta *et al*., 2017, p. ?). Hence, knowledge creation includes collaboration, coordination and communication (Kao and Wu, 2016). Manuj *et al*. (2013) and Tsai *et al*. (2016) explained that organizations build sustainable competitive advantage by developing and utilizing knowledge efficiently. Similarly, Ferraris *et al*. (2017), Fidel *et al*. (2015), Tseng (2016a, b), and Yesil and Kaya (2013) conclude that

corporate performance and innovativeness are the outcomes of proper knowledge management systems. Hussinki *et al.* (2017) suggests that knowledge creation can deliver organizational performance when controlling for confounding factors such as organizational structure and leadership.

According to Bi *et al.* (2017), knowledge creation is essential for learning organizations, and because of its expansive and congregative nature, it serves as a tool for learning and creativity. Furthermore, organizations with adequate knowledge management systems that connect knowledge in various and distinctive ways can add value to their clients, thereby improving organizational effectiveness, efficiency, competitiveness and innovativeness (Chia, 2003; Nonaka and Konno, 1998). Further, Kao and Wu (2016) and Quinn *et al.* (1996) asserted that an improved knowledge creation process leads to superior financial marketing, creativity and optimal organizational performance.

Studies have concluded that creating new knowledge can positively influence firm performance positively (Erden *et al.*, 2014; Del Giudice and Cillo, 2022; Gold *et al.*, 2001; Holsapple and Joshi, 2000). Various forms of knowledge creation have also been demonstrated to have contrasting influences on performance, although knowledge creation measured through R&D efforts has consistently been shown to have a positive effect (Erden *et al.*, 2014). Organizations with effective internal knowledge distribution and management mechanisms may experience impressive financial performance, stemming from the knowledge creation system within the organization (Elrehail *et al.*, 2013; Holsapple and Joshi, 2000). Moreover, proper management of personnel will reinforce success by increasing employees' expertise, experience, abilities and morale (Elrehail *et al.*, 2021; Jackson *et al.*, 2014). Essentially, knowledge creation has been proven to exert a degree of influence on firms' financial performance and their portion of market share. Based on the above empirical and logical arguments, we propose the following hypothesis:

H3. Knowledge creation is positively related to financial performance.

Knowledge creation and uncertainty

Financial uncertainty or turbulence is associated with an unknown effect of environmental or external forces on an organization's financial performance. Dahlin (2007) explained turbulence as the rate of process and product changes. With the proliferation of technology, products are becoming obsolete more rapidly than ever (Nonaka, 1991). Unpredictable or unexpected changes in the business environment are known to decrease firm value (Hitt *et al.*, 2000). Hanvanich *et al.* (2006) suggest that a firm can use time-sensitive knowledge quickly to solve problems associated with market and environmental turbulence. Their opinion is rooted in the assumption that adequate knowledge can effectively curb the influence of turbulence on a firm's value.

According to Dröge *et al.* (2003), the difference between successful firms is that successful organizations link value creation to knowledge creation, use and know-how. Based on this assertion, we argue that financial uncertainty might be a source of concern for establishments whose knowledge management systems are still in their infancy. Since knowledge creation ensures that both explicit and tacit knowledge interact to create a dynamic and innovative business climate, firms with effective knowledge management systems will probably recognize the environmental and technological turbulence that may impact their financial certainty. Dröge *et al.* (2003) further highlight the importance of knowledge creation for organizational innovativeness, as it helps firms create solutions internally to face external realities. Based on the above empirical and logical arguments, we propose the following hypothesis:

H4. Knowledge creation is negatively related to financial uncertainty.

(3) Knowledge creation as a mediator

The main aim of knowledge creation is "to create new knowledge and ideals, thus enabling the 'knowledge creating' company to achieve continuous innovation" (Nonaka, 1991, p. 96). Knowledge creation can take different forms and types, and emanate from different entities. According to Soon *et al.* (2017, p. 22), "the main platform of knowledge creation is the 'phenomenal' place". Knowledge creation can result from "individuals, working groups, project teams, informal circles, temporary meetings, e-mail groups, and at the front-line contact with the customer" (Nonaka and Konno, 1998, p. 41).

Abubakar *et al.*'s (2019) conceptual study on knowledge enablers, knowledge creation and organizational performance suggests that the knowledge-creation process involves both recognition-oriented and technical-oriented approaches to knowledge management. This implies that knowledge can be considered a storable, retrievable and encrypted entity. This also implies the novelty of's the role of information technology in knowledge processing (Ekbia and Hara, 2008). Nonaka and Nishiguchi (2001) describe knowledge as a blend of concepts, such as macro and micro, mind and body, chaos and order, induction and deduction, and explicit and implicit.

Goucher (2007) concluded that the result of knowledge management is social knowledge, which he described as the sum of the knowledge bases of individuals in a specific organization. The core of T-shaped and A-shaped skills is the ability of these individuals to adapt and manage knowledge in ways that an ordinary employee is unable to do (Thammasang and Poonikom, 2016). This implies that T- and A-shaped individuals are willing to explore and try new things, thereby gathering new forms of knowledge that, when adequately managed, may result in better performance. Since knowledge management aims to balance knowledge creation and its application (Bi *et al.*, 2017), it influences the impact of employees' cognitive skills on organizational performance.

Knowledge creation and implementation result in new product development and innovation in organizations. Innovation is linked to enhanced performance. Bi *et al.* (2017) found that maintaining a balanced approach to knowledge creation and application improves organizational performance. Ferraris *et al.* (2017) suggest that knowledge application results in corporate learning and improves financial performance, while Kao and Wu (2016) and Tseng (2016a) conclude that creative performance, which often results in financial performance, is a direct consequence of knowledge management practices.

Therefore, the relationship between employees' cognitive skills and organizational outcomes can be mediated by the organizational knowledge approach. T-shaped individuals can use the knowledge gathered from other experts in current projects, and A-shaped individuals can blend all available knowledge resources into innovative products or services that will lead to better organizational performance. Hence, we propose the following hypotheses:

H5a. Knowledge creation mediates the relationship between T-shaped skills and financial performance.

H5b. Knowledge creation mediates the relationship between T-shaped skills and financial uncertainty.

H6a. Knowledge creation mediates the relationship between A-shaped skills and financial performance.

H6b. Knowledge creation mediates the relationship between A-shaped skills and financial uncertainty.

(4) Rational and intuitive decision-making styles as moderator

Scott and Bruce (1995) conceptualized personal differences in decision-making styles into four types: dependent, rational, intuitive and avoidant. A decision-making style can be considered a distinctive response that produces "a habit-based propensity to react in a certain way in a specific decision context" (Kheradmand and Jafari, 2015, p. 123). Leaders and managers adopt and implement different decision-making styles depending on the organizational culture, their personality, the situation they are challenged with, the nature of the decision itself and the personalities of their team members or employees (Estelami and Nejad, 2017). Accordingly, this study argues that the nature of decision-making style can shape the influential impact of T-shaped and A-shaped skills by creating an appropriate organizational environment and imposing particular behavior.

Financial performance is the primary measure of success in many organizations. Achieving optimal financial performance is the goal of every business; hence, employees and managers are under constant pressure to deliver optimal output. Uzelac *et al.* (2016) describe this as the purpose of decision-making, although achieving this is not straightforward. Various complex associations, such as environmental turbulence, technological advances and internal knowledge structures, may constantly alter the goal or process of achieving optimal financial performance. Therefore, understanding the dynamic nature of the business world requires that managers be appropriately equipped to gather, digest and use readily available knowledge to make informed decisions. There must be a direct connection between decision-making and knowledge management (North and Kumta, 2014). Both occur across all levels within an organization. Thus, their impact on organizational outcomes is meaningful because the input on what is to be done comes from every quarter of the organization (Althuizen *et al.*, 2016; Riaz and Khalili, 2014).

As already established, decision-making can be either rational or intuitive. In their studies on decision-making styles, scholars such as Appan *et al.* (2017), Chater *et al.*, 2006, Parboteeah *et al.* (2010), and Smith and Paquette (2010) have opined that rational and intuitive decision-making styles affect decision output differently. For instance, Smith and Paquette (2010) concluded that a rational decision-making style involves problem identification, assessment of possible solutions and selection of the best option through a logical examination of all options.

On the other hand, proponents of intuitive decision-making styles assume that decisions are better made using impulses rather than logic (Bullini Orlandi and Pierce, 2020; Busari *et al.*, 2017; Klein *et al.*, 2002). Their argument is based on the belief that intuition reinforces the information available to enable quick and accurate decisions to be made. Wray (2017) elaborated on this view by proposing that the decision-making process in an intuitive style favors the decision-maker's feelings, which are often products of experience. Busari *et al.* (2017) simplified this by asserting that intuitive decision-making style is based on impulse, eliminating the need for logical reasoning and cognition in rational decision-making (Hoefer and Green, 2016; Pretz *et al.*, 2014). Decision-making, a crucial aspect of every business, requires knowledge to be effective. Holsapple and Joshi (2000) suggested that knowledge management influences every step in decision-making. In other words, the presence or absence of knowledge management in an organization influences the decision-making ability of employees, and if knowledge is created and managed adequately, the tendency for employees to apply an appropriate decision-making style is higher. In addition, decision-making has been empirically confirmed to exert some degree of influence on organizational performance.

Marusich *et al.* (2016) and Walker *et al.* (2017) conclude that the influence of rational decision-making on organizational performance, with the incessant quest to solve a problem

rationally, may lead to an analysis of the overall situation. This results in a decision to holistically address areas that require control and monitoring. Ferretti and Parmentola (2015) proposed that the participative nature of rational decision-making aids collaboration and partnership within the organization, thus ensuring the collective accomplishment of organizational objectives. Intuitive decision-making also contributes to organizational performance in that intuitive individuals can perceive decision situations early enough to enable them to take the necessary action in advance (Klein *et al.*, 2002). Intuitive decision-makers can also decipher complex situations comparatively easily by using their inner feelings (de Boer and de Boer, 2017).

Combining these arguments, we deduce that both rational and intuitive decision-making styles can influence the nature of the relationship between knowledge creation and organizational performance. Specifically, in this study, we argue that the presence of decision-making styles in an organization represents a moderating factor in the relationship between knowledge creation, financial performance and financial uncertainty. We developed the following set of hypotheses:

H7. Rational and intuitive decision-making styles moderate the relationship between knowledge creation and financial performance, such that the relationship will be stronger when decision makers employ both styles.

H8. Rational and intuitive decision-making styles moderate the relationship between knowledge creation and financial uncertainty, such that the relationship will be weaker when decision makers employ both styles.

