

## **Impact of information technologies and social networks on knowledge management processes in Middle Eastern audit and consulting companies**

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# IMPACT OF INFORMATION TECHNOLOGIES AND SOCIAL NETWORKS ON KNOWLEDGE MANAGEMENT PROCESSES IN MIDDLE EASTERN AUDIT AND CONSULTING COMPANIES

## Abstract

**Purpose** – *The purpose of this study is to examine the impact of information technologies and technology-enabled social networks on the efficiency of knowledge management processes in the Middle Eastern audit and consulting companies.*

**Methodology** – *Scientific literature analysis, structural equation modeling and expert evaluation (structured questionnaire) were used in order to develop the research model, collect data from the audit and consulting companies' experts and test the research hypotheses.*

**Findings** – *The empirical results of this research supported the hypotheses stating that information technologies and social networks positively affect the knowledge management cycle, including five processes (acquisition, creation, storage, sharing, and application) within the Middle Eastern audit and consulting companies.*

**Research limitations** – *The research results were generated from the Middle Eastern audit and consulting companies, which form a limitation concerning the geographical area and the business sector.*

**Practical implications** – *From the results of this study, audit and consulting companies, as well as organizations and society broadly, would benefit via the positive effect of information technologies and technology-enabled social networks on the whole knowledge management cycle, which has a further impact on organizational performance. These practical implications are related to a more open, sharing culture that drives organizational performance to the members and stakeholders of organizations, which in turn, benefits society.*

**Originality/Value** – *This research analyzes information technologies and technology-enabled social networks' impact on knowledge management processes, particularly in the context of the Middle Eastern audit and consulting companies. While the phenomena have received some attention in the prior scientific research, the studied context so far remained under-researched, where a gap is found in studying the knowledge management cycle as a whole.*

**Keywords** *Information technologies, Social networks, Knowledge management, Knowledge management processes, Knowledge management cycle, audit and consulting companies*

**Paper type** *Research paper*

## 1. Introduction

Globalization and technological advancements have brought many business challenges. Technological innovation increases creativity demand and contributes to growing market competition, with driving organizations seeking uniqueness and new opportunities in order to satisfy customer needs and enhance organizational performance (Akbari and Ghaffari, 2017; Raudeliūnienė et al., 2018a, 2019). Information technologies and technology-enabled social networks, actively used by more than 50% of the world's population, have changed the means of communication and exchange of knowledge, products, and services. These changes make the adoption of such techniques a necessity for the organizations globally, with the global COVID-19 pandemic only increasing this necessity. Therefore, organizations are facing the risk of losing their customers and market share in case they resist to adapt quickly to the dynamic changes caused by globalization, technology development or other turbulences in the environment (Tubigi and Alshawi, 2015; Chhim et al., 2017).

In the context of knowledge-based economy globalization, technology development and transformation, knowledge management is an efficient tool for seeking the desired organizational objectives, increasing organizational performance, and creating uniqueness and market leadership (Du Plessis, 2007). Knowledge management theories and a process-based knowledge management cycle elaborated from these theories and based on this elaboration have created a foundation for efficiently managing an organization's knowledge potential and creating strategic knowledge management decisions in a dynamic and uncertain environment with limited organizational resources (Marques and Simón, 2006; Lee and Lee, 2007; Pandey et al., 2018; Raudeliūnienė et al., 2016, 2018a, 2018b, 2019).

Considering the role of technology in transforming tacit knowledge into explicit knowledge, and personal knowledge into organizational knowledge (Korbi and Chouki, 2017), the need to adopt new technologies and interactive

knowledge management methods became a requirement for organizations. These methods would lead to satisfy dynamic customer needs and to achieve desired objectives through leveraging dynamic organizational capabilities (Teece et al., 2016). Furthermore, in the context of developing economies with weaker institutional arrangements (Khan et al., 2016), this need becomes even more evident due to the character of a catching-up and rapidly developing environment (Al-Roubaie and Al-Ameen 2015; Kassab 2016; Al Shamsi and Ajmal, 2018).

Thus, the research of the relationship between technological factors such as information technologies and technology-enabled social networks within organizations and the efficient knowledge management cycle became necessary for developing countries (Al-Roubaie, 2013; Al-Roubaie and Al-Ameen, 2015). The related studies in the Middle East region are still rare, and research results demonstrate that almost half of the available knowledge resources are not properly utilized for achieving organizational goals, improving organizational performance, developing knowledge infrastructure, innovation, and inventions in the industries (Al-Roubaie, 2013; Elwany and Mahrous, 2016; Kassab, 2016; Tummappudi, 2016). Prior studies have associated the latter to the lack of international collaboration and strategic alliances for applying knowledge management practice in addition to the high organizational costs that require implementing the needed technology and training the staff accordingly (Al Roubaie, 2013; Ahmed and Al-Roubaie, 2012; Al-Roubaie and Al-Ameen, 2015).

In order to compete with the organizations which have already successfully applied knowledge management principles globally, scientists alike urge the Middle Eastern companies and developing economies to employ the knowledge management practices (Al-Roubaie and Al-Ameen, 2015; Kassab, 2016; Al Shamsi and Ajmal, 2018). This is particularly evident for such sectors as audit and consulting, where a response to new challenges is based on the knowledge accumulated from the prior projects (Tarek et al., 2017). Accordingly, previously created and acquired knowledge should be carefully stored and shared, either through electronic documents within information repositories or through interpersonal communication (Janicot and Mignon, 2012). As a result, the auditors could benefit from available knowledge and techniques in order to respond to the problems faced by their customers. Thus, the advancement of technology is considered as a significant factor that affects the audit and consulting activities, where all accounting and auditing processes are currently taking place through the usage of technology and accounting software (Tarek et al., 2017).

Scientists and business practitioners analyze a variety of knowledge management cycles and distinguish between different combinations of knowledge management processes. Based on previous studies (Raudeliūnienė et al. 2016, 2018a, 2018b, 2019), the knowledge management cycle includes knowledge management processes such as knowledge acquisition, knowledge creation, knowledge storage, knowledge sharing and knowledge application which are investigated.

