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Open Innovation in SMEs: A dynamic capabilities perspective

ABSTRACT

Purpose: This study examines the relationships between organizational learning capabilities, open innovation, and firm performance in the context of small and medium enterprises (SMEs) in the emerging economies.

Design/methodology/approach: Data collected from 384 manufacturing SMEs operating across the seven emirates of the UAE were statistically analyzed using SmartPLS 3 to examine the hypotheses of this study.

Findings: The results show that organizational learning capabilities positively influences both inbound and outbound dimensions of open innovation. Inbound open innovation practice positively impacted both market effectiveness and profitability, while outbound open innovation practice only affected profitability. Findings further confirmed the mediating role of inbound open innovation practice on the relationships of organizational learning capabilities with market effectiveness and profitability. In contrast, outbound open innovation practice did not mediate the relationships of organizational learning capabilities with market effectiveness and profitability.

Originality/Value: This is among the first study contributing to the extant innovation literature in terms of investigations into the significant and complex interrelations of organizational learning capabilities, open innovation, and firm performance in a single study, demonstrating various theoretical implications in the context of manufacturing SMEs in emerging countries. Overall, the findings of this study confirmed that the owners/managers of the UAE's manufacturing SMEs need to be acquainted with the need of creating a working environment fostering organizational learning processes and capabilities to enhance inbound and outbound open innovation activities, thereby improving their market effectiveness and profitability.

Keywords: *Dynamic Capabilities, Organizational Learning Capabilities, Open Innovation, Inbound Open Innovation Practice, Outbound Open Innovation, Firm Performance, SMEs.*

1. INTRODUCTION

Organizational innovation is an essential contributor to sustainable and innovative organizational performance (Otoo, 2019). Contemporary organizations are extensively encouraged to implement various innovative practices into their business models, which helps them refine their vision on learning and innovation (Barrick, Thurgood, Smith, & Courtright, 2015). According to Chesbrough (2003: p. 24), open innovation (OI) is defined as “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology”. OI implies the use of knowledge inflows (inbound open innovation termed as IP) and outflows (outbound open innovation termed as OP) to expedite internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough, 2003). Many organisations have progressively been embedding OI within their innovation process. In the research of Ahn et al. (2015), it was pointed out that OI can be a good approach for improving the performance of small and medium enterprises (SMEs) (Parida, Westerberg & Frishammar, 2012). The establishment of OI concept and its growing interest for collaboration, outsourcing, organisational flexibility, and agility allowed academics to review innovation strategies in the light of competitive business environment (Huggins & Thompson, 2015; Popa et al., 2017). As a result, open innovation has become one of the themes that attracted the most attention in the field of innovation management related research over the last decade (Marzi et al., 2023; Popa et al., 2017; Spithoven et al., 2013; Vrontis & Christofi, 2021).

Today, SMEs, on the other hand, tend to promote organization learning capabilities (OLC) to endure in the continuous changes in the business world. It is inevitable OLC has been essential (Gomes & Wojahn, 2017; Papa et al., 2018) in linking to the different forms of innovation strategy including OI. There have been numerous studies that empirically attempted to examine the

interrelations between OLC, OI, and firms' performance measures (Arias-Pérez, et al., 2022; Lazzarotti et al., 2016; Lim et al., 2020; Papa et al., 2018). Nevertheless, their results were inconclusive. For instance, while Do & Mai (2022) accentuated the significant role of organization learning capabilities in improving firm performance, Gomes & Wojahn (2017) showed otherwise. Moreover, in those studies, it is uncertain which aspects of organizational performance are influenced by organization learning capabilities and open innovation. These inconclusive findings impelled the need to look at exact facets of organizational performance to stipulate a profound insight into the influence of organization learning capabilities and open innovation, which the present study addresses.

Despite the strong interest as to these concepts exists amongst researchers and practitioners, there are research gaps in the extant literature in establishing the interrelationship OLC, OI, and firm performance (FP). First, most of the research focusing organization learning capabilities, firm performance and innovation have individually been conducted in the developed countries, with studies undertaken in Europe, the USA, Japan, Singapore, Korea, New Zealand, and Russia (Ahmad & Schroeder, 2003; Carayannis & Meissner, 2017; Papa et al., 2018; Wan, Ong & Kok, 2002). Hence, meaningful research results and insights are in their infancy for emerging economies, such as the UAE and emerging economies, and needs to be investigated (Bertello et al., 2022).

