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RESEARCH ARTICLE

THE ROLE OF SMART ORGANISATIONS IN ORGANISATIONAL AMBIDEXTERITY: A STUDY OF EDUCATIONAL SUPERVISORS' PERSPECTIVES AT DUHOK GOVERNORATE

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ABSTRACT – Recent technological advancement has prompted smart organisations to become the focal point of any organisation. This research investigates the role of smart organisations (understanding the environment, finding strategic alternatives, continuous learning, smart processes, and intelligence teams) in organisational ambidexterity (exploration and exploitation of ambidexterity). Simple random sampling was used to select 60 educational supervisors in the Duhok Governorate. A quantitative approach via survey questionnaire was employed for data collection and Statistical Package for Social Sciences was used for data analysis purposes. The findings demonstrated a significant relationship between smart organisations and organisational ambidexterity. Future studies are recommended to investigate the nexus between additional factors and their moderating and mediating roles as well as exploring the strategic differences between balancing exploration and exploitation and maximising their scope.

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1. INTRODUCTION

In today's rapidly changing business world, organisations must be adaptable and innovative to remain competitive. This means striking a balance between exploration and utilisation to achieve long-term success. These two essential attributes can be collectively referred to as ambidexterity (Yigit, 2013). The topic has been prominently featured as a rising paradigm in the Organisational Theory that sets a crucial and favourable path for future management research (Zhang et al., 2022; Girod et al., 2023). According to the Schumpeterian Theory, organisations that engage in innovation outperform those that do not, and organisations that can balance exploitation and exploration perform even better than those that focus on only one perspective (Soares et al., 2018). Organisational ambidexterity, which involves simultaneously pursuing exploration and exploitation, is a crucial strategy for innovation. However, more research must be done on the motivating factors behind innovation strategies for foreign ventures competing in emerging markets. Several studies have explored the outcomes and reflections of smart organisations and organisational ambidexterity. For instance, Ju and Elliott (2024) investigated the factors contributing to foreign ventures' ability to effectively balance exploration and exploitation in an emerging market. The study concluded that strategic flexibility at the firm level positively influences organisational ambidexterity. On the other hand, Moreno-Luzon et al. (2023) looked at green agro-food organisations to determine how ambidextrous culture mediated the connection between quality-oriented human resource practices (QHRP) and organisational ambidexterity. The results demonstrate that QHRP positively affects organisational ambidexterity. Ambidextrous culture also serves as a mediator on the relationship between QHRP and ambidexterity in the workplace.

Furthermore, the study by Alexandro and Basrowi (2024) highlighted the efficacy assessment of smart digital organisations in promoting the adoption of digital technology inside educational institutions in Indonesia. The study outlined that smart digital organisations play a role in facilitating the relationship between digital leadership, digital talent development programs, and learning management systems in adopting digital technologies. Salim and Ermakov (2023) conducted a study in Iraq that focused on the early warning system and smart organisation in mobile phone organisations, notably Korek and Asia Cell. They found that the surveyed organisations had satisfactory smart organisation principles and viewed the principles of smart organisation as desirable and somewhat equal.

The digital transformation extends beyond creating novel technologies and digitalised services or digitally enabled business models. To successfully implement this change and undertake the necessary organisational transformation, established organisations must acquire new operational methods, develop new skills, and revamp their organisational structures and management systems to adjust to evolving market conditions continually. Hence, exploring novel managerial knowledge is of growing significance. One possible explanation is that activities nowadays are not only initiated to develop new businesses or technologies (Selig & Baltes, 2020). According to Katou et al. (2021), the role of technology in organisational ambidexterity is multifaceted, with the potential to both facilitate and hinder the exploration

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and exploitation processes. By investigating this relationship, researchers can provide valuable insights into how organisations can leverage technology to enhance their ambidextrous capabilities, ultimately leading to improved performance and adaptability in a rapidly changing business area. Erdey et al. (2024) argue that there is a theoretical understanding of how smart organisations can enhance organisational ambidexterity. More research is needed to validate these theories with real-world data, particularly in different cultural and economic environments. Understanding how these factors interact can provide deeper insights into how educational areas can effectively leverage smart organisations to achieve organisational ambidexterity.

Upon these arguments, this paper examines the research variables within the educational directorate from educational supervisors' perspectives at Duhok Governorate due to the inadequate testing of this variable at the internal level. It also develops a theoretical model confirming the significance of organisational ambidexterity for smart organisations. Effective supervisors within educational institutions are essential for meeting their objectives and improving overall performance. However, numerous educational supervisors in Duhok Governorate encounter difficulties in recognising and addressing their educational needs, especially regarding organisational ambidexterity. This lack of clarity can impede their capacity to balance the pursuit of innovative practices with the effective use of current resources and capabilities.

1.1 Problem Statement

There has been extensive research on ambidexterity in the last 20 years following the general agreement on how an ambidextrous organisation performs better. Many believe that ambidextrous organisations can adapt to changing markets and technology by exploiting or becoming more efficient in existing business operations while exploring new business ideas. An organisation's ability to innovate in both exploratory and exploitative approaches is also linked towards gaining a competitive edge and increasing sales (Chakma et al., 2024). The literature suggests that ambidexterity in organisations often results from complex and contradictory knowledge-processing activities. According to Andriopoulos and Lewis (2009), organisations can achieve their goals through incremental innovation, which involves utilising their current experiences and knowledge, and radical innovation, which involves exploring new knowledge. The Knowledge-Based View (KBV) associates ambidexterity with the execution of both incremental and radical innovation whereby organisations that achieve superior performance and competitive advantage view knowledge as a critical resource for innovation performance. On the other hand, organisations with limited resources, such as small and medium enterprises (SMEs), develop ambidexterity through internal and external learning by searching for and accessing information from various sources. Ultimately, organisations can improve their innovation performance by using the knowledge they gain from organisational learning and open innovation (Tian et al., 2021). Within the same framework, Khaddam et al. (2020) state that smart organisations can comprehend their environment by utilising information technology, knowledge management, employee intelligence, and developing internal knowledge to create novel services. In this regard, organisational ambidexterity is challenging because it necessitates balancing exploitative and explorative activities, each requiring unique skills. Ju and Elliott (2024) underscore the need for a deeper understanding of organisational ambidexterity and call for further research on the topic. It aligns with Birkinshaw and Gupta (2013) who advocate for additional studies to develop instruments for measuring organisational ambidexterity. To bridge this gap, the current research will test the role of smart organisations in improving organisational ambidexterity from the perspective of educational supervisors in Duhok Governorate. This is particularly relevant due to the significant relationship between smart organisations or digital transformation in organisations and organisational ambidexterity. Smart organisations, as a valuable tool, can significantly enhance organisational ambidexterity (Clauss et al., 2021; Teece et al., 2016).

This paper offers significant contributions to the academic literature by expanding the limited research on organisational ambidexterity in the context of the educational sector, particularly in Duhok Governorate. It enriches the body of knowledge by providing insights that can serve as a reference for future research in this area. The findings also contribute towards institutional performance by focusing on the principles of smart organisations (SO) and organisational ambidexterity (OA) within the educational needs of leaders. This can lead to better decision-making, enhanced leadership capabilities, and improved educational outcomes, ultimately contributing to the overall improvement of educational associations. In conclusion, the significance of this study lies in its potential to enhance the effectiveness of educational supervisors, inform policy and practice, and significantly contribute to a deeper and broader understanding of SO and OA within the educational sector.

1.2 Research Questions

This research addresses the following questions:

RQ1: Do educational supervisors adopt ambidexterity towards smart organisations?

RQ2: Does smart organisation significantly correlate with organisational ambidexterity in the targeted sample?

RQ3: Does smart organisation significantly impact organisational ambidexterity in the targeted sample?