The purpose of this study is to examine the impact of information technologies and technology-enabled social networks on the efficiency of knowledge management processes in the Middle Eastern audit and consulting companies. The audit and consulting sector provides and delivers a wide range of services such as accounting, auditing, compliance, financial reviews, financial advisory, taxation and consulting services conducted by auditors and certified public accountants (CPAs). A scientific literature review was conducted and empirical results were collected using a survey strategy, the data were analyzed using structural equation modeling, and expert evaluation (structured questionnaire) was applied to validate the research results.

## **2. Literature review**

### **2.1. Knowledge and knowledge management**

Knowledge is considered amongst the most crucial assets and critical organizational resources (Linderman et al., 2004; Schiuma et al., 2012; Wee and Chua, 2013; Mahdi et al., 2019). It is defined as the gain of certain understanding, reasonable beliefs and personal capabilities (Wu and Lee, 2007; Hanadeh et al., 2008; Shahzad et al., 2016), and the combination of know-how, techniques, judgments, perspectives and values that people hold during their life (Wu and Lee, 2007; Hanadeh et al., 2008; Shahzad et al., 2016). Davenport and Prusak (1998) studying knowledge in organizations see it as a combination of experience, values, contextual information, and expert insight (Davenport and Prusak, 1998). Knowledge is developed through combining internal and external organizational resources and competences in order to solve business problems, improve business performance, increase innovation (Inkinen, 2016), and achieve organization's uniqueness and success (Chou et al., 2005; Vrandečić et al., 2005; Jung et al., 2007; Wee and Chua, 2013; Henttonen et al., 2016; Akbari and Ghaffari, 2017; Archer-Brown and Kietsmann, 2018; Mahdi et al.,

2019). Given the importance of knowledge, organizations should consider how to obtain, store, access and share it (Chou et al., 2005; Jones and Mahon, 2012; Fang et al., 2013). Accordingly, knowledge and knowledge management are perceived as the sources of organizational uniqueness and leadership (Raudeliūnienė et al., 2016, 2018a, 2018b, 2019).

Knowledge management serves as a supporting system for any organization (Marques and Simon, 2006; Chang and Lin, 2015; Wahba, 2015; Hwang, 2016; Hashemi et al., 2018). It consists of a set of rules and strategies that combine technology, business processes, software engineering, human resource management, and organizational behavior (Lee and Roth, 2008; Chugh et al., 2015; Shahzad et al., 2016). Knowledge management aims to facilitate the processes of acquisition, creation, storage, sharing and application of knowledge within an organization and across organizational boundaries (Tubigi and Alshawi, 2015; Henttonen et al., 2016; Muthuveloo et al., 2017; Shamim et al., 2019) in order to support innovation and creativity, enhance the quality of decision making, and increase organizational performance (Marques and Simon, 2006; Ranjbarfard et al., 2014; Raudeliūnienė and Szarcki, 2019).

Based on scientific literature review results, the knowledge management processes examined so far, do not have a clear knowledge management structure and feedback aspects, required for the evaluation of the whole knowledge management cycle (Raudeliūnienė and Szarcki, 2019). This study builds upon a model of knowledge management previously developed by Raudeliūnienė et al. (2018a, 2019). This model is selected as the knowledge management processes highlighted in it (knowledge acquisition, knowledge creation, knowledge storage, knowledge sharing, and knowledge application) provide assumptions for efficient management of organizational knowledge.

Scientists and business practitioners not only distinguish between different knowledge management models, cycles and processes combinations but also define knowledge management processes differently (Henttonen et al., 2016; Lee et al., 2016; Acharya and Mishra, 2017; Chhim et al., 2017; Kaba and Ramaiah, 2017; Kansakoski, 2017; Sumbal et al., 2017; Youssef et al., 2017; Ali et al., 2018; Chen et al., 2018; Le and Lei, 2018; Mirzaee and Ghaffari, 2018; Pandey et al., 2018; Rafique et al., 2018). For these reasons, it is crucial to analyze and define the selected knowledge management processes in more detail (Table I).

Knowledge acquisition is the process of catching and gathering knowledge from different sources inside and outside of an organization (Pandey et al., 2018; Wang et al., 2019). Knowledge sources and channels for knowledge acquisition may take such forms as interpersonal and inter-organizational interactions, documented (codified) knowledge (such as reports and manuals), and others (Dokas and Panagiotakopoulos, 2006; Ramachandran et al., 2009; Wang et al., 2019). Knowledge acquisition process depends on the capacity of an organization to identify, realize and capture knowledge that leads to the improvement of the organizational performance (Henttonen et al., 2016; Pandey et al., 2018).

Knowledge creation is the process of generating new knowledge for which the existing knowledge is a prerequisite. It is described as the development of new know-how, unique expertise, and new activities within an organization (Wang et al., 2006; Ceptureanu et al., 2018; Mahdi et al., 2019). Knowledge creation is the process of generating new substance that contributes to the organization's development (Henttonen et al., 2016; Ceptureanu et al., 2018), it is the primary key to innovation, uniqueness, and efficiency within an organization (Choi and Lee, 2002; Ceptureanu et al., 2018; Shujahat et al., 2019).

Table I

Knowledge storage is the process of categorizing knowledge and saving it in the organization's repositories and databases (Franco and Mariano, 2007; Feghali and El Den, 2008; Supyuenyong et al., 2009; Ramachandran et al., 2009; Mishra and Bhaskar, 2011; Ranjbarfard et al., 2014; Chang and Lin, 2015; Sangari et al., 2015; Tongo, 2016; Henttonen et al., 2016; Acharya and Mishra, 2017; Sumbal et al., 2017; Ceptureanu et al., 2018; Mahdi et al., 2019). The knowledge stored consists of employees' skills, organizational culture, formal strategies, systems, manual and document management (Franco and Mariano, 2007; Feghali and El Den, 2008; Mishra and Bhaskar, 2011; Sumbal et al., 2017). Knowledge storage helps to transform tacit knowledge into explicit knowledge and accumulate knowledge into accessible repositories through adequate networks and information technology devices, systems and processes, along with the people's skills and experiences (Chang and Lin, 2015, Henttonen et al., 2016; Acharya and Mishra, 2017). Knowledge should be organized and stored in order to facilitate its access and dissemination within the organization, which can improve the efficiency of the organization's activities (Raghu and Vinze, 2007; Supyuenyong

et al., 2009; Franco and Mariano, 2010; Henttonen et al., 2016; Acharya and Mishra, 2017).