Second, although the relation between the organizational learning capability, open innovation and firm performance has separately been studied in developed countries' high-tech and large firms (Brunswick & Chesbrough, 2018; Dodgson, Gann, & Salter 2006; Remneland 2020; Remneland & Styhre, 2019) and SMEs in developed countries (e.g. a few SMEs' related studies, such as Barrett, et al., 2021; D'Angelo & Baroncelli, 2020; Expósito et al. 2019; Popa et al., 2017) there

is little empirical evidence to support this perspective concerning the SMEs in emerging economies (Gomes & Wojahn, 2017). Several authors have proposed that open innovation practices can also be beneficial to SMEs (Leckel, et al., 2020; Torchia, & Calabrò, 2019; Usman et al., 2018). For instance, Torchia, & Calabrò (2019) emphasized that SMEs may have an interest in initiating their innovation to cope with their limited resources. It is also widely accepted that empirical findings of most of the previous literature regarding OLC and open innovation and their significance in large firms cannot be generalized to SMEs (Lee et al., 2010; Spithoven et al., 2013; Popsa et al., 2017).

Third, there could not be found a single study investigating the relationships OLC, open innovation, and SMEs' performance in emerging countries, though the imperativeness of organizational learning capabilities and open innovation in SMEs tends to grow over time in term of firm performance (Leckel, et al., 2020; Torchia, & Calabrò, 2019; Usman et al., 2018). It is extensively accepted in the literature that open innovation and organizational learning capabilities practices and its consequences depend mostly on firm size (Popa et al., 2017). As stated by Amara et al. (2008), it is necessary that SMEs turn to the development and implementation of organizational learning, allowing the dissemination and exploitation of knowledge among the organization, and the competitive external environment, which may reflect later on open innovation and firm performance. Hence, the critical importance of empirically examining these inevitable interlinks amongst organizational learning capabilities, open innovation, and firm performance in the perspective of SMEs is stressed by this study.

Fourth, despite the substantial investigation of these practices in both larger firms or SMEs in developed countries, there are gaps related to the validity and reliability of the research findings (Freeburg, 2018). This is because most studies examining the relationships between organizational

learning capabilities, open innovation, and firm performance are qualitative by nature (Oduro et al., 2021; Vincent-Hoper & Stein, 2019). This denotes that a greater emphasis has been placed upon the subjective experiences of participants concerning the effective organizational learning capabilities and open innovation practices, and performance measures (Do & Mai, 2022). Additionally, part of this research in extant literature on organizational learning has been based on case studies and other non-quantitative descriptive methods, especially in large companies (Do & Mai, 2022). The novelty of the present research, thus, is based on the idea of having a more objective representation of how organizational learning capabilities practices affect organizations' open innovation capacity and firm performance. Even though the concept of open innovation has been extensively explored in research, it is essential to provide stronger arguments based on quantitative analysis (Gressgard, et al., 2014; Oduro et al., 2021), which is espoused by the present study.

In view of the abovementioned arguments, it is raised the question whether: Does organizational learning capabilities and open innovation impact the performance of SMEs in emerging economies and, if then, how organizational learning capabilities contributed to firm performance through open innovation? Accordingly, this study addresses the following research objectives regarding SMEs in emerging countries.

1. To investigate whether organizational learning capabilities improve open innovation in the context of SMEs in emerging economies
2. To investigate whether open innovation significantly influence the performance of SMEs in emerging economies
3. To examine the role of open innovation on the relationship between whether organizational learning capabilities and firm performance by the SMEs

This study is justified because the increasing changes in the highly competitive UAE business environment result in increased competition and challenges in the traditional markets of SMEs, which consequently leads to the increased need for organizational learning for creating and managing internal and external knowledge, open innovation, and firm performance. While drawing upon the dynamic capabilities theory, the findings of this research immensely address the issues as to the current management practices associated with organizational learning capabilities, open innovation and firm performance within SMEs in emerging economies, such as the UAE. According to Stepanyan et al. (2019), the private sector investment in the Arab region is the second lowest worldwide. SMEs are a cornerstone of Arab economies, including the UAE, accounting for over 90% of all enterprises and offering a major source of new job creations (Stepanyan et al., 2019). Since SMEs are growing in emerging countries, their competitiveness has been immense, requiring them to be more innovative. The competitiveness of the SMEs in the UAE is reflected by the fact that 95% of all enterprises registered in the country are SMEs, which contribute to the workforce and gross domestic product by 86% and 60%, respectively (The UAE Government Portal, 2022).

Accordingly, the findings of this study, it is possible to develop an evidence-based correlation between organizational learning capacities, open innovation and firm performance in a single study concerning the SMEs in the emerging countries, such as UAE. Moreover, the study also provides the managers of SMEs in the emerging countries with suggestions to profoundly enhance their organisational learning capabilities and contribution to open innovation, thereby SMEs' performance.

The rest of the paper is organized as follows: in the section two, the relevant literature and theory are reviewed, followed by the hypothesis development. Section three explains the methodology

used. Subsequently, the findings are presented in section 4. Finally, the discussion and conclusions along with the avenues for future research are provided the section five.