Methods and industrial background

Industrial production involves the manufacture of merchandise using human labor, machinery and raw materials (i.e. plants, animals, chemicals and natural substances) using biological or artificial formulations. Industrial production encompasses any form of human activity, ranging from handicrafts to high-tech, in which raw materials are transformed into finished goods (e.g. consumer goods, household appliances, furniture, equipment, aircraft and automobiles). Industrial companies represent the economic backbone of both developed and developing countries.

Jordan's industrial sector is dominated by mining, manufacturing, construction and power, together representing 26% of the country's GDP (Statistics, 2016) Mining accounting for 3.1%, manufacturing 16.2% and the construction industry 4.6%, together with approximately 21% of Jordan's workforce. The byproducts of these industries include pharmaceutical products, potash, phosphates, cement, fertilizers and clothing.

As of 2016, 72 industrial companies have been listed on the Amman Stock Exchange (ASE). However, not all listed companies were included in this study, which applied several selection criteria to increase the data quality.

(1) The company has invested heavily in knowledge management systems.

(2) The company's shares were traded on the Amman Stock Exchange between 2010 and 2016.

(3) Trading in the companies' shares has not been interrupted.

(4) The companies were not merged or liquidated between 2010 and 2016.

(5) The company's annual reports for 2010 to 2016 are available.

Only 49 companies met the criteria. They were invited to participate by rating several questions developed by the researchers. Considering the large number of employees in the

selected companies, a convenience sample was selected, and employees holding managerial positions were invited to participate in the study (Emerson, 2015). A total of 500 questionnaires were distributed, and 392 were returned; based on an initial screening eight were excluded as incomplete. Accordingly, 384 questionnaires were deemed appropriate for statistical analysis, with a response rate of 76.8%.

From the demographic data, 79.2% (n = 304) of the employees were male and 20.8% (n = 80) were female, which is an accurate representation of the Jordanian workforce. 42.2% (n = 162) were in the 41–50 age group, 23.7% (n = 91) 31–40, 18.8% (n = 72) over 50 years, 14.1% (n = 54) 21–30 and the rest below 20. Regarding educational level, over half (55.5%, n = 213) had a bachelor's degree, 20.8% (n = 80) had a higher degree, 15.6% (n = 60) had a college degree and the rest had a high school certificate. This indicates a high level of intellectual capital, which is valuable in the knowledge economy. Approximately 79.2% (n = 304) had more than 6 years of work experience, 15.1% (n = 58) had 4–6 years, 3.9% (n = 15) had 1–3 years and the rest had less than 1 year.

Research instruments

Responses to items in all sections were measured on a 5-point scale (1 = strongly disagree to 5 = strongly agree).

T-shaped skills were captured using 5 items validated by Johannessen *et al.* (1999). Sample items include, "Our company members can understand not only their own tasks but also others' tasks".

A-shaped skills are captured using the four items validated by Tsai and Huang (2008). Respondents were asked to indicate the extent to which their team leaders demonstrated A-shaped skills; for example, "Our team leader has specialized knowledge in more than one discipline".

Knowledge creation process was captured using 19 items validated by Nonaka *et al.* (1994), covering the following processes: socialization (5 items), externalization (5 items), internalization (4 items), and acquisition, integration, synthesis, processing and dissemination (5). Sample items include, 'Our company stresses the use of deductive and inductive thinking'.

Decision-making styles were captured using four items for the rational decision-making style and five for the intuitive style adapted from the General Decision-Making Style Inventory (GDMS) validated by Scott and Bruce (1995). Sample items include, "I make decisions in a logical and systematic way" (rational); and "When I make decisions, I tend to rely on my intuition" (intuitive).

Financial performance was captured using the four items validated by Drew (1997) and modified to capture the financial growth of the company. Sample items include "Compared with key competitors, our company is more financially successful".

Financial uncertainty was captured using four items validated by Jaworski and Kohli (1993) and Tsai and Huang (2008) and modified to detect the perceived speed and magnitude of change and uncertainty in the financial market. Sample items include "It is very difficult to forecast the financial status of firms in our industry".

Data analysis

IBM's SPSS AMOS version 21 was applied to analyze the collected data "for structural equation modeling (SEM) for diagnosing not only the measurement model, but also the structure of the variables" (Alnajdawi *et al.*, 2017, p. ?). The demographic variables (gender, age, monthly salary, education level and work experience) of the 384 subjects were captured, and Table 1 presents the psychometric properties of the data.

The CFA results produced the following fit indices for the seven-factor model (χ^2 = 1572.752, df = 601, p < 0.000, χ^2/df = 2.617, GFI = 0.801, NFI = 0.834, TLI = 0.878, CFI = 0.889, RMSEA = 0.065, PCLOSE = 0.000). The researcher tested alternative models to identify any common method bias. For instance, a five-factor model in which (T-shaped skills and A-shaped skills) and (rational decision-making style and intuitive decision-making style) were combined to form one factor was tested. The alternative model produced the following fit indices: ($\Delta\chi^2$ = +1008.038, χ^2 = 2580.790, p < 0.000, χ^2/df = 4.210, GFI = 0.704, NFI = 0.727, TLI = 0.757, CFI = 0.776, RMSEA = 0.092, PCLOSE = 0.000). See Table 2.

The CFA results show that the scale items loaded significantly on their respective factors, and that the standardized factor loadings ranged from 0.481 to 0.909 with t-values from 7.746 to 25.058. The t-values were significant and the factor loadings were also above the benchmark of 0.40 (Anderson and Gerbing, 1988; Bagozzi, 1980; Bagozzi and Heatherton, 1994; Bagozzi and Yi, 1988). Cronbach's alpha (α) of the research variables was above the benchmark of 0.70 (Nunnally, 1978); composite reliability (CR) of the variables was above the benchmark of 0.70 (Hair *et al.*, 2016); and average variance extracted (AVE) was above the benchmark of 0.50 (Anderson and Gerbing, 1988; Fornell and Larcker, 1981), except for the knowledge-creation process and financial uncertainty. See Table 3.

		Gender	Age	Income	Education	Experience
N	Valid	384	384	384	384	384
	Missing	0	0	0	0	0
Mean		1.21	3.63	2.77	2.89	3.72
Std. Error of Mean		0.021	0.050	0.053	0.042	0.032
Std. Deviation		0.407	0.985	1.034	0.823	0.626
Variance		0.165	0.970	1.070	0.677	0.392

Source(s): Table created by Author

Table 1. Psychometric properties for demographic data

Indices	Benchmark	Measurement Model-7 factor	Alternative Model-5 factor	Harman single factor test
Chi-square (χ^2)		χ^2 = 1572.752	χ^2 = 2580.790	χ^2 = 5674.156
Degree of freedom (df)		df = 601	df = 613	df = 594
p value		p = 0.000	p = 0.000	p = 0.000
GFI, goodness-of-fit indices	1 = maximum fit (Tanaka and Huba, 1985)	GFI = 0.801	GFI = 0.704	GFI = 0.435
NFI, Normed Fit Index	1 = maximum fit (Bentler and Bonett, 1980)	NFI = 0.834	NFI = 0.727	NFI = 0.375
CFI, comparative fit index	1 = maximum fit (McDonald and Marsh, 1990)	CFI = 0.889	CFI = 0.776	CFI = 0.398
TLI, Tucker–Lewis index	1 = maximum fit (Bentler and Bonett, 1980)	TLI = 0.878	TLI = 0.757	TLI = 0.362
RMSEA, root mean square error of approximation	Values < 0.08 indicating good fit (Browne and Cudeck, 1993)	RMSEA = 0.065	RMSEA = 0.092	RMSEA = 0.149
χ^2/df, Relative Chi-square	Values > 1 and <5 were accepted (Marsh and Hocevar, 1985)	χ^2/df = 2.617	χ^2/df = 4.210	χ^2/df = 9.552

Source(s): Table created by Author

Table 2. Model indices

Variables	Cronbach's alpha (α)	Composite reliability	Average variance extracted	Maximum shared variance
T-shaped skills	0.854	0.839	0.569	0.558
A-shaped skills	0.836	0.828	0.557	0.557
Knowledge-creation process	0.926	0.922	0.461	0.324
Rational decision-making style	0.898	0.901	0.752	0.416
Intuitive decision-making style	0.854	0.858	0.609	0.121
Financial performance	0.913	0.915	0.729	0.324
Financial uncertainty	0.771	0.737	0.420	0.061

Table 3.
Construct validity

Source(s): Table created by Author

Table 4 presents the concurrent correlation coefficients of the variables investigated. T-shaped skills correlated significantly with the knowledge-creation process ($r = 0.181$, $\rho = 0.000$), rational decision-making style ($r = 0.532$, $\rho = 0.000$), intuitive decision-making style ($r = -0.165$, $\rho = 0.000$) and financial performance ($r = 0.329$, $\rho = 0.000$) but not with financial uncertainty.

Similarly, A-shaped skills correlated significantly with the knowledge-creation process ($r = 0.318$, $\rho = 0.000$), rational decision-making style ($r = 0.493$, $\rho = 0.000$) and financial performance ($r = 0.338$, $\rho = 0.000$) but not with intuitive decision-making style or financial uncertainty. Furthermore, the knowledge creation process correlated significantly with rational decision-making style ($r = 0.288$, $\rho = 0.000$), intuitive decision-making style ($r = 0.130$, $\rho = 0.000$), financial performance ($r = 0.525$, $\rho = 0.000$) and financial uncertainty ($r = -0.180$, $\rho = 0.000$). See Table 4.