Knowledge sharing is the process of exchanging knowledge, thoughts, expertise and skills between different parties within the organization or between various organizations. The internal exchange of knowledge could happen between the individuals or units whereas the external exchange takes place within partnerships, joint ventures and other forms of relationships between organizations (Franco and Mariano, 2007; Sangari et al., 2015; Lee et al., 2016), with organizations becoming increasingly more interdependent (Dyer and Singh, 1998). Knowledge sharing contributes to enhancing goods, services, and processes as well as organizational capacities such as innovation, development, problem-solving, efficiency and profitability (Strach and Everett, 2006; Christensen, 2007; Youssef et al., 2017; Chen et al., 2018; Le and Lei, 2018; Rafique et al., 2018).

Knowledge application implies the utilization of knowledge that was created, acquired, or stored (Franco and Mariano, 2007; Pandey et al., 2018). Knowledge application makes knowledge more relevant and useful in solving problems, increasing efficiency, enhancing the decision-making process, and improving the organizational performance (Lopez and Esteves, 2013; Wahba, 2015; Kansakoski, 2017). Knowledge application similarly to value capture in the business model terms (Saebi and Foss, 2015) constitutes a crucial part of the overall knowledge management processes because it enables the organization to benefit from the knowledge available (Chhim et al., 2017; Pandey et al., 2018) which leads to an improvement in the overall organizational performance.

Efficient knowledge management processes require the utilization of adequate information technologies as well as technology-enabled social networks that include organizational systems and networking. Those, in turn, constitute the means of communication and the link between employees and knowledge, since they enable gathering and integrating knowledge from many organizational sources into one place reachable by the employees (Franco and Mariano, 2010; Saenz et al., 2012; Kim and Choi, 2018).

## **2.2. Information technologies and knowledge management**

Within knowledge management processes, information technologies serve as a facilitator, support, an enabler, and a contributor (Wang et al., 2006; Dang et al., 2018). Information technologies are applied to manage the organizational knowledge capital (Muthukumar and Hedberg, 2005), facilitate knowledge management implementation, aid reductions of the time spent, and space barriers (Pinho et al., 2012; Rathi et al., 2014). Information technologies are widely employed to connect people with reusable codified knowledge and to create, share, store, and use knowledge efficiently (Al Alawi et al., 2007; Lee and Lee, 2007; Mehta 2008; Podrug et al., 2017).

Information technologies are a generic term fundamentally used to refer to programs, computers, and telecommunications. Information technologies such as hardware, software, databases, bulletin boards, electronic forums and so on provide effective knowledge storage and sharing mediums (Casimir et al., 2012; Pérez-López et al., 2012; Rathi et al., 2014; Podrug et al., 2017). Furthermore, information technologies represent an enabler for knowledge sharing through eliminating the barriers and decreasing the time and efforts needed to transfer a specific piece of knowledge (Lee and Lee, 2007; Kim and Choi, 2018; Dang et al., 2018). It is also a contributor to knowledge application since it permits the usage of appropriate knowledge once the knowledge is accessed (Rathi et al., 2014; Khedhaouria and Jamal, 2015; Valmohammadi and Ghassemi, 2016; Chhim et al., 2017; Dang et al., 2018).

Information technologies support knowledge storage through retaining and organizing the records, experiences and knowledge of an organization, so, the employees can leave the company, but their experiences will be stored and documented in the databases that can be accessed by other employees to benefit from it (Lee and Lee, 2007; Narteh, 2008; Mehta, 2008; Franco and Mariano, 2010; Moreno and Cavazotte, 2015; Dang et al., 2018). Most companies do not face a lack of knowledge or access to it, but they fail to apply it efficiently (Moreno and Cavazotte, 2015; Kim and Choi, 2018). While companies may face challenges to find and retrieve the knowledge available, information technologies help improving knowledge management processes in either formal or informal ways that will affect organizational performance.

Based on scientific studies results, the impact of information technologies on the knowledge management cycle is very limited. Besides, most of the previously carried out studies are not examined the whole knowledge management cycle. These studies analyze only a specific knowledge management process such as knowledge sharing (Al Alawi et al., 2007; Podrug et al., 2017), retention and retrieval (Franco and Mariano, 2010), knowledge acquisition, transfer and reuse (Moreno and Cavazotte, 2015), knowledge management implementation (Valmohammadi and Ghassemi, 2016) and so on. Also, prior works studying the impact of information technologies on certain knowledge management processes have certain limitations (Table II).

Table II

Based on previous scientific studies results, this research identifies information technologies as a valuable tool for efficient knowledge management cycle (knowledge acquisition, creation, storage, sharing, and knowledge application) in order to implement a knowledge strategy and to achieve the desired organizational performance outcomes.

The main value of this study is to test the impact of information technologies on the whole knowledge management cycle (knowledge acquisition, creation, storage, sharing, and application) in order to find out the impact of information technologies on knowledge management practices in the Middle Eastern audit and consulting companies and how to efficiently integrate them into the whole knowledge management cycle for successful implementation of knowledge strategy and achievement of desired outcomes.

In order to test the positive impact of information technologies on knowledge management processes in Middle Eastern audit and consulting companies, the following hypotheses are proposed (Figure 1):

H1a: Information technologies positively affect the knowledge acquisition process

H1b: Information technologies positively affect the knowledge creation process

H1c: Information technologies positively affect the knowledge storage process

H1d: Information technologies positively affect the knowledge sharing process

H1e: Information technologies positively affect the knowledge application process

### **2.3. Social networks and knowledge management**

Social networks are defined as a vital source of reliable, trusted knowledge, online communities (Jones and Mahon, 2012), social media (Ding et al., 2013), self-organizing systems, knowledge networks (Sedighi et al., 2018) and social capital (Archer-Brown and Kietzmann, 2018). Furthermore, technology-enabled social networks place the knowledge in a specific context (Štrach and Everett, 2006), operate through individuals and systems (Christensen, 2007), refer to the existing strength of social ties between the knowledge provider and the knowledge recipient (Tangaraja et al., 2015), increase trust between members (Tangaraja et al., 2015) and allow users to share interests or practices through a computer-mediated system (Sedighi et al., 2018). Technology-enabled social networks allow the use of dynamic, emergent, continuous communication and collaborative environment (Sedighi et al., 2018) and facilitate the effective dissemination of tacit knowledge (Ding et al., 2013).