1.3. Research Objectives

This research aims to diagnose the role of smart organisations in organisational ambidexterity from the perspective of educational supervisors at Duhok Governorate. It aims to achieve the following objectives:

RO1: To explore the educational supervisors' adoption of ambidexterity towards smart organisations.

RO2: To explore the association between smart organisations and organisational ambidexterity in the targeted sample.

RO3: To determine the impact of smart organisations on organisational ambidexterity in the targeted sample.

2. LITERATURE REVIEW

This section presents a thorough review of relevant literature pertaining to smart organisations on organisational ambidexterity.

2.1 The Concept of Smart Organisations (SO)

The concept of smart organisations was first introduced by Matheson and Matheson (1998) in their book "The Smart Organisation: Creating Value Through Strategic R&D". It stands as one of the most crucial competitive advantages in the 21st century and refers to an organisation's capacity to make intelligent decisions and quickly react to environmental changes. Successful organisations often cultivate a corporate culture that prioritises making optimal strategic choices at the appropriate moment, aligning organisational procedures to facilitate these decisions, and maintaining the positive results. The successful implementation of smart practices in organisations often faces several challenges, such as skill gaps, resistance to change, and the complexity of integrating new technologies. Organisations must proactively address these challenges through training, change management, and strategic planning (Buhalis et al., 2023). This is the key justification for testing SO in the educational area as it sits on the intermediate level of smart processes, which has yet to be adequately tested in the context of education at Duhok Governorate. Smart organisation practices offer valuable lessons for educational research, particularly in areas related to organisational design, learning culture, adaptability, and stakeholder value creation. By studying these organisations, educational researchers can develop strategies that can enhance the effectiveness and sustainability of educational institutions (Lazarević & Lukić, 2015).

High-performance organisations were developed in the late 1990s and early 2000s due to the committed teamwork from the members. As a result, the concept of a virtual and borderless firm is gradually replacing previous organisational models. Organisations today recognise that attempting to maintain authority over their environments is ineffective and, at worst, may inhibit the qualities essential for the growth of new ideas in the digital age. Furthermore, organisations founded on teams also have an advantage when dealing with non-routine tasks that necessitate agility, responsiveness, and innovation. Such paradigm shift eventually prompts emerging organisational forms to prioritise connectivity and agility over stability and rigidity (Pescatore, 2022). The essence of a smart organisation lies in its ability to effectively utilise knowledge as a single resource, combining the knowledge of its human resources with the aid of technology-driven platforms. The concept of a smart environment is alluring as it encompasses intelligence that extends to real and virtual items, social relationships, and human cognition. A key goal of a smart world is to create a unified hyperspace that consists of virtual, physical, social, and cognitive dimensions. This vision necessitates intricate interconnections and intelligent correlations between the perception of the physical world, interactions in the virtual realm, social correlation, and cognitive thinking integrated into all aspects of our daily lives (Adamik & Sikora-Fernandez, 2021).

The concept of a smart organisation has evolved into a modern approach in the field of management, focusing on research, development, and ongoing improvement. A business can enhance itself by cultivating smart staff members. Smart organisations distinguish themselves from other business organisations through their unique methods, procedures, and practices employed to achieve their objectives. This distinction is largely due to the role of smart individuals in the organisation who contribute significantly to its success (Adamik, 2020).

Previous studies described a smart organisation as an adaptable, inventive, and technologically equipped institution that utilises cutting-edge technologies, data-driven analysis, and intelligent systems to enhance its operations, decision-making procedures, and overall effectiveness. This concept arose due to the rapid technological advancement and the necessity for enterprises to maintain their competitiveness and relevance in the digital era (Bibi et al., 2023).

Researchers believe that cultivating smart individuals within an organisation can enhance its performance (Al-Taie et al., 2013). Smart organisations have also emerged as a modern concept focusing on organisations' research and development processes. Following the internal needs, this idea has further developed to include the organisation's overall growth and transformation. Thus, smart organisations have become a comprehensive representation of such concept that is linked to knowledge management (Teresko, 2006). Later, the idea of a "smart organisation" changed to emphasise on knowledge management, acquisition, learning, and adaptation. A smart organisation integrates knowledge management with other efficient management techniques and leads knowledge generation (Poulsen & Arthur, 2005). They also set themselves apart from other business organisations through the unique methods, procedures, and practices to achieve their goals. Consequently, various terms have been coined to describe this concept, including high-performance business organisations, distinguished organisations, talented organisations, expert organisations, and sustainable organisations (Al-Abadi, 2012).

While smart organisations present a promising framework for enhancing manufacturing efficiency and adaptability amidst rapid technological changes, it is crucial to address the associated challenges, including cost barriers, resistance to change, and security concerns. A holistic approach that integrates technology, human capital, and effective management

practices is imperative for the successful implementation of smart organisations. This will allow organisations to unlock the full potential of smart organisations and drive sustainable growth in the digital age (Valipour-Parkouhi et al., 2023). The concept of smart organisations is undoubtedly transformative, offering numerous benefits that can lead to enhanced performance and competitiveness in the digital age. However, organisations must approach this transformation thoughtfully by balancing technological advancements with human factors and ethical considerations (Abiodun et al., 2023). This implies that the journey towards becoming a smart organisation is fraught with challenges; the potential rewards in terms of efficiency, customer satisfaction, and sustainability make it a worthwhile endeavour for many businesses.

The drivers and foundations of smart organisations underscore the pivotal role of technology, customer focus, and operational agility. By giving precedence to these elements, hospitality organisations can establish a more responsive, efficient, and customer-centric environment. Such approach not only meets the evolving demands of the industry but also significantly enhances the overall experience (Koens et al., 2021). Smart organisations utilise advanced technologies, specifically smart technologies, to improve their operational efficiency, decision-making processes, and overall performance. It also employs technologies, such as the Internet of Things (IoT), artificial intelligence (AI), big data analytics, and automation, to establish a more agile and adaptable business environment (AlZayani et al., 2024). This indicates that smart organisations are characterised by integrating technology into their operations, enabling them to operate more efficiently, sustainably, and responsively in a rapidly changing business environment. It emphasises the integration of smart technologies to enhance operational efficiency, improve decision-making, and foster innovation within organisations. Additionally, smart organisations leverage on data and connectivity to optimise processes and adapt to changing market conditions (Kandarkar & Ravi, 2024).

Notably, smart organisations are agile and flexible entities that prioritise engaging stakeholders, utilising knowledge, and integrating technology to improve efficiency and responsiveness in a rapidly evolving environment. This emphasises the significance of these organisations in promoting innovation and advancement within their respective environments (Godlewska-Majkowska et al., 2023). While smart organisations present numerous opportunities for enhancing efficiency and competitiveness, they also pose significant challenges and risks that must be carefully managed. Organisations must create a balance between leveraging technology and maintaining a human-centric approach to ensure sustainable growth and success (Liu et al., 2021).

In conclusion, smart organisations represent a significant evolution in how businesses operate and interact with their environments. Organisations can enhance their performance and create value for all stakeholders by embracing technology, fostering collaboration, and prioritising data-driven decision-making. However, to fully realise the potential of smart organisations, it is crucial to navigate the associated challenges thoughtfully and ethically, ensuring that the benefits of smartness are sustainable and inclusive (Buhalis et al., 2023).

2.2 Sub-Variables of Smart Organisations

This section explores the sub-variables of smart organisations. However, these sub-variables may vary depending on the viewpoints and objectives of different research.