Table 5 and Figure 1 present the concurrent maximum likelihood coefficients from the structural equation modeling. Hypothesis 1 predicted that T-shaped skills will positively impact the knowledge-creation process, but the data analysis highlighted an insignificant

	Variables	Mean	SD	1	2	3	4	5	6	7
1	T-shaped skills	3.516	0.891	–						
2	A-shaped skills	3.327	0.795	0.587**	–					
3	Knowledge-creation process	2.778	0.673	0.181**	0.318**	–				
4	Rational decision-making style	3.592	0.963	0.532**	0.493**	0.288**	–			
5	Intuitive decision-making style	2.544	0.947	−0.165**	−0.017	0.130*	−0.253**	–		
6	Financial performance	2.798	0.906	0.329**	0.338**	0.525**	0.333**	−0.080	–	
7	Financial uncertainty	3.946	0.478	0.079	0.084	−0.180**	0.061	−0.197**	0.012	–

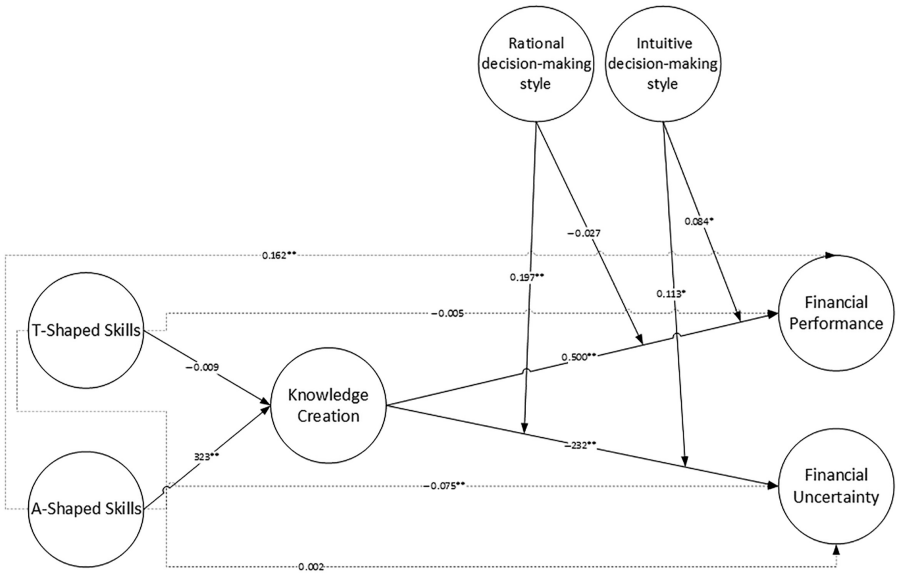
Table 4.
Pearson coefficients, mean and standard deviation of the model

Source(s): Table created by Author

Independent variables	Dependent variables	β	S.E	ρ-value	
T-shaped skills	- > Knowledge creation process	−0.009	0.037	0.850	Rejected
A-shaped skills	- > Knowledge creation process	0.323	0.047	0.000	Accepted
Knowledge-creation process	- > Financial performance	0.500	0.056	0.000	Accepted
Knowledge-creation process	- > Financial uncertainty	−0.232	0.034	0.000	Accepted
Rational decision-making style	- > Financial performance	0.162	0.039	0.000	Accepted
Rational decision-making style	- > Financial uncertainty	0.100	0.024	0.035	Accepted
Intuitive decision-making style	- > Financial performance	−0.105	0.040	0.015	Accepted
Intuitive decision-making style	- > Financial uncertainty	−0.154	0.024	0.001	Accepted
Knowledge-creation process*Rational decision-making style	- > Financial performance	−0.027	0.037	0.530	Rejected
Knowledge-creation process*Rational decision-making style	- > Financial uncertainty	0.197	0.022	0.000	Accepted
Knowledge-creation process*Intuitive decision-making style	- > Financial performance	0.084	0.037	0.051	Rejected
Knowledge-creation process*Intuitive decision-making style	- > Financial uncertainty	0.113	0.022	0.018	Accepted

Note(s): β, standardized estimates, S.E, standard error
Source(s): Table created by Author

Table 5.
Concurrent maximum likelihood coefficients



Source(s): Figure created by Author

Figure 1.
Structural equation modeling results

association (β = −0.009, ρ > 0.100). Hypothesis 2 predicted that A-shaped skills will positively impact knowledge creation, and the results show a significant association (β = 0.323, ρ < 0.000). **Thus, hypothesis 1 was rejected and hypothesis 2 received empirical support**.

In hypothesis 3, it was proposed that the knowledge-creation process will have a positive impact on financial performance; the result shows a positive impact (β = 0.500, ρ < 0.000). Hypothesis 4 predicts that knowledge creation will have a negative impact on financial uncertainty; the results indicate that a significant association exists (β = −0.232, ρ < 0.000). **Thus, hypotheses 3 and 4 received empirical support.**

Mediation analysis

Bootstrapping analysis was carried out to test for indirect effects in the model using a simulation sample (n = 2,000) and a 95% confidence interval. See Table 6. Although the SOBEL test and Baron and Kenny's mediation steps are widely used, bootstrapping analysis was chosen because of its ability to overcome the flaws in the SOBEL test (see, e.g. Preacher and Hayes, 2004; Rucker *et al.*, 2011). Hypothesis 5a proposes that the knowledge creation process mediates the relationship between T-shaped skills and financial performance. Similarly, Hypothesis 5b proposes that financial uncertainty mediates the relationship between T-shaped skills and financial uncertainty. The analysis shows that insignificant relationships exist; therefore, mediation does not hold. **Hence, hypotheses 5a and 5b were rejected** (see Table 6).

Hypothesis 6a proposes that the knowledge creation process mediates the relationship between A-shaped skills and financial performance. The results show that the indirect effect of A-shaped skills on financial performance through knowledge creation is positive (β = 0.162, ρ = 0.000). The bias-corrected estimates were as follows (ρ = 0.000, 95% confidence interval: 0.109–0.225). A practical interpretation of this finding is that a 1 unit increase in A-shaped skills increases financial performance by 0.162 units through the knowledge-creation process. Altogether, the present outcome depicts partial mediation; **thus, hypothesis 6a received empirical support**.

Hypothesis 6b proposes that the knowledge creation process mediates the relationship between A-shaped skills and financial uncertainty. The results show that the indirect effect of A-shaped skills on financial uncertainty through knowledge creation was negative (β = −0.075, ρ = 0.000). The bias-corrected estimate results are as follows (ρ = 0.000,

Independent variables	Dependent variables	Total effect	Direct effect	Indirect effect	ρ-value
T-shaped skills	- > Knowledge-creation process	−0.009	−0.009	0.000	
T-shaped skills	- > Financial performance	−0.005	0.000	*−0.005*	*>0.100*
T-shaped skills	- > Financial uncertainty	0.002	0.000	*0.002*	*>0.100*
A-shaped skills	- > Knowledge-creation process	0.323	0.323	0.000	
A-shaped skills	- > Financial performance	0.162	0.000	*0.162*	*<0.001*
A-shaped skills	- > Financial uncertainty	−0.075	0.000	*−0.075*	*<0.001*
Knowledge-creation process	- > Financial performance	0.500	0.500	0.000	
Knowledge-creation process	- > Financial uncertainty	−0.232	−0.232	0.000	

Table 6.
Mediation analysis (effects breakdown)

Note(s): β, standardized estimates, S.E, standard error
Source(s): Table created by Author

95% confidence interval: −0.109 to −0.048). A practical interpretation of this finding is, a 1 unit increase in A-shaped skills will reduce financial uncertainty by 0.075 units through the knowledge-creation process. Altogether, this outcome depicts partial mediation; **thus, hypothesis 6b received empirical support**.

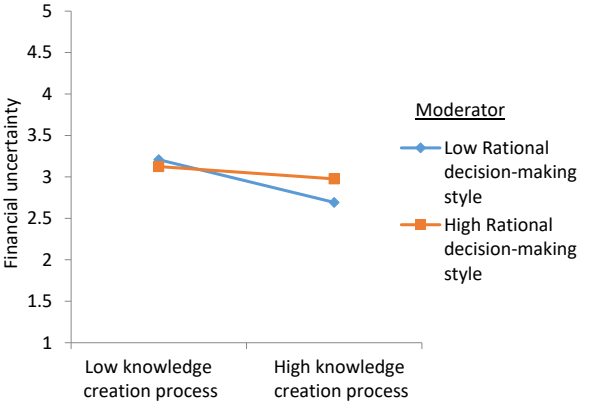
Moderation analysis

Moderated regression analysis was conducted following the procedures recommended by Aiken *et al.* (1991). First, the knowledge-creation process, rational decision-making style and intuitive decision-making style were standardized to reduce multicollinearity. The standardized estimates were then multiplied by the moderators to produce the interaction terms. The author included the 'main' effects while modeling the moderating effects to prevent a biased estimate of the interaction terms. Readers should be aware that, for moderating effects, all values were standardized following the recommendations of Aiken *et al.* (1991).

Hypothesis 7 predicts that rational and intuitive decision-making styles moderate the relationship between knowledge creation and financial performance. The analysis revealed that neither style moderated the relationship. **Thus, Hypothesis 7 was rejected**.

Hypothesis 8 predicted that rational and intuitive decision-making styles moderate the relationship between knowledge creation and financial uncertainty. The analysis revealed that both styles moderated this relationship. More specifically, rational decision-making moderates the link between knowledge creation and financial uncertainty ($\beta = 0.197$, $\rho = 0.000$), reducing the negative relationship between them. In particular, if the rational decision-making style is high and knowledge creation is high, the tendency toward financial uncertainty is low. However, financial uncertainty tends to be high when both rational decision-making styles and knowledge creation are low.

Similarly, intuitive decision-making moderates the link between knowledge creation and financial uncertainty ($\beta = 0.113$, $\rho = 0.018$) and reduces the negative relationship between them. In particular, if intuitive decision-making style is high and knowledge creation is high, the tendency toward financial uncertainty is low. However, financial uncertainty tends to be high when both intuitive decision-making styles and knowledge creation are low. **Thus, hypothesis 8 received empirical support**. To further explore the nature and form of the significant interaction, we plotted graphs using unstandardized beta values. See Figures 2 and 3.



Source(s): Figure created by Author

Figure 2. Interaction of rational decision-making style on knowledge-creation process and financial uncertainty

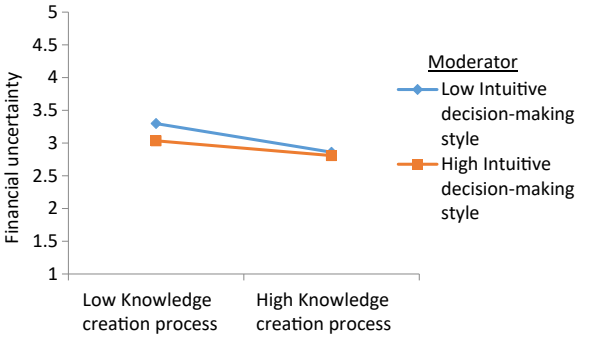
Discussion

This study set out to investigate the role of cognitive skills in knowledge creation and their impact on a firm's financial performance and financial uncertainty while also uncovering the mediating role of knowledge creation and the moderating role of decision-making styles in the complex model of organizational outcomes. Consistent with previous studies (e.g. Franco-Santos *et al.*, 2012), our findings substantiate the hypothesized relationships between T-shaped and A-shaped cognitive skills and knowledge creation. This result implies that firms with an adequate mix of individuals and diversified cognitive skills can create and manage knowledge more effectively.