While previous means of communication focused on one-to-one communication, technology-enabled social networks emerged to create a new structure for connecting people. They became the basic model for reaching information, people, and thoughts across distance (Boyd, 2015). Following the fast-growing popularity of social networks between individuals, organizations became interested in similar online platforms for their employees. Scientists are differentiating between information technologies and social networks in the corporate context where organizations benefit from new types of interaction, leading to more efficient communication, collaboration, employees' engagement and participation in different projects and innovative activities. These networks constitute a feedback channel and create an open culture for communication and knowledge exchange (Richter et al., 2016; Cetto et al., 2018). Since connections between individuals are as important as the individuals themselves, the opportunities that social networks offer to businesses increase their importance, especially for such activities as recruitment, marketing, and business advancement or innovation (Fish et al., 2019). While explicit knowledge could be embedded in information repositories, tacit knowledge is embedded in the enterprise social networks, including the technology-enabled social networks that influence both individuals' emotional and behavioral reactions, which affect the performance outcomes. The transfer of tacit knowledge depends on the social networks which motivate individuals to exchange their knowledge by surpassing the geographical and departmental boundaries (Shams et al., 2019), resulting in more open communications with more participants (Huang, 2017; Cetto et al., 2018).

According to Archer-Brown and Kietzmann (2018), social networks recognize the relational aspects between human participants, the extent to which the value of knowledge and expertise flows between individuals and groups to generate value. Also, social networks enable dialogues and communication between individuals to clarify the knowledge transferred (Ding et al., 2013).

In sum, there are many ways to define social networks, and the more generic ones see them as 'human interactions': *'Each individual (called ego) has a social network, defined as a set of actors or alters who have relationships or ties with the ego, and who may or may not have ties with each other'* (Carrasco and Miller, 2006).

Social networks are characterized by the availability of knowledge in a specific context such as the internet, intranet, email, and groupware, which constitute the systems for managing knowledge and supporting inter-organizational collaboration and activities by enabling knowledge sourcing and sharing through connecting individuals and groups with each other. Additionally, social networks are considered as a facilitator of the knowledge management processes since networking between individuals, customers, suppliers and other participants is the main factor that leads to the creation and acquisition of new knowledge and contributes to the exchange and accessibility of knowledge (Štrach and Everett, 2006; Christensen, 2007; Pinho et al., 2012; Tangaraja et al., 2015; Archer-Brown and Kietzmann, 2018; Sedighi et al., 2018).

Technology-enabled social networks permit more significant direct interaction and faster advancement and employment of knowledge (Jones and Mahon, 2012). The communication channels and other smart systems make it easier to find knowledge when required and enable real-time contact between individuals (Guechtouli et al., 2013; Ding et al., 2013; Tangaraja et al., 2015; Sedighi et al., 2018; Jiang et al., 2019). Technology-enabled social networks lead to improving the process of innovation and capturing new ideas where participants can choose the parties they want to communicate with and the knowledge they want to collect or share (Archer-Brown and Kietzmann, 2018; Sedighi et al., 2018).

Based on previous studies, scientists and business practitioners recognized the importance of social networks within organizations. Prior research results although show that social networks have a positive influence only on specific knowledge management processes: knowledge donating and knowledge collecting (Tangaraja et al., 2015), knowledge sharing and contribution (Henttonen et al., 2013; Sedighi et al., 2018; Jiang et al., 2019). A review of the prior research reveals that there is a lack of studies analyzing the impact of social networks on an entire knowledge management cycle (Table III).

Table III

Following the research focus towards knowledge management, this research identifies technology-enabled social networks as human and technology interaction and a useful tool for efficient knowledge management (knowledge acquisition, creation, storage, sharing, and knowledge application) for successful implementation of knowledge strategy and achievement of desired outcomes.

In order to test the positive impact of technology-enabled social networks on knowledge management processes in Middle Eastern audit and consulting companies, the following hypotheses are proposed (Figure 1):

- H2a: Social networks positively affect the knowledge acquisition process
- H2b: Social networks positively affect the knowledge creation process
- H2c: Social networks positively affect the knowledge storage process
- H2d: Social networks positively affect the knowledge sharing process
- H2e: Social networks positively affect the knowledge application process

Figure 1. Research model

The research model (Figure 1) reveals the relationship between the different variables where information technologies and technology-enabled social networks affect the knowledge management cycle. The whole knowledge management cycle includes the five knowledge management processes (acquisition, creation, storage, sharing, and application) that lead to an improvement in the overall organizational performance.

## 2.4. Middle Eastern context

Knowledge management as a phenomenon and as a research topic has received considerable attention in the context of developing, predominantly western economies like the ones relying on knowledge as a source of innovation and growth (Kaur and Singh, 2016). The developing economies, including the catching-up economies of the Middle East,

while acknowledging the need for effective knowledge management, are struggling with multiple economic and geopolitical constraints (Kassab, 2016). Such conditions make these developing regions and the phenomenon of knowledge management within them less explored yet important to understand to support further countries' development and their potential transition towards a knowledge-based model (AlShamsi and Ajmal, 2018; Kaur and Singh, 2016).

While most of the Middle East countries are suffering from the shortage of strategic plans for sustainable development due to wars and armed conflicts, growing population, youth unemployment, corruption, limited entrepreneurship, water scarcity, pollution, urbanization, and poverty, the Middle Eastern companies are suffering from the lack of strategic alliances, economic opportunities, global cooperation, a challenge of reputation building to match the global international ranking (Khan et al., 2016). All leading issues are related to inadequate employment of technologies, and an increase in the operating and personnel costs. The challenges that Middle Eastern companies have faced range from economic, as global and local economic crises, to organizational, cultural and social difficulties (Paterson, 2009). Audit and consulting companies, like any professional service sector, particularly face the challenge of aligning the local social, cultural and business norms with the international standards as International Financial Reporting Standards (IFRS), Total Quality Management System (TQM) or International Standards Organization (ISO) certification (Mirza et al., 2010; Mezher et al., 2005). Knowledge is sourced from overseas in most of the cases, which requires a cognitive shift towards a knowledge-based approach called to support social and economic development. In order to accomplish these alterations, multiple change actions are needed, including modifying institutional arrangements (Khan et al., 2016) that allow benefiting from the knowledge available, enhancing the individuals' education, extending the usage of information technologies, including platform-based social networks to communicate the knowledge, as well as encouraging innovation, research and development effectively, in order to create new knowledge (Kassab, 2016; Al-Roubaie and Al-Ameen 2015; Al-Roubaie, 2013). In the knowledge-based economies, the service sectors such as audit and consulting are more likely to contribute to the wealth generation than the manufacturing sectors. One of the significant challenges have faced by the audit and consulting companies in the Middle East region is the technological advancement that has changed the traditional systems to more developed systems relying on information technologies especially the accounting software for conducting the daily operations and processes, and the technology-enabled social networks for the communication with the stakeholders and the exchange of the required knowledge (Tarek et al., 2017).