2.2.1 Understanding the Environment

Empirical evidence demonstrates that organisations emerge not randomly but rather in response to the demands of their societal context. They fully integrate and continuously adapt to environmental changes while identifying opportunities to capitalise on threats avoidance. The environment includes a variety of factors, dimensions, and components that can affect administrative, organisational, and strategic practices. To succeed, a smart organisation must fully understand these dimensions, including their overlaps, details, and interactions. The organisation must also be able to interact with and navigate the environment in a balanced and dynamic manner, enabling it to achieve optimal outcomes. Furthermore, a smart organisation possesses the primary benefit of promptly adjusting to the social and economic context in which it functions and effectively reacts to alterations in the surrounding environment by utilising information and communication technologies. This will improve the internal processes, accelerate its ability to innovate in commodity production, and increase its competitiveness (Hareem, 2010).

2.2.2 Finding Strategic Alternatives

According to Al-Sharafi (2020), smart organisations are responsible for providing and developing a collection of new vital alternatives and options, continuously evaluating them, and making the most appropriate decision following the evaluation results. They concluded that any successful organisation should ensure effective business operations by developing various alternatives rather than limiting its options to just one. Salim and Sadiq (2018) pointed out that finding strategic alternatives is an organisation's capacity to generate novel alternatives, options, and innovative approaches that facilitate the attainment of its objectives and requirements while narrowing the disparity between desired and actual performance.

2.2.3 Continuous Learning

Al-Sharafi (2020) describes continuous learning as the ongoing process of consistently and diversely acquiring opportunities, knowledge, and new skills. This can be achieved through various means, including training and

development programs, lectures and seminars, keeping up with competing organisations in the market, and leveraging their experiences. This is particularly important in the face of rapid technological advancements, intense competition, and global changes. Continuous organisational changes have made continuous learning important for development and facilitated the self-development of its staff members by offering ongoing training, development, and education procedures. The organisation's ability to manage and respond effectively to various environmental issues and changes further adds to its value. When the organisation and its members consistently learn new things, they reduce change resistance, mobilise, and develop human energies more effectively. Meanwhile, Beuses (2019) defines continuing education as acquiring new knowledge and skills to adapt to changes and foster self-directed learning. This can occur at the individual, group, or organisational level. Therefore, organisations should gather comprehensive information about their external environment, including customers, suppliers, and markets, and effectively utilise this information to enhance processes and products. This can be achieved by harnessing employees' potential and the surrounding environment. Additionally, organisational plans and programs play a crucial role in achieving desired goals and improving production, ultimately increasing market share (Al-Zoubi, 2020).

2.2.4 Smart Processes

Intelligent operations aim to improve capacity to handle emergencies and crises. These operations include sharing information, making it accessible to the right people at the right time, and giving feedback. Moreover, establishing a harmonious coexistence of social, economic, and environmental factors is fundamental to smart processes, which revolve around the organisation's sequential processing of primary data into actual information (Khaddam et al., 2020).

2.2.5 Intelligence Team

Vengerov (2011) views intelligence team as a key driver for enhancing the efficiency and effectiveness of learning. Effective leaders often have the capability to guide and oversee their team's work. Both the work team and the group form the fundamental basis of any work, whether economic, social, or political. Researchers often concentrate on collective intelligence, knowledge management, and innovation processes when discussing collective intelligence in teams and organisations. These areas are crucial due to their significant impact in a rapidly evolving world. By utilising knowledge management and collective intelligence to support innovation, organisations can achieve more efficient outcomes and save time and money.

2.3 The Concept of Organisational Ambidexterity

The term “ambidexterity” comes from the Latin word *ambos*, which means "both", and *dexter*, which means "right". It was first used by Raisch and Birkinshaw (2008) in reference to the ability of using both hands with equal skill, ease, and dexterity. More recently, ambidexterity is defined as the general ongoing process of balancing trade-offs from different alternatives and exemplifies the ability to simultaneously apply seemingly contradictory methods to maximise returns (Stubner et al., 2012). It describes the ability of an organisation to pursue competing strategic orientations simultaneously. At its core, ambidexterity consists of both 'efficient selection and implementation' and 'exploration, comprising search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation.' Examples of ambidexterity include exploiting current business operations with ever-increasing efficiency (exploitation) and exploring new opportunities and radical innovations (exploration). Both exploration and exploitation are mutually exclusive activities with competing goals (Andriopoulos & Lewis, 2009); however, both elements often reach a compromise in the pursuit of ambidexterity. This guarantees that organisations can use existing business methods to their full advantage and still engage in exploratory activities aimed at long-term growth.

Duncan (1976) pioneered the concept of organisational ambidexterity and later introduced the notions of exploration and exploitation as distinct endeavours that involve inherent trade-offs in 1991. These concepts have received a substantial number of citations and should be further explored to fully understand their impact and significance (Kassotaki, 2022).

In the Organisational Theory, organisational ambidexterity refers to the capability of organisations to effectively balance and manage both the exploitation of existing capabilities and the exploration of new opportunities (Sarmento et al., 2024). It emphasises organisations' need to actively engage with technological and socio-economic environments to ensure long-term survival and success. Organisational ambidexterity also highlights the importance of maintaining efficiency while being responsive to changes. Mindful and diverse organisational learning is crucial for reducing inefficiencies and enhancing viability. However, balancing mindfulness and operational significance is challenging as organisations often prioritise short-term performance, which can lead to inefficiencies. This short-term focus may threaten their ability to adapt to changes, particularly in complex tasks (Leitão et al., 2024). Although an ambidextrous organisation will not have a competitive advantage in an unpredictable market, it does have a more evolved learning capacity than other organisations. Past evidence indicates that 20% of ambidextrous organisations can learn more quickly than other businesses because of their skills in exploration and exploitation after controlling variables (Tay & Lusch, 2007).

According to O’Reilly-Iii and Tushman (2008), an organisation’s ambidexterity is fundamental to its dynamic capacities. This concept places a significant responsibility on senior managers who must be ambidextrous in their approach. They are tasked with two crucial responsibilities. First, they need to have a keen understanding of how technology, competitors, consumers, and government policies might impact their industry. Second, they must be capable of capitalising on these opportunities and mitigating any risks by adapting their physical and immaterial resources.

Ambidexterity is a dynamic skill that includes numerous different tasks, such as decentralisation, differentiation, targeted integration, and the top management's ability to find solutions that allow for exploration and exploitation. It is the responsibility of executive leadership to continually enhance these dynamic capabilities.

OA is a concept rooted in the complex and often contradictory knowledge-processing activities within firms, which underscores the pivotal role of companies in managing innovation. It is associated with the idea that firms that successfully navigate both incremental (exploitation) and radical (exploration) innovations tend to achieve superior performance and sustained competitive advantage. By balancing these opposing demands, firms can effectively steer through market shifts and technological changes, thereby enhancing their long-term viability and success. OA also extends beyond merely a concept but is also a responsibility for firms to achieve innovation and competitive advantage by balancing exploration and exploitation in dynamic business environments (Tushman & O'Reilly, 1996; Chakma et al., 2021).

Resource paucity, established routines, and environmental dynamics often drive the inherent tension between exploration and exploitation in organisations. This tension often leads organisations to prioritise one activity over the other, resulting in potential pitfalls known as the success trap or failure trap, which can hinder rapid development. To overcome this, organisations are encouraged to adopt organisational ambidexterity, allowing them to simultaneously engage in both exploration and exploitation, thereby enhancing competitiveness and improving short- and long-term performance. This shift also suggests a move from traditional views that emphasise individual leadership styles to a more structured approach where managers play a crucial role in enforcing rigid regulations and utilising administrative authority and organisational hierarchy to guide staff behaviour (Wang et al., 2023).

Organisational ambidexterity is significant for research due to its critical role in balancing exploration and exploitation, enhancing performance, addressing uncertainties, providing insights for future trends, and contributing to theoretical advancements in organisational studies (Restuputri et al., 2024). It possesses a multifaceted importance in contemporary organisational management and strategy. OA is a theoretical construct and a practical imperative for organisations aiming to succeed in complex and dynamic environments. Its implications for strategy, performance, and resilience make it a critical area for ongoing exploration and application in organisational studies.