This further suggests that knowledge development, use and storage, which ultimately impact organizational performance, can be readily utilized in organizations with highly cognitively skilled employees. T-shaped professionals are managers or employees who are loyal to their organization and, thus, shun the orthodox corporate hierarchy by facilitating knowledge dissemination throughout the organization (Hecklau *et al.*, 2016). However, this study failed to identify T-shaped skills as an important antecedent of the knowledge-creation process, in disagreement with previous studies (e.g. Brown *et al.*, 2015; Leonard-Barton, 1995). One could argue that the nature of managerial culture and some cultural attributes may contribute to this finding. To validate this proposition, more research is needed to explore the potential impact of organizational culture on knowledge transformation behavior.

T-shaped skilled employees are gifted with the ability needed for creative and innovative performance, thereby enabling them to develop problem-solving and decision-making techniques (Abubakar *et al.*, 2019). Therefore, we conclude that T-shaped skill does not significantly predict knowledge creation in Jordan, primarily because of collective cultural norms; Al-Faleh (1987, p 9) said, "Clearly a country's culture has a great influence on the individual and managerial climate, on organizational behavior and ultimately on the types of managerial development programs offered". However, A-shaped skills predict knowledge creation, supporting the link between cognitive skills and knowledge creation, as reported in previous studies (e.g. Madhavan *et al.*, 1994; Nonaka, 1994; Nonaka *et al.*, 1994; Madhavan and Grover, 1998). Again, the cultural nature of Jordan helps explain this, because A-shaped skills are widely used by those with power or influence. Countries such as Jordan exhibit significant power distance.

Consequently, good knowledge management is evident through an organization's knowledge-creation capabilities, which relate positively to its financial performance. This outcome is crucial because financial productivity is an important measure of organizational performance and growth. As such, organizations aspiring to be productive must seek to grow



Source(s): Figure created by Author

Figure 3.
Interaction of intuitive decision-making style on knowledge-creation process and financial uncertainty

financially, and an understanding of this finding is a pointer to achieving financial growth. This finding also corroborates the literature on the impact of knowledge management on firm performance.

For instance, Darroch's (2005) study on knowledge management, innovation and firm performance concludes that knowledge responsiveness, a dimension of knowledge creation, significantly influences a firm's financial performance. Similarly, knowledge creation mediates the relationship between employees' cognitive skills (A-shaped skills) and organizations' financial performance. These findings highlight the need to appropriate employees' cognitive capabilities in an organization's knowledge management system for optimum output. However, this did not hold for T-shaped skills, as knowledge creation did not mediate the link between T-shaped skills and financial performance. Further research is needed before the current findings can be considered conclusive.

Sosa *et al.* (2015), in the context of new product development (NPD), believe that team leaders play an important role in upholding disciplined foresight that manages differing technical competences and integrates multiple perspectives. That is, cognitive skills are needed to manage trade-offs and integration acquired through the process of incorporating two distinct areas, which will give the team leader the dexterity to unify the vision that represents different fields fairly. The knowledge literature confirms the notion that new ideas and creativity emerge from interactions of different sets of knowledge (e.g. Simon, 1985), science (e.g. Kaufman, 1995) and in related disciplines such as social networks (e.g. Granovetter, 1973).

Knowledge creation also positively influences financial uncertainty and mediates the influence of employees' cognitive skills (A-shaped skills) on financial uncertainty. These findings are noteworthy because uncertainty is an inevitable part of the organization and must be handled appropriately to maintain a favorable outlook for investors. The discussion of the influence of knowledge management on overall organizational performance has been at the center of recent academic research (Lee and Choi, 2003; Li *et al.*, 2009). However, this did not hold for T-shaped skills, as knowledge creation did not mediate the link between T-shaped skills and financial uncertainty. Further research is needed before the current findings are widely accepted.

The findings also highlight the importance of enabling knowledge within organizations to achieve success. The mediating role of knowledge creation in the model suggests that while A-shaped skills may be a predictor of financial performance and financial uncertainty, organizations will be unable to appropriate the value of their employees' cognitive skills without implementing knowledge-management systems that prioritize knowledge creation.

Finally, the findings regarding decision-making styles and knowledge creation are consistent with the outcomes of prior studies. Thus, the insignificant result generated for our hypothesized moderating effect of decision-making style on knowledge creation and organizational performance signifies that decision-makers are not always able to link unrelated information in a way that leads to a solution for issues arising in the organization. Moreover, the possible direct impact of decision-making styles on knowledge creation, which has already been validated by various researchers (Courtney, 2001; Donate and Sánchez de Pablo, 2015; Kazadi *et al.*, 2016) might eliminate the proposed moderating impact. However, the end product of knowledge creation is usually unprocessed knowledge, which, through conscious thought, may yield valuable knowledge for the organization (Zander *et al.*, 2016).

Technically, the end product does not always affect financial performance but may influence other forms of performance, such as creativity and innovation. On the other hand, the significant result generated for our hypothesized moderating effect of decision-making style on knowledge creation and financial uncertainty signifies that decision-makers can link unrelated information in a way that leads to a solution. Specifically, bundling decision-making styles and the availability of a knowledge database can reduce financial uncertainty.

Over a five-year period, the knowledge management literature concerning knowledge creation was centered on knowledge enablers, knowledge management system implementation, and, generally, the importance of knowledge management for organizational effectiveness. However, this study specifically introduces how knowledge creation affects organizational outcomes and the conditions under which it is most likely to improve performance. Our findings concerning the moderating effect of decision-making style suggest that knowledge creation and employees' cognitive skills are better utilized when employees also possess decision-making abilities. Knowledge management systems usually emphasize organizations' strategic purposes, such as improved performance, competitive advantage and innovation, in addition to the lessons learned and success stories. Therefore, they play a crucial role in improving performance at individual and corporate levels.

Overall, regardless of the number of factors influencing organizational performance, this study's findings reveal that employees' cognitive skills, the organization's knowledge-creation ability and decision-making style are significant predictors of firms' financial performance and financial uncertainty. The impact of cognitive skills on performance is mediated through knowledge creation, while that of knowledge creation on financial uncertainty is moderated by decision-making style. This study provides salient information on the mechanisms for achieving optimal outcomes for firms seeking performance optimization through effective utilization of their human resources.

Theoretical implications

The foremost finding of this study is that cognitive skills might influence financial performance and how they can reduce the financial uncertainty of an organization through the mediating role of knowledge creation using rational and intuitive decision-making styles. To the best of our knowledge, few researchers have studied the mechanisms that trigger the relationship between cognitive skills and organizations' financial performance. To fill this gap, we designed a theoretical model and established that not only do cognitive skills have a direct relationship with organizational financial performance, they also have an indirect influence by strengthening knowledge creation.

Some novel insights are provided from the results of this study concerning the mediating influence of knowledge creation on the relationship between cognitive skills, financial performance and financial uncertainty, in addition to the moderating influence of different decision-making styles on this mediating relationship. The research suggests that both T- and A-shaped skills benefit organizational financial performance and reduce financial uncertainty by improving the organization's knowledge-creation process.

Since T-shaped skills involve the ability to process and assimilate different knowledge as well as integrate others' knowledge or skills into their own knowledge, they could make it easier for people with these skills to use their acquired knowledge to create new knowledge to suit their purposes. This is consistent with the findings of previous studies (Choi and Lee, 2000; Yang *et al.*, 2008), that they lead to better financial performance and reduce uncertainty. According to Leonard-Barton (1995), A-shaped skilled persons can graft several disciplines and forge technical alliances for carrying out tasks; that is, they are able to integrate several disciplines. Madhavan and Grover (1998) agreed that team members who possess A-shaped skills perform well in knowledge creation, which supports our findings.

Our study also extends the influence of cognitive skill theory and cognitive skill acquisition theory in the field of knowledge management by establishing the importance of the mediating role of knowledge creation in the relationship between cognitive skills and firm performance. Prior theories on cognitive skills have focused on individual-level analysis, considering only the contribution of individuals' skills to organizational performance (Crook *et al.*, 2006; Gatzert, 2015; Ling and Jaw, 2006). However, our study extends these findings by empirically confirming

the relevance of this theory at the group level, as the outcomes from the analysis of both primary and secondary data were deemed adequate for the hypothesized relationships (Kogut and Zander, 2003; Moldogaziev and Resh, 2016; Neffke and Henning, 2013; Weinzimmer *et al.*, 2011). This matches the emerging trend of focusing on teamwork and a collaborative working environment. It also calls for more attention to the cognitive part of employees' behavior instead of focusing on their actual or explicit behavior. Another important contribution of our study is that it develops an understanding of the influence of decision-making on knowledge creation and firm performance. This contribution corroborates the findings of Abu-Shanab *et al.* (2014) and Wang and Wang (2012) regarding the importance of knowledge creation and decision-making in organizational performance.

Firms need to analyze real-time, semi-structured and unstructured datasets to address internationalization issues and effectively manage overseas expansion risks (Bertello *et al.*, 2021). Big data analytics can help organizations compete by better understanding, interpreting and using massive amounts of data from internal and external sources (Ferraris *et al.*, 2019). The resource-based view of the firm highlights the importance of tacit knowledge held by organization members, with its characteristics of being hard to imitate, path dependency and causal ambiguity (Liu and Liu, 2011; Scully *et al.*, 2013; Taamneh *et al.*, 2018). This study could complement previous studies that argued about the role of KC, and that top management should emphasize KM practices as one of the elements fostering performance and reducing the risk of uncertainty.

Many authors have stressed the importance of HRM practices in implementing KM successfully and the initiatives taken to support people and motivate them in the process of KM. People's readiness to generate and share knowledge largely relies on organizational factors, including sound HRM practices (Mann, 2001). Therefore, HRM practices are crucial in promoting these attributes, which in turn could lead to competitive advantage. HRM practices, such as compensation, training and performance management play a vital role in facilitating the creation, absorption and sharing of KM. Moreover, the HRM department can determine tacit knowledge and how it can be utilized for the benefit of the entire organization.

Practical implications

This research provides several significant insights for management practitioners interested in the importance of cognitive skills and knowledge management. First, the mediating role of knowledge creation suggests that it is not enough for organizations to employ employees with high levels of cognitive skills. Management must create a knowledge system that ensures that employees' cognitive skills are duly put to use. Thus, they must clearly understand the effects of cognitive skills and knowledge creation on firm performance. This is because different cognitive skills influence performance in varying ways; therefore, managers should encourage mechanisms through which employees' cognitive skills are optimized for performance.