Lebanon is an example of an economy facing fluctuations caused by wars, political, civil conflicts within the country, as well as at the neighboring territories, for example, Syria and the Syrian crisis. Those increase poverty and unemployment also through increasing the refugee flows (1.5 million Syrians since the conflict erupted in March 2011) (The World Bank, 2019). At the same time, an increase in the country GDP growth rate is forecasted, and the human capital in Lebanon is also characterized as increasing (The World Bank, 2020), which has a potential to create conditions favoring efficient knowledge exchange and management for economic growth (Elwany and Mahrous, 2016). That is why Lebanon is an interesting and yet unstudied context to take a look at, while the sector of audit and consulting companies offers a mixture of both multinational and local companies, which allows tracking the effects of information technologies and technology-enabled social networks within both international and national standards.

### **3. Research methodology**

The existing scientific literature lacks an examination of the impact of information technologies and technology-enabled social networks on the knowledge-intensive sector as audit and consulting practices, and specifically in developing regions such as the Middle East. This is one of the sectors affected by technologies that have changed the audit activities from the traditional audit, which is based on gathering the needed documentary evidence, to the information technology audit, which is based on technological platforms and software. Big audit and consulting companies started investing in information technologies and computer software in order to improve the audit process and facilitate knowledge management processes. That created a challenge of adopting and implementing these technologies for smaller companies due to their limited resources (Tarek et al., 2017).

Accordingly, this research is designed as an empirical study to test the relationship between variables, where information technologies and social networks represent the independent variables and the knowledge management processes (knowledge acquisition, knowledge creation, knowledge storage, knowledge sharing, and knowledge application) represent the dependent variables.

A structured questionnaire was used to gather the data required for research hypotheses testing. The questionnaire was distributed among certified auditors, members of the Lebanese Association of Certified Public Accountants, who owns



local audit and consulting companies, representing the small and medium companies or work for multinational audit and consulting companies, representing mainly the Big Four (PWC, KPMG, EY, and Deloitte) in the Middle East region. For expert evaluation, 500 auditors were reached during April 2019, 210 of them responded and filled up the questionnaire, which resulted in a response rate of 42%. The study involved (75.72%) of males and (24.28%) of females, aged between 25 years and 35 years (45.24%) and between 35 years and 45 years (21.43%), holding a master's degree (37.14%) and certified public accountants (34.76%), operating in upper management positions (31.9%) and senior positions (26.67%), working in local companies (72.86%) and multinational companies (27.14%) (Table IV).

Table IV

The basis for the data collection and analysis is a field study in which respondents answered all questions based on a five-point Likert-scales ranging from "1" meaning "strongly disagree" to "5" indicating "strongly agree". In addition, factors used to consider each of the constructs were obtained from prior scientific research. The survey questions provided a valued source for data gathering, and measurement as their reliability and validity have been verified through previous research and peer reviews.

The knowledge acquisition process was evaluated through the ability to acquire knowledge used for developing specific programs, and the process of acquiring expertise and intelligence (Buheji, 2013; Ali et al., 2018). The knowledge creation process was evaluated through the generation of best practices from previous projects to improve future projects, the quick usage of new opportunities to serve the clients, and the delivery of the new services depending on the market demands (Lin, 2007; Buheji, 2013; Wu and Chen, 2014; Ali et al., 2018). The knowledge storage process was evaluated through the availability of customer information database and knowledge database that are easy to access (Lin, 2007; Ramachandran et al., 2009; Buheji, 2013; Yusr et al., 2017). The knowledge sharing process was evaluated through the ability to share the necessary knowledge with colleagues, with stakeholders, and among business units (Casimir et al., 2012; Buheji, 2013; Fullwood et al., 2013; Mura et al., 2013; Dijk et al., 2016; Ali et al., 2018). The knowledge application process was evaluated through converting knowledge into action plans, and matching sources of knowledge to problem solving, and using the knowledge efficiently to reach specific goals (Lin, 2007; Ramachandran et al., 2009; Casimir et al., 2012; Buheji, 2013; Fullwood et al., 2013; Dijk et al., 2016; Ali et al., 2018).

Information technology factor was evaluated through the usage of information technologies to create and acquire knowledge, to access knowledge easily, and to facilitate knowledge sharing and application (Ramachandran et al., 2009; Casimir et al., 2012; Buheji, 2013; Fullwood et al., 2013; Yusr et al., 2017; Ali et al., 2018).

Social networks factor was evaluated through the support of innovative capabilities and acquisition of new knowledge from many sources, the availability of internal and external networks for sharing knowledge, and the usage of social networks for better knowledge storage and knowledge application (Lin, 2007; Buheji, 2013; Fullwood et al., 2013; Ali et al., 2018).

The distributed research survey includes three questions related to each knowledge management process (acquisition, creation, storage, sharing, and application), five questions related to information technology, and seven questions related to social networks. The reliability of the survey questions and the internal consistency between the questions related to each factor were tested and proved through Cronbach's alpha, and the validity of the survey questions was tested and proved through the Average Variance Extracted (AVE) values (Table V for a description of the variables and Table VII for Cronbach's alpha and AVE values).

In order to test the research hypotheses, the study employed correlation and structural equation modeling (SEM) techniques, which use various types of models to depict relationships among observed variables, aiming to provide a quantitative test of a theoretical hypothesized research model.