The concept of organisational ambidexterity has gained prominence in the management literature (Lis et al., 2018) as is commonly associated with gaining and maintaining a competitive edge and high performance inside an organisation (Birkinshaw & Gupta, 2013). Clauss et al. (2021) argued that OA has become a crucial concept in organisational science over the past two decades. It allows organisations to utilise existing capabilities while developing new ones through innovation. This dual focus helps organisations to exploit current strengths and explore new opportunities for growth and development. Exploration deals with an organisation’s ability to learn new knowledge, discover new techniques, and explore new opportunities to develop a business journey.

Organisational ambidexterity is also significant in the field of education as it enhances learning and enables institutions to adapt to market changes while maintaining stability. It supports balancing innovation and stability, allowing educational institutions to balance the need for innovation (exploration) with the necessity of maintaining stability and efficiency (exploitation). This balance is crucial in a rapidly changing educational environment where institutions must adapt to new technologies and teaching methods while ensuring the quality of existing programs (Souza & Takahashi, 2019). This is the key justification for testing OA in an educational context, which has yet to be sufficiently tested in Duhok Governorate.

While the concept of organisational ambidexterity remains largely untested in the context of education, it is well-suited for adaptation in this environment. This is because OA reflects the dual need for optimising existing frameworks (exploitation) and fostering innovation (exploration), which is common in schools where increased autonomy comes with greater accountability demands. Educational supervisors must balance maintaining the status quo with developing innovative visions. Competition among academies is seen as a catalyst for principals to enhance academic quality and adapt to changing demands, focusing more on improvement and innovation rather than routine management tasks. This dynamic environment necessitates that school leaders prioritise meeting the educational needs of current and future trends to improve their institutions (Pietsch et al., 2022).

In conclusion, organisational ambidexterity is not merely a theoretical concept but a practical necessity for firms aiming to achieve sustainable competitive advantage. By effectively balancing exploitation and exploration, organisations can navigate the complexities of modern markets, drive innovation, and ensure long-term success. Embracing this duality requires a strategic mindset, cultural alignment, and a commitment to continuous learning and adaptation (Ed-Dafali et al., 2023).

2.4 Sub-Variables of Organisational Ambidexterity

Many researchers agree that there are two main types of organisational ambidexterity: exploitation and exploration (Venugopal et al., 2017). However, these concepts are often used interchangeably because they describe similar phenomena (Raisch & Birkinshaw, 2008).

2.4.1 Exploration Ambidexterity

Exploration can be defined as the quest for new information and the willingness to adapt to changing conditions in one's environment. Phrases like research, experimentation, risk-taking, and adaptability are associated with competing institutions and exploration. Exploring new possibilities and looking for fresh prospects is an expression of organisations' ability to search for new opportunities and anticipate future events. This not only enables them to adapt to environmental changes over the long term but also emphasises the crucial role of meeting the needs and desires of customers in emerging and new markets. Organisations can demonstrate their commitment to customer satisfaction by introducing novel services or new distribution channels. According to Al-Sakarna (2005), organisations can capitalise on opportunities using novel approaches through the provision of services, the strengthening of their competitive position, and the execution of competitive acts through which they can confront their competitors.

2.4.2 Exploitation Ambidexterity

Al-Sarhani and Darwish (2019) define exploitation as an organisation's efforts to enhance its operations to generate value immediately and increase its expertise. This may involve using tried-and-true methods that require no new training or research and maintaining a steady stream of incremental applications of existing resources. Investing in the organisation's work environment means making use of all opportunities to obtain investment in terms of competitive advantage. This is related to various concepts, including efficiency in choice and production, efficacy in application and execution, and knowledge gained through scientific study and experimentation.

Exploration, according to this concept, brings about radical innovations, whereas exploitation is associated with progressive innovations and various results for an organisation. These two distinct parts need different means, materials, and methods of execution. In addition, subunits that are not opposite to each other can handle the exploration and exploitation balancing issue concurrently, even when there is a lack of resources in such circumstances. This balance is crucial for the organisation's success and understanding it is key to making informed decisions. Unlike exploitation, which is seen as a multi-dimensional element, exploration is a local search. The interaction of these dimensions may facilitate the introduction of new services to existing markets, provided that the competing activities do not rely on limited, specific resources (March, 1991). While exploration mainly concerns the power of discovering new knowledge, exploitation is defined as the competency of reusing current knowledge within organisations. In this manner, organisational ambidexterity involves exploring new opportunities while exploiting existing capabilities simultaneously. This balance is crucial for long-term success and adaptability in dynamic environments. Understanding this concept will enable organisations to manage these dual activities effectively, which is essential for balancing exploration and exploitation (Arsawan et al., 2022). Table 1 summarises the differences between exploration ambidexterity and exploration ambidexterity.

Table 1. The difference between exploration ambidexterity and exploitation ambidexterity

From	Exploration Ambidexterity	Exploitation Ambidexterity
Outcomes	Innovative designs, unexplored opportunities, and novel distribution channels.	Pre-existing designs, present markets, and established distribution channels.
Knowledge Base	Need both new knowledge and a break from the past.	Develop and expand current knowledge and abilities.
Findings From	The following: exploration, diversity, adaptability, experimentation, and taking risks.	Refinement, production, effectiveness, and implementation.
Implications Performance	Temporal separation	Short-term advantage

Source: Yigit (2013). Organisational ambidexterity: balancing exploitation and exploration in organisations. Master Thesis. Blekinge Institute of Technology. School of Management. Karlskrona – Sweden. P.19.

2.5 Theoretical Framework

The theoretical framework of this study encompasses two variables. The first variable is a smart organisation with five dimensions (understanding the environment, finding strategic alternatives, continuous learning, smart processes, and an intelligence team) as independent variables. The second variable is organisational ambidexterity as a dependent variable, which involves exploration ambidexterity and exploration ambidexterity. Figure 1 shows the theoretical framework of this study.

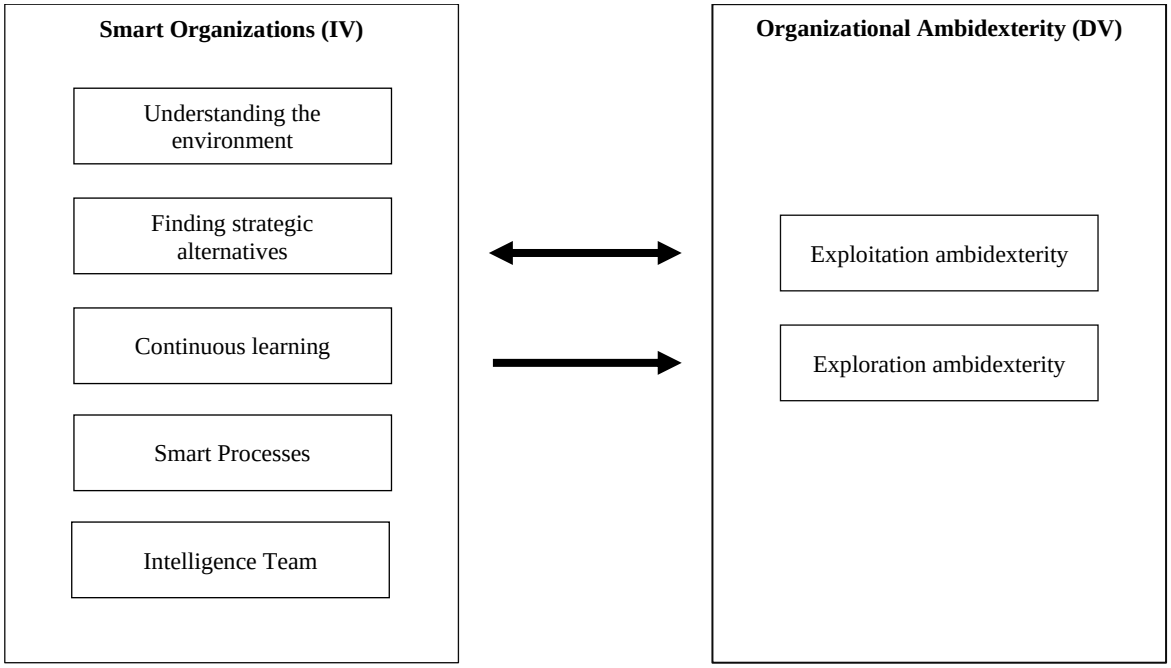

Figure 1. Theoretical framework

Source: Authors based on Literature Review based on (Khaddam *et al*., 2020; Al-Shyyab, 2023; Al-Jumai and Al-Harithi, 2021)