Regarding the importance of knowledge creation in practice, managers should be more attentive to the knowledge embedded in systems within the organization. This is because such knowledge aids in both individual- and team-level operations, which may result in better performance. When managers aim to improve the financial performance of their organization, they must prioritize knowledge creation and ensure that employees are appropriately trained to maximize their cognitive skills through knowledge management. One of the main roles of HR managers is to foster knowledge creation among individuals and groups, leading to organizational innovation, creativity and outstanding performance (Alatailat *et al.*, 2019; Gope *et al.*, 2018; Nisula and Kianto, 2016). Sound HRM practices play a vital role in creating a platform in which knowledge creation and transformation can be boosted at the individual and group levels. Moreover, sound HRM practices have the capacity to offer a culture that

enhances the process of knowledge creation and, consequently, employee improvisation in order to provide creativity and innovation. However, utilizing knowledge creation, cognitive skills, rational decision-making and financial performance is governed by, and built on, the existence of well-designed HRM practices.

Consistent with Liang and Xue's (2009) study, managers must be aware of advances in information systems in their approach to knowledge management to increase firm performance. They should also be aware of the double-edged nature of technological advancement, as it can also lead to information leakage and compromise the organization (Liang and Xue, 2009). Hence, adequate measures should be in place to regulate and control knowledge use and knowledge management processes to maintain the novelty and privacy of the internal knowledge system for the benefit of the organization.

If knowledge is not properly managed and adequate regulation is not in place for knowledge use, the security and privacy content of the organization may be breached, which may increase the level of uncertainty in the performance of the business. Hence, it is advisable for managers to establish policies that set boundaries for knowledge use (Weinzimmer *et al.*, 2011). Organizations also need to facilitate explicit knowledge creation so that managers can establish clear structures and processes for knowledge codification regarding specific work tasks (Liang *et al.*, 2010). KMS affects the organization's memory by taking advantage of the organization's collective knowledge from one task to another. Therefore, ample investment in the technological infrastructure required for the KMS should be maintained. However, little is known about the return on investment from KMS regarding its impact on organizational and employee performance (Bock *et al.*, 2005; Sharda *et al.*, 2014).

Managers may create a team atmosphere and social influences that encourage employees to internalize the benefits of the knowledge system and become advocates (Liang *et al.*, 2010). They may also employ strategies such as teamwork design, rewarding collective performance individually, and through programs such as informal travel activities and dining to improve employees' willingness to collaborate and learn together to achieve improved financial performance.

Limitations and future directions

Since the design of this study was cross-sectional, there might be interference in the measurement model. To increase confidence, a longitudinal study with a larger sample size should be undertaken. Readers should view the results of this study with caution, since we can generalize them only to Jordan and the selected industrial sector. These research findings are reliable to some extent. We encourage other scholars to replicate this study to validate the current outcome. Through this study, we recommend that researchers study big data analytics, workplace climate, organizational culture, organizational support, organizational learning, knowledge management and organizational commitment. These variables are known to influence organizational performance. Future studies might add factors such as knowledge sharing, leadership, innovation and trust, all of which present a challenge in the Arabian context (Alsaad *et al.*, 2017; Elrehail *et al.*, 2018).

References

Abu-Shanab, E., Haddad, M. and Knight, M.B. (2014), "Knowledge sharing practices and the learning organization: a study", *IUP Journal of Knowledge Management*, Vol. 12 No. 2, p. 38.

Abubakar, A.M., Elrehail, H., Alatailat, M.A. and Elçi, A. (2019), "Knowledge management, decision-making style and organizational performance", *Journal of Innovation and Knowledge*, Vol. 4 No. 2, pp. 104-114, doi: 10.1016/j.jik.2017.07.003.

Aggarwal, I. and Woolleyb, A.W. (2019), "Team creativity, cognition, and cognitive style diversity", *Management Science*, Vol. 65 No. 4, pp. 1586-1599, doi: 10.1287/mnsc.2017.3001.

Ai-Faleh, M. (1987), "Cultural influences on Arab management development: a case study of Jordan", *Journal of Management Development*, Vol. 6 Issue 3, pp. 19-33, doi: 10.1108/eb051643.

Aiken, L.S., West, S.G. and Reno, R.R. (1991), *Multiple Regression: Testing and Interpreting Interactions*, Sage, New York, NY.

Al-Adaileh, R.M. and Al-Atawi, M.S. (2011), "Organizational culture impact on knowledge exchange: Saudi Telecom context", *Journal of Knowledge Management*, Vol. 15 No. 2, pp. 212-230, doi: 10.1108/13673271111119664.

Al-Tit, A. and Hunitie, M. (2015), "The mediating effect of employee engagement between its antecedents and consequences", *Journal of Management Research*, Vol. 7 No. 5, p. 47, doi: 10.5296/jmr.v7i5.8048.

Alatailat, M., Elrehail, H. and Emeagwali, O.L. (2019), "High performance work practices, organizational performance and strategic thinking: a moderation perspective", *International Journal of Organizational Analysis*, Vol. 27 No. 3, pp. 370-395, doi: 10.1108/IJOA-10-2017-1260.

Aljuhmani, H.Y., Ababneh, B., Emeagwali, L. and Elrehail, H. (2022), "Strategic stances and organizational performance: are strategic performance measurement systems the missing link?", *Asia-Pacific Journal of Business Administration*, Vol. ahead-of-print No. ahead-of-print. doi: 10.1108/APJBA-09-2021-0445.

Alnajdawi, S., Emeagwali, O.L. and Elrehail, H. (2017), "The interplay among green human resource practices, organization citizenship behavior for environment and sustainable corporate performance: evidence from Jordan", *Journal of Environmental Accounting and Management*, Vol. 5 No. 3, pp. 169-182, doi: 10.5890/JEAM.2017.9.001.

Alsaad, A., Mohamad, R. and Ismail, N.A. (2017), "The moderating role of trust in business to business electronic commerce (B2B EC) adoption", *Computers in Human Behavior*, Vol. 68, pp. 157-169, doi: 10.1016/j.chb.2016.11.040.

Althuizen, N., Wierenga, B., Chen, B. and others (2016), "Managerial decision-making in marketing: matching the demand and supply side of creativity", *Journal of Marketing Behavior*, Vol. 2 Nos 2-3, pp. 129-176.

Alzghoul, A., Elrehail, H., Emeagwali, O.L. and AlShboul, M.K. (2018), "Knowledge management, workplace climate, creativity and performance", *Journal of Workplace Learning*, Vol. 30 No. 8, pp. 592-612, doi: 10.1108/jwl-12-2017-0111.

Anderson, J.R. (1982), "Acquisition of cognitive skill", *Psychological Review*, Vol. 89 No. 4, p. 369.

Anderson, R.C. and Ausubel, D.P. (1965), *Readings in the Psychology of Cognition*, Holt Rinehart & Winston, New York City.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, p. 411.

Appan, R., Bolton, D.E. and Madhavaram, S. (2017), "Strategy, decision making, and cognition: an integrative perspective", *International Journal of Strategic Decision Sciences (IJSDS)*, Vol. 8 No. 3, pp. 78-98.

Bagozzi, R.P. (1980), "Performance and satisfaction in an industrial sales force: an examination of their antecedents and simultaneity", *Journal of Marketing*, Vol. 44 No. 2, pp. 65-77.

Bagozzi, R.P. and Heatherton, T.F. (1994), "A general approach to representing multifaceted personality constructs: application to state self-esteem", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 1 No. 1, pp. 35-67.

Bagozzi, R.P. and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16, pp. 74-94.

Bardach, L. and Klassen, R.M. (2020), "Smart teachers, successful students? A systematic review of the literature on teachers' cognitive abilities and teacher effectiveness", *Educational Research Review*, Vol. 30, doi: 10.1016/j.edurev.2020.100312.

Barile, S., Franco, G., Nota, G. and Saviano, M. (2012), "Structure and dynamics of a 'T-Shaped' knowledge: from individuals to cooperating communities of practice", *Service Science*, Vol. 4 No. 2, pp. 161-180.

Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

Bentler, P.M. and Bonett, D.G. (1980), "Significance tests and goodness of fit in the analysis of covariance structures", *Psychological Bulletin*, Vol. 88 No. 3, p. 588.

Bertello, A., Ferraris, A., Bresciani, S. and De Bernardi, P. (2021), "Big data analytics (BDA) and degree of internationalization: the interplay between governance of BDA infrastructure and BDA capabilities", *Journal of Management and Governance*, Vol. 25 No. 4, pp. 1035-1055, doi: 10.1007/s10997-020-09542-w.

Bhatti, S.H., Hussain, M., Santoro, G. and Culasso, F. (2023), "The impact of organizational ostracism on knowledge hiding: analysing the sequential mediating role of efficacy needs and psychological distress", *Journal of Knowledge Management*, Vol. 27 No. 2, pp. 485-505, doi: 10.1108/JKM-03-2021-0223.

Bi, J., Sarpong, D., Botchie, D. and Rao-Nicholson, R. (2017), "From imitation to innovation: the discursive processes of knowledge creation in the Chinese space industry", *Technological Forecasting and Social Change*, Vol. 120, pp. 261-270, doi: 10.1016/j.techfore.2017.01.008.

Bock, G.-W., Zmud, R.W., Kim, Y.-G. and Lee, J.-N. (2005), "Behavioral intention formation in knowledge sharing: examining the roles of extrinsic motivators, social-psychological forces, and organizational climate", *MIS Quarterly*, Vol. 29 No. 1, pp. 87-111, doi: 10.2307/25148669.

Brown, A.D., Colville, I. and Pye, A. (2015), "Making sense of sensemaking in organization studies", *Organization Studies*, Vol. 36 No. 2, pp. 265-277.

Browne, M.W. and Cudeck, R. (1993), "Alternative ways of assessing model fit", in Bollen, K.A. and Long, J.S. (Eds), *Testing Structural Equation Models*, Sage, Newbury Park, CA, pp. 136-162.

Bullini Orlandi, L. and Pierce, P. (2020), "Analysis or intuition? Reframing the decision-making styles debate in technological settings", *Management Decision*, Vol. 58 No. 1, pp. 129-145, doi: 10.1108/MD-10-2017-1030.

Busari, A.H., Busari, A.H., Mughal, Y.H., Mughal, Y.H., Khan, S.N., Khan, S.N., Rasool, S., Rasool, S., Kiyani, A.A. and Kiyani, A.A. (2017), "Analytical cognitive style moderation on promotion and turnover intention", *Journal of Management Development*, Vol. 36 No. 3, pp. 438-464.

Calabretta, G., Gemser, G. and Wijnberg, N.M. (2017), "The interplay between intuition and rationality in strategic decision making: a paradox perspective", *Organization Studies*, Vol. 38 Nos 3-4, pp. 365-401.

Capel, C. (2014), "Mindfulness, indigenous knowledge, indigenous innovations and entrepreneurship", *Journal of Research in Marketing and Entrepreneurship*, Vol. 16 No. 1, pp. 63-83.