#### **4. Research results and discussion**

Research results present the mean values and the standard deviation (SD) for each construct, including knowledge acquisition, creation, sharing, storage and application in addition to information technologies and social networks (Table V). The results generated are based on a five-point Likert-scales questionnaire ranging from 1 to 5. After analyzing the results and considering the responses average, three ranges were identified. In case the mean is more

than or equal to 3.75, then the respondents have highly agreed to the statement. In case the mean is between 2.75 and 3.74, then the respondents were on a medium agreement with the statement, and in case the mean is below 2.75, then respondents were on a low agreement with the statement.

Respondents highly agreed to the following constructs related to knowledge management processes: knowledge is shared among colleagues (4.21); organization can match sources of knowledge to problem solving (4.12); organization applies knowledge efficiently to reach its goals (4.09); organization has the capability to share relevant knowledge among business units (4.07); organization quickly uses new opportunities to serve the clients (4.06); organization keeps customer information database that is easy to access (4.06); organization has knowledge database that is easy to access (4.02); organization can convert knowledge into action plans (3.88); organization has an ability to acquire knowledge used to develop specific programs (3.87); organization generates best practices from previous projects to improve future projects (3.85); organization provides new services depending on the market demands (3.85); organization has a clear process for acquiring expertise (3.78); organization writes case notes on all executed projects (3.78); and organization always shares its knowledge with its stakeholders (3.76) (Table V). Thus, internal (intra-organizational) communication (Brennecke and Rank, 2017) as well as openness, fast response to the external factors (markets, stakeholders) and related absorptive capacity (Cohen and Levinthal, 1990) appear the most salient as per respondents. What is also noticeable in these results is a strong accent on adaptability (particularly in such items as 'match', 'quickly uses' and salient 'knowledge sharing' within the organization and beyond organizational borders). This adaptability might be closely related to the dynamic capabilities of sensing, seizing and reconfiguring, theorized by Teece (1997). The relevance of these capabilities found by this study might be explained by the particular turbulence of the Lebanon context. It may point to a more substantial need in developing these capabilities for particularly knowledge management processes. Besides, respondents highly agreed to the following constructs related to technological factors: organization uses information technologies to acquire a wide range of knowledge (4.21); to facilitate the process of knowledge creation (4.20); organization uses repositories to store knowledge for easy access (4.19); organization uses information technology that facilitates the application of knowledge (4.11); allows employees to share knowledge (4.04); and uses different social networks for communication (3.75) (Table V). These factors mostly relate to the knowledge search breadth (Iorio et al., 2017), which may signal that broader access to information and overcoming the information asymmetries (Greenwald and Stiglitz, 1990) might present the major knowledge management tasks in the studied context. That might additionally highlight the context of developing and turbulent economy, like Lebanon, where the knowledge on professional services is sourced from overseas with a challenge to understand what particular pieces of that knowledge might be specifically relevant for such a different local context and how to adapt to the international standards. Some earlier considerations of these challenges are mentioned by Mezher et al. (2005) – one of a very few studies on knowledge management in the consulting sector in Lebanon, a qualitative case study, which is focused particularly on engineering consulting by Dar Al-Handasah. This study aids the scarce body of scientific literature on the Lebanon context as it offers a holistic quantitative perspective towards the sector of audit and consulting companies.

The remaining constructs and factors demonstrate a medium level of agreement and include: the organization has internal social networks for sharing knowledge (3.70); the organization has a clear process for acquiring intelligence (3.69); social networks enable employees to acquire new knowledge from many sources (3.63); the organization has external social networks for sharing knowledge (3.57); the organization has suitable social networks that support innovative capabilities (3.41) and enable the employees to apply the knowledge available better (3.41); and social networks are considered as a system for knowledge storage (3.23) (Table V). These represented factors mostly related to social networks usage, internal knowledge acquisition and processing. As those show a moderate level of agreement, they might be considered as less developed or yet more challenging aspects for the studied context. The analysis of the difference in usage of information technology and social networks between local and multinational companies demonstrates the moderate usage of social networks, which scored the lowest percentages in local companies (Table V).

Table V

In order to identify the differences between local and multinational audit and consulting companies, in this survey participated 153 experts operating in local companies and 57 operating in multinational companies such as PWC, KPMG, EY, and Deloitte. Considering the large number of local audit and consulting companies in Lebanon and the Middle East compared to the limited number of multinational companies (mainly the Big Four), the majority of experts

participating in this survey represented local companies. The responses from both types of companies in the Middle East region were analyzed. The research results have illustrated the percentage of respondents who agreed that the usage of information technologies and technology-enabled social networks in both local and multinational companies support five knowledge management processes (acquisition, creation, storage, sharing, and application) constituting the whole knowledge management cycle. In addition, independent samples t-test was conducted resulting in the mean, standard deviation, t value, degree of freedom (df), and significance (p) for both groups (local and multinational audit and consulting companies) usage of information technologies and social networks in support of the five knowledge management processes.

Comparing the results for both information technology and social networks factors in relation with each process, the difference is revealed between the percentage of experts in local and multinational companies which agreed that the usage of information technology in their organizations supports knowledge acquisition (100% in multinational > 70.6% in local), knowledge creation (100% in multinational > 60.8% in local), knowledge storage (87.7% in multinational > 75.8% in local), knowledge application (86% in multinational > 75.8%), and knowledge sharing (77.2% in multinational > 66.7% in local). Experts also agreed that the usage of social networks supports knowledge acquisition (77.2% in multinational > 52.3% in local), knowledge application (68.4% in multinational > 42.5% in local), knowledge sharing (64.9% in multinational > 52.3% in local), knowledge storage (58.8% in multinational > 32.7% in local), and knowledge creation (57.9% in multinational > 35.9% in local). All percentages were greater in multinational companies than in local companies, which may be associated with different reasons. First, the ability of multinational companies to invest in technology is more than local companies can do, due to the shortage in their resources being the case of all developing countries. Moreover, having their subsidiaries located in different countries worldwide and especially in developed countries, multinational companies can reach the latest technology available and benefit from outsourcing it at a lower cost. Experts, working in multinational audit and consulting companies, are granted the opportunity to get special training on new technology platforms and to travel abroad to gain new knowledge (e.g., attend workshops regularly regarding the newest audit techniques). This enables them to rely more on information technologies and technology-based social networks and to benefit from their integration in the knowledge management cycle. An example of the usage of information technology and technology-based social networks in the multinational companies is a special platform implemented in Deloitte called "knowledge exchange platform" that enables all the company's members to access it to gain or share new knowledge. In order to assess the knowledge acquired, the company conducts a challenge through sending emails to its members regarding specific knowledge shared on the platform, as a way to motivate them to access this platform frequently and benefit from the knowledge available. However, the case would differ in the local audit and consulting companies where outsourcing the latest technologies and shifting from the traditional audit methods to the advanced technological methods is not that affordable. In further analysis of the results, the lowest percentages are recognized for the usage of social networks supporting knowledge storage (32.7%), knowledge creation (35.9%), and knowledge application (42.5%) in local companies (Table VI). This moderate usage of technology-enabled social networks for knowledge management in the Middle East region may arise from different reasons, including the technological ones as the need to prioritize the usage of internet connection (Hawi, 2012) or reasons related to the liberalization of social networking per se concerning political, religious or professional views of the individuals in Lebanon and the Arab world as a whole (Ghannam, 2011).

