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Organizational Practices' Role in Managing Open Innovation and Business Performance

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Abstract: Given the ever-changing world of technological advances, and due to the fact that business entities strive for efficiency and cost reduction, open innovation (OI) has become the focus of academic and scholarly discussions. Furthermore, to increase their competitiveness, small and medium enterprises (SMEs) have started implementing OI practices. This study aims to investigate the impact of SMEs' internal organizational practices on OI and the impact of the latter on SMEs' business performance. This quantitative study, which was based on gathering insights from SMEs, sought to answer two research questions related to the effects of organizational practices on the adoption and management of OI processes in SMEs and the role of OI in accelerating the business performance of SMEs. The findings revealed that not all SMEs' internal organizational practices have a positive impact on both OI and SMEs' business performance. This study is among the earliest studies in the UAE and GCC region to explore the impact of specific internal organizational practices on SME OI adoption and its business performance. The present study contributes theoretically and practically to OI literature and assists SME managers in evaluating their internal organizational practices' suitability for OI adoption.

Keywords: open innovation; SMEs; organizational practices; business performance; dynamic capabilities; absorptive capacity; RBV

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1. Introduction

Recently, governments worldwide generally, and UAE specifically, started to increase their reliance on SMEs in driving the different economic sectors toward a more diversified and sustainable economy. According to the World Bank's published reports on SMEs, these firms represent a remedy for global and regional economic recovery, especially after the COVID-19 pandemic and its economic impacts. Furthermore, Nguyen et al. (2021) stated that SMEs are the foundation of many emerging nations.

In a recent study, Chelliah et al. (2022) stated that the consequences of the COVID pandemic impose a call for organizations to design and adopt strategies that give them a competitive edge. Accordingly, firms began to reconsider budgets allocated to innovation strategies and activities. Thus, firms started to depend on OI more than "closed innovation" to minimize their budgets and achieve competitive advantage.

Despite the importance of innovation and SMEs and their contribution to the economic development of any country around the world, to date, the topic of innovation generally, and OI specifically, in SMEs within the Gulf Cooperation Council (GCC) countries, is still not researched sufficiently in the literature. Moreover, since the field of open innovation research has rapidly developed in recent years, starting with Chesbrough in 2003, scholars have highlighted several research gaps in the open innovation literature that must be addressed and analyzed in order to contribute to both theory and practice. Nguyen et al.

(2021) stated that SMEs in developing nations. Typically struggle to survive. Besides, the majority of literature focuses on the effects of inbound open innovation. Moreover, previous literature has ignored the effects of managerial capabilities and attitudes on the open innovation performance of SMEs (Hossain and Kauranen 2016, p. 68). On the other hand, most of the available literature on open innovation focuses on large enterprises and SMEs in developed countries, especially in Europe and the US. Vanhaverbeke (2017, p. 1) stated that "Open innovation really does work differently in SMEs." OI studies have extensively focused on large and multinational firms, which have internal research teams, R&D departments, as well as their own innovation strategy. Therefore, it is evident that there is a scarcity of studies dedicated to investigating the facilitators of and barriers to OI in firms in developing countries in general and SMEs specifically.

A research gap thus exists in the academic literature on SMEs in the GCC specifically and in the Arab region generally. Additionally, the UAE represents one of the top Arab countries in terms of innovation capability (Schilirò 2015). Therefore, the state and drivers of OI in SMEs in the UAE deserve to be further investigated. Based on the importance of OI for firms regardless of their size, firms started to show interest in OI due to its capability to produce new and cost-effective practices and business models (Portuguez-Castro 2023). Scholars and researchers have also begun to investigate the drivers and enablers of OI in firms. Among these enablers is the organizational structure of firms represented in their internal policies and practices (Matvienko 2016), which is an under-researched topic. Despite the amount of literature on OI and the number of scholars who have declared that open innovation maximizes a firm's performance on different levels, limited studies have investigated the effects and role of human resource management (HRM) and organizational practices on open innovation adoption (Matvienko 2016, p. 8). Scholars such as Vanhaverbeke et al. (2014) have made several calls for future researchers to investigate the role of HR and organizational practices in open innovation adoption. The importance of organizational practices in open innovation adoption is represented in some researchers' claims that firms could overcome many of the organizational obstacles and challenges of open innovation by adopting organizational practices and HRM strategies that support open innovation practices (Matvienko 2016, p. 2).

Accordingly, this study aims to investigate the impact of (a) internal organizational practices on OI practices in SMEs and (b) OI practices on SMEs' business performance in the UAE. Additionally, the mediating impact of OI on the relationship between internal organizational practices and SMEs' business performance was investigated.

Scholars have highlighted several research gaps in the OI literature that must be addressed in order to contribute to both theory and practice. First, a research gap in the literature exists regarding measuring the financial and non-financial contribution of OI to firms (Hossain and Kauranen 2016, p. 67). The second research gap concerns the effects of outbound and coupled OI on SMEs' performance. Moreover, previous literature has ignored the effects of managerial capabilities and attitudes on the OI performance of SMEs (Hossain and Kauranen 2016, p. 68). On the other hand, most of the available literature on OI focuses on large enterprises and SMEs in developed countries, especially in Europe and the US. Vanhaverbeke (2017, p. 1) stated that "Open innovation really does work differently in SMEs". Furthermore, Sağ et al. (2016, p. 761) mentioned that "despite the abundance of research on OI, less is known about SMEs in developing countries". In addition, (Hossain and Kauranen 2016, p. 68) declared that there is a crucial need to expand the scope of OI studies to study SMEs in different geographical contexts. A research need thus exists to fill this gap as much as possible.

On a separate note, limited studies have investigated the effects and role of HRM and organizational practices on OI adoption (Matvienko 2016, p. 8). Scholars (Vanhaverbeke et al. 2014) have made several calls for future researchers to investigate the role of HR and organizational practices in open innovation adoption. The importance of organizational practices in OI adoption is represented in some researchers claims that firms could overcome

many of the organizational obstacles and challenges of OI by adopting organizational practices and HRM strategies that support OI practices (Matvienko 2016, p. 2).

Based on the above-mentioned information, this study contributes to that research by designing a framework for measuring the effects of internal organizational practices on the adoption and implementation of open innovation practices and their effects on the business performance of SMEs. The rationale for this study is the desire to measure the effects of open innovation on the business performance of SMEs, as there is still a debate among scholars about the financial and non-financial contribution of open innovation to SMEs, and the ideal approach to confirm the advantages and disadvantages of this type of innovation is to test the business and financial benefits that SMEs acquire from open innovation practices. This study has two central research questions, which are as follows: (1) To what extent do organizational practices in SMEs affect the adoption and management of OI processes? (2) To what extent do OI processes improve the business performance of SMEs in the UAE?

2. Literature Review

2.1. Contribution of SMEs and Innovation to the UAE Economy

Many SMEs, which are the main drivers of the economy of many countries, are constantly innovating their products, processes, and business models to ensure a stable future (Bertello et al. 2022). SMEs have contributed greatly to the UAE economy. As Mariam et al. (2011) and Ogunyomi and Bruning (2016) have pointed out, SMEs play a crucial role in achieving economic growth and development in developing countries. Moreover, SMEs are considered to be tools for maximizing the GDP of countries and creating job opportunities.

According to the UAE Ministry of Economy report in 2023, titled "The Impact of SMEs on the UAE's Economy" (The Impact of SMEs on the UAE's Economy—The Official Portal of the UAE Government 2023), Over 94% of all businesses in the nation are in the SME sector. Over 86% of workers in the private sector are employed by them. SMEs make up almost 95% of all businesses in Dubai alone, employing 42% of the labor force and producing about 40% of the city-state's GDP. Another contribution is the positive value SMEs add to the country's manufacturing sector, where most of the contributors and players in the UAE manufacturing sector are SMEs.

On the other side, innovation contributes to the economy by providing new jobs, maximizing productivity, and activating the markets (OECD 2015, p. 2) as innovation helps firms, regardless of their size, to reserve their spot in the market and represents a guarantee for long-term existence in the market. Innovation is a "power" for firms that manage to adopt it successfully (Drach-Zahavy et al. 2004; Kamaşak and Bulutlar 2010). The majority of research on open innovation has primarily focused on large enterprises, and only recently has this line of literature begun to explore the involvement of SMEs, seeking a deeper understanding of how innovation management and organizational practices are evolving within smaller firms (De Marco et al. 2020; Bertello et al. 2022). Therefore, Several European and Arabian reports have highlighted the contribution of innovation to SMEs growth.

2.2. Contribution of Open Innovation to the UAE Economy

In 2003, Henry Chesbrough coined the term OI to express practices that are opposite to "closed innovation" (Escoffier et al. 2016, p. 3). The definition developed throughout the years. Generally, open innovation is the process of collaborating with external parties by opening up the boundaries of a firm (Escoffier et al. 2016, p. 2). Specifically, the OI model allows valuable knowledge to flow from outside sources into the organization (Marzi et al. 2023).

There has been a debate about the contribution and importance of OI in terms of overall business performance and innovation performance in both large enterprises and SMEs. Bouncken and Kraus (2013) stated that any cooperation and partnerships between

firms and stakeholders, such as customers, suppliers, and competitors, are considered a "double-edged sword" to firms' innovation performance. As OI practices imply some risks related to the openness of a firm. This status may allow competitors to access the shared knowledge and information about consumers' preferences and needs on the firm's portal and produce modified and new products that meet these needs (Escoffier et al. 2016, p. 86). Overall, OI has been a significant player in the development of different industries, communities, and economies. OI is a key driver in the development and evolution of the entrepreneurship sector in different economies (Portuguez-Castro 2023; Saura et al. 2023).

In recent decades, open innovation has been a major force behind developments in industry, society, and the economy. It has become a major force behind the entrepreneurship sector's evolution, necessitating quick adaptation through innovation and flexibility.

Furthermore, although OI is important for any firm, it is more important for small firms as it is one of the limiting factors for small businesses' success and competitiveness. According to Carayannis and Provance (2008, p. 3), "Innovation in SMEs is considered one of the factors that affect the competitive advantage of SMEs in any country". As such, Dahlander et al. (2021) explained that open innovation offers one potential way to develop and innovate SMEs. By harnessing external resources and knowledge networks, SMEs can effectively enhance their competitiveness in the market. Limited resources characterize SMEs; thus, OI represents a rescue and remedy for SMEs to compete and innovate using limited resources. Moreover, OI is deemed to be more important for SMEs as, according to (Zhang and Chen 2014, p. 716), SMEs are normally considered more innovative in terms of patent issuance and the production of improved developed products or services. Based on that, SMEs have a crucial need to adopt OI practices more than large firms. This is due to SMEs' limited resources, focus on daily business processes, limited concentration on long-term planning, and lack of R&D teams. Based on all of that, OI represents the remedy to all of this as it assists SMEs to collaborate with other firms to solve their product problems (Escoffier et al. 2016, p. 76).

2.3. Open Innovation Practices

Regarding OI practices, Gassmann and Enkel (2004) classified OI processes or practices into three main types: (1) outside-in OI (inbound OI); (2) inside-out OI (outbound OI); and (3) coupled OI.

Outside-in or inbound OI is defined as a partnership between different enterprises to acquire external knowledge and use it internally. It refers to "the practice of exploring and integrating external knowledge for technology development and technology exploitation" (Parida et al. 2012, p. 288). Furthermore, it implies the use of discoveries that others make, and it involves a firm opening up to and establishing relationships with external firms with the aim of accessing their competencies to enhance the firm's innovation performance (Chesbrough and Crowther 2006; Muzamil Naqshbandi and Kaur 2014). SMEs engaging in inbound, outbound, and coupled open innovation practices are often service-oriented businesses with a significant focus on financial metrics for assessing company performance (Rumanti et al. 2021). Inbound open innovation refers to the process of acquiring knowledge from external sources to support internal innovation resources and activities (Rumanti et al. 2021).