2. THEORY AND HYPOTHESES

The dynamic capabilities theory initially developed by Teece et al. (1997) provide an insight into the understanding as to firm's growth and survival and are described as organizations' abilities to integrate and develop both internal and external competences in the conditions of changing organizational environments (Hidalgo-Penate, Padron-Robaina, & Nieves, 2019). A firm's growth and survival in a changing business environment is confirmed by its competitive advantages and, firm performance which can be supported by dynamic capabilities (Teece 2018).

The vast majority of researchers view dynamic capabilities as the change-oriented capabilities of an organization to reconfigure its resource base in order that the organization can respond effectively to changes taking place in its dynamic environment so as to remain competitive (See for instance, (Kump et al., 2019; Swoboda & Olejnik, 2016; Teece, 2018). Tallott & Hilliard (2015) states that dynamic capabilities are shaped through path-dependent learnings and involved in the deliberate and purposeful creation, modification, or extension of an organizational resource base, are exposed to both endogenous and exogenous drivers of changes in the business environment. Pavlou & El Sawy (2011) elucidated that the key dynamic capabilities comprise the firm's ability to: learn, sense and pursue opportunities, combine new knowledge into its operational capabilities, and organize and deploy tasks, activities and resources in reconfigured operational capabilities. Hence, from the perspective of dynamic capabilities theory, it appears that organizations are required their capabilities, such as learning capabilities, to improve their competitive advantage, which are required for firm's superior performance and survival.

Specific dynamic capabilities are needed by most organizations to address the continuously emerging new challenges in the organizational context. Thus, employees and organizations need to recognize the importance of learning in order to build various strategic assets (Hidalgo-Penate, Padron-Robaina, & Nieves, 2019). The assets that should be incorporated into an organization's culture refer to capability, technology, and customer feedback. One of the dynamic capabilities pertaining to the scope of the current study is learning capability.

Organizational learning is referred to as a firm's capability to process knowledge, i.e., to acquire, create, transfer, and integrate knowledge, while modifying its behavior to mirror the new insightful situation, with a view to cultivating firm competitiveness and performance (Migdadi, 2021). Organizational learning is viewed as an active process based upon knowledge, which denotes moving amongst the diverse levels of actions, passing from the individual to the group level, and afterward to the firm level and vice versa (Barrick et al. 2015). This collective knowledge, which is kept in the organizational memory, influences how it is interpreted and used in the firm (Freeburg, 2018). What an individual learns in an organization greatly depends on what is already known by the other members of the organization (on the common knowledge base). Such organizational learning indicates that employees are focused on finding proper solutions to specific organizational problems.

The application of the theory of dynamic capabilities in the context of this study denotes the fact that dynamic capabilities, including learning capabilities, facilitate organizations' ability to gain competitive advantage resulting in the innovative performance, firm growth, and survival (Ferraris et al., 2017; Santoro et al., 2018). Firms respond to the dynamic working environment where dynamic capabilities have been essential (Gomes & Wojahn, 2017; Papa, Dezi, Gregori, Mueller, & Miglietta, 2018) by organizational learning capabilities and open innovation. The view of

dynamic capabilities makes a significant effect on organizational learning capabilities as well as innovation disciplines (Garavan et al. 2016).

According to Garavan et al. (2016), it can be found numerous conceptualizations of dynamic capabilities in innovation as well as learning including: learning and innovation (Teece 2007), innovation and adaptation (Anand, Oriani & Vassolo 2010), strategic change and learning (Ployhart & Moliterno 2011), and ambidexterity (Eisenhardt, Furr, & Bingham 2010; Dezi, Ferraris, Papa, & Vrontis, 2019). Concerning learning and innovation perspective as well as strategic learning and change perspective, dynamic capability mainly focuses on developing learning capabilities and leveraging knowledge assets into human capital and organizational capabilities through learning mechanisms (Garavan et al. 2016). On the other hand, the innovation and adaptation perspective consider that dynamic capability influences organizational routines in inhibiting innovation and has a role in acquiring new capabilities and shaping innovation (Anand et al. 2010; Eggers & Kaplan, 2009; Yi et al., 2023). In contrast, ambidexterity view of dynamic capability tends to balance flexibility and efficiency, stability, change, and incremental and radical innovation, explore new knowledge domains, and while using human resource and learning strategies to facilitate ambidexterity (Garavan et al. 2016; Tushman et al., 2010).