2.6 Hypotheses Development

Exploration and exploitation are two separate but complementary aspects of organisational ambidexterity that significantly deal with environmental uncertainty. When making decisions or developing strategies, ambidextrous organisations adopt two focuses and utilise their internal resources differently. Organisations with an ambidextrous organisational structure can manage their innovation streams and decision-making in complementary ways. Learning through searching, mutation, experimentation, risk-taking, resilience, discovery, and innovation are all part of exploration while processing, picking, manufacturing, effectiveness, executing, and refining are steps in the exploitation process. Organisations should have an appropriate balance of exploratory and exploitative skills, even though March (1991) does not use ambidexterity to describe either trait (Hwang et al., 2023).

Organisational ambidexterity plays a crucial role in avoiding two types of success traps. The first trap occurs when an organisation overly focuses on its current competencies, leading to inertia and poor performance due to the inability of adapting to changing environmental conditions. The second trap is when an organisation underinvests in exploratory innovation activities, leading to failure. Chakma et al. (2024) believe that ambidexterity helps technological innovation, competitive advantage, and firm survival in turbulent environments by allowing organisations to make both small (exploitation) and big (exploration) changes.

The structure of modern organisations reflects the significance of organisational ambidexterity. It effectively and successfully deals with the facts of the changing environment, putting the organisation in a state of continuous movement to face the challenges posed by the environment by establishing its present position in relation to competitors (Al-Ali & Al-Ani, 2018). OA emphasises the critical role of technological capability in an organisation, highlighting its significance in development, research, commercialisation, and achieving competitive advantage. Besides noting that technology enhances innovation activities and contributes to industry and economic growth, OA also discusses the importance of integrating technological changes into existing systems to create sustainable competitive advantages. Equal concern is also placed on the importance of absorbing and applying new technology to improve efficiency and productivity. This underscores the importance of technological progress for driving industrial change and highlights the need for organisations to upgrade their technological capabilities to remain competitive in the industry and market (Yunita et al., 2023).

An organisation's adaptability to changing environments relies on developing and deploying smart processes while pursuing organisational ambidexterity. Smart processes facilitate acquiring and processing new information, subsequently enhancing the effectiveness and efficiency of operations like customer management and supplier relationships. They enable businesses to gather insights about consumers and markets, improve stakeholder communication, and streamline the development, manufacturing, and distribution of new products and services. Effective information storage and processing through appropriate smart resources also enhance internal administrative functions, including finance and human resource management (Trieu et al., 2023; Qalati et al., 2021; Al-Atwi et al., 2023).

Notably, banking system managers can use this model to determine what parts play what roles in achieving organisational outcomes and then putting these parts into action by keeping an eye on how they interact with one another

(Mottaghi et al., 2022). Various organisations have created novel services because of smart organisations and implemented remarkable changes in their systems, allowing them to respond faster to changes, innovate more effectively, and save costs by tapping into knowledge sources throughout the organisation.

The theoretical relationship between SO and OA is centred on how organisations can effectively balance two critical actions (exploration and exploitation). This balance is essential for thriving in smart organisations' dynamic and innovative environments. It also highlights organisations' need to effectively balance pursuing new opportunities with optimising existing capabilities and capitalise the seeking advantage and seeking opportunities behaviours. Such balance is crucial for navigating the challenges and leveraging the opportunities presented by the rapidly evolving landscape of smart urban environments (Bresciani et al., 2018). Moreover, SO and OA highlight organisations' ability to exploit existing resources while exploring new opportunities. It is essential for SO to enable this dual focus by improving operational efficiency and fostering innovation. By adopting SO, firms can optimise processes for better exploitation and utilise data to explore new business models. Meanwhile, OA helps organisations to manage the tensions between these strategies effectively. Ultimately, integrating SO enhances operational performance and provides the agility necessary for sustained innovation and competitive advantage (Gastaldi et al., 2022).

These notions seem to suggest that OA is not just a strategic concept, but also a cultural one. To keep pace with the rapidly changing business environment, organisations must prioritise the acceleration of their learning processes. This involves fostering an environment of openness and actively seeking out novel ideas. It is also crucial to develop new products, services, and techniques, provide comprehensive training to employees, and foster a culture that promotes initiative and innovation in organisations. The commitment to achieving organisational goals serves as the foundation for values and motivates managers' behaviours. By prioritising the utilisation of workers' knowledge, skills, and intelligence, organisations can strive for excellence and become smart organisations. Therefore, it is essential to address the key components of smart organisations. In the business world, leaders with strong leadership skills are crucial for organisations to adapt to their environment, grow, and sustain themselves. These leaders play an important role in developing and transforming their organisations into smart ones that excel and achieve long-term success.

The following hypotheses were developed to explain the association between smart organisations and organisational ambidexterity.

H_1. Smart organisations positively correlate with organisational ambidexterity.

H_2. Smart organisations positively affect organisational ambidexterity.

3. RESEARCH METHODOLOGY

This study employed a descriptive-analytical research design to explore the relationship between the variables. The research sample consisted of educational supervisors who played a critical role in educational leadership. These participants possessed relevant knowledge regarding the concepts of SO and OA, which could be useful for generating impactful recommendations that can benefit educational institutions.

The primary data of this study was collected via a questionnaire survey. All participants were asked to respond to each item through a five-point Likert-type scale ranging from “1= Very Low” to “5 = Very High”. The survey questionnaire encompassed three parts. Part A gathered the participants’ demographic data, including gender, job title, educational qualification, training participation, and service length. Part B measured the independent variable (i.e., Smart Organisations) through 10 items and five sub-variables. Meanwhile, Part C concerned the dependent variable (i.e., Organisational Ambidexterity) and consisted of 10 items and two sub-variables. All items were adopted from previous studies (e.g., Khaddam et al., 2020; Al-Jumai & Al-Harithi, 2021). Finally, the data was analysed using descriptive statistics, such as mean, percentages, standard deviation, correlation, and regression.

The survey questionnaire’s validity and reliability were assessed using Cronbach’s alpha and the Kaiser-Meyer-Olkin (KMO) test. Cronbach's alpha is widely utilised to confirm whether items are correlated and contribute to a unified measure. Meanwhile, a KMO value above 0.60 indicates a robust data structure, which is necessary for valid conclusions. Descriptive statistics are also useful to summarise key data features and guide interpretation, while correlation analysis identifies potential associations to guide hypotheses. Additionally, regression analysis reveals how changes in independent variables impact the dependent variable, thus informing decisions and recommendations. A significance level of 0.05 is a widely accepted benchmark to determine the statistical significance of research results, ultimately guiding researchers in making interpretations and conclusions. Moreover, a 0.05 significance level helps researchers to make informed decisions about the validity of their hypotheses. It provides a standard criterion for evaluating the strength of the evidence against the null hypothesis. Overall, the use of these methods enhances the validity and reliability of this study and provides comprehensive insights into data relationships and patterns, thereby strengthening the quality and credibility of the research outcomes.