Inbound OI includes two main processes: (1) sourcing and (2) acquiring. Sourcing refers mainly to how enterprises employ external knowledge sources to innovate while acquiring relates to how enterprises use the surrounding ecosystem or environment to gain knowledge during the innovation process.

Inside-out or outbound OI represents a partnership between different enterprises to export their ideas and knowledge to other enterprises to commercialize that data and maximize the enterprises' profits. It refers to the spin-off of new ventures based on prior product or technology development and external involvement in product development and licensing out technologies to other organizations (Gassmann 2006; Van de Vrande et al. 2009; Lichtenthaler and Ernst 2007; Lichtenthaler 2011; Parida et al. 2012; Chesbrough et al.

2014). In other words, it is the process of presenting new ideas and technologies to the market faster than developing products and services internally (Gassmann and Enkel 2004; Lichtenthaler and Ernst 2007). Inside-out or outbound OI thus creates an income source for firms who do this. Therefore, it is about commercializing the knowledge that enterprises will not use in their innovation processes (Gassmann and Enkel 2004, p. 6).

Outbound OI includes two main processes: (1) revealing and (2) selling. Revealing refers to how enterprises reveal their internal resources and knowledge to the external ecosystem without acquiring any financial profit while selling refers to how enterprises commercialize and market the innovations that were developed using external resources acquired from other market players and that the enterprise is unable to implement in its innovation strategy (Hossain et al. 2016; Enkel et al. 2009).

The coupled OI process Involves combining both inbound and outbound OI practices in the same innovation strategy by establishing alliances with industry partners to exchange knowledge and innovations (Gassmann and Enkel 2004; Matvienko 2016). Gassmann and Enkel (2004, p. 12) states that "Companies that decide on the coupled process as a key process, combine the outside-in process (to gain external knowledge) with the inside-out process (to bring ideas to market). To do both, these companies cooperate with other companies in strategic networks".

2.4. Effects of Open Innovation on SMEs' Business Performance

There is an ongoing debate regarding whether OI positively or negatively affects the overall business performance of enterprises regardless of their size. Bouncken and Kraus (2013) consider OI a "double-edged sword" to the business performance of enterprises, and Verbeke (2000) adds that based on empirical studies, OI activities, especially in SMEs, are not a guarantee of positive business performance. On the contrary, other researchers, such as Zhang and Chen (2014, pp. 718–19), state that the positive impact of OI on a firm's business performance is based on the firm's absorptive capabilities. Furthermore, Sağ et al. (2016, p. 756) state that the literature includes conflicting and contradicting findings about OI in SMEs due to the difference in business contexts between developed and developing countries. Moreover, Enkel et al. (2009, p. 7) state that "Not all OI activities of SMEs have a positive effect on their innovation output." The positive impact of OI on SMEs' business performance is thus not guaranteed and is based on the adopted OI practices and the context. The study was conducted on SMEs operating in different sectors (trade, manufacturing, and services) in the UAE, in contrast to some previous studies that suggest that future research can expand the research framework on SMEs in the service and manufacturing sectors. Therefore, this provides a comprehensive understanding, enhances knowledge, and aids policymakers in developing effective strategies to support OI practices in SMEs within the UAE (Singh et al. 2021).

2.5. Hypotheses Development

The literature on the effects of organizational practices in SMEs on OI performance is limited (Verbeke 2000; Matvienko 2016). Based on the available literature, firms face several challenges and obstacles to implementing OI practices in their business strategies. These obstacles could be categorized into two main themes: financial and organizational. Researchers have claimed that firms could overcome many organizational obstacles by adopting organizational practices and HRM strategies that support OI practices (Matvienko 2016, p. 2). Suitable organizational practices thus act as facilitators or enablers of OI adoption.

HRM is a crucial and competitive resource for any organization. According to Rauch and Hatak (2016, p. 485), HRM practices contribute greatly to any firm and more specifically to SMEs. Moreover, Rauch and Hatak (2016, p. 485) reinforce that "SMEs need to implement HRM practices that focus on enhancing skills, motivation, and empowerment". Furthermore, Corral de Zubielqui et al. (2017) state that adopting modern HRM practices affects firms' external knowledge capacity and degree of innovativeness, and Larsen and

Mayrhofer (2006, p. 12) have found that HRM practices are considered among the capabilities that SMEs depend on to maximize their performance. Neglecting investments in human resources has emerged as a barrier hindering innovation within SMEs, thereby significantly impacting organizational performance. The importance of HRM cannot be overstated, as it plays a pivotal role in fostering innovation within organizations (Gede Riana et al. 2020). Therefore, firms in general and SMEs specifically should invest in adopting HRM-supporting practices to succeed in maximizing their open innovation performance.

Nevertheless, despite the importance of HRM practices for OI in SMEs, there is also a scarcity of studies investigating the effects of HRM on OI in SMEs (Golightly et al. 2012), and a considerable need thus exists to investigate the effects of those practices on stimulating the adoption of OI practices. HRM in SMEs plays a significant role in OI. Furthermore, limited studies have investigated the effects of HRM and organizational practices on OI adoption (Matvienko 2016, p. 8). While Chesbrough et al. (2014) have made several calls for future researchers to investigate this relationship. Based on dynamic capability theory, this paper supports the argument that HRM is key to developing open innovation capabilities (Engelsberger et al. 2021). Accordingly, the researchers hypothesize that HRM practices are positively related to open innovation practices and business performance:

H1. *HRM is positively related to OI practices.*

H2. *HRM is positively related to SMEs' business performance.*

The organizational culture of the firm is among the motivators and facilitators for maximizing its performance and increasing its competitiveness. The role of organizational culture in maximizing the innovative performance of firms is represented in its ability to allow employees to consider innovation as one of the most important organizational values that they must adopt (Hartmann 2006, p. 159). Srisathan et al. (2020) demonstrated the crucial role of organizational culture, highlighting its significant impact on performance and organizational success.

Several scholars (Judge and Cable 1997; Tesluk et al. 1997; Johnson and McIntye 1998) have emphasized the importance of organizational culture as a contributing and essential factor in achieving creativity and innovation. A firm's organizational culture is thus a stimulator and key player in facilitating and motivating the adoption of creativity and both closed and open innovation (Hartmann 2006).

The importance of organizational culture is represented in the following statement (Hartmann 2006, p. 159): "A culture that motivates new solutions and innovative improvements in particular first of all prevents ideas from getting lost in daily business and within the organization". Moreover, Martins and Terblanche (2003, p. 67) stated earlier that "organizational culture lies at the heart of organization innovation". Furthermore, Lam et al. (2021) emphasized that culture inherently acts as a fundamental driver of innovation. Therefore, organizational culture should be regarded as the most effective stimulator for innovative attitudes and behaviors in any firm.

Furthermore, a firm's organizational culture, if implemented correctly, is considered to be among the essential predictors of OI (Muzamil Naqshbandi and Kaur 2014) and the valuable assets of any firm (Lau and Ngo 2004). In addition, scholars (Boschma 2005; Van de Vrande et al. 2009; Carbone et al. 2010; Lichtenthaler 2011; Naqshbandi et al. 2015) consider organizational culture to be one of the essential challenges of OI adoption. Dynamic capability theory comprehensively encapsulates the essence of the understudied framework, along with its associated variables such as open innovation and organizational culture (Parveen et al. 2023).

This study thus focuses on investigating the effect of organizational culture on OI practices in SMEs. Furthermore, as Naranjo-Valencia et al. (2011, p. 56) state, the majority of studies that investigate the relationship between organizational culture and innovation have been conducted in U.S. firms, whereas few have been conducted in European firms,

and there is a lack of research in the Asian, African, and MENA regions. Hence, it is reasonable to argue that an organization's culture is a potent instrument for fostering desired innovative outcomes (Parveen et al. 2023). Moreover, the majority of studies focus on the relationship between large firms' organizational culture and innovation performance. Therefore, there is a need to study the effects of SMEs' organizational culture on the open innovation practices of SMEs. Based on that, the researchers thus propose that organizational culture is positively related to open innovation practices and business performance:

H3. *Organizational culture is positively related to OI practices.*

H4. *Organizational culture is positively related to SMEs' business performance.*

Several scholars have highlighted the contribution of knowledge to firms (Voelpel and Han 2005; Nilakanta et al. 2006; Kamaşak and Bulutlar 2010). Some state that the "Sum of knowledge acquired externally and internally constitutes a sustainable resource for maintaining competitive advantage" (Kamaşak and Bulutlar 2010, p. 307). The sustainability and competitiveness of firms are thus affected by the exchange of knowledge internally and externally. Furthermore, studies such as (Tsai 2001; Storey and Kelly 2002) point out that a lack of knowledge is among the main barriers to innovation (Kamaşak and Bulutlar 2010, p. 308). They define knowledge sharing as "a process where individuals mutually exchange their implicit (tacit) and explicit knowledge to create new knowledge", and the knowledge sharing process is divided into two main branches: collecting and donating. Knowledge collection or, as mentioned in some literature, knowledge receiving refers to a firm's trials to encourage other firms to share the knowledge they have, while knowledge donating or disseminating relates to a firm's desire to transfer its knowledge and IP to other firms (Kamaşak and Bulutlar 2010, pp. 307–8).

Several scholars have discussed the importance of knowledge sharing for firms. However, SMEs may face significant challenges when implementing and using knowledge-sharing practices, finding them tedious and complex tasks (Singh et al. 2021). It is a crucial organizational practice in SMEs aiming to adopt OI practices. According to (Day 1994; Grant 1996; Kamaşak and Bulutlar 2010), knowledge-sharing practices are considered to be among the most important factors that affect OI practices in large firms as the process of collecting and absorbing new knowledge generally leads to maximizing the firms' degree of innovativeness (Subramaniam and Youndt 2005; Kamaşak and Bulutlar 2010). Moreover, Scholars (Calantone et al. 2002; Reid 2003) have pointed out that knowledge sharing allows firms to fulfill their customers' needs, generate efficient and suitable solutions, develop their products, and thus achieve competitiveness. Moreover, it enables firms to innovate and maximize their innovation performance. Singh et al. (2021) propose in their study that knowledge-sharing practices have an impact on OI, which subsequently affects organizational performance in SMEs.

According to a study that investigated approximately 124 firms, knowledge-sharing practices are part of the three OI processes: inside-out, outside-in, and coupled open innovation processes either in the form of knowledge exploration (outside-in) or knowledge exploitation (inside-out) or by mixing inside-out and outside-in practices and establishing alliances with other firms in the market to share the knowledge they possess (Gassmann and Enkel 2004, p. 1). Although knowledge-sharing practices play a crucial role in OI innovation, there has been a limited number of studies examining their influence on SMEs (Singh et al. 2021). To conclude, knowledge-sharing practices are essential for firms with low budgets, such as SMEs, that plan to innovate and excel in the market. The researchers thus propose that knowledge sharing is positively related to OI practices and SMEs' business performance:

H5. *Knowledge-sharing practices are positively related to OI practices.*

H6. *Knowledge-sharing practices are positively related to SMEs' business performance.*

Researchers (Luo 2003; Li et al. 2008; Li and Zhou 2010; Naqshbandi 2016; Guo et al. 2020) state that firms could benefit from social networks and managerial ties to seek knowledge and opportunities to deal with business challenges. Furthermore, in their recent study, Guo et al. (2020) discuss the benefits of managerial ties, stating that managerial ties facilitate acquiring, processing, and interpreting knowledge by facilitating knowledge acquisition as well as knowledge sharing with regard to customer needs and competitors, which facilitates specifying market needs and future entrepreneurial opportunities. Moreover, Recent research findings highlight the collaborative impact of managerial ties with other organizational variables, thereby enhancing overall organizational innovation (Naqshbandi and Jasimuddin 2022). In addition, Guo et al. (2020) state that managerial ties are more beneficial to SMEs compared to large firms as they assist SMEs to overcome the challenge of resource scarcity without relying on conventional techniques.