Chapelle, C.A. (2009), "The relationship between second language acquisition theory and Computer-Assisted language learning", *The Modern Language Journal*, Vol. 93 No. s1, pp. 741-753.

Chasanidou, D., Elvesæter, B. and Berre, A.-J. (2016), "Enabling team collaboration with task management tools", *Proceedings of the 12th International Symposium on Open Collaboration*, Vol. 20.

Chater, N., Oaksford, M., Fiedler, K. and Juslin, P. (2006), "Speculations on human causal learning and reasoning", *Information Sampling and Adaptive Cognition*, Vol. 23 No. 1, pp. 101-115.

Chia, R. (2003), "From knowledge-creation to the perfecting of action: Tao, Basho and pure experience as the ultimate ground of knowing", *Human Relations*, Vol. 56 No. 8, pp. 953-981.

Choi, B. and Lee, H. (2000), *Knowledge Management and Organizational Performance*, Inform-Korms, London.

Courtney, J.F. (2001), "Decision making and knowledge management in inquiring organizations: toward a new decision-making paradigm for DSS", *Decision Support Systems*, Vol. 31 No. 1, pp. 17-38, doi: 10.1016/S0167-9236(00)00117-2.

Crocitto, M.M., Sullivan, S.E. and Carraher, S.M. (2005), "Global mentoring as a means of career development and knowledge creation: a learning-based framework and agenda for future research", *Career Development International*, Vol. 10 Nos 6-7, pp. 522-535, doi: 10.1108/13620430510620593.

Crook, T.R., Todd, S.Y., Combs, J.G., Woehr, D.J. and Ketchen, D.J. (2006), "Does human capital matter? A meta-analysis of the relationship between human capital and firm performance", doi: 10.1037/a0022147.

Cui, A.S., Chan, K. and Calantone, R. (2014), "The learning zone in new product development", *IEEE Transactions on Engineering Management*, Vol. 61 No. 4, pp. 690-701.

Dahlin, P. (2007), *Turbulence in Business Networks : A Longitudinal Study of Mergers, Acquisitions and Bankruptcies Involving Swedish IT-companies*, PhD dissertation, Ekonomihögskolan, available at: http://urn.kb.se/resolve?urn=urn:nbn:se:mdh:diva-432

Darroch, J. (2005), "Knowledge management, innovation and firm performance", *Journal of Knowledge Management*, Vol. 9 No. 3, pp. 101-115.

de Boer, L. and de Boer, L. (2017), "Procedural rationality in supplier selection: outlining three heuristics for choosing selection criteria", *Management Decision*, Vol. 55 No. 1, pp. 32-56.

Del Missier, F., Mäntylä, T. and de Bruin, W.B. (2012), "Decision-making competence, executive functioning, and general cognitive abilities", *Journal of Behavioral Decision Making*, Vol. 25 No. 4, pp. 331-351, doi: 10.1002/bdm.731.

Del Giudice, M. and Cillo, V. (2022), "The spiral of knowledge creation in a dynamic and evolving business environment", *The Routledge Companion to Knowledge Management*, pp. 15-32, doi: 10.4324/9781003112150-3.

Donate, M.J. and Sánchez de Pablo, J.D. (2015), "The role of knowledge-oriented leadership in knowledge management practices and innovation", *Journal of Business Research*, Vol. 68 No. 2, pp. 360-370, doi: 10.1016/j.jbusres.2014.06.022.

Drew, P. (1997), "'Open'class repair initiators in response to sequential sources of troubles in conversation", *Journal of Pragmatics*, Vol. 28 No. 1, pp. 69-101.

Dröge, C., Claycomb, C. and Germain, R. (2003), "Does knowledge mediate the effect of context on performance? Some initial evidence", *Decision Sciences*, Vol. 34 No. 3, pp. 541-568.

Duarte, E., Rebelo, F., Teles, J. and Wogalter, M.S. (2014), "Behavioral compliance for dynamic versus static signs in an immersive virtual environment", *Applied Ergonomics*, Vol. 45 No. 5, pp. 1367-1375.

Ekbia, H.R. and Hara, N. (2008), "The quality of evidence in knowledge management research: practitioner versus scholarly literature", *Journal of Information Science*, Vol. 34 No. 1, pp. 110-126.

Ellis, R. and Shintani, N. (2013), *Exploring Language Pedagogy through Second Language Acquisition Research*, Routledge, Oxfordshire, England.

Elrehail, H.H., Trad, M.A. and Algraibeh, K.M. (2013), "Applying knowledge management oriented objectives into distance E-learning process and strategies", *Management*, Vol. 3 No. 6, pp. 316-322, doi: 10.5923/j.mm.20130306.04.

Elrehail, H., Alzghoul, A., Saydam, P. and AlArarah, K. (2016), "The role of knowledge sharing mechanism in the development of pricing strategy", *International Journal of Online Marketing Research*, Vol. 2 No. 1, p. 53, doi: 10.5455/IJOMR.204243.

Elrehail, H., Emeagwali, O.L., Alsaad, A. and Alzghoul, A. (2018), "The impact of Transformational and Authentic leadership on innovation in higher education: the contingent role of knowledge sharing", *Telematics and Informatics*, Vol. 35 No. 1, pp. 55-67, doi: 10.1016/j.tele.2017.09.018.

Elrehail, H., Harazneh, I., Abuhjeeleh, M., Alzghoul, A., Alnajdawi, S. and Ibrahim, H.M.H. (2020), "Employee satisfaction, human resource management practices and competitive advantage: the case of Northern Cyprus", *European Journal of Management and Business Economics*, Vol. 29 No. 2, pp. 125-149, doi: 10.1108/EJMBE-01-2019-0001.

Elrehail, H., Rehman, S.U., Chaudhry, N.I. and Alzghoul, A. (2021), "Nexus among cyberloafing behavior, job demands and job resources: a mediated-moderated model", *Education and Information Technologies*, Vol. 26 No. 4, pp. 4731-4749, doi: 10.1007/s10639-021-10496-1.

Emerson, R.W. (2015), "Convenience sampling, random sampling, and snowball sampling: how does sampling affect the validity of research?", *Journal of Visual Impairment and Blindness*, Vol. 109 No. Issue 2, pp. 164-168, doi: 10.1177/0145482x1510900215.

Erden, Z., Klang, D., Sydler, R. and von Krogh, G. (2014), "Knowledge-flows and firm performance", *Journal of Business Research*, Vol. 67 No. 1, pp. 2777-2785.

Estelami, H. and Nejad, M.G. (2017), "The impact of cognitive style, entrepreneurial attitudes and gender on competitive price responses", *Journal of Product and Brand Management*, Vol. 26 No. 7, pp. 759-770, doi: 10.1108/JPBM-05-2016-1189.

Ferraris, A., Santoro, G. and Dezi, L. (2017), "How MNC's subsidiaries may improve their innovative performance? The role of external sources and knowledge management capabilities", *Journal of Knowledge Management*, Vol. 21 No. 3, pp. 540-552.

Ferraris, A., Mazzoleni, A., Devalle, A. and Couturier, J. (2019), "Big data analytics capabilities and knowledge management: impact on firm performance", *Management Decision*, Vol. 57 No. 8, pp. 1923-1936, doi: 10.1108/MD-07-2018-0825.

Ferretti, M. and Parmentola, A. (2015), "The firm-driven LISs", *The Creation of Local Innovation Systems in Emerging Countries*, Springer, pp. 61-89.

Fidel, P., Schlesinger, W. and Cervera, A. (2015), "Collaborating to innovate: effects on customer knowledge management and performance", *Journal of Business Research*, Vol. 68 No. 7, pp. 1426-1428.

Fornell, C. and Larcker, D.F. (1981), *Structural equation models with unobservable variables and measurement error: algebra and statistics*, Vol. 18 No. 3, pp. 382-388.

Franco-Santos, M., Lucianetti, L. and Bourne, M. (2012), "Contemporary performance measurement systems: a review of their consequences and a framework for research", *Management Accounting Research*, Vol. 23 No. 2, pp. 79-119.

Gatzert, N. (2015), "The impact of corporate reputation and reputation damaging events on financial performance: empirical evidence from the literature", *European Management Journal*, Vol. 33 No. 6, pp. 485-499.

Gold, A.H., Malhotra, A. and Segars, A.H. (2001), "Knowledge management: an organizational capabilities perspective", *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 185-214, doi: 10.1080/07421222.2001.11045669.

Gope, S., Elia, G. and Passiante, G. (2018), "The effect of HRM practices on knowledge management capacity: a comparative study in Indian IT industry", *Journal of Knowledge Management*, Vol. 22 No. 3, pp. 649-677, doi: 10.1108/JKM-10-2017-0453.

Goucher, N.P. (2007), "Organizational knowledge creation to enhance adaptive capacity: exploratory case studies in water resource management".

Granovetter, M.S. (1973), "The strength of weak ties", *American Journal of Sociology*, Vol. 78 No. 6, pp. 1360-1380.

Hair, J.F., Jr., Sarstedt, M., Matthews, L.M. and Ringle, C.M. (2016), "Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I–method", *European Business Review*, Chicago, Vol. 28 No. 1, pp. 63-76.

Hamdi, S., Silong, A.D., Binti Omar, Z. and Mohd Rasdi, R. (2016), "Impact of T-shaped skill and top management support on innovation speed; the moderating role of technology uncertainty", *Cogent Business and Management*, Vol. 3 No. 1, doi: 10.1080/23311975.2016.1153768.

Hansen, M.T. and von Oetinger, B. (2001), "Introducing T-shaped managers. Knowledge management's next generation", *Harvard Business Review*, Vol. 79 No. 3, pp. 106-116,165.

Hanvanich, S., Sivakumar, K.M. and Hult, G.T. (2006), "The relationship of learning and memory with organizational performance: the moderating role of turbulence", *Journal of the Academy of Marketing Science*, Vol. 34 No. 4, pp. 600-612.

Hecklau, F., Galeitzke, M., Flachs, S. and Kohl, H. (2016), "Holistic approach for human resource management in Industry 4.0", *Procedia CIRP*, Vol. 54, pp. 1-6.

Hitt, M.A., Dacin, M.T., Levitas, E., Arregle, J.-L. and Borza, A. (2000), "Partner selection in emerging and developed market contexts: resource-based and organizational learning perspectives", *Academy of Management Journal*, Vol. 43 No. 3, pp. 449-467.

Hockerts, K. (2015), "A cognitive perspective on the business case for corporate sustainability", *Business Strategy and the Environment*, Vol. 24 No. 2, pp. 102-122.