The decision of choosing educational supervisors as the research sample was based on several key considerations. First, educational supervisors play a pivotal role in shaping the direction and effectiveness of educational associations. Their decisions and leadership styles significantly impact the overall performance, culture, and strategic initiatives. Second, educational supervisors are directly involved in administrating and governing educational programs and policies.

Understanding their educational needs is crucial for identifying gaps and areas for development that can enhance their leadership capabilities and effectiveness in managing educational institutions. Third, educational supervisors encompass a range of roles, including educational supervisor, critical friend supervisor, specialist educational supervisor, and other administrative positions. This diversity allows for a comprehensive understanding of the varying needs of educational supervisors across different levels of academic disciplines, thus enriching the research findings. Finally, identifying the specific needs and challenges faced by educational supervisors can ultimately lead to enhanced leadership practices and improved institutional performance, making it highly relevant to the educational sector.

4. RESULTS AND DISCUSSION

4.1 Target Sample and Response Rate

The population of this research encompassed educational supervisors in the Duhok Governorate. Simple random sampling was employed to select 60 educational supervisors as the research sample. Such method ensures that every individual in the population has an equal chance of being selected. This minimises selection bias and enhances the sample's representativeness, leading to more reliable and valid results. To partake in the study, all participants should have minimum experience in their roles, such as years in educational supervision, to ensure that they possess sufficient knowledge and insights to contribute meaningfully to the study. Additionally, the participants should be well-trained because training is the cornerstone of education. Furthermore, having a small sample size enables the cultivation of focused insights and resource limitations. A smaller sample size can be a practical choice that still provides valuable insights due to the homogeneity of the population. The survey questionnaire was administered to 60 educational supervisors in the Duhok Governorate and 56 questionnaires were returned. However, only 53 questionnaires were completed and used for further analysis, resulting in a response rate of 88%. This aligns with Sekaran and Bougie (2016) who suggest that a 30% response rate is acceptable for a study. Table 2 shows the response rate of this study.

Table 2. Response rate

Response Rate	Quantity	%
Survey distributed	60	100%
Survey received	56	93%
Survey valid for data analysis	53	88%

Source: Survey Data (2024)

4.2 Validity of Tools and Sampling Adequacy

The survey questionnaire was sent for review by several judges to assess the validity of the items. A thorough literature review was also conducted to ensure that only credible sources and publications were used for data analysis. Additionally, the questionnaire was translated from English to Arabic for better accessibility and comprehension by a wider range of participants. As shown in Table 2, the Bartlett's test result was less than 0.05, hence considered significant. The sample size was sufficient because the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was greater than 0.6 for the first (0.775) and second (0.615) constructs (Ehido et al., 2020).

The smart organisations variable was assessed using 10 items. Table 3 shows that the KMO value was 0.775, which was greater than 0.50. It indicated a good value according to the Kaiser classification. The Bartlett test result was also significant at 110.867, with a significance level of 0.001 and smaller than 0.05. Furthermore, the organisational ambidexterity variable was measured using 10 items. As illustrated in Table 3, the KMO value of 0.615 exceeded the 0.50 threshold and was deemed a good value according to the Kaiser classification. The Bartlett test result of 50.456 was also significant at a significance level of 0.001 and less than 0.05. It denotes that the data was acceptable.

Table 3. Kaiser-Meyer-Olkin (KMO) and Bartlett's Tests

Variables	Indicators No.	KMO Test	Bartlett's Tests by Chi-Square	Sig.
Understanding the environment	2	0.775	110.867	0.001
Finding strategic alternatives	2			
Continuous learnings	2			
Smart operations	2			
Collective intelligence	2			
Smart Organisations (IV)	10			
Exploration Ambidexterity	5	0.615	50.456	
Exploitation Ambidexterity	5			
Organisational Ambidexterity (DV)	10			

Source: Authors from SPSS outputs

4.3 Reliability of the Measurement

This study used Cronbach's alpha as the reliability indicator that measures internal consistency. Sekaran and Bougie (2016) propose that a reliability coefficient of 0.60 is the average in social sciences. Table 3 shows that all measures achieved a high level of reliability, with coefficients ranging from 0.604 to 0.959. Therefore, the construct measures are deemed reliable and all items in the construct measures are sustained, as displayed in Table 4.

Table 4. Reliability of the measurement (Cronbach's Alpha)

Variables	Cronbach's Alpha	Indicators No.
Understanding the environment	0.604	2
Finding strategic alternatives	0.602	2
Continuous learnings	0.768	2
Smart operations	0.762	2
Collective intelligence	0.675	2
Smart Organisations (IV)	0.959	10
Exploration Ambidexterity	0.790	5
Exploitation Ambidexterity	0.795	5
Organisational Ambidexterity (DV)	0.854	10
Overall Indicator	0.890	20

Source: Survey Data (2024)

4.4 Demographic Profile of the Participants

A total of 53 educational supervisors participated in this study. The initial phase was to analyse and comprehend the demographic profile of these participants in terms of gender, job title, educational qualification, training participation, and length of service.

4.4.1 Gender

The analysis revealed that there were more male participants than female participants. Table 5 shows that there were 34 male respondents (64.2%) and 19 female respondents (35.8%).

Table 5. Participants' gender

Gender	Frequency	Percent	Valid Percent
Male	34	64.2%	64.2%
Female	19	35.8%	35.8%
Total	53	100.0%	100.0%

Source: Survey data (2024)

4.4.2 Job Title

Table 6 presents the data on the participants' job titles, which is crucial for comprehending the characteristics of the sample. The largest group comprised first educational supervisor with 58.5%, followed by specialist educational supervisor with 22.6% and critical friend supervisor with 18.9%.

Table 6. Participants' job titles

Job Title	Frequency	Percent	Valid Percent
First Educational Supervisor	31	58.5%	58.5%
The Critical Friend Supervisor	10	18.9%	18.9%
Specialist Educational Supervisor	12	22.6%	22.6%
Total	53	100.0%	100.0%

Source: Survey data (2024)

4.4.3 Educational Qualification

Many of the participants had a bachelor's degree (71.7%) while the remaining participants were master's (15.1%), PhD (7.5%), and higher diploma (5.7%) holders. This indicates that most educational supervisor positions were held by

individuals with bachelor's degrees or higher, suggesting that the educational directorate is becoming more challenging and that only individuals with these degrees have a chance to be supervisors in top positions.

Table 7. Participants' level of education

Educational Qualification	Frequency	Percent	Valid Percent
Bachelor's degree	38	71.7%	71.7%
Higher diploma	3	5.7%	5.7%
Master's degree	8	15.1%	15.1%
PhD	4	7.5%	7.5%
Total	53	100.0%	100.0%

Source: Survey data (2024)

4.4.4 Training Participation

The data in Table 8 shows that 73.6% of the participants had participated in more than five training courses. Whereas, 26.4% of them had participated in less than five training courses. It indicates that most educational supervisors are well-trained in various courses and modules due to their years of experience.

Table 8. Participants' training participation

Training Participation	Frequency	Percent	Valid Percent
1 to 5 training	14	26.4%	26.4%
More than 5 training	39	73.6%	73.6%
Total	53	100.0%	100.0%

Source: Survey data (2024)

4.4.5 Length of Service Profile

Regarding the length of service, 79.2% of the respondents had served for more than 10 years. This is followed by those who had been in service between 5 to 10 years (13.2%) and between 1 to 5 years (7.5%). It indicates that most educational supervisors have more the 10 years of experience.