In addition, SME managers normally act as the main motivators for closed and open innovation. Naqshbandi and Jasimuddin (2022) posited that managerial ties play a crucial role in fostering open innovation practices. Therefore, as previously stated, the managerial ties of the CEOs and managing directors of SMEs affect the culture, strategy, direction, and performance of those firms (Hossain 2015, p. 5). Moreover, managerial ties are crucial for OI adoption; however, less is known about the impact of managerial ties on each type of OI practice. Accordingly, the impact of managerial ties on OI practices and business performance is hypothesized as follows:

H7. *Managerial ties are positively related to OI practices.*

H8. *Managerial ties are positively related to SMEs' business performance.*

There is a debate among researchers about whether OI positively or negatively affects the overall business performance of enterprises, regardless of their size. On the one hand, Bouncken and Kraus (2013) consider OI to be a "double-edged sword" to the business performance of enterprises; it can sometimes harm a firm instead of improving its performance. Likewise, opening up a firm's innovation strategy to the public and competitors may cause the firm to lose its competitive advantage related to understanding customers' needs and fulfilling them, as well as producing modified products that are required in the market.

On the other hand, according to the reviewed literature, OI practices have the capability to maximize the value of firms by using IP acquisition and productizing practices to increase firms' sales revenues, which leads to increasing their stock value (Escoffier et al. 2016, p. 13). Furthermore, OI assists firms to develop their products or services using innovation with fewer costs. It thus achieves two main objectives: it lowers the cost of innovation, and it increases firms' profits.

To specify the position of SMEs in this debate, the researchers investigate the impact of OI on the overall business performance of SMEs. Based on that, the following hypothesis is tested:

H9. *OI practices have a direct and positive effect on SMEs' business performance.*

A post-hoc analysis is conducted to determine the role of open innovation as a possible mediator in the relationships between the five independent constructs and the two final dependent constructs. Figure 1 presents the proposed conceptual model, which was developed based on the previous literature.

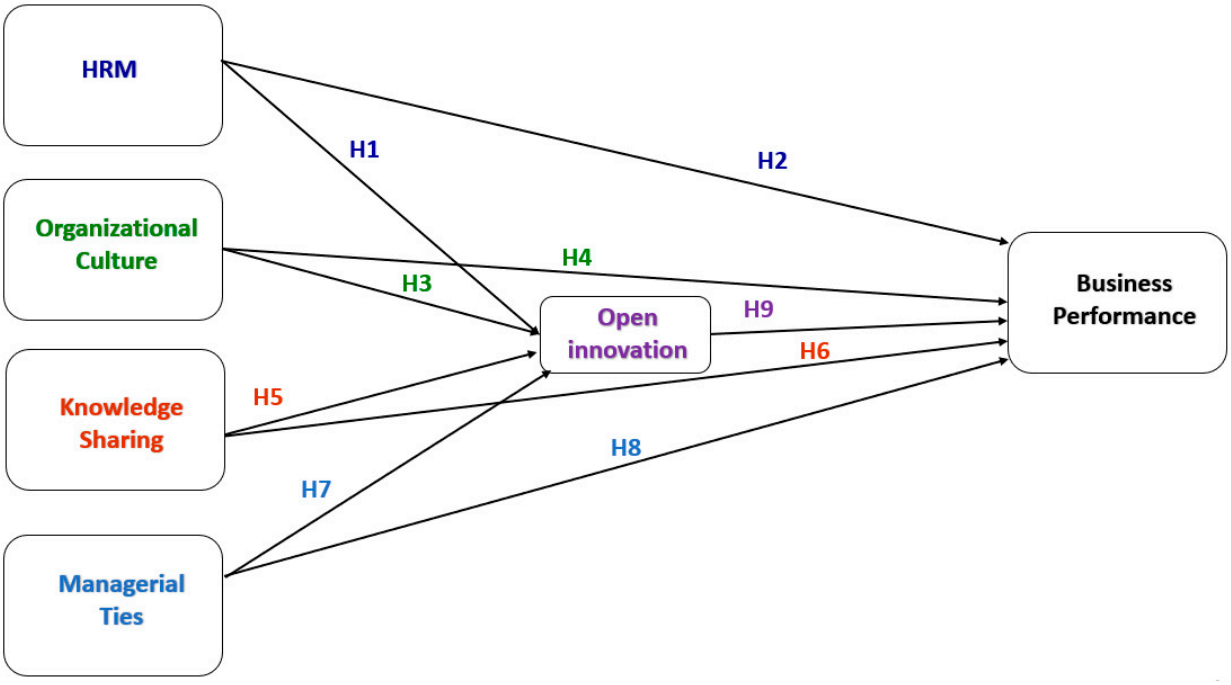

Figure 1. Proposed Conceptual Framework.

3. Materials and Methods

In this study, primary data was collected using a questionnaire distributed to a sample of 520 SME managers and CEOs in the UAE. The data was collected using two data collection tools: person-administered surveys and online surveys. A structural equation model was estimated using using SPSS, version 26, and Smart PLS software, version 3.

3.1. Measures

In this study, the internal organizational practices were tested using a number of pre-validated concepts and indicators (Appendix A): HRM practices, organizational culture, knowledge sharing, and managerial ties. It is worth noting that the independent variables are inter-related and interconnected; however, in order to adopt a less complex and measurable framework, and based on the previous literature (Chesbrough and Bogers 2014), the variables of internal organizational practices were as follows: HRM practices, organizational culture, knowledge sharing, and managerial ties. Additionally, the open innovation practices were tested based on three main indicators: inbound (outside-in) open innovation, outbound (inside-out) open innovation, and coupled open innovation. Regarding the SMEs' business performance, two main aspects were assessed: innovation performance and market performance. Details of the variables and scales that were used to test each indicator are presented next.

The HRM practices' indicators included several variables as tested by (Ngo et al. 2008): hiring and recruitment, training and development, performance appraisal, and compensation. These four factors are indicators of the HRM practices in different firms, regardless of their size. The scale included 15 items with a Cronbach's alpha of 0.91. This scale is a highly cited scale (cited more than 200 times). The organizational culture of SMEs was measured using the framework that was developed by (Lau and Ngo 2004). This framework includes four items, and the Cronbach's alpha value of the scale is 0.74. This scale is a highly cited scale (cited more than 600 times). Furthermore, the knowledge-sharing construct was measured using the scale developed by (Chang Lee et al. 2005). This scale is a highly cited scale (cited more than 700 times), includes four items, and has a Cronbach's alpha value of 0.75. The managerial ties were measured using the scale developed by (Peng and Luo 2000) which includes six items. This scale has a Cronbach's alpha value of 0.79 and has been cited more than 2700 times. Regarding open innovation practices, three

open innovation practice levels were tested in this study. The researchers in this study adopted the scales that were first proposed by several researchers (Vanhaverbeke et al. 2002; Miotti and Sachwald 2003; Fey and Birkinshaw 2005; Belderbos et al. 2006; Laursen and Salter 2006; Lichtenthaler and Ernst 2007; Aschhoff and Schmidt 2008; Segarra-Blasco and Arauzo-Carod 2008; Grimpe and Kaiser 2010) and developed later by (Cheng and Huizingh 2014). These scales measure inbound, outbound, and coupled open innovation practices in firms. Inbound open innovation was tested using four items, and outbound and coupled open innovation were tested using three items for each. Cronbach's alpha values of inbound, outbound, and coupled open innovation are 0.75, 0.80, and 0.87 respectively. First, the scale that assessed SMEs' inbound open innovation performance is based on co-operating with external partners, relying on external partners' contributions, and buying R&D copyrights and IP. Second, the scale that assessed SMEs' outbound open innovation performance is based on selling patent licenses, having royalty rights, and investing in IP rights. Third, the scale that assessed SMEs' coupled open innovation performance is based on internal and external partners' knowledge integration and knowledge sharing co-ordination between internal and external partners.

Furthermore, SMEs' business performance was measured using two main aspects: innovation performance and market performance. Both scales were developed by (Ritala 2012) and included 11 items. The Cronbach's alpha value is 0.79 for innovation performance is 0.84 for market performance. Innovation performance was assessed based on the SMEs' innovation performance during the last three years compared to other SMEs in the same sector regarding replacement of phased-out products or services, extension of products or services within and outside the main market, developments of eco-friendly products or services, the opening of new markets abroad, and the opening of new domestic target groups. Moreover, the SMEs' market performance was assessed based on their market performance during the last three years compared to other SMEs in the same sector regarding the following aspects: growth in sales, profitability, market share, and market growth.

3.2. Data Collection

The data collection stage included different main stages involved contacting official entities in the UAE, such as the Khalifa Fund, Dubai SME, RAK SME, and RAKEZ, to gain access to their databases and collect the data. Alternatively, the researchers utilized the professional social media platform LinkedIn to search for SMEs and connect with the managers and owners. By the end of the first stage, the researchers had a list of a number of SMEs registered in the UAE. In the second stage, the managers of these SMEs were contacted using several techniques that included direct visits, phone calls, and LinkedIn messages to seek their approval. The third stage included sending an official invitation to the selected participants and an online version of the questionnaire.

3.3. Sample

According to the Dubai SME report in 2020, SMEs in the UAE amount to almost 151,875 enterprises. As a sample rule (Ahmad et al. 2016, p. 2) states that "When there is five or less latent construct and each latent construct has more than three measuring items, the minimum sample required to use SEM is 100 samples". Therefore, the targeted sample size for using SEM should be a minimum of 100 participants and a maximum of 400. The population consisted of SMEs operating in different sectors (trading, manufacturing, and services) in the UAE. The survey targeted SME managers and CEOs as elite informants. The selection criteria for SMEs were based on SME age, sector, and innovation history.

The researchers distributed the survey to 520 in total (430 SME managers and CEOs via LinkedIn messages and emails and 90 via direct visits. A number of 293 were completed: 216 via LinkedIn and emails and 77 using the person-administered surveys. Therefore, the total number of completed surveys using the two techniques was 293 out of 520. Furthermore, the unit of analysis in this study is the firm level, where one elite informant respondent in each SME was selected. This technique, in addition to other tests and proce-

dures that are discussed in the reliability and validity sections, allows for data triangulation and increases the validity, reliability, and generalizability of the research results.

3.4. Questionnaire

Based on existing literature and the work of Chesbrough and Bogers (2014), the variables of internal organizational practices were as follows: HRM practices, organizational culture, knowledge sharing, and managerial ties. Furthermore, OI practices were tested using three types of OI: inbound OI, outbound OI, and coupled OI practices. SMEs' business performance was measured on two levels: innovation performance and market performance. All of the constructs were tested using a 7-point Likert scale. Furthermore, the questionnaire was used to collect the participants' demographic data (firm size, SME business sector, tenure in the current organization, and geographical location of the firm's main headquarters in the UAE. The questionnaire was sent to 520 SMEs via email, LinkedIn platform, and direct visits. 293 questionnaires were completed (56.3% response rate). The demographic profile of the participants is provided in Table 1.

Table 1. Demographic Details.