The independent samples t-test results reveal greater mean values for multinational than for local audit and consulting companies in the relation of information technologies and social networks with the five knowledge management processes (acquisition, creation, storage, sharing, and application). All t values with degree of freedom (df) that equals to (208) provide p values of less than 0.01, indicating the significance of the means difference between the two groups (local and multinational audit and consulting companies) in favor of the multinational companies (Table VI).

Table VI

Reliability is measured through internal consistency where the most recognized measure of reliability is Cronbach's alpha. The Cronbach's alpha value ranges between 0 and 1, the closer the value to 1 indicates a higher reliability (Al Ahababi et al., 2019; Mahdi et al., 2019). For internal consistency to be acceptable leading to effective results, Cronbach's alpha should be greater than 0.7 (Al Ahababi et al., 2019; Mahdi et al., 2019; Dzenopoljac et al., 2018; Mirzaee and Ghaffari, 2018; Akbari and Ghaffari, 2017). In this research, the Cronbach's alpha is used to test the reliability of the survey questionnaire and internal consistency between the different constructs related to each

variable. The higher the Cronbach's alpha value indicates a better reliability and internal consistency between the constructs. Cronbach's alpha test for both factors, information technologies and social networks, as well as for the five knowledge management processes were analyzed. Information technologies Cronbach's alpha of (0.940) and social networks Cronbach's alpha of (0.933) demonstrate an excellent reliability and internal consistency of constructs for both factors. Besides, Cronbach's alpha of the five knowledge management processes were tested, demonstrating a very good consistency for knowledge acquisition (0.884), knowledge sharing (0.862), knowledge application (0.849), and knowledge creation (0.828), and an acceptable internal consistency for knowledge storage with a Cronbach's alpha of (0.739) > 0.7 (Table VII).

Furthermore, the validity of the study was measured through the Average Variance Extracted (AVE) which verifies the convergent validity of the constructs. The AVE threshold is 0.5 (Al Ahababi et al., 2019; Mahdi et al., 2019; Khosravi et al., 2018; Mirzaee and Ghaffari, 2018). The measured AVE values for information technologies, social networks and the five knowledge management processes in this study range from (0.52) to (0.91), all greater than 0.5, indicating strong convergent validity (Table VII). Table VII illustrates the reliability and the validity of the proposed model.

Table VII

According to the model's goodness of fit indices presented in Table VIII, each of the independent variables (information technologies and social networks) and the dependent variables of knowledge management processes (acquisition, creation, storage, sharing, and application) created good fit. The Chi-square for IT and SN is equal to (99.57) and p-value is less than 0.01, indicating the significance of the results. The df is equal to (32) > 0. The Chi-square/df is (3.11), which is less than the threshold value of 5. In addition, the Root Mean Square Error (RMSE) of (0.049) is lower than the 0.08 threshold value. As per Mahdi et al. (2019), in case the sample size of the study is greater than 200, the minimum discrepancy Chi-square's absolute fit index could be ignored. For the knowledge management processes as well, the Chi-square is equal to (49.97) and p-value is less than 0.01, indicating the significance of the results. The df is equal to (26) > 0. The Chi-square/df is (1.92), which is less than the threshold value of 5, and the RMSE is (0.041) which is lower than the 0.08 threshold value (Table VIII). The results demonstrate that the model is statistically significant and show validity in the response items of the study.

Table VIII

The results of the collinearity assessment among the independent variables (information technologies and social networks) were illustrated in Table (IX). The values of tolerance are (0.686) greater than the threshold value of 0.2, and the values of VIF are (1.457) less than the threshold value of 5. Therefore, there is no collinearity issue with the independent variables and no construct is needed to be eliminated from the model since the measurement criteria of tolerance and VIF both met the thresholds of more than 0.2 and less than 5, respectively (Khosravi et al., 2018).

Table IX

The quality of the structural model was evaluated through the model's predictive capabilities characterized by the  $R^2$  and adjusted  $R^2$  values.  $R^2$  represents the proportion of variance of the dependent variable, that has been accounted for by the independent variables in the structural model, and it gives a measure of how well the unseen samples are likely to be predicted by the model. The value of  $R^2$  ranges from a minimum of 0 to a maximum of 1 where the higher values indicate the better prediction capability of the model (Khosravi et al., 2018). According to Mirzaee and Ghaffari (2018), three values of 0.19, 0.33 and 0.67 represent the criteria for low, average and high values for  $R^2$ , respectively. The  $R^2$  values of the knowledge management processes (acquisition, creation, storage, sharing, and application) presented in Table X range from (0.292) to (0.423) and the adjusted  $R^2$  values range from (0.285) to (0.417), explaining an average  $R^2$ , and indicating that the proposed path models of the study are statistically acceptable (Table X).

Table X

Presented in Table XI are the results of the Pearson correlation between information technologies and social networks with the knowledge management processes forming the knowledge management cycle: acquisition, creation, storage, sharing, and application. The correlation coefficient ranges from -1 to +1, while a negative sign indicates a negative relation between the variables, the positive sign indicates a positive relation between the constructs. The higher the correlation coefficient value the more significant is the relation, and a 0 value indicates a null relation between the variables. A strong correlation was considered when the correlation coefficient was greater than or equal to 0.6, a medium-strength correlation was considered when the correlation coefficient was between 0.4 and 0.6, and a weak correlation was considered when the correlation coefficient was below 0.4, given 0.5 is the midpoint between the lowest and the highest correlation values.