Table 9. Participants' length of service

Length of Service	Frequency	Percent	Valid Percent
1 to 4 years	4	7.5%	7.5%
5 to 10 years	7	13.2%	13.2%
More than 10 years	42	79.2%	79.2%
Total	53	100.0%	100.0%

Source: Survey data (2024)

4.5 Statistical Description for Research Variables

The availability level scale score for **Understanding the Environment** was 62.3% with a mean score of 2.792 and a standard deviation of 0.750. Educational supervisors are crucial in facilitating the educational process between students and teachers. They are responsible for training teachers to create a supportive learning environment that adapts to the rapidly changing educational landscape.

Exploration Ambidexterity achieved the last rank in availability level with 46.7% while the mean score was 2.875 and the standard deviation was 0.910. It underscores the need for educational supervisors or organisations to adopt new methods and techniques, which can help maintain a balance between creativity and foresight. This will encourage innovation and ensure that decisions are based on evidence and logical judgment. The targeted sample should be utilised to employ these methods for identifying the new learning needs in the 21st century by exploring and further adopting ambidexterity.

Finally, the overall availability of all items exceeded 19%, with less than 30% being the unavailability level and more than 52% being the moderate availability level. The total mean and standard deviation were 2.908 and 0.839, respectively.

Table 10. Survey Outcomes and ranking of ordinal significance for all variables

Variables	Response Scale					Moderate Ratio	Mean	STD
	5 Very High	4 High	3 Moderate	2 Low	1 Very Low			
Understanding Environment	1.90	8.50	62.3	21.70	5.70	62.30	2.792	0.750
Continuous Learning	5.70	18.00	54.7	17.90	3.80	54.70	3.038	0.861
Exploitation Ambidexterity	3.00	13.60	53.6	27.50	2.30	53.60	2.875	0.779
Collective Intelligence	2.90	10.40	51.9	30.20	4.80	51.90	2.764	0.795
Smart Operations	5.70	21.70	48.1	20.80	3.80	48.10	3.047	0.903
Finding Strategic Alternatives	2.90	22.70	48.1	20.80	5.70	48.10	2.962	0.877
Exploration Ambidexterity	4.10	18.10	46.7	26.80	6.10	46.70	2.875	0.910
Average	3.74	16.14	52.20	23.67	4.60	-	-	-
Total	19.89		52.20		28.27		2.908	0.839

Source: Authors from SPSS outputs

4.6 Pearson Analysis

Table 11 shows a comprehensive overview of the correlation and measurements of smart organisations (IV) and organisational ambidexterity (DV). The correlation coefficients not only provide insight into the direction and strength of the relationships between these variables but also highlight the thoroughness of this research. The Pearson correlation coefficient indicated a significant positive association between all SO and OA measures. Table 5 demonstrates a substantial positive correlation (0.740**, P<0.01) between SO and OA at the comprehensive level. This supports the first hypothesis (H1), which posits a significant correlation between smart organisations and organisational ambidexterity in the targeted sample.

A significant positive correlation was also found between all sub-variables of smart organisations and organisational ambidexterity. This was evidenced by the OS values of 0.523**), (0.454**), (0.621**), (0.684**), and (0.601**) as well as the OA values of (0.698**) and (0.704**) at the significant level of (0.01).

Table 11. Correlation analysis of the research variables

(DV) Organisational Ambidexterity / Smart Organisations (IV)	Exploration Ambidexterity	Exploitation Ambidexterity	Total Indicator
Understanding Environment	0.419**	0.566**	0.523**
Finding Strategic Alternatives	0.432**	0.428**	0.454**
Continuous Learning	0.590**	0.587**	0.621**
Smart Operations	0.673**	0.626**	0.684**
Collective Intelligence	0.603**	0.540**	0.601**
Total Indicator	0.698**	0.704**	0.740**

Source: Authors from SPSS Results. N = 53 ** P ≤ 0.01,

4.7 Regression Analysis

A simple linear regression was employed for hypothesis testing purposes by examining the significant effects between the independent (SO) and dependent (OA) variables. The results in Table 12 indicate a significant positive effect of SO on OA with an explicit value of 0.542. This suggests that 54% of change in the sub-variables of SO can be attributed to OA. On the other hand, the remaining 56% of change is influenced by other unknown factors. This is supported by the F-value (61.845), which exceeded the threshold value of 4.03, with a degree of freedom of 5,47 and a significant P-value (0.05) that reached 0.000. Meanwhile, the T-value of 7.864 exceeded the recorded tabular value (T) of 1.68. Overall, the

declination value (β1) was 0.740 while the score for (β0) was 0.562. These results conclusively confirmed the primary impact of the second hypothesis (H2) whereby SO has a significant impact on OA.

Table 12. Impact factor of the research variables

(DV) / (IV)= Smart Organisations	Organisational Ambidexterity							
	R^2	F		BETA		T		Degree of Freedom
		Calculated	Tabulated	β0 Constant	β1	Calculated	Tabulated	
Understanding Environment	0.274	19.201	4.03	0.459	0.523	4.382	1.68	Regression 5
Finding Strategic Alternatives	0.206	13.241		0.377	0.454	3.639		
Continuous Learning	0.386	32.086		0.511	0.621	5.664		
Smart Operations	0.468	44.910		0.539	0.684	6.701		Residual 47
Collective Intelligence	0.362	28.912		0.561	0.601	5.377		
Total Indicator	0.542	61.845		0.562	0.740	7.864		52

Source: Authors from SPSS results N = 53 $P \leq 0.05$

5. CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

5.1 Conclusion

Our results revealed a significant correlation between smart organisations and organisational ambidexterity, as perceived by educational supervisors in the Duhok Governorate. It indicates that smart organisations play a significant role in achieving organisational ambidexterity. This refers to the ability of the surveyed sample to effectively balance and integrate exploration and exploitation activities. Smart organisations have directly and positively achieved organisational ambidexterity. The findings align with a study performed by Kalra et al. (2023), which demonstrated a positive correlation between the metaverse and smart organisations in public and private hospitals in Dubai, UAE. On the other hand, organisational ambidexterity allows for the automation and streamlining of corporate activities by smart organisations. Therefore, smart organisations will remove intermediaries so that the selected groups can fulfil their contractual obligations directly. Fully automated and decentralised operations will be possible for organisations. The findings by Andrade et al. (2024) also confirm previous research and show that the organisational ambidexterity of SMEs is affected by the personality traits of their owner-managers.

Moreover, the findings demonstrate the capacity of smart organisations to develop organisational ambidexterity within the educational directorate, as viewed by educational supervisors. This is consistent with prior research whereby strategic ambidexterity was reported to significantly influence smart organisations at Jordan Telecom Group (Orange) (Al-Shyyab, 2023). It also agrees with Sweis and Abdeen (2019) who found a direct correlation between the features of business intelligence systems (data gathering and analysis, work analysis and management of organisation performance, decision-making, and support for competitive position) and the development of organisational ambidexterity. The study also revealed a correlation between organisational ambidexterity and business intelligence systems, suggesting that organisational ambidexterity may result from an increased emphasis on business intelligence system implementation and appropriate decision-making.

The influence of smart organisations is profound in the educational sector. These organisations leverage on data analytics and cutting-edge digital technology to simplify processes, enhance students' experiences, and create new services that contribute to a healthier and more positive environment for both students and instructors via online apps. For instance, smart organisations use artificial intelligence and other technology to increase output while decreasing costs. They also make it feasible to set up virtual training environments that approximate classroom conditions. This not only benefits the students but also provides a safe space for educational supervisors to experiment with new methods. The interest in training among this demographic is overwhelming, given that most jobs require participation in such activities to advance one's career.