Sector	**Frequency**	**Percent**
Service	162	60.9%
Trading	68	25.6%
Manufacturing	36	13.5%
Years of Experience	Frequency	Percent
10 years	98	36.8%
5–9 years	93	35%
1–4 years	75	28.2%
Geographical Distribution	Frequency	Percent
Dubai	161	60.5%
Abu Dhabi	66	24.8%
RAK	21	7.9%
Sharjah	14	5.3%
Fujairah	2	0.8%
Ajman	2	0.8%
Umm Al Quwain	0	0%

4. Results

In this study, the first step was to specify the constructs in terms of reflective and formative constructs. The study model included reflective and formative constructs. Formative constructs are human resource management, open innovation, and business performance. Reflective constructs are organizational culture, knowledge sharing, and managerial ties. Based on that, the researchers used both SPSS and PLS-SEM to analyze the data. SPSS was used at first to check missing values and outliers in the data and the procedures for treating them. Then, data normality, linearity, homoscedasticity, and multicollinearity were assessed to prepare the data for further investigations and tests. In the second stage, SPSS was used to conduct an EFA to assess the factor analysis, factor models, numbers, and rotation methods and to report the EFA findings. Furthermore, other tests were conducted, such as tests for reliability, correlation, and common method bias. Additionally, the second stage includes CFA as well as SEM, hypothesis testing, and mediation tests. PLS-SEM was used as according to Schumacker and Lomax (2004, p. 7), SEM allows researchers to use multiple observed variables to enhance their understanding of the research phenomena by testing complex theoretical models. It thus examines theoretical models quantitatively and

either confirms or refutes them. Based on that, SEM enables the researchers in this study to test the conceptual model and enrich the current understanding of open innovation in SMEs. Moreover, SEM guarantees a higher level of reliability and validity as it decreases the existence of measurement errors, and "SEM explicitly takes measurement error into account when statistically analysing data and it includes latent and observed variables as well as measurement error terms in certain SEM models" (Schumacker and Lomax 2004, p. 7). Furthermore, De Carvalho and Chima (2014, p. 7) stated that SEM enables researchers to test complex relationships between latent and observed variables. Moreover, SEM decreases measurement error through CFA by allowing the testing of several indicators of latent variables and visually representing the model (Kline 2023; O'Rourke and Hatcher 2013; De Carvalho and Chima 2014). In addition, SEM tests the overall models, not the coefficients separately, and it has the capability to test models that include several dependent variables and mediating variables. Besides, SEM was also used in this study to test the extent to which the theoretical hypothesized model about the relationship between internal organizational practices and open innovation practices is supported by the collected data. Besides, SEM enabled the researchers to test the conceptual model and enrich our understanding of open innovation in SMEs.

4.1. Preliminary Data Analysis

In this study, no negatively worded items exist in the survey. Therefore, there is no need to do any reversing for negative survey items. The missing values check revealed approximately 15 variables with missing values (all less than 2% missing. Therefore, all 15 cases with missing values were imputed and replaced with the median scores, as recommended by (Hair et al. 2014; Hair et al. 2023) and James Gaskin. Moreover, one respondent case was deleted due to having incomplete responses (more than 20%). Following this, two approaches were adopted to check for unengaged responses. The first technique involved checking the duration of filling the survey. In this study, the average time of filling the survey ranged from 3 to 10 min, and answers less than 3 min were excluded. In the second approach, the standard deviation of the items was checked, where a standard deviation of 0 means no variance. In this study, 20 responses were deemed to be unengaged responses, and the duration of those same responses was less than 3 min. Therefore, the 20 responses were deleted and excluded from the dataset.

The researchers tested both univariate outliers and multivariate outliers. Univariate outliers were checked by calculating the standardized Z scores of cases and excluding cases above 4. Based on that, six outliers were removed from the dataset. Furthermore, the researchers checked multivariate outliers using Mahalanobis distance (D2) values. One case was recorded as an outlier (case 42). However, it was not excluded from the dataset as it is not effective.

Following this, the researchers assessed data normality. All of the skewness and kurtosis values are within the normal range. Skewness scores ranged from 0.533 and 1.201. While kurtosis value ranged from −0.331 and 2.152. Moreover, the Q-Q plot falls close to the diagonal line, with some exceptions, and histograms are almost bell shaped. The distribution is thus considered to be acceptable. Therefore, normality is not an issue in this study.

Data linearity and homoscedasticity were checked. The data met the homoscedasticity requirements. The scatterplot curve is close to the diagonal, with no curves, and the residuals are almost distributed without major concentration. The linearity and homoscedasticity requirements were thus met. Moreover, Cook's distance test revealed that all of the cases are below the cut-off of 1 (Cook and Weisberg 1982). The dataset is thus free from any linearity and homoscedasticity issues.

Subsequently, the researchers conducted the multicollinearity test. No issues regarding multicollinearity exist in this research as the tolerance scores range from 0.368 and 0.719, and in all cases, the threshold is more than 0.1. Moreover, regarding VIF, the scores range

from 1.390 and 2.718, and the threshold is less than 4. Regarding the demographic details of the sample, the overall number of valid cases was 266.

Following the preliminary data analysis, an EFA was conducted to test the overall structure of the variables constituting the model. Additionally, this study was based on a strong theoretical background and broad literature review. EFA result showed that the KMO test value is 0.887, and Bartlett's test of sphericity is significant ($p < 0.01$). These values thus verify the previously mentioned theoretical background and allow the researchers to proceed with the next step of testing the model.

The researchers used SPSS software to run EFA model and removed factors that loaded less than ±0.50 and cross loadings. All of the items loaded in separate components, and all factor loadings were above 0.50. Table 2 portrays the final EFA outcomes in terms of pattern matrix, components' variance extracted and eigenvalues, items' factor loadings, and the model scree plot. All of the factors loaded above 0.30, and no cross-loadings loaded above 0.30.

Table 2. EFA Pattern Matrix.

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
OC1						0.725		
OC2						0.742		
OC3						0.570		
OC4						0.565		
HRM2		0.580						
HRM3		0.475						
HRM5		0.808						
HRM6		0.714						
HRM7		0.767						
HRM9		0.699						
HRM10		0.545						
HRM12		0.788						
HRM13		0.565						
HRM14		0.666						
KS1				0.777				
KS2				0.860				
KS4				0.709				
MT3			0.695					
MT4			0.919					
MT5			0.979					
MT6			0.796					
OIP1							0.971	
OIP2							0.968	
OIP5								0.983
OIP6								0.983
OIP8					0.784			
OIP9					0.824			
OIP10					0.696			
BP1	0.627							
BP3	0.698							
BP4	0.702							
BP5	0.733							
BP7	0.872							
BP8	0.835							
BP9	0.840							
BP10	0.860							
BP11	0.764							

The eight components explained 69.02% of the variance and fulfilled the eigenvalue criterion (eigenvalue greater than 1). The EFA using the principal component extraction

method revealed the existence of eight latent variables, which represent the theoretical basis of this study. The previously mentioned 38 items all exhibited high factor loadings.

After conducting the EFA, the researchers checked the reliability of constructs, mean values, standard deviations, and the correlation between the different variables. In this research, the researchers fulfilled the item total correlation threshold (0.5) and managed to achieve the inter-item correlation value for all variables. Furthermore, the Cronbach's alpha reliability values of all variables were more than 0.70. Furthermore, one of the items in inbound OI and outbound OI was likely redundant, even though the researchers retained both items in each construct to obtain satisfactory solutions using SEM, since single indicator constructs frequently produce unsatisfactory results (Hair et al. 2014). Therefore, the researchers retained inbound OI and outbound OI that were measured using two observed items only, as the inter-item correlation was more than the threshold (<0.70) between each latent variable item, and the degree of correlation with other variables was weak. Table 3 lists the mean, standard deviations, and Cronbach's alpha values of all of the constructs.

Table 3. Mean, standard deviation, and Cronbach's alpha values.

Variable	Mean	St. Deviation	Cronbach's Alpha
Organizational culture	1.91	0.85	0.830
Human resource management	2.45	0.94	0.875
Knowledge sharing	1.97	0.96	0.821
Managerial ties	2.79	1.36	0.888
Inbound OI	2.50	1.39	0.989
Outbound OI	3.34	1.88	0.999
Coupled OI	2.56	1.23	0.873
Business performance	2.53	1.08	0.916

For this study, the researchers relied on conducting Harman's single-factor test to assess the level of common method bias in the study. Harman's single factor test result revealed that this study does not include any common method bias, as the highest variance for a single factor was 31.29% out of 68.39%.

The next step after conducting the EFA and checking reliability and common method bias is to run SEM to test the model and the tested hypotheses. The researchers used PLS-SEM to assess the measurement model and hypothesized relationships. In this study, a higher-order model technique was used to test HRM, OI, and business performance. The researcher applied in this study a disjoint two-stage approach. The researchers used PLS-SEM as per the instructions, guidelines, and recommendations provided by other scholars (Haenlein and Kaplan 2004; Ringle et al. 2020). The first stage included testing both the lower-order and the higher-order measurement models. The researchers assessed internal consistency reliability, composite reliability and convergent validity by reporting outer loadings, Cronbach's alpha, rho_A (ρA), and AVE values. The researchers assessed the measurement model of the lower order and reported collinearity issues related to inbound and outbound OI constructs. Due to collinearity issues (high VIF) in inbound and outbound OI, the one item was removed from each construct and collinearity was re-checked. No issues appeared in the second time. Based on that, inbound and outbound OI were measured using single item (Hair et al. 2023; Ringle et al. 2020). Cronbach's alpha values and rho_A (ρA) were all above 0.70 except for compensation, training and hiring. This is due to the small number of items for these constructs. However, the CR and AVE values of all of the constructs were above the threshold. Thus, it can be concluded that all of the study constructs explain more than 50% of the item's variance (Chin 1998). Therefore, the researchers kept all of the constructs. Additionally, inbound, and outbound are each single item constructs. Based on that, the high reliability was totally expected. Figure 2 shows the lower order measurement model. Table 4 shows the first order model outer

loadings, Cronbach's alpha, rho_A (ρA), AVE values and VIF values of the lower order measurement model.