Moreover, with the overall goal being the attainment of firm performance, the analysis of the theory in the context of the current study relates to open innovation. Specifically, it highlights how organizational learning capabilities, as a dynamic capability, can facilitate the achievement of firm performance through open innovation. In this case, open innovation refers to products, processes, and knowledge. In this sense, the theory supports the notion that organizational learning capabilities can make a significant difference to open innovation hence influence the overall capacity of a firm to innovate. Considering that open innovation allows new ideas with the

potential for generating value, it, therefore, serves as a critical factor for firm performance (Rasool et al., 2019). In modern-day dynamic business environments, organizations can create comparative advantages by gathering knowledge regarding the markets, competition, and future market prospects. With this kind of knowledge, the theory implies that the organization can better coordinate resources to enhance performance. However, it notes that due to the constant changes in the market, firms are faced with new demands necessitating improvements in the current capabilities. The capability of organizations to change in line with the latest market demands depends on their overall preparedness to penetrate the market and make relevant transformations. Rapid changes in the market require that businesses react promptly; hence the application of dynamic capabilities theory in the study focuses on how firms can fast track their chance to gain competitive advantage and firm performance through organizational learning capabilities and open innovation (Santoro et al., 2019).

2.1 Organizational Learning Capabilities and Open Innovation

Learning capabilities is the most essential component of organizations to maintain their competitiveness and sustain in the market (Do & Mai, 2022). The focus of the dynamic capabilities theory is on the optimal utilization of organizational resources (Hernández-Linares et al., 2021). In this way, organizations can use their internal and external competencies in a proper manner corresponding to the changing business environment (Matarazzo et al., 2021). Organizational learning capabilities refer to the ability to adapt to changes and cope with the external variations (Danneels, 2008; Do & Mai, 2022; Pham, & Hoang, 2019). Some firms have a better capability to modify their resource conditions, for instance extend, modify, reconfigure, create, or delete resources in order to manage and survive with the changes (Danneels, 2010; Teece, 1997; Hernández-Linares et al., 2021).

Open innovation implies the use of knowledge inflows (inbound) and outflows (outbound) to expedite internal innovation, and expand the markets for external use of innovation, respectively (Chesbrough, 2003). Inbound open innovation (IP) has become a common strategy used to support firms' technology competitiveness in this challenging emerging market (Lyu, He, Zhu, & Li, 2019). Inbound open innovation practice illustrates organizations' openness to adopt external sources of knowledge. In this way, companies tend to expand their opportunities to offer more competitive products and services (Lee, Min, & Lee, 2016). The emphasis is upon internalizing capabilities developed by others (Nestle, Taube, Heidenreich, & Bogers, 2019). This aspect indicates that the concept of inbound open innovation supports the idea of innovativeness and growth.

Open innovation depends on individual values and skills. It is important to note that any applied strategy requires the responsiveness of the organization's stakeholders, defined as those individuals or groups that influence an organization's activities and are influenced by them. Stakeholders typically include employees, customers, suppliers, regulators, and local communities (Lee et al., 2016). Yet the innovation influence of individual employees' openness has not received significant consideration (Badir et al., 2020). Employees can support organizations in improving their business performance as they have the capabilities to obtain knowledge, create distinct ideas, and resolutions (De Jong & Den Hartog, 2010). Additionally, employees tend to show less resistance to the development of innovative practices and adding new knowledge (Antons & Piller, 2015). From this perspective, it seems reasonable that organizational learning capabilities will help to reach towards the intended outcomes.

However, a few studies have been conducted in relation to the effect of organizational learning capabilities on inbound and outbound open innovation (Greco et al., 2019; Milan et al., 2020; Naqshbandi & Tabche, 2018; Wang & Xu, 2018). Ferrigno et al. (2022) combined open innovation and organizational learning literature in the context of strategic alliances and validated a framework that links inbound and outbound open innovation practice and two types of organizational learning, namely, experiential and experimental learning which yielded in different proposed typologies of learning opportunities to capitalize through open innovation. Severoni and Muldoon (2019) found a reverse link of inbound open innovation practice on organizational learning processes whereas Naqshbandi and Tabche (2018) did not find interaction of organizational learning on open innovation. Nonetheless, Greco et al. (2019) had revealed that neither competitive advantage nor costs are minimized under inbound open innovation practice, while Milan et al. (2020) revealed how innovation assets along with capabilities become liabilities for technologically innovative organizations. Inbound open innovation practice affects innovation output more effectually through exploitative activities, whilst outbound open innovation practice is more effectual through exploration activities (Sun et al., 2020).

Drawing on and the knowledge-based view and the strategy competence- competitive advantage framework, Zhang et al. (2023) revealed that open innovation contributes to sustainable competitive advantage through improving organizational learning including both exploitative and exploratory learning as well as their balance. Furthermore, they found that knowledge management capability moderates the associations of open innovation to exploration and exploitation and their combination positively. Bašić (2021) found that that organizations with lower internationalization levels owe their innovation success to coupled and outbound innovation practices that originated from market research, public information, competitor tracking. The study of Bašić (2021) further

highlighted that organizations with higher internationalization level do not show a significant effect of open innovation on innovation success, whereas their organizational learning antecedents, such as market research and research and development activities negatively affect innovation success. Naqshbandi and Tabche (2018) revealed that empowering leadership contribute to enhanced open innovation outcomes through the intervention of organizational learning culture. Wang and Xu (2018) showed that inbound open innovation practice activities directly impacted radical innovation whilst the effect of outbound open innovation practices on radical innovation mixed with the organizational exploitative learning ability was indirect. Peris-Ortiz et al. (2018) revealed a relationship between open innovation and incremental and radical innovation success in knowledge-based companies by considering are organizational learning capabilities as a fundamental nexus of this relationship. Also, they conferred scarce literature linking organizational learning factors and open innovation to different types of innovation. Accordingly, it is assumed that organizational learning capabilities impacts open innovation positively. Hence, the following two hypotheses are developed:

H1a: Organization learning capabilities positively influences inbound open innovation practice.

H1b: Organization learning capabilities positively influences outbound open innovation practice.

2.2 Open Innovation and Firm Performance

Firm performance is defined as the functioning of the firm by referring to the specific outcomes of its operations. Understanding the components by which firm performance is measured provides relevant insights about the financial stability and overall competitiveness of organizations (Carree, Lokshin, & Alvarez, 2019). Firm performance is measured by domestic market share, profitability, total sales, and domestic sales growth relative to competitors (Tojeiro-Rivero & Moreno, 2019;

Wu, Ma, Liu, & Lei, 2019). In the empirical studies, various measures have been employed to assess small business growth including number of customers and growths in market share (Altınay et al. 2016), profit levels (Birley & Westhead 1990), sales volume (Reuber & Fischer, 2002), and number of employees (Birley & Westhead 1990). In this study, firm performance is measured with respect to market effectiveness and profitability, as they reflect both non-financial and financial performance indicators, respectively (respectively (Arias-Pérez et al., 2022; Morgan et al., 2009). Initially, the literature on open innovation mainly focused on large firms (Brunswick & Chesbrough, 2018; Dodgson, Gann, & Salter 2006; Remneland 2020; Remneland & Styhre, 2019), since then several authors have proposed that open innovation practices can also be strategically advantageous to SMEs (Leckel, Veilleux & Dana, 2020; Torchia, & Calabrò, 2019; Usman et al., 2018). Torchia, & Calabrò (2019) and Usman et al., (2018) highlighted that SMEs may indeed have an interest in initiating their innovation processes to cope with their limited resources. As elucidated by Gassmann, Enkel, & Chesbrough (2010: p. 216) open innovation is a mean to overcome SME's "liability of smallness". The few recent studies utilizing large scale data propose that the imperativeness of open innovation in SMEs tends to grow over time in term of firm performance (Leckel, Veilleux & Dana, 2020; Torchia, & Calabrò, 2019; Usman et al., 2018; Van de Vrande et al. 2009), which may be lagging large firms (Hochleitner et al., 2016).

From a theoretical perspective, the current study support for the positive effects resulting from the adoption of open innovation strategies on firm performance. Moreover, the benefits of externally acquired knowledge on the performance of an organization. According to Rasool et al. (2019), the open innovation paradigm has emerged as a critical strategy for developing and sustaining an organization's competitive advantage. Open innovation facilitates the utilization of mechanisms that support management knowledge beyond the boundaries of the business. Such knowledge may

originate from any of the following domains: technology, managerial functions, geographic location, and the industry. Based on this argument, it is clear that open innovation assumes a much more significant role in enhancing the search for management knowledge for learning purposes, and to expand the opportunities for generating practical innovation through the combination of external and internal expertise to boost firm performance.

Very few studies have investigated the interaction between outbound open innovation practice and firm performance. For example, Arias-Pérez, et al. (2022) found that big data analytics capability has a partial mediating impact on the association between open innovation and firm performance, and between open innovation and non-financial performance. Cheah and Yuen-Ping (2021) demonstrated that public research organizations' outbound open innovation practice projects with technologies of high innovation potential were likely to have high commercialization performance. Liao et al. (2020) revealed that technological capability strengthens the influence of inbound open innovation practice on firm performance. Valdez-Juárez and Castillo-Vergara (2021) showed that technological capability significantly affects open innovation and eco-innovation practices, however, not directly in corporate financial performance, but through open innovation or eco-innovation. Lim et al., (2020) indicated that open innovation activities are positively related to non-financial performance. Particularly, innovation activities have greater effects on external non-financial performance than on internal non-financial performance.