In today's rapidly changing world, organisations need to be ambidextrous to take advantage of the arising opportunities. Being able to balance these competing demands is crucial for success. The targeted sample adopts and implements programs for organisational ambidexterity by taking advantage of existing opportunities, exploring both the internal and external surroundings, and seeking out prospects by utilising the facets of smart organisations. This is particularly true for Understanding Environment, which emerged as the most abundant and intriguing aspect from educational supervisors' perspectives. The participants in this study perceive their organisations as being focused on technology, smart practices, research, and development. They also believe that these factors enable their needs to be met and allow them to adapt to changing circumstances quickly. This is achieved through ongoing learning as one of the smart organisations' sub-variables and providing regular training courses for the educational staff. Furthermore, our findings indicate that the education directorate is actively working towards enhancing advanced services by improving and developing management systems and development programs. Likewise, the education directorate is keen on understanding instructors' preferences, identifying their capabilities, and making investments in them.

The discussion thus far suggests that OA is vital for effectiveness and long-term success. Therefore, it is essential to understand the foundations that influence its efficacy. Smart organisations significantly impact organisational ambidexterity, especially in the educational sector where rapid technological advancements create new business models. Educational institutions must assess their smart capabilities, including technology utilisation, effective educational practices, and the ability to learn new procedures. In Duhok Governorate, smart organisations are key contributors to achieving organisational ambidexterity in education.

5.2 Theoretical Implications and Future Research Direction

The practical implications of organisational ambidexterity for educational supervisors are significant, yet they come with challenges that can hinder effective implementation. Besides balancing competing demands, supervisors often face the dual challenge of fostering exploration (innovation and novel ideas) while simultaneously ensuring exploitation (efficiency, optimisation of existing processes, and maximising current capabilities). This balancing act can be difficult because the resources, time, and attention required for exploration can detract from those needed for exploitation and vice versa. Supervisors must navigate these competing demands carefully to prioritise one aspect.

While smart organisations offer valuable insights for enhancing organisational ambidexterity, supervisors may face significant challenges in their practical implementation. Balancing competing demands, allocating resources effectively, fostering the right culture, and developing clear guidelines and metrics are critical factors influencing the success of ambidextrous organisational strategies. Overall, this study enhances the theoretical landscape of organisational ambidexterity by applying it to the unique context of the educational field and its efforts, providing a foundation for future research and practical applications. It also extends the application of ambidexterity beyond the traditional organisational contexts to the educational sector, suggesting that educational supervisors can effectively manage the dual demands of exploitation and exploration via smart organisations disciplines. This opens avenues for further research into the ambidextrous behaviours of educational supervisors to explore how these practices affect academic performance and outcomes. The findings shall provide a novel perspective on how ambidexterity and smart processes can inform the current understanding of effective educational supervisors and management in increasingly competitive and dynamic educational environments.

Nevertheless, it is crucial to highlight some limitations of the current research. First, the data was primarily collected quantitatively using a questionnaire. The use of a qualitative approach, such as interviews, can help identify and address the predominant challenges and obstacles within this domain, particularly with top-level management. Moreover, as the landscape of Industry 4.0 continues to evolve, ongoing research and adaptation are essential to address the challenges and complexities associated with becoming a smart organisation. Future studies should focus on empirical validation of smartness metrics and explore the implications of smart organisations across different industries and cultural contexts (Abiodun et al., 2023).

Second, the sample selection for this study was limited to the Duhok Governorate due to constraints in accessing participants, resources, and practical conditions. This may limit the generalisability of the findings to other cultures and regions. Therefore, future research may conduct comparative studies in different cultural settings, increase the sample size to include the whole Kurdistan region (KRG), and test the concept of organisational ambidexterity across SMEs in KRG.

Finally, future research should explore the correlation between additional factors, such as strategic green behaviour, organisational resilience, and sustainable mindset, alongside their moderating and mediating roles. Further investigation should also look into the relationship between personality traits and organisational ambidexterity. This is to establish the strategic differences between balancing exploration and exploitation while maximising their scope as such distinction has significant implications for resource allocation and configuration. Managers must have a deep understanding of the factors that motivate organisational ambidexterity.

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AUTHORS CONTRIBUTION

Each author was involved and contributed evenly to this manuscript. All authors read and approved the final manuscript.

AVAILABILITY OF DATA AND MATERIALS

The data collected for this research can be made available upon request and will be shared in accordance with applicable data protection and privacy regulations.

ETHICS STATEMENT

No conflicts of interest were present in this research, which was conducted with integrity and adherence to ethical standards and guidelines.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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APPENDIX

Constructs Measurements

This questionnaire assists in data collection for academic purposes, the authors appreciate your valuable time to participate in this survey under the title: (**The role of Smart Organizations in the Organizational Ambidexterity: A study of a Sample from Educational Supervisors perspectives at Duhok Governorate**). So, your real and honest answer is very important for the success of the research, and the researcher would like to thank you in advance for helping with the study.

Firstly: Biographical Data

Please put the (√) sign in the place that shows your opinion regarding the item.

1. Gender: ( ) Male, ( ) Female.
2. Job Title: ( ) First Educational Supervisor, ( ) The Critical Friend Supervisor, ( ) Specialist Educational Supervisor.
3. Educational Qualification: ( ) Bachelor, ( ) Higher Diploma, ( ) Master Degree, ( ) PhD Level.
4. Training Participation: ( ) 1 - below 5 training, ( ) further 5 training.
3. Length of Service: ( ) 1 – below 5 years, ( ) 5 – 10 years, ( ) further 10 years.

Secondly: Smart organizations: Certified organizations that focus on interconnected, dynamically adaptive knowledge and that respond to new organizational forms and emerging practices.

Seq.	Statements/items	Very Low	Low	Moderate	High	Too High
Understanding the environment						
1	Sources of environmental uncertainty are identified and adopted in the decision-making process.	1	2	3	4	5
2	Specialized leaders are provided to assess the impacts of environmental uncertainties.	1	2	3	4	5
Finding strategic alternatives						
3	A regular review of the business environment is conducted to identify opportunities and risks.	1	2	3	4	5
4	There is a continuous discussion of the work environment, and methods used to meet current and future challenges.	1	2	3	4	5
Continuous learning						
5	The Educational directorate provides resources and opportunities to its staff for training.	1	2	3	4	5
6	The Educational directorate promotes a continuous learning process regarding how to generate added value.	1	2	3	4	5
Smart operations						
7	Educational directorate constantly updates the techniques used in the work.	1	2	3	4	5
8	The information systems used support the broad flow of information.	1	2	3	4	5
Collective intelligence						
9	The strategic work team in education can deal with changing circumstances that result in crises.	1	2	3	4	5
10	The prevailing organizational climate in educational directorate enhances collective Innovation.	1	2	3	4	5

Thirdly: Organizational Ambidexterity: It is the ability of an educational institution to invest current activities in existing fields, and to explore new activities in new fields, in a way that creates a balance between exploration and exploitation performance.

Seq.	Statements/items	Very Low	Low	Moderate	High	Too High
Exploration Ambidexterity						
11	The Educational directorate encourages teachers to come up with original ideas that challenge past ideas.	1	2	3	4	5
12	It makes efforts to explore teachers' talents and learn about their skills and abilities.	1	2	3	4	5
13	The Educational directorate constantly aligns with changes in the external environment.	1	2	3	4	5
14	The Educational directorate participates with teachers in brainstorming sessions to determine future directions.	1	2	3	4	5
15	The Educational directorate is searching for new digital technological means in pre-planned manner.	1	2	3	4	5
Exploitation Ambidexterity						
16	The Educational directorate uses the scientific method in designing work strategies.	1	2	3	4	5
17	The Educational directorate encourages and rewards to innovative teachers and staff.	1	2	3	4	5
18	The Educational directorate holds meetings and workshops periodically.	1	2	3	4	5
19	The Educational directorate Employs digital technology in the educational services provided.	1	2	3	4	5
20	The Educational directorate invests in and seizes new opportunities.	1	2	3	4	5

Thanks for your Support!