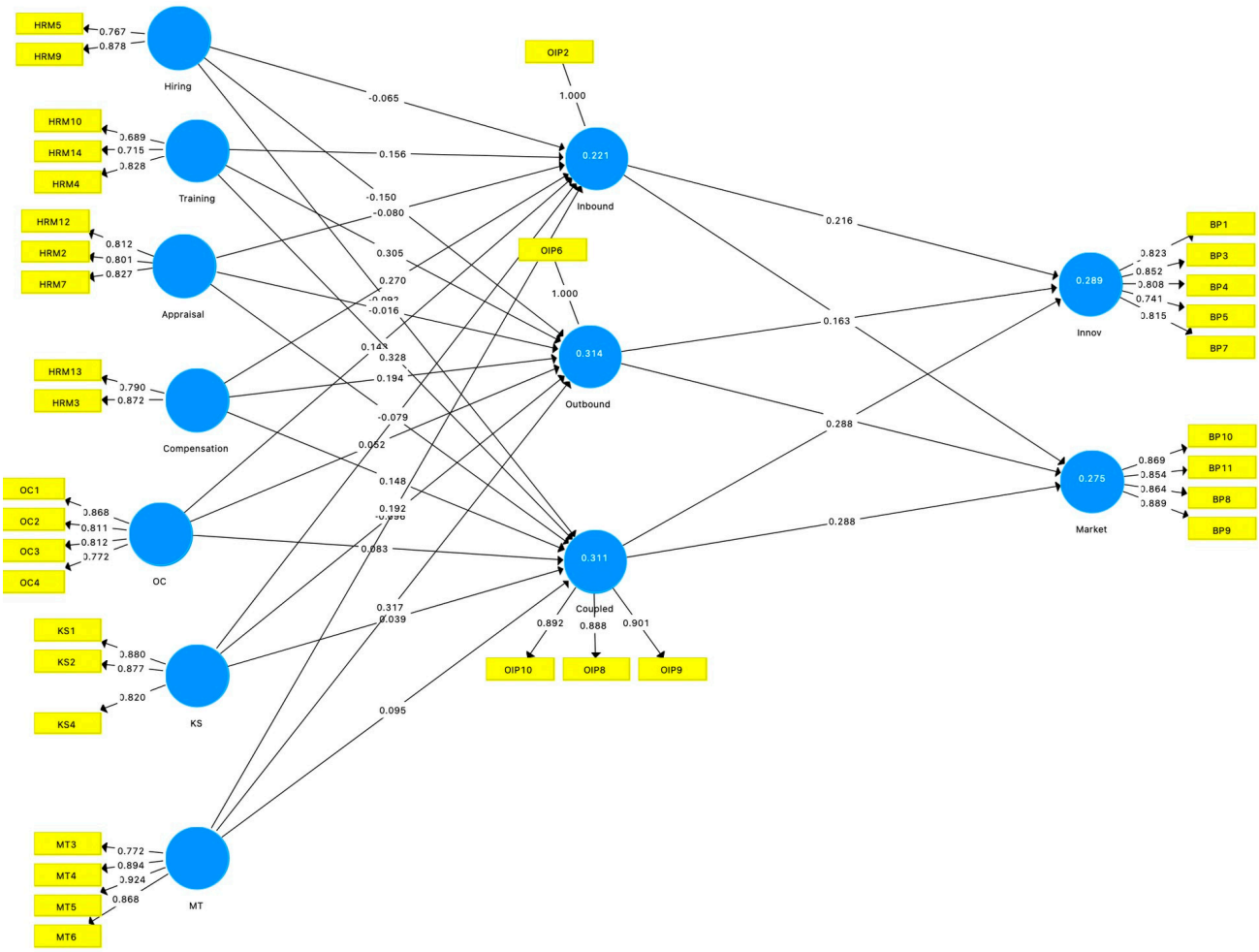

Figure 2. Lower Order Measurement model.

Table 4. Lower order measurement model.

			Loadings	Cronbach's Alpha	rho_A	CR	AVE	VIF
HRM	Compensation	HRM3	0.872	0.744	0.744	0.854	0.661	1.18
		HRM13	0.79					1.18
	Appraisal	HRM2	0.801	0.562	0.58	0.818	0.693	1.426
		HRM7	0.827					1.589
		HRM12	0.812					1.469
	Training	HRM4	0.828	0.616	0.656	0.79	0.558	1.195
		HRM10	0.689					1.238
		HRM14	0.715					1.233
	Hiring	HRM5	0.767	0.537	0.567	0.809	0.68	1.156
		HRM9	0.878					1.156
OC		OC1	0.868	0.833	0.84	0.889	0.667	2.166
		OC2	0.811					1.861
		OC3	0.812					1.752
		OC4	0.772					1.606

Table 4. *Cont.*

			Loadings	Cronbach's Alpha	rho_A	CR	AVE	VIF
KS		KS1	0.88	0.823	0.829	0.894	0.738	2.103
		KS2	0.877					1.938
		KS4	0.82					1.668
MT		MT3	0.772	0.887	0.888	0.923	0.75	1.574
		MT4	0.894					5.761
		MT5	0.924					7.173
		MT6	0.868					2.444
OI	Inbound	OIP2	1	1	1	1	1	1
	Outbound	OIP6	1	1	1	1	1	1
	Coupled	OIP8	0.888	0.874	0.875	0.922	0.798	2.35
		OIP9	0.901					2.528
		OIP10	0.892					2.21
BP	Innov	BP1	0.823	0.868	0.878	0.904	0.654	1.935
		BP3	0.852					2.266
		BP4	0.808					1.963
		BP5	0.741					1.717
		BP7	0.815					1.992
	Market	BP8	0.864	0.892	0.893	0.925	0.755	2.397
		BP9	0.889					2.959
		BP10	0.869					2.572
		BP11	0.854					2.111

Regarding discriminant validity, the researchers checked cross loadings, Fornell and Larcker values, HTMT values and the bootstrapping procedure. All of the variables loaded higher in its items compared to its cross loadings with other variables (Table 5). No discriminant validity issues appear in this study regarding Fornell and Larcker test (Table 6).

Table 5. Cross loadings of the measurement model.

	Component											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
HRM5	0.767	0.518	0.590	0.284	0.387	0.332	0.142	0.100	0.096	0.209	0.121	0.116
HRM9	0.878	0.548	0.558	0.345	0.410	0.363	0.107	0.140	0.133	0.277	0.152	0.176
HRM4	0.506	0.828	0.552	0.481	0.504	0.431	0.196	0.275	0.336	0.517	0.360	0.327
HRM10	0.399	0.689	0.553	0.373	0.462	0.377	0.094	0.165	0.216	0.294	0.208	0.259
HRM14	0.541	0.715	0.563	0.478	0.452	0.420	0.298	0.248	0.271	0.278	0.358	0.289
HRM2	0.541	0.618	0.801	0.377	0.548	0.443	0.172	0.247	0.261	0.320	0.275	0.232
HRM7	0.571	0.586	0.827	0.510	0.530	0.434	0.187	0.135	0.185	0.402	0.308	0.296
HRM12	0.567	0.583	0.812	0.599	0.502	0.363	0.220	0.231	0.241	0.350	0.294	0.310
HRM3	0.368	0.584	0.604	0.872	0.465	0.382	0.261	0.382	0.347	0.444	0.448	0.438
HRM13	0.262	0.390	0.392	0.790	0.256	0.195	0.454	0.284	0.373	0.280	0.364	0.348
OC1	0.350	0.520	0.500	0.399	0.868	0.449	0.232	0.271	0.243	0.356	0.420	0.354
OC2	0.434	0.513	0.550	0.383	0.811	0.415	0.214	0.219	0.157	0.334	0.306	0.310
OC3	0.384	0.537	0.553	0.359	0.812	0.530	0.164	0.262	0.218	0.311	0.355	0.333
OC4	0.420	0.490	0.522	0.309	0.772	0.462	0.108	0.138	0.240	0.315	0.333	0.227
KS1	0.390	0.492	0.437	0.316	0.549	0.880	0.142	0.112	0.092	0.299	0.245	0.200
KS2	0.349	0.462	0.448	0.302	0.459	0.877	0.094	0.137	0.133	0.314	0.299	0.195
KS4	0.348	0.452	0.423	0.305	0.458	0.820	0.176	0.127	0.157	0.239	0.310	0.283

Table 5. *Cont.*

	Component											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
MT3	0.145	0.225	0.248	0.372	0.222	0.174	0.772	0.297	0.379	0.262	0.340	0.306
MT4	0.092	0.243	0.197	0.339	0.185	0.106	0.894	0.298	0.373	0.207	0.375	0.361
MT5	0.112	0.209	0.176	0.348	0.189	0.108	0.924	0.289	0.361	0.194	0.373	0.353
MT6	0.153	0.232	0.197	0.371	0.173	0.149	0.868	0.277	0.429	0.269	0.420	0.471
OIP2	0.148	0.314	0.253	0.405	0.277	0.146	0.336	1.000	0.428	0.464	0.419	0.402
OIP6	0.141	0.376	0.283	0.429	0.264	0.148	0.448	0.428	1.000	0.472	0.392	0.386
OIP8	0.293	0.466	0.414	0.356	0.389	0.332	0.189	0.395	0.411	0.888	0.375	0.404
OIP9	0.252	0.429	0.366	0.389	0.319	0.264	0.237	0.403	0.414	0.901	0.424	0.404
OIP10	0.255	0.473	0.395	0.442	0.373	0.295	0.297	0.443	0.440	0.892	0.445	0.418
BP1	0.182	0.348	0.290	0.415	0.355	0.247	0.345	0.386	0.327	0.435	0.823	0.532
BP3	0.137	0.366	0.311	0.421	0.330	0.273	0.415	0.395	0.309	0.413	0.852	0.597
BP4	0.119	0.364	0.278	0.474	0.322	0.271	0.438	0.350	0.393	0.299	0.808	0.588
BP5	0.214	0.324	0.358	0.296	0.427	0.343	0.261	0.209	0.235	0.322	0.741	0.520
BP7	0.040	0.304	0.239	0.362	0.355	0.232	0.294	0.321	0.310	0.395	0.815	0.644
BP8	0.107	0.297	0.251	0.392	0.270	0.210	0.403	0.319	0.285	0.424	0.608	0.864
BP9	0.195	0.352	0.311	0.397	0.337	0.231	0.364	0.345	0.286	0.402	0.607	0.889
BP10	0.184	0.360	0.320	0.389	0.367	0.228	0.338	0.368	0.375	0.346	0.635	0.869
BP11	0.142	0.354	0.311	0.470	0.338	0.232	0.400	0.363	0.389	0.417	0.622	0.854

(1 = Hiring, 2 = Training, 3 = Appraisal, 4 = Compensation, 5 = Organizational Culture, 6 = Knowledge Sharing, 7 = Managerial Ties, 8 = Inbound Open Innovation, 9 = Outbound Open Innovation, 10 = Coupled Open Innovation, 11 = Innovation Performance, 12 = Market Performance).

Table 6. Fornell & Larcker.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	0.813											
2	0.610	0.832										
3	0.439	0.445	0.893									
4	0.688	0.384	0.298	0.825								
5	0.253	0.405	0.464	0.148	1.000							
6	0.360	0.491	0.466	0.167	0.419	0.809						
7	0.508	0.357	0.332	0.421	0.146	0.331	0.859					
8	0.238	0.415	0.272	0.147	0.336	0.438	0.157	0.866				
9	0.344	0.476	0.458	0.181	0.402	0.712	0.259	0.434	0.869			
10	0.648	0.445	0.403	0.482	0.277	0.436	0.567	0.223	0.378	0.816		
11	0.283	0.429	0.472	0.141	0.428	0.392	0.148	0.448	0.386	0.264	1.000	
12	0.733	0.596	0.511	0.644	0.314	0.422	0.545	0.263	0.393	0.630	0.376	0.747

(1 = Appraisal, 2 = Compensation, 3 = Coupled OI, 4 = Hiring, 5 = Inbound OI, 6 = Innovation performance, 7 = Knowledge sharing, 8 = Managerial ties, 9 = Market performance, 10 = Organizational culture, 11 = Outbound OI, 12 = Training).

Discriminant validity was assessed in this study as advised using Fornell-Larcker criterion, cross loadings as well as HTMT values. The bootstrapping procedure showed that the bootstrap confidence interval for all of the constructs is statistically different from 1 except the sub constructs of HRM as these constructs have high HTMT due to the conceptual similarity of HRM practices (Table 7). Discriminant validity was fully achieved for all constructs except the first order constructs of HRM.

Following this, the researchers proceeded to stage two of the disjoint two stage approach which is assessing the measurement model of the higher (second) order model for the constructs: HRM, OI, and business performance. The higher order is formative. Based on that, formative higher order model was assessed by assessing the collinearity (VIF values) and outer weights. All of the VIF values are below 3.3 which is the strictest cutoff (Table 8). Therefore, no collinearity issues were reported in this study.

Table 7. Bootstrapping Results.