The study of Motohashi (2016) shows that innovation behaviors measured by patenting, characterized by inbound and outbound open innovation practice, are positively correlated with firm performance. Despite the limited evidence existing on outbound open innovation (Santoro, Vrontis, Thrassou, & Dezi, 2018), it has been argued that the respective practice contributes to

companies' innovativeness and competitive advantage (Popa et al., 2017), thereby firm performance. The open innovation paradigm explains how a given organization can benefit from changes derived from interaction with other firms. Although it is unclear how open innovation impacts on performance, considering that little is known about its capacities, Ahn, Mortara, and Minshall (2013) argue that specific functions should be identified to enable such analysis. Findings of their research based on six specific open innovation capacities; absorptive, connective, desorptive, inventive, innovative, and transformative, indicated that they were closely associated with performance. For maximum benefits, they advise that capacities should be considered individually. This way, firms can focus on capabilities with more significant potential while developing policies to complement inadequate capacities. According to Ahn, Mortara, and Minshall (2013), open innovation capacities may directly affect the way an organization build its strategy hence impacting its performance. Thus, we propose that:

H2a: Inbound open innovation practices positively influence market effectiveness of the firm.

H2b: Inbound open innovation practices positively influence the profitability of the firm.

H2c: Outbound open innovation practices positively influence market effectiveness of the firm.

H2d: Outbound open innovation practices positively influence the profitability of the firm.

2.3 The Mediating Role of Open Innovation

It is important to illustrate that open innovation plays a mediating role in the context of enhancing organizational learning capabilities and firm performance. Since open innovation requires collaboration with external stakeholders, it is believed that such cooperation usually leads to improved organizational learning capabilities (Chang, Chang, Chi, Chen, & Deng, 2012; Giniuniene & Jurksiene, 2015). This is because organizations tend to increase their capacity to redefine their innovative parameters and knowledge pool (Arranz, Arroyabe, Li, & de Arroyabe,

2019). A comprehensive view of the link between organizational learning capabilities and firm performance allows for a more accurate assessment of the changes needed in terms of implementing open innovation initiatives (Kalmuk & Acar, 2015; Mousavi, Bossink, & van Vliet, 2018). Such changes need to correspond to the precise level of strategic preparedness of organizations. The utilization of dynamic capabilities theory as theoretical frameworks in this study can clarify organizations' readiness for open innovation and how this would affect their long-term performance.

To address the mediation impact of open innovation on the relationship between organizational learning capabilities and firm performance, the study also uses the dynamic capabilities theory to explain the possible improvement in firm performance and open innovation through learning capabilities. The dynamic capabilities theory focuses on organizations' abilities to integrate both internal and external competencies (Teece, 2014). The underlying idea is that firms are always engaged in modifying their respective resource bases with the primary goal of achieving higher performance outcomes.

The dynamic capabilities theory stresses that organizational learning could be treated as an approach to incorporate dynamic capabilities into the firms' internal processes (Zhou et al., 2019). Organizational learning is well known as a vital element in fostering sustained competitiveness (Giniuniene & Jurksiene, 2015). Researchers (Do & Mai, 2022; Pham & Hoang et al., 2019) have found that organizational learning has positive outcomes on firm performance.

Acting mainly within the firm's internal environment of the organization learning could be viewed as one of the vital internal processes, and therefore, it may mediate the relationship between dynamic capabilities and firm performance (Giniuniene & Jurksiene, 2015). Even though researchers confirm the impact of organizational learning capabilities on firm performance (Gomes

& Wojahn, 2017; Pham & Hoang et al., 2019), it is also argued that this relation can also be mediated by innovation (Gomes & Wojahn, 2017). Limited studies show that organizational learning capabilities affects firm performance indirectly through innovation (mediator) (Migdadi, 2021), whereas no study has found the mediation role of open innovation (i.e., inbound and outbound innovation) on the relationship between organizational learning capabilities and firm performance.

In view of that, open innovation tends to play a mediating role with regard to the link between organizational learning capabilities and firm performance. In this way, organizations are focused on expanding their access to new knowledge obtained from an extensive number of external sources (Kianto, Saenz, & Aramburu, 2017; Zhang, Edgar, Geare, & O'Kane, 2016) through inbound and outbound open innovation practice. As a result, they tend to increase the diversity of their products and services, along with their internal knowledge pool (Wikhamn, 2019). Since innovation processes occur within specific organizational boundaries (Eriksson, Qin, & Wang, 2014), the role of organizational learning capabilities, mediated through open innovation practices, is substantial in firm performance. According to the above arguments, it is hypothesized that open innovation has played a mediation role in the relationship between organizational learning capabilities and firm performance. In view of that, we propose the following hypotheses:

H3a: *Inbound innovation practices mediates the relationship between organizational learning capabilities and market effectiveness.*

H3b: *Inbound innovation practices mediates the association between organizational learning capabilities and the firm's profitability.*

H3c: *Outbound innovation practices mediates the relationship between organizational learning capabilities and market effectiveness.*

H3d: Outbound innovation practices mediates the relationship between organizational learning capabilities and the firm's profitability.