Hoefer, R.L. and Green, S.E. (2016), "A rhetorical model of institutional decision making: the role of rhetoric in the formation and change of legitimacy judgments", *Academy of Management Review*, Vol. 41 No. 1, pp. 130-150.

Holsapple, C.W. and Joshi, K.D. (2000), "An investigation of factors that influence the management of knowledge in organizations", *The Journal of Strategic Information Systems*, Vol. 9 No. 2, pp. 235-261.

Huang, Y.C., Ma, R. and Lee, K.W. (2015), "Exploitative learning in project teams: do cognitive capability and strategic orientations act as moderator variables?", *International Journal of Project Management*, Vol. 33 No. 4, pp. 760-771, doi: 10.1016/j.ijproman.2014.10.004.

Hussinki, H., Ritala, P., Vanhala, M. and Kianto, A. (2017), "Intellectual capital, knowledge management practices and firm performance", *Journal of Intellectual Capital*, Vol. 18 No. 4, pp. 904-922, doi: 10.1108/JIC-11-2016-0116.

Iansiti, M. (1993), "Real-world R & D", *Jumping the Product Generation Gap. Harvard Business Review*, Vol. 71 No. 3, pp. 138-147.

Jackson, S.E., Schuler, R.S. and Jiang, K. (2014), "An aspirational framework for strategic human resource management", *Academy of Management Annals*, Vol. 8 No. 1, pp. 1-56, doi: 10.1080/19416520.2014.872335.

Jackson, S.A., Kleitman, S., Stankov, L. and Howie, P. (2017), "Individual differences in decision making depend on cognitive abilities, monitoring and control", *Journal of Behavioral Decision Making*, Vol. 30 No. 2, pp. 209-223, doi: 10.1002/bdm.1939.

Jaworski, B.J. and Kohli, A.K. (1993), "Market orientation: antecedents and consequences", *Journal of Marketing*, Vol. 57 No. 3, pp. 53-70.

Johannessen, J.-A., Olsen, B. and Olaisen, J. (1999), "Aspects of innovation theory based on knowledge-management", *International Journal of Information Management*, Vol. 19 No. 2, pp. 121-139.

Kao, S.-C. and Wu, C. (2016), "The role of creation mode and social networking mode in knowledge creation performance: mediation effect of creation process", *Information and Management*, Vol. 53 No. 6, pp. 803-816.

Kaufman, S. (1995), "At home in the universe: the search for the laws of self-organization and complexity", New York.

Kazadi, K., Lievens, A. and Mahr, D. (2016), "Stakeholder co-creation during the innovation process: identifying capabilities for knowledge creation among multiple stakeholders", *Journal of Business Research*, Vol. 69 No. 2, pp. 525-540, doi: 10.1016/j.jbusres.2015.05.009.

Kheradmand, M. and Jafari, M. (2015), "Effect of the knowledge acquisition on the strategic decision-making of industrial units' managers", *European Journal of Business and Management*, Vol. 7 No. 17, pp. 121-131.

Kianto, A., Ritala, P., Spender, J.-C. and Vanhala, M. (2014), "The interaction of intellectual capital assets and knowledge management practices in organizational value creation", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 362-375, doi: 10.1108/JIC-05-2014-0059.

Klein, H.A., Pongonis, A. and Klein, G. (2002), "Cultural barriers to multinational C2 decision making", *Proc. of the 2002 C2 Research and Technology Symposium*.

Kogut, B. and Zander, U. (2003), "Knowledge of the firm and the evolutionary theory of the multinational corporation", *Journal of International Business Studies*, Vol. 34 No. 6, pp. 516-529.

Lee, H. and Choi, B. (2003), "Knowledge management enablers, processes, and organizational performance: an integrative view and empirical examination", *Journal of Management Information Systems*, Vol. 20 No. 1, pp. 179-228, doi: 10.2307/40398621.

Leonard-Barton, D. (1995), "Wellsprings of knowledge: building and sustaining the sources of innovation".

Li, Y.-H., Huang, J.-W. and Tsai, M.-T. (2009), "Entrepreneurial orientation and firm performance: the role of knowledge creation process", *Industrial Marketing Management*, Vol. 38 No. 4, pp. 440-449.

Liang, H. and Xue, Y. (2009), "Avoidance of information technology threats: a theoretical perspective", *MIS Quarterly*, Vol. 33 No. 1, pp. 71-90, doi: 10.2307/20650279.

Liang, T.-P., You, J.-J. and Liu, C.-C. (2010), "A resource-based perspective on information technology and firm performance: a meta analysis", *Industrial Management and Data Systems*, Vol. 110 No. 8, pp. 1138-1158.

Liebeskind, J.P. (1996), "Knowledge, strategy, and the theory of the firm", *Strategic Management Journal*, Vol. 17 S2, pp. 93-107.

Ling, Y.-H. and Jaw, B.-S. (2006), "The influence of international human capital on global initiatives and financial performance", *The International Journal of Human Resource Management*, Vol. 17 No. 3, pp. 379-398.

Liu, N.C. and Liu, M.S. (2011), "Human resource practices and individual knowledge-sharing behavior - an empirical study for Taiwanese R&D professionals", *International Journal of Human Resource Management*, Vol. 22 No. 4, pp. 981-997, doi: 10.1080/09585192.2011.555138.

Madhavan, R. and Grover, R. (1998), "From embedded knowledge to embodied knowledge: new product development as knowledge management", *Journal of Marketing*, Vol. 62 No. 4, pp. 1-12, doi: 10.1177/002224299806200401.

Madhavan, R., Shah, R.H. and Grover, R. (1994), "Motivations for and theoretical foundations of relationship marketing", *AMA Winter Educator's Conference Proceedings*, pp. 183-190.

Mann, P. (2001), "Tacit knowledge in an age of reform", *International Journal of Human Resource Management*, Vol. 12 No. 1, pp. 76-90, doi: 10.1080/713769582.

Manuj, I., Omar, A. and Yazdanparast, A. (2013), "The quest for competitive advantage in global supply chains: the role of interorganizational learning", *Transportation Journal*, Vol. 52 No. 4, pp. 463-492.

Marsh, H.W. and Hocevar, D. (1985), "Application of confirmatory factor analysis to the study of self-concept: first-and higher order factor models and their invariance across groups", *Psychological Bulletin*, Vol. 97 No. 3, p. 562.

Martin, S.L., Javalgi, R. and Raj, G. (2019), "Explaining performance determinants: a knowledge based view of international new ventures", *Journal of Business Research*, Vol. 101, pp. 615-626, doi: 10.1016/j.jbusres.2019.02.041.

Marusich, L.R., Bakdash, J.Z., Onal, E., Yu, M.S., Schaffer, J., O'Donovan, J., Höllerer, T., Buchler, N. and Gonzalez, C. (2016), "Effects of information availability on command-and-control decision making: performance, trust, and situation awareness", *Human Factors*, Vol. 58 No. 2, pp. 301-321.

McDonald, R.P. and Marsh, H.W. (1990), "Choosing a multivariate model: noncentrality and goodness of fit", *Psychological Bulletin*, Vol. 107 No. 2, p. 247.

Mert, İ.S., Sen, C. and Alzghoul, A. (2022), "Organizational justice, life satisfaction, and happiness: the mediating role of workplace social courage", *Kybernetes*, Vol. 51 No. 7, pp. 2215-2232, doi: 10.1108/K-02-2021-0116.

Moldogaziev, T.T. and Resh, W.G. (2016), "A systems theory approach to innovation implementation: why organizational location matters", *Journal of Public Administration Research and Theory*, Vol. 26 No. 4, pp. 677-692.

Neffke, F. and Henning, M. (2013), "Skill relatedness and firm diversification", *Strategic Management Journal*, Vol. 34 No. 3, pp. 297-316.

Nisula, A.M. and Kianto, A. (2016), "The role of knowledge management practices in supporting employee capacity for improvisation", *International Journal of Human Resource Management*, Vol. 27 No. 17, pp. 1920-1937, doi: 10.1080/09585192.2015.1088885.

Nonaka, I. (1991), "The knowledge-creating company", *Harvard Business Review*.

Nonaka, I. (1994), "A dynamic theory of organizational knowledge creation", *Organization Science*, Vol. 5 No. 1, pp. 14-37.

Nonaka, I. and Konno, N. (1998), "The concept of 'ba': building a foundation for knowledge creation", *California Management Review*, Vol. 40 No. 3, pp. 40-54.

Nonaka, I. and Nishiguchi, T. (2001), *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation*, Oxford University Press, Oxford.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, Oxford.

Nonaka, I., Byosiere, P., Borucki, C.C. and Konno, N. (1994), "Organizational knowledge creation theory: a first comprehensive test", *International Business Review*, Vol. 3 No. 4, pp. 337-351.

North, K. and Kumta, G. (2014), *Knowledge Management: Value Creation through Organizational Learning*, Springer Science and Business Media, Berlin.

Nunnally, J.C. (1978), "An overview of psychological measurement", *Clinical Diagnosis of Mental Disorders: A Handbook*, pp. 97-146.

Ortega-Parra, A. and Sastre-Castillo, M.Á. (2013), "Impact of perceived corporate culture on organizational commitment", *Management Decision*, Vol. 51 No. 5, pp. 1071-1083, doi: 10.1108/MD-08-2012-0599.

Parboteeah, K.P., Chen, H.C., Lin, Y.-T., Chen, I.-H., Lee, A.Y.P. and Chung, A. (2010), "Establishing organizational ethical climates: how do managerial practices work?", *Journal of Business Ethics*, Vol. 97 No. 4, pp. 599-611.

Parziale, J. and Fischer, K.W. (1998), "The practical use of skill theory in classrooms", In *Intelligence, Instruction and Assessment*, Routledge, pp. 95-110.

Preacher, K.J. and Hayes, A.F. (2004), "SPSS and SAS procedures for estimating indirect effects in simple mediation models", *Behavior Research Methods, Instruments, and Computers*, Vol. 36, pp. 717-731.

Pretz, J.E., Brookings, J.B., Carlson, L.A., Humbert, T.K., Roy, M., Jones, M. and Memmert, D. (2014), "Development and validation of a new measure of intuition: the types of intuition scale", *Journal of Behavioral Decision Making*, Vol. 27 No. 5, pp. 454-467.

Qazi, A., Tamjidyamcholo, A., Raj, R.G., Hardaker, G. and Standing, C. (2017), "Assessing consumers' satisfaction and expectations through online opinions: expectation and disconfirmation approach", *Computers in Human Behavior*, Vol. 75, pp. 450-460.

Quinn, J.B., Anderson, P. and Finkelstein, S. (1996), "Leveraging intellect", *The Academy of Management Executive*, Vol. 10 No. 3, pp. 7-27.