	HTMT	2.5%	97.5%
Compensation -> Appraisal	0.923	0.762	1.133
Coupled -> Appraisal	0.545	0.383	0.710
Coupled -> Compensation	0.618	0.454	0.807
Hiring -> Appraisal	1.098	0.958	1.310
Hiring -> Compensation	0.681	0.430	1.001
Hiring -> Coupled	0.430	0.228	0.662
Inbound -> Appraisal	0.291	0.134	0.438
Inbound -> Compensation	0.533	0.340	0.695
Inbound -> Coupled	0.496	0.367	0.606
Inbound -> Hiring	0.198	0.055	0.414
Innovation -> Appraisal	0.454	0.298	0.618
Innovation -> Compensation	0.690	0.505	0.890
Innovation -> Coupled	0.528	0.379	0.670
Innovation -> Hiring	0.249	0.134	0.472
Innovation -> Inbound	0.441	0.310	0.572
KS -> Appraisal	0.649	0.495	0.808
KS -> Compensation	0.510	0.332	0.719
KS -> Coupled	0.510	0.254	0.535
KS -> Hiring	0.633	0.446	0.859
KS -> Inbound	0.161	0.043	0.305
KS -> Innovation	0.400	0.259	0.541
MT -> Appraisal	0.291	0.157	0.452
MT -> Compensation	0.606	0.430	0.789
MT -> Coupled	0.304	0.152	0.465
MT -> Hiring	0.216	0.084	0.423
MT -> Inbound	0.356	0.211	0.505
MT -> Innovation	0.492	0.350	0.626
MT -> KS	0.185	0.082	0.331
Market -> Appraisal	0.422	0.275	0.584
Market -> Compensation	0.663	0.518	0.825
Market -> Coupled	0.517	0.394	0.644
Market -> Hiring	0.255	0.099	0.473
Market -> Inbound	0.425	0.299	0.553
Market -> Innovation	0.809	0.722	0.885
Market -> KS	0.306	0.171	0.444
Market -> MT	0.483	0.350	0.608
OC -> Appraisal	0.827	0.720	0.931
OC -> Compensation	0.631	0.490	0.804
OC -> Coupled	0.472	0.311	0.632
OC -> Hiring	0.727	0.561	0.948
OC -> Inbound	0.299	0.178	0.444
OC -> Innovation	0.518	0.402	0.631
OC -> KS	0.688	0.570	0.804
OC -> MT	0.256	0.138	0.380
OC -> Market	0.434	0.312	0.558
Outbound -> Appraisal	0.327	0.193	0.455
Outbound -> Compensation	0.576	0.437	0.731
Outbound -> Coupled	0.504	0.397	0.602
Outbound -> Hiring	0.189	0.050	0.362
Outbound -> Inbound	0.428	0.284	0.524
Outbound -> Innovation	0.418	0.290	0.539
Outbound -> KS	0.163	0.049	0.288
Outbound -> MT	0.473	0.344	0.590
Outbound -> Market	0.406	0.272	0.531
Outbound -> OC	0.288	0.158	0.412
Training -> Appraisal	1.091	0.995	1.216
Training -> Compensation	0.988	0.799	1.240

Table 7. *Cont.*

	HTMT	2.5%	97.5%
Training -> Coupled	0.656	0.510	0.816
Training -> Hiring	1.114	0.963	1.369
Training -> Inbound	0.389	0.243	0.558
Training -> Innovation	0.563	0.418	0.717
Training -> KS	0.764	0.627	0.899
Training -> MT	0.351	0.230	0.499
Training -> Market	0.522	0.360	0.699
Training -> OC	0.879	0.779	0.992
Training -> Outbound	0.464	0.331	0.593

Table 8. VIF higher-order model.

Construct	VIF
Compensation	1.765
Appraisal	2.968
Hiring	2.115
Training	2.592
Inbound	1.373
Outbound	1.387
Coupled	1.443
Innovation Performance	2.026
Market Performance	2.026

The researchers run the bootstrapping procedure to assess the model items' outer weights' significance. All of the outer weights of the formative higher-order model are significant except for appraisal. In this case content validity and outer loading significance results were checked in order to decide whether to exclude the item from the model or to retain it (Ramayah et al. 2018). Regarding content validity, as per the literature, appraisal practices are among the core HRM practices in any firm, regardless of the firm size. Furthermore, all constructs outer loadings are significant. Based on these two criteria, the researchers retained the "appraisal" indicator as part of the formative HRM construct.

Structural Model Assessment and Hypothesis Testing

Following assessing the measurement model of the lower (first) and higher (second) order model, the researchers assessed the structural model to test the hypothesized relationships between the constructs, and the mediation impact of OI practices on the relationship of internal organizational practices (HRM, OC, KS, MT) and SMEs' business performance and the predictive capability of the model. The researchers assessed the R2 values of the endogenous variables to assess the predictive power of the sample model. The R2 value of OI is 0.409 and business performance is 0.462. Therefore, the R2 values are accepted and indicate moderate impact. Additionally, the researchers used blindfolding procedure to obtain Q2 value. The D value in this study was 6. The Q2 value for OI is 0.334 and for business performance is 0.400. Thus, Q2 values of OI and business performance show that predictive relevance was achieved. The structural model explains 40.9% variation in the OI construct and 46.2% of the variation in business performance construct (Figure 3).

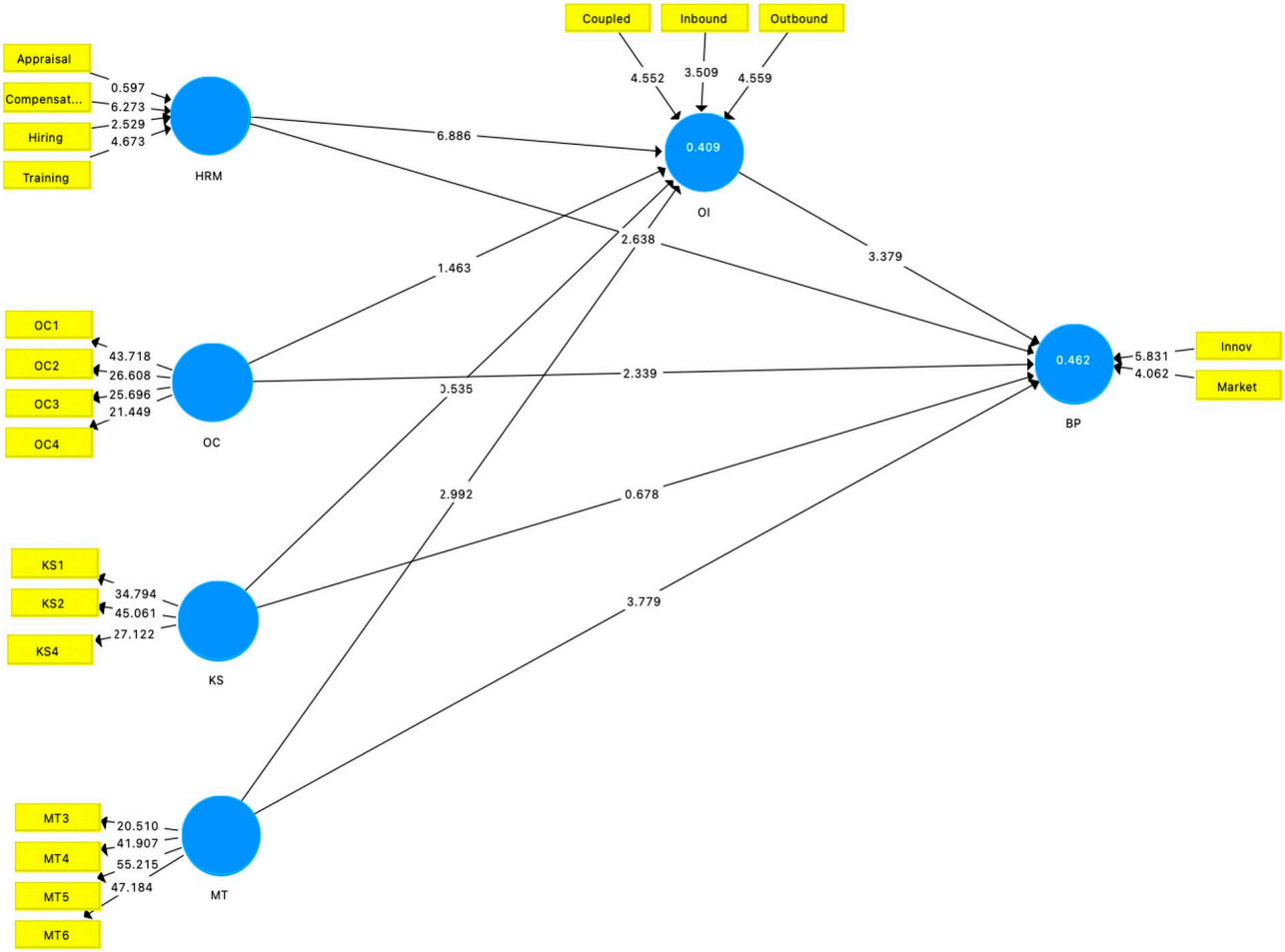

Figure 3. Higher Order Structural model.

4.2. Hypotheses Testing

The findings of the structural model path analysis indicate that the relationship between HRM and OI is supported: HRM positively impact OI (β = 0.455, t-value = 6.886, $p < 0.05$). Moreover, HRM found to be positively significant and impact business performance (B = 0.209, t = 2.638, $p < 0.05$). Therefore, H1 and H2 are supported. The findings of the structural model indicate that the relationship between OC and OI is not supported (β = 0.118, t-value = 1.463, p = 0.144). While OC found to be positively significant and impact business performance (B = 0.142, t = 2.339, $p < 0.05$). Therefore, H3 is not supported. While H4 is supported. The findings of the structural model indicate that the relationship between KS and OI is not supported (β = −0.040, t-value = 0.535, p = 0.593). Moreover, KS did not significantly impact business performance (B = 0.039, t = 0.678, $p = 0.498$). Therefore, neither H5 nor H6 are supported. The findings of the structural model indicate that the relationship between MT and OI is supported (β = 0.237, t-value = 2.992, $p < 0.05$). Moreover, MT found to be positively significant and related to business performance (B = 0.232, t = 3.779, $p < 0.05$). Therefore, both H7 and H8 are supported.

Regarding the relationship between OI and business performance, the findings of the structural model indicate that the relationship between OI and business performance is supported (β = 0.278, t-value = 3.379, $p < 0.05$). Thus, H9 is supported. Table 9 shows path coefficient, t statistics and p values.

Table 9. Structural Model Hypotheses Testing.

	Beta Coefficient	STDEV	t-Statistics	*p* Values	Results
H1: HRM -> OI	0.455	0.066	6.886	0.000	Supported
H2: HRM -> BP	0.209	0.079	2.638	0.008	Supported
H3: OC -> OI	0.118	0.081	1.463	0.144	Not Supported
H4: OC -> BP	0.142	0.061	2.339	0.019	Supported
H5: KS -> OI	-0.040	0.074	0.535	0.593	Not Supported
H6: KS -> BP	0.039	0.057	0.678	0.498	Not Supported
H7: MT -> OI	0.237	0.079	2.992	0.003	Supported
H8: MT -> BP	0.232	0.061	3.779	0.000	Supported
H9: OI -> BP	0.278	0.082	3.379	0.001	Supported

4.3. Mediation Tests

The researchers conducted a mediation test to evaluate the relationship between the independent variables (HRM, OC, KS, MT) and dependent variable (BP) through the mediating variable (OI). According to Table 9, both the relationship between the independent variable HRM and the dependent variable BP and the independent variable OC and the dependent variable BP are statistically significant with p values equals to 0.008 and 0.019 respectively. While the relationship between the independent variable KS and the dependent variable BP is not statistically significant (P = 0.498). Finally, the relationship between the independent variable MT and BP is statistically significant ($p < 0.05$). Thus, the first step of mediation is fulfilled in this study for all constructs except for the relationship between KS and BP (Table 10). Additionally, the researchers used the bootstrapped confidence interval (lower and upper level) technique (Hair et al. 2023). Table 10 shows that the p values and the lower and upper-level bootstrapped confidence interval values. Table 11 illustrates the direct and indirect effects between independent and dependent variables via OI as a mediator (P1, P2, P3).

Table 10. Bootstrapped Confidence Interval.