[Insert Figure 1 here]

3. METHODS

3.1 Sample and Procedure

Data were gathered by emailing the self-administered questionnaires to owner/manager of the randomly selected manufacturing SMEs in the UAE. The permission to the list of manufacturing SMEs and their contact details was requested from the Department of Economic Development (Appendix A). As a result, questionnaires were emailed to 2,000 SMEs in the manufacturing sector with the purpose of achieving the minimum sample size of 384 SMEs. The actual response rate could further be approximated to 20% by randomly contacting the owner/manager of the SMEs targeted through phone calls. The analysis of SMEs' profiles (the sample of the study) surveyed by this study is provided in Table 3.4. The profiles of the number of SMEs, which was resulted in 299 firms (n=299) after screening collected data sample of 384 firms, were analyzed referring to four aspects viz. the number of years from the establishment, current number of workers employed, region of the UAE SME is located, and the Product the SME is manufacturing.

Accordingly, concerning the number of years from the establishment, the vast majority of SMEs were found to be in the range of 21 – 30 years (30%), 11 - 15 years (20%), followed by 6-10 years (18%), and 16-20 years (16%), respectively. Minority of the SMEs has been operating for less than five years (7%) and more than 30 years (8%). This finding shows that most SMEs surveyed have been considerably experienced firms in operations in the UAE. The analysis of the number of

employees of the SMEs surveyed showed that they are in the range of criteria defining SMEs in the UAE. According to the UAE's Cabinet Resolution No. 22 of 2016, the maximum number of employees for determining a whether a firm is a SME is 200 (Silver 2016). The majority of SMEs surveyed was in the range of 26-50 employees (32%); less than 25 employees (30%), and 51-150 employees (29%). Only a small of fraction of SMEs surveyed had employees between 101-150. With regard to location of the SMEs, most of the SMEs had been located in Abu Dhabi (34%) and Dubai (22%), followed by Fujairah (13%), Sharjah (12), Ajman (12%), Umm al Quwain (5%), and Ras al Khaimah (3%). Finally, it was revealed that SMEs surveyed involve in manufacturing several products in the UAE such as grocery & consumer products (22%), metal product & building material (21%), apparel & clothing (15%), food & beverages (13%), petrochemical (10%), others (10%), machinery & equipment (7%).

3.2 Measuring Instruments

We used 16 items from Jerez-Gomez, Cespedes-Lorente & Valle-Cabrera (2005) to assess organizational learning climate (OLC), eight items from Cheng & Shiu (2015) to measure open innovation (OI), and eight items from Morgan, Vorhies, & Mason (2009) to measure firm performance (FP). They were rated on a seven-point Likert-type scale (1 = strongly disagree, 7 = strongly agree) by the respondent in this study.

4. RESULTS

4.1 The confirmatory factor analysis

The confirmatory factor analysis (CFA) was used to statistically test the study's measurement models. A measurement model is known as a combination of various indicators/items linked with

a construct (Hair *et al.*, 2018). Therefore, CFA was performed to validate the basic indicators or items of the eight constructs produced by the EFA and to verify the relationships between the measurement models of the current study. The reliability, convergent validity, and discriminant validity, therefore, were examined to confirm the reliability and validity of the constructs. The reliability is the internal consistency of the construct's scales and can be ascertained through Cronbach's alpha. A Cronbach's alpha value in the excess of 0.7 is considered as statistically reliable (Hair *et al.*, 2018). Table 1 presents that the Cronbach's alpha values of all constructs in the study were in excess of 0.7, demonstrating they were statistically reliable.

Similarly, the convergent validity is the extent to which multiple variables espoused to measure the same construct are in accord. Composite reliability (CR) along with average variance extracted (AVE) were utilised to test the convergence validity (Hair *et al.*, 2010). A CR value in the excess of 0.70 is deemed as statistically significant, whilst AVE ought to exceed 0.50 to be statistically significant (Zait & Berteau, 2011). The results presented by the measurement model (Table 2) showed that AVE and CR are above 0.5 and 0.7, respectively. Therefore, the findings revealed that the measures espoused by this study established convergent validity.

On the other hand, the discriminant validity was established by using the criterion of Fornell & Larcker (1981) viz., the square root of AVE ought to be more than the squared correlation between the dimensions. Discriminant validity is the degree to which variables differ amongst distinct concepts (Hair *et al.*, 2014). The results confirmed that the values of each construct fortify discriminant validity (Table 3), demonstrating that the square root of AVE for each of the constructs more than the squared correlations values involving the construct. Moreover, Heterotrait-Monotrait ratio of Correlation (HTMT) was used to ensure discriminant validity is met by all constructs. If HTMT value is greater than 0.90, then there is a problem of discriminant

validity (Gold et al., 2001). Table 3 shows that HTMT value of all constructs are below 0.9, hence ascertaining discriminant validity.

[Insert Table 1, 2 and 3 here]

4.2 The structural model and hypotheses testing

SmartPLS 3 was used to test the structural models of the study and its hypotheses.