The results show that information technologies were positively correlated with knowledge acquisition, creation, storage, sharing, and application. The level of correlation varied between the processes, where information technologies showed a strong correlation with knowledge creation (0.615), a medium-strength correlation with knowledge acquisition (0.527) and knowledge sharing (0.409), and a weak correlation with knowledge application (0.396) and knowledge storage (0.343). All correlation coefficients are significant with p values of less than 0.01 (Table XI). While a medium-level relationship with knowledge sharing seems not-surprising, a particularly strong correlation between information technologies use and knowledge creation signals that technologies are being used not only for knowledge sharing and not even so much for knowledge storage, but for stimulating knowledge creation. This fact is related to the knowledge theory developments of Nonaka and Takeuchi (1995), where information stored does not yet imply 'knowledge'. Furthermore, usage of information technology for knowledge creation may also characterize the catching-up character of professional services in the developing world versus developed countries and knowledge being sourced from the knowledge-based economies (Al-Roubaie and Al-Ameen 2015; Kassab 2016; Al Shamsi and Ajmal, 2018).

Social networks were also positively correlated with knowledge acquisition, creation, storage, sharing, and application. The level of correlation varied between the processes, where social networks showed a medium-strength correlation with knowledge application (0.556), knowledge storage (0.532), and knowledge acquisition (0.449), and a weak correlation with knowledge sharing (0.369), and knowledge creation (0.362). All correlation coefficients are significant with p values of less than 0.01 (Table XI). The relatively low relationship with knowledge sharing seems somewhat counterintuitive as 'sharing' is one of the critical functions of social networks (Aalbers et al., 2013). This also corresponds to the abovementioned limited usage of social media and prioritization of different channels preferred for sharing tacit versus explicit knowledge – related to trust hold by the society concerning social networks usage both for professional and social needs (Ghannam, 2011). The relatively high correlation with knowledge application, in turn, demonstrates the importance of social exchange in cognitive processes of transforming and using the acquired knowledge (Ghazinoory et al., 2014).

Table XI

Structural equation modeling results are illustrated in Table XII. All factors were assessed using factor analysis and factor loadings were determined for information technologies and social networks as well as for the five knowledge management processes. Subsequently, regression analysis was used to test each hypothesis under the relevant constructs. Results proved that the independent variables (information technologies and social networks) have a significant positive association with the dependent variables (knowledge acquisition, knowledge creation, knowledge storage, knowledge sharing, and knowledge application). Accordingly, all the proposed research hypotheses were supported with p-value of less than 0.01 (Table XII).

Table XII

According to the analyzed empirical results of this study, the proposed hypotheses stating that information technologies and social networks positively affect knowledge acquisition, creation, storage, sharing, and application,

are supported. These five knowledge management processes constitute the knowledge management cycle studied in this research where the results lead to a conclusion that the information technologies and the social networks positively influence the whole knowledge management cycle and therefore the organizational performance of the audit and consulting companies in the Middle East region representing the developing economies. At the same time, the limited usage of information technologies and social networks at the specific stages of the knowledge management cycle, as well as a lower level of these means by local companies in comparison with locally present multinationals allows pointing the specified theoretical contributions, challenges and possible practical implications as concluding remarks.

## 5. Conclusion

The continuous advancement in technology has affected the entire world and changed the way of doing business. Similarly, it has affected the audit and consulting companies where the technology-based audit has replaced the traditional audit process, which became a challenge for this sector to overcome. Accordingly, the implementation of knowledge management processes became a necessity in the audit and consulting companies, and technological factors are considered to have a high level of influence on these processes.

This study examined the effect of information technologies and technology-enabled social networks on knowledge management processes in the Middle Eastern audit and consulting companies. An empirical study was conducted where auditors in local and multinational audit and consulting companies have participated in a structured survey. The results of the study supported the proposed hypotheses. They proved that information technologies and technology-enabled social networks positively affect the knowledge acquisition, creation, storage, sharing and application processes, constituting the whole knowledge management cycle, which leads to an improvement in the overall organizational performance. Among other notable findings, this survey data showed a strong correlation between the information technology use and knowledge creation, which corresponds to the results on the studied companies' tendency to imply more of knowledge processing activities related to accessing the external knowledge and effective internal knowledge sharing.

Furthermore, the role of technology-enabled social networks appeared more salient in knowledge application than in knowledge sharing, which illustrates well the growth of such phenomena as crowdsourcing, knowledge and technology market growth (Dushnitsky and Klueter, 2017). However, those might also signal a general caution related to the usage of social networks and media for professional or social needs in the Arab World (Ghannam, 2011). While the usage and positive effects of information technologies in managing knowledge in audit and consulting companies have a limited presence in the scientific literature (Mezher et al. 2005), the role of social networks in knowledge management, especially in the Middle Eastern and particularly Lebanon context remain unstudied. Further research is needed to identify the possible reasons for the limited use of social networks for knowledge sharing in Lebanon and other developing countries of the Middle East. Accordingly, organizations are recommended to consider the technological factors, adoption of information technologies and social networks as a mean to support their knowledge management processes throughout the whole knowledge management cycle, from knowledge creation to knowledge application, therefore, positively affect their performance and their contribution to the social and economic development. Local companies could potentially learn the principles of introducing and adopting information technologies and social networks to their context and practices of knowledge management via relying on the best practices of their multinational counterparts. Alternatively, they could use their advantage of being local and rely on, e.g., bottom-up initiatives of social network developments in Lebanon or the greater Middle East (Ghannam, 2011). Furthermore, policymakers could use this study results as signals for the need to develop further social trust, general usage of information technologies and technology-enabled social networks in the country and region as a whole.

The effect of knowledge management processes' implementation on the organizations' performance is an important topic that scientists have been concerned about and continue to study for the organizations to benefit from and achieve their desired goals. Future research could consider other factors affecting the efficiency of knowledge management processes in different sectors and regions. The Middle East, and particularly, developing economies of respective regions remain considerably less studied when it comes to the knowledge management processes compared with developed countries, and this study is among a few of those existing (Tarek et al., 2017; Mezher et al., 2005) to shed light on this topic.

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