	Coefficient	STDEV	t-Statistics	2.5%	97.5%	*p* Values
HRM -> OI -> BP	0.127	0.042	3.032	0.055	0.216	0.002
OC -> OI -> BP	0.033	0.028	1.194	−0.010	0.097	0.233
KS -> OI -> BP	−0.011	0.022	0.499	−0.060	0.030	0.618
MT -> OI -> BP	0.066	0.029	2.281	0.018	0.129	0.023

Table 11. Direct and Indirect Relationships.

	P1 (IV->M)	P2 (DV->M)	P3 (IV->DV)	Mediation Type
HRM -> OI -> BP	0.000	0.001	0.008	Complementary (partial mediation)
OC -> OI -> BP	0.144	0.001	0.019	Direct-only (no mediation)
KS -> OI -> BP	0.593	0.001	0.498	No effect (no mediation)
MT -> OI -> BP	0.003	0.001	0.000	Complementary (partial mediation)

Furthermore, to specify the type of mediation, the researchers used the technique proposed by (Zhao et al. 2010; Hair et al. 2023) to specify the mediation type. Table 12 summarizes the mediation relationship results.

Table 12. Mediation Results.

Relation	Mediators	Mediation Type
HRM to BP	OI	Complementary (partial mediation)
OC to BP	OI	Direct-only (no mediation)
KS to BP	OI	No effect (no mediation)
MT to BP	OI	Complementary (partial mediation)

5. Discussion and Conclusions

Based on the research findings, it is evident that not all internal organizational practices have an equal effect on OI practices. For instance, HRM and managerial ties in SMEs act as facilitators of OI, whereas KS practices and OC in SMEs hinder OI adoption and need to be re-evaluated. Furthermore, there is a positive relationship between OI practices and the business performance of SMEs in the UAE. In other words, implementing OI practices maximize SMEs' business performance.

Regarding the role of OI as a mediator of the relationship between the internal organizational practices of SMEs and the business performance. The findings revealed that there is a complementary partial mediation impact of OI on the relationship between HRM practices of SMEs and the business performance of SMEs. There is a direct only with no mediation impact of OI on the relationship between organizational culture and the business performance of SMEs. Additionally, there is no mediation impact of OI on the relationship between knowledge sharing practices of SMEs and the business performance of SMEs. Finally, the findings showed that there is a complementary partial mediation impact of OI on the relationship between managerial ties practices of SMEs and the business performance of SMEs.

Regarding the relationship between HRM and OI, these findings are partially expected since, theoretically, HRM practices should lead to better adoption of OI practices. The current study confirms and contributes to the previous study of (Wynarczyk et al. 2013). The latter study concluded that firms' training and developmental programs positively enhance both firms' external cooperation with other firms as well as their knowledge-sharing capability, which improves firms' open innovation capability (Podmetina et al. 2013; Matvienko 2016). Furthermore, the study by Remneland Wikhamn et al. (2022) demonstrated the involvement of HRM activities in inbound, outbound, and coupled practices of open innovation.

Besides, a recent study by Natalicchio et al. (2018) concluded that both recruitment of highly educated employees and employee training activities implementation do not positively affect the relationship between external knowledge acquisition and firms' innovation performance. Thus, it partially contradicts with the current study and confirms that HRM practices in large firms have a different impact on OI adoption and business performance compared to SMEs. Other literature has explored the impact of different HRM practices on OI adoption. For instance, Hong et al. (2019) investigated the effect of four collaborative HRM practices (i.e., teamwork-based recruitment, training in teamwork skills, team-based appraisals and rewards, and rotational job design) on fostering OI. Moreover, Engelsberger et al. (2021), study indicated that open innovation managers can create dynamic capabilities by implementing HRM practices such as recruitment, training and development, and reward systems. These practices consequently enhance the overall performance of OI innovation initiatives. Based on that, we can conclude that both collaborative and non-collaborative HRM practices that do not include any type of teamwork empower OI adoption.

Regarding the relationship between HRM and SMEs business performance. This study's outcome confirms previous literature findings. For instance, a recent study by Sardi et al. (2020) investigated the same relationship in European SMEs and concluded that HRM represents a crucial factor in enhancing European SMEs performance management. The findings are also in line with a study conducted by Gede Riana et al. (2020) in SMEs in Indonesia, which concluded that HRM practices play a crucial role in enhancing orga-

nizational performance. This suggests a universal trend where effective HRM practices positively impact SMEs' overall performance across different geographical contexts. To conclude, HRM practices used in SMEs facilitate open innovation adoption. Besides, HRM practices positively impact SMEs business performance.

Regarding the relationship between organizational culture and OI, these results are surprising, especially in SMEs. As a firm's organizational culture is considered to be among the essential predictors of OI (Naqshbandi et al. 2015) and the valuable assets of any firm (Lau and Ngo 2004) if implemented correctly. Furthermore, organizations must pay attention to and recognize critical elements of organizational culture that may influence OI performance in SMEs (Srisathan et al. 2020). However, scholars (Boschma 2005; Van de Vrande et al. 2009; Carbone et al. 2010; Lichtenthaler 2011; Lau and Ngo 2004) consider organizational culture to be one of the essential challenges for OI adoption. Thus, this explains the possibility of a negative relationship. Nevertheless, it is worth noting that the relationship between the organizational culture and OI practices in SMEs has not been tested before. Previous studies (Lau and Ngo 2004; Tchuinou et al. (2020) have focused on either assessing the role of organizational culture in product innovation without specifying the type of innovation—closed or open—or evaluating the impact of SMEs' organizational culture on their degree of innovativeness. Furthermore, Lau and Ngo (2004) confirmed in their study that developmental organizational culture has a direct impact on product or service innovation.

In addition, a recent study by Tchuinou et al. (2020) about the determinants of OI in SMEs concluded that SMEs with an open organizational culture are more capable of adopting OI practices. This conclusion was backed by earlier literature (Fontana et al. 2006; Rangus and Drnovšek 2013; Mazur and Zaborek 2016; Szymańska 2016; Grimsdottir and Edvardsson 2018; Kim and Ahn 2020). Therefore, companies should focus on organizational culture, as it directly contributes to achieving excellent performance outcomes for SMEs Srisathan et al. (2020).

However, the former study did not test the impact of organizational culture on each type of OI separately. However, the current study findings contradict with the literature of (Fontana et al. 2006; Rangus and Drnovšek 2013; Mazur and Zaborek 2016; Szymańska 2016; Grimsdottir and Edvardsson 2018; Kim and Ahn 2020; Tchuinou et al. 2020). While it confirms the view that organizational culture to be one of the essential challenges for OI adoption. The results of the current study also contribute to the literature by concluding that SMEs organizational culture hinders the adoption of OI in SMEs in the UAE.

A recently published study by Bertello et al. (2022) investigated the OI challenges in low and medium-tech SMEs and supports the current study findings. Researchers stated that among the challenges are organizational culture (Van de Vrande et al. 2009; Lee et al. 2010a; Dufour and Son 2015). On the other hand, organizational culture may enable companies to control the complexity of open innovation (Lam et al. 2021).

Thus, we can summarize that organizational culture can hinder OI adoption in some cases and represent a challenge.

Similarly, the current study results about the relationship between KS and OI practices contradict the published study (Singh et al. 2021). However, that study did not test the impact of knowledge sharing practices on coupled OI and the data was collected from firms only operating in the manufacturing sector with an employee count ranging from 115 to 355. On the contrary, the current study findings confirm and supports a previous study (Väyrynen et al. 2017). Moreover, several scholars (Singh et al. 2021; Lee et al. 2010a; Lee et al. 2010b; Wang and Noe 2010; Wang and Wang 2012; Del Giudice and Maggioni 2014; Del Giudice et al. 2015; Cheng and Huizingh 2014; Donate and Sánchez de Pablo 2015; Scuotto et al. 2017; Shujahat et al. 2019) have emphasized the positive impact of knowledge sharing on both innovation and organizational performance. Therefore, despite that theoretically KS is a crucial component for the success of OI, empirically it still needs to be implemented effectively in SMEs to contribute to OI adoption.

Concerning the relationship between managerial ties and OI, the current study results support that SMEs' CEOs and managers have a substantial impact on OI performance in terms of risk perception and views about OI (Tchuinou et al. 2020). Moreover, Guo et al. (2020) have highlighted that managerial ties allow firms to specify entrepreneurial and cooperation opportunities. The same paper also highlighted that managerial ties facilitate the acquiring, processing, and interpreting of knowledge by facilitating knowledge acquisition as well as knowledge sharing about customer needs and competitors. Apart from this, Thongsri and Chang (2019) suggest that managerial ties enable firms to deal with market and business uncertainty. Another study also confirmed the current study results (Thongsri and Chang 2019).

On the other side, the current study's results partially confirm the results of Muzamil Naqshbandi and Kaur (2014) study. Their results revealed that managerial ties with government employees have a positive impact on inbound OI, while managerial ties with other firms' managers negatively impact this type of innovation. They also found that the levels of both types of managerial ties relate negatively to outbound OI. This contradicts the current study's results. However, the results could not be identical due to, firm size (large firms vs. SMEs), sector (high-tech sector vs. non-tech sector), and differences in the country-related cultural context (Malaysia vs. the UAE). The study conducted by Naqshbandi and Jasimuddin (2022) suggested a positive relationship between managerial ties and both inbound and outbound open innovation across three diverse country contexts: France, UAE, and Malaysia.

Regarding the impact of OI practices on SMEs' business performance, until today there is still a debate in the literature about the impact of OI on SMEs' performance. The literature includes conflicting results about this relationship. As literature on OI is still limited and scattered and the findings are sometimes contradictory (Tchuinou et al. 2020). Furthermore, Sağ et al. (2016) claim that these conflicting results are due to SMEs' different statuses and systems, which differ between developed and developing countries.

Regarding the relationship between internal organizational practices (HRM, OC, KS, and MT) and business performance via OI practices as a mediator, due to the scarcity of research on OI in SMEs, these relationships were not tested earlier. Thus, we cannot compare it to existing literature.

6. Theoretical and Practical Contribution

Chesbrough (2003) highlighted that no theory includes all of the aspects of open innovation, with its internal and external aspects, as defined by Chesbrough (2003). Accordingly, open innovation has been linked to more than one theory, and every theory adds a component to the puzzle of innovation. This research contributes to the earlier literature by bridging the research gap in the literature and connecting OI to management and firm theories, specifically dynamic capabilities theory.

As the dynamic capabilities theory was designed to solve the drawbacks of the RBV theory (Eisenhardt and Martin 2000). Contrary to RBV, dynamic capabilities connect a firm's resources with the changing market circumstances to preserve and maximize the firm's competitive advantage. Moreover, dynamic capabilities consider all of a firm's resources, whether tangible or intangible resources, as capabilities that assist the firm in being prepared, responding to market changes, and innovating. In other words, capabilities, unlike resources, capabilities are based on the creation, management, and exchange of information via an organization's human capital. Capabilities serve as an example of how an organization can gain a competitive edge through ongoing resource development and adjustments, particularly in times of rapid and unpredictable change in the competitive landscape landscape (Singh et al. 2021). Due to the wide diversity of capabilities, a company's capabilities may surpass those of its competitors (Farida and Setiawan 2022, p. 3). Accordingly, dynamic capabilities could be represented by, for example, organizational learning capabilities, HRM systems, product or process development capabilities, and inno-

vation capabilities. Based on that, OI practices could be considered one of a firm's dynamic capabilities and intangible resources that support the firm's competitive advantage.

Accordingly, this study contributes to the dynamic capabilities theory by testing the internal organizational practices that facilitate open innovation adoption and thus maximize the dynamic capabilities and competitive advantage of SMEs in the UAE. Furthermore, this study confirms what Grimaldi et al. (2013) stated about the link between dynamic capabilities and open innovation practices in SMEs in a developed country context, and it tested the same link in a developing country context. We can thus conclude, based on this study, that firms possessing dynamic capabilities to adapt to market changes are more successful in implementing open innovation practices.