Reed, E.S. (1982), "An outline of a theory of action systems", *Journal of Motor Behavior*, Vol. 14 No. 2, pp. 98-134.

Riaz, M.N. and Khalili, M.T. (2014), "Transformational, transactional leadership and rational decision making in services providing organizations: moderating role of knowledge management processes", *Pakistan Journal of Commerce and Social Sciences*, Vol. 8 No. 2, pp. 355-364, available at: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=97989602&site=ehost-live

Rowe, C. and Healy, S.D. (2014), "Measuring variation in cognition", *Behavioral Ecology*, Vol. 25 No. 6, pp. 1287-1292.

Rucker, D.D., Preacher, K.J., Tormala, Z.L. and Petty, R.E. (2011), "Mediation analysis in social psychology: current practices and new recommendations", *Social and Personality Psychology Compass*, Vol. 5 No. 6, pp. 359-371.

Sadler-Smith, E. (1998), "Cognitive style: some human resource implications for managers", *International Journal of Human Resource Management*, Vol. 9 No. 1, pp. 185-202, doi: 10.1080/095851998341260.

Santoro, G., Thrassou, A., Bresciani, S. and Giudice, M.D. (2021), "Do knowledge management and dynamic capabilities affect ambidextrous entrepreneurial intensity and firms' performance?", *IEEE Transactions on Engineering Management*, Vol. 68 No. 2, pp. 378-386, doi: 10.1109/TEM.2019.2907874.

Schilling, M.A. (2005), *Strategic Management of Technological Innovation*, Tata McGraw-Hill Education, New York, NY.

Scott, S.G. and Bruce, R.A. (1995), "Decision-making style: the development and assessment of a new measure", *Educational and Psychological Measurement*, Vol. 55 No. 5, pp. 818-831.

Scully, J.W., Buttigieg, S.C., Fullard, A., Shaw, D. and Gregson, M. (2013), "The role of SHRM in turning tacit knowledge into explicit knowledge: a cross-national study of the UK and Malta", *International Journal of Human Resource Management*, Vol. 24 No. 12, pp. 2299-2320, doi: 10.1080/09585192.2013.781432.

Sharda, R., Delen, D., Turban, E., Aronson, J. and Liang, T.P. (2014), *Businesss Intelligence and Analytics: Systems for Decision Support*, Prentice Hall London, Hoboken, NJ.

Simon, C.S. (1985), *Communication Skills and Classroom Success*, College-Hill Press, London.

Smith, S. and Paquette, S. (2010), "Creativity, chaos and knowledge management", *Business Information Review*, Vol. 27 No. 2, pp. 118-123.

Sobkow, A., Garrido, D. and Garcia-Retamero, R. (2020), "Cognitive abilities and financial decision making", *Psychological Perspectives on Financial Decision Making*, pp. 71-87, doi: 10.1007/978-3-030-45500-2_4.

Soon, T.T., Fisher, J. and Zainol, F.A. (2017), "An integrated view of knowledge management enablers, process and organizational performance in Malaysian enterprises", *Asian Institute of Knowledge Management*, Vol. 1 No. 1, p. 40.

Sosa, M.E., Gargiulo, M. and Rowles, C. (2015), "Can informal communication networks disrupt coordination in new product development projects?", *Organization Science*, Vol. 26 No. 4, pp. 1059-1078.

Srikanth, P. (2020), "The relative contribution of personality, cognitive ability and the density of work experience in predicting human resource competencies", *Personnel Review*, Vol. 49 No. 8, pp. 1573-1590, doi: 10.1108/PR-09-2018-0329.

Statistics, J. (2016), "Department of statistics", available at: http://dosweb.dos.gov.jo/

Taamneh, A., Alsaad, A.K. and Elrehail, H. (2018), "HRM practices and the multifaceted nature of organization performance", *EuroMed Journal of Business*, Vol. 13 No. 3, pp. 315-334, doi: 10.1108/EMJB-02-2018-0010.

Taie, M. (2014), "Skill acquisition theory and its important concepts in SLA", *Theory and Practice in Language Studies*, Vol. 4 No. 9, p. 1971.

Tanaka, J.S. and Huba, G.J. (1985), "A fit index for covariance structure models under arbitrary GLS estimation", *British Journal of Mathematical and Statistical Psychology*, Vol. 38 No. 2, pp. 197-201.

Thammasang, S. and Poonikom, K. (2016), "The development of indicators and form of knowledge management in production management case study: agricultural machine industry in the northeast of Thailand", *International Journal of Applied Engineering Research*, Vol. 11 No. 22, pp. 10912-10922.

Tsai, M.T. and Huang, Y.C. (2008), "Exploratory learning and new product performance: the moderating role of cognitive skills and environmental uncertainty", *Journal of High Technology Management Research*, Vol. 19 No. 2, pp. 83-93, doi: 10.1016/j.hitech.2008.10.001.

Tsai, F.-S., Lin, J.L. and Chen, Y.-C. (2016), "Open service innovation: proposed antecedents and moderators from knowledge-based view", *2016 Global Marketing Conference at Hong Kong*, pp. 1001-1014.

Tseng, S.-M. (2016a), "Knowledge management capability, customer relationship management, and service quality", *Journal of Enterprise Information Management*, Vol. 29 No. 2, pp. 202-221.

Tseng, S.-M. (2016b), "The effect of knowledge management capability and customer knowledge gaps on corporate performance", *Journal of Enterprise Information Management*, Vol. 29 No. 1, pp. 51-71.

Tziner, A. and Eden, D. (1985), "Effects of crew composition on crew performance: does the whole equal the sum of its parts?", *Journal of Applied Psychology*, Vol. 70 No. 1, p. 85.

Ur Rehman, S., Elrehail, H., Alsaad, A. and Bhatti, A. (2022), "Intellectual capital and innovative performance: a mediation-moderation perspective", *Journal of Intellectual Capital*, Vol. 23 No. 5, pp. 998-1024, doi: 10.1108/JIC-04-2020-0109.

Uzelac, B., Bauer, F., Matzler, K. and Waschak, M. (2016), "The moderating effects of decision-making preferences on M&A integration speed and performance", *The International Journal of Human Resource Management*, Vol. 27 No. 20, pp. 2436-2460.

VanLehn, K. (1996), "Cognitive skill acquisition", *Annual Review of Psychology*, Vol. 47, pp. 513-539, doi: 10.1146/annurev.psych.47.1.513.

Von Krogh, G., Nonaka, I. and Ichijo, K. (1997), "Develop knowledge activists", *European Management Journal*, Vol. 15 No. 5, pp. 475-483.

Walker, R.M., James, O. and Brewer, G.A. (2017), *Replication, Experiments and Knowledge in Public Management Research*, Taylor & Francis, Oxfordshire.

Wang, Z. and Wang, N. (2012), "Knowledge sharing, innovation and firm performance", *Expert Systems with Applications*, Vol. 39 No. 10, pp. 8899-8908, doi: 10.1016/j.eswa.2012.02.017.

Weinzimmer, L.G., Michel, E.J. and Franczak, J.L. (2011), "Creativity and firm-level performance: the mediating effects of action orientation", *Journal of Managerial Issues*, Vol. 23 No. 1, pp. 62-82, available at: http://www.jstor.org/stable/25822538

Wray, C. (2017), "A proposed new psychological model for judgement and decision-making: integrating the tri-partite model with hemispheric difference", *Leadership and Organization Development Journal*, Vol. 38 No. 4, pp. 549-563.

Yang, H.-D., Kang, H.-R. and Mason, R.M. (2008), "An exploratory study on meta skills in software development teams: antecedent cooperation skills and personality for shared mental models", *European Journal of Information Systems*, Vol. 17 No. 1, pp. 47-61.

Yesil, S. and Kaya, A. (2013), "The effect of organizational culture on firm financial performance: evidence from a developing country", *Procedia-Social and Behavioral Sciences*, Vol. 81, pp. 428-437.

Zack, M.H. (1999), "Managing codified knowledge", *Sloan Management Review*, Vol. 40 No. 4, p. 45.

Zander, S., Mandrella, M., Marrone, M. and Kolbe, L. (2016), "Value Co-creation in supply chains through IT integration: the role of collaborative network structure".

About the authors

Dr Hamzah Elrehail serves as an Associate Professor of Management at Abu Dhabi School of Management, Abu Dhabi, United Arab Emirates. His research spans into Leadership, HRM, Innovation management, Knowledge management and Strategy. He published several papers in ISI and Scopus indexed journals such as *Computers in Human Behaviour, Telematics and Informatics, Journal of Workplace Learning, Journal of Information Technology, Journal of Innovation and*

Knowledge and Journal of Intellectual Capital. Hamzah Elrehail is the corresponding author and can be contacted at: cs-hamzah@hotmail.com

Raed Aljahmani is currently enrolled in PhD program in Business Management at Girne American University, his research span managerial skills, knowledge management, financial analysis and financial management.

Abdallah Mohammad Taamneh is an assistant professor in the business school at Jadara University. Dr Taamneh holds an undergraduate degree in MIS from Yarmouk University, a master's degree in business administration from Yarmouk University, and a PhD in Human Resource Management (HRM) from Girne American University. His teaching and research interests are in the area of business administration and management information systems. His current research involves HRM practices, cyberloafing and technology adoption.

Abdallah Khalaf Alsaad is an Associate Professor in the business school at Jadara University. Dr Alsaad holds an undergraduate degree in MIS from Al-balqa University, a master degree in MIS from Yarmouk University, and a Ph.D. in E-business from University Utara Malaysia. His teaching and research interests are in the area of business administration and management information systems. His current research involves end user computing, cyberloafing, adoption of information technology. He has published many referred articles in journals such as Computers in Human Behavior and Telematics and Informatics

Manaf Al-Okaily serves as an Assistant Professor of Accounting Information Systems (AIS) at Jadara University, Jordan. Al-Okaily earned his Doctor of Philosophy in AIS from University Malaysia Terengganu, Malaysia. His current research interest is in the domain of Digital Transformation in Accounting and Finance, Intelligent Accounting Systems, as well as FinTech Services Acceptance and Adoption. Al-Okaily has published more than 35 scholarly articles in reputable and leading academic journals including Information Technology and People, Technology in Society, EuroMed Journal of Business, Kybernetes Journal, VINE Journal and the TQM Journal. On top of that, he has reviewed several referred articles in highly ranked journals (e.g. Scopus and Clarivate Analytics).

Okechukwu Lawrence Emeagwali is a Prof. Dr at Girne American University, Head of Business Management and Director Center for Management Research (CMR). His research focus on Strategic Management and leadership.