To conclude, this study fulfills the requests of previous scholars to conduct additional studies about the impact of internal organizational practices on open innovation in SMEs. Moreover, it fulfills the call of researchers to investigate the state of open innovation in SMEs in developing countries.

The practical implications of this study are several to different stakeholders. As it assists SME managers and innovation managers in managing their internal organizational practices to implement OI in their enterprises. For instance, according to the research findings, SME managers need to adjust their internal organizational practices by reconsidering their organizational culture to enhance open innovation adoption. As the tested practices were revealed to have a negative impact on open innovation adoption. Thus, managers should change their organizational culture and knowledge-sharing practices, as the adopted organizational culture and knowledge-sharing practices in SMEs in the UAE displayed a negative impact on open innovation performance. Furthermore, managers should keep their practices related to managerial ties as they are. Additionally, despite that SMEs rely on informal HRM practices, the informal HRM practices act as facilitators of open innovation adoption. This contradicts with Hinteregger et al. (2019). As the researchers declared that SMEs that aim to engage in open innovation activities should aspire to have formal HRM practices with specialized, highly experienced teams. To conclude, this study is evident that formal and informal HRM practices empower open innovation adoption in SMEs. Besides, this study helps innovation managers to assess and evaluate their OI organizational activities. This aim was addressed in this study by evaluating the internal practices and categorizing them into two groups. The first group includes practices that foster the adoption of open innovation practices, And the second group includes practices that hinder that adoption. Additionally, the study evaluates the degree of readiness of SMEs' organizational culture and climate to implement OI practices. According to this study, the organizational cultures of UAE-based SMEs need to be reconsidered; SME managers should evaluate those cultures and adopt more collaborative and flexible cultures that facilitate the adoption of open innovation practices. Furthermore, this study helps CEOs to assess their OI performance regarding firms' overall business performance in relation to their objectives. Therefore, SMEs' CEOs and managers should use the framework presented in this study to help them evaluate their OI practices in relation to their objectives. Practically, we believe that our findings may serve as guidelines for SME managers and CEOs to evaluate and enhance their organizational practices in order to implement OI practices and maximize their competitive advantage and overall business performance. Finally, implementing open innovation in SMEs is crucial, especially for SMEs operating in developing countries such as the UAE. Given that around 99% of firms operating in the UAE are SMEs (Dubai SME 2019) and vast contributors to the UAE's local economy, leaders and official entities need to shape policies and frameworks that facilitate the existence of open innovation ecosystems in the UAE (Sağ et al. 2016). This study contributes to policymakers' and officials' knowledge about the practices that can either foster or hinder the adoption of open innovation practices.

7. Limitations and Future Research

There are a few limitations to this present study as well. One of the limitations of this study is related to the sample size. Due to limitations in accessing SMEs, the researchers decreased the sample size from a sample range of 350–400 to a range of 100–150 SMEs, and they managed to collect a total sample size of 266. This limitation reduced the generalizability rate of the research results. While it may not be possible to generalize the research findings to other MENA countries due to the differences in SMEs' statuses and open innovation between countries, the findings could still be generalized to other GCC countries. Moreover, due to the lack of published databases that include all of the details of SMEs registered in the UAE, the researchers faced difficulty in reaching out to SMEs at the beginning of the data collection stage. The researchers approached official entities, such as the Khalifa Fund, Dubai SME, and RAK SME, in order to gain access to their SME database. It is worth noting that some of these entities were highly cooperative; however, the rest refused to cooperate due to the confidentiality of their databases. Finally, the researchers managed to communicate with SMEs by attending events, seminars, and exhibitions, as well as through direct visits to their offices. In addition, the LinkedIn platform and emails were employed to communicate with SME managers and CEOs and request their approval to fill out the survey. Furthermore, due to the lack of financial reporting of SMEs in the UAE, the researchers could not evaluate the financial performance of SMEs. Therefore, the researchers used the market performance indicator to compensate for the lack of accurate and credible financial details about SMEs in the UAE. Additionally, due to the time constraints of the research, the researchers did not have a chance to collect data from employees inside SMEs. Therefore, the researchers relied on collecting data from SMEs' CEOs and managers, since they are knowledgeable about their firms' practices and are involved in all of the firms' activities and daily processes. Finally, this research did not focus on regulatory frameworks and the government's strategies in supporting and encouraging SMEs' OI adoption. as our focus here was to study the firm level of open innovation in SMEs in the UAE. Therefore, the main focus of this research was on the relationship between SMEs' organizational practices and their adoption of open innovation practices on the one hand and the relationship between the adoption of open innovation practices and the business performance of SMEs in the UAE on the other. Although the context of the research is the UAE, the results can be generalized to SMEs operating in other Gulf Co-operation countries and some developing countries that have similar business environments.

Due to the scarcity of research about internal organizational practices and OI in SMEs generally and in SMEs in developing countries, there are several areas of development in this field. Based on that, the researchers recommend conducting a qualitative study to explore the challenges of OI adoption in SMEs in the UAE. Another future direction is the investigation of how OI and business performance across various industries and sectors affect one another. Besides, due to the interconnected and interrelated relationship between the independent variables, the researchers could not assess this complex relationship given the circumstances of the study. However, the researchers propose that further studies should investigate the relationship between the SMEs inter-organizational practices such as HRM practices, knowledge sharing, organizational culture, managerial ties, and OI. Additionally, this study tested the impact of knowledge-sharing practices on open innovation practices in SMEs in the UAE. The results revealed that the knowledge-sharing practices used in these SMEs are not effective in maximizing the adoption of OI practices. SMEs should thus implement knowledge-sharing practices more in their organizational structure and rely more on knowledge-sharing tools to facilitate knowledge transfer to all team members inside the firms. In addition, further research should be conducted to understand the reasons for weak knowledge-sharing practices in SMEs in the UAE. Due to the scarcity of research about both outbound and coupled open innovation practices in SMEs in the UAE, the researchers recommend that future research be conducted about both of those innovation practices. The researchers recommend conducting future research

about HRM practices by collecting data from SME employees in order to test their views about organizational practices and open innovation performance. Another future research direction is conducting comparative studies to test the same variables with the same measures in other business environments and compare the results. Additionally, the researchers recommend conducting a future study about the impact of HRM practices in SMEs using other scales (such as collaborative-based HRM practices). Furthermore, the researchers recommend conducting a study to check the mediating impact of absorptive capacity on the relationship between internal organizational practices and open innovation practices in SMEs.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of British University in Dubai's Research Policy (9.3 Policies and Procedures Manual) and approved by the Institutional Review Board of the British University in Dubai (approved on 23.04.2019).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. This study was reviewed by the college's ethical committee and was approved. Participants provided their written consent to participate in this study, and participants' identities were protected.

Data Availability Statement: The data supporting the findings of this study are not publicly available due to privacy and ethical restrictions, as the data contains information that could compromise the privacy of research participants.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Construct	No. of Items	Items	Cronbach's Alpha	Source
HRM	15	**Item 1:** "Our staff selection process is rigorous."	0.91	(Ngo et al. 2008)
		Item 2: "Our performance appraisals emphasize outcomes."		
		Item 3: "Our compensation package is designed to be more competitive than other firms in the industry."		
		Item 4: "We provide a considerable amount of training."		
		Item 5: "We try to keep employee turnover to minimum."		
		Item 6: "In determining compensation, we emphasize the individual's contributions more than job titles."		
		Item 7: "Our remuneration package is designed to reward long-term employees."		
		Item 8: "Employee behaviour is a key component in performance appraisal."		

Construct	No. of Items	Items	Cronbach's Alpha	Source
HRM	15	**Item 9:** "We primarily hire applicants who currently possess the necessary knowledge and skills."	0.91	(Ngo et al. 2008)
		Item 10: "On-the-job training is more important than formal education or experience with other organizations."		
		Item 11: "We emphasize external pay comparability in determining compensation."		
		Item 12: "Our remuneration package is intended to promote employee retention."		
		Item 13: "We intend to keep large salary differences between high and low performers in the same position."		
		Item 14: "Employees transfer to new functional areas, and/or new units are used as a development activity in our firm."		
		Item 15: "We have a sufficient training budget."		
Organizational Culture	4	**Item 1:** "Our firm is a very dynamic and entrepreneurial place."	0.74	(Lau and Ngo 2004)
		Item 2: "The head of our firm is generally considered to be an entrepreneur, an innovator, or a risk-taker."		
		Item 3: "The glue that holds our firm together is commitment to innovation and development."		
		Item 4: "Our firm emphasizes growth and acquiring new resources."		
Knowledge Sharing	4	**Item 1:** "We share information and knowledge necessary for the tasks."	0.75	(Chang Lee et al. 2005)
		Item 2: "We improve task efficiency by sharing information and knowledge."		
		Item 3: "We developed information systems, such as intranet and electronic bulletin boards, to share information and knowledge."		
		Item 4: "We promote sharing of information and knowledge with other teams."		
Managerial Ties	6	**Item 1:** "Top managers at buyer firms."	0.79	(Peng and Luo 2000)
		Item 2: "Top managers at supplier firms."		
		Item 3: "Top managers at competitor firms."		
		Item 4: "Governmental leaders."		
		Item 5: "Industry associations (e.g., chambers of commerce)."		
		Item 6: "Regulatory and supporting organizations (e.g., Khalifa Fund, Dubai SME, RAK SME, incubators, tax bureaus, banks, etc.)."		

Construct	No. of Items	Items	Cronbach's Alpha	Source
Inbound open innovation	4	**Item 1:** "External partners (ex: customers, competitors, research institutes, consultants, suppliers, government, or universities) are directly involved in all our innovation projects."	0.75	(Cheng and Huizingh 2014)
		Item 2: "All our innovation projects are highly dependent upon the contribution of external partners (ex: customers, competitors, research institutes, consultants, suppliers, government, or universities)."		
		Item 3: "Our firm often buys R&D-related services from external partners (ex: customers, competitors, research institutes, consultants, suppliers, government, or universities)."		
		Item 4: "Our firm often buys intellectual property (ex. patents, copyrights, or trademarks) from external partners to be used in our innovation projects."		
Outbound Open innovation	3	**Item 1:** "Our firm often sells licenses (ex. patents, copyrights, or trademarks) to other firms to better benefit from our innovation efforts."	0.80	(Cheng and Huizingh 2014)
		Item 2: "Our firm often offers royalty agreements to other firms to better benefit from our innovation efforts."		
		Item 3: "Our firm strengthens every possible use of our own intellectual properties so as to better benefit from our firm."		
Coupled open innovation	3	**Item 1:** "In innovation projects, our firm usually integrates all internal and external partners' information."	0.87	(Cheng and Huizingh 2014)
		Item 2: "In innovation projects, our firm co-ordinates the activities of exchange of information among partners."		
		Item 3: "In innovation projects, our firm keeps internal and external partners updated about new information."		
Business performance	11	**Item 1:** "Replacement of products being phased out."	Innovation (0.79), Market (0.84)	(Ritala 2012)
		Item 2: "Replacement of services being phased out."		
		Item 3: "Extension of product/service range within the main market."		
		Item 4: "Extension of product/service range outside the main market."		
		Item 5: "Development of environment-friendly products/services."		

Construct	No. of Items	Items	Cronbach's Alpha	Source
Business performance	11	**Item 6:** "Opening of new markets abroad."	Innovation (0.79), Market (0.84)	(Ritala 2012)
		Item 7: "Opening of new domestic target groups."		
		Item 8: "Growth in sales."		
		Item 9: "Profitability."		
		Item 10: "Market share."		
		Item 11: "Market growth."		

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