4.2.1 Testing for the direct hypotheses

Table 4 presents the results of the direct hypothesis testing. The relationship between OLC and OI was positive as IP and OP, reflecting IP, were both affected by OLC ($\beta = 0.217$; $t = 3.522$, $p < 0.05$ and $\beta = 0.325$; $t = 2.773$, $p < 0.05$), hence accepting H1a and H1b. In the similar vein, ME and P were also affected by IP ($\beta = 0.298$; $t = 5.421$, $p < 0.05$ and $\beta = 0.256$; $t = 4.382$, $p < 0.05$), thus accepting H2a and H2b. However, the impact of OP on ME was not significant ($\beta = 0.103$; $t = 1.445$, $p > 0.05$), whereas there was a significant relationship between OP and P. Therefore, H2c was rejected, while accepting H2d.

[Insert Table 4 and 5 here]

[Insert Figure 2 here]

4.2.2 Testing for the indirect hypotheses

Table 5 presents the results of the testing for the indirect hypotheses. Both ME and P were affected by OLC ($\beta = 0.065$; $t = 2.579$, $p < 0.05$ for ME and $\beta = 0.055$; $t = 2.164$, $p < 0.05$ for P) via IP. Thus, H31 and H3b were accepted, suggesting IP mediates the relationship between OLC and ME,

as well as OLC and P. Nonetheless, both ME and P were not indirectly affected by OLC ($\beta = 0.033$; $t = 1.322$, $p > 0.05$ and $\beta = 0.053$; $t = 1.652$, $p > 0.05$) through OP. Hence, H3c and H3d were rejected, implying the relationship between OLC and ME and OLC and P are not mediated by OP.

5. DISCUSSION AND CONCLUSION

The results of this study suggested that the four facets of organizational learning capabilities had a significant relationship with open innovation in terms of inbound and outbound innovation practices. This finding was inconsistent with Severoni & Muldoon (2019) who found a reverse link of inbound open innovation practices on organizational learning processes, and with Naqshbandi & Tabche (2018) who did not find interaction of organizational learning on open innovation. Even though, previous empirical studies strengthen the relationship amongst effective organizational learning and organizational innovation (Jimenez-Jimenez et al., 2008; Wu & Fang, 2010), scarce literature links organizational learning capabilities and open innovation to different types of innovation. For example, Peris-Ortiz et al. (2018) analyzed the relationships between organizational learning capabilities and open innovation and between open innovation and incremental and radical innovation by using Fuzzy-set qualitative comparative analysis (fsQCA). Nonetheless, no prior study has investigated the relationship of organizational learning capabilities with inbound and outbound open innovation practice, reflecting the novelty of this study.

We also found that inbound open innovation practices predict market effectiveness and profitability of the SMEs while outbound open innovation predicts profitability than market effectiveness of the SMEs. To some extent, the finding of this study is consistent with the findings

of Hung & Chou's (2013) and Oduro's et al (2021). For example, Hung & Chou's (2013) revealed that external technology acquisition relating to inbound open innovation practice positively affects firm performance, which was consistent with the finding as to the inbound open innovation practice - firm performance relationship. Hung & Chou's (2013) also found external technology exploitation vis-à-vis outbound open innovation practice does not impact firm performance, which is inconsistent with the current study's finding as to insignificant outbound open innovation practice - market effectiveness relationship. Similarly, the significant relationship between inbound open innovation practice and non-financial performance and between outbound open innovation practice and non-financial performance somewhat similar to findings of this study. While the former is consistent with the finding of the current study, the latter is inconsistent with the insignificant outbound open innovation practice - market effectiveness relationship found by this study. Also, the finding of these previous studies has been limited to a few dimensions of inbound and outbound open innovation practice, and firm performance.

Finally, the findings of the study suggest that organizational learning capabilities for the firm through inbound open innovation indirectly predicts market effectiveness and profitability of the SMEs, whereas outbound open innovation does not. These study findings have several key implications to advance and expand theory and practice of open innovation, and they are discussed in detail.

5.1 Theoretical Implications:

There are three key theoretical implications of this study.

Firstly, the extant literature suggest that open innovation remains under researched in the context of the SMEs (Singh et al., 2021; Hochleitner et al., 2016; West et al. 2014) though it plays a vital role in the economic development of the nations across the globe (Singh et al., 2021; Hochleitner

et al., 2016). The prior literature on the linkage of organizational learning capabilities and open innovation has roots in the large firms (Spithoven et al., 2013; Popsa et al., 2017) and certainly have implications for the SMEs but we do not know much on this yet in the context of SMEs. In view of this, the findings of this study advance and expand the extant literature to suggest that SMEs' performance depends significantly upon the interplay of organizational learning capabilities and open innovation.

Secondly, the extant literature does not suggest any consensus in innovation literature as to which aspects of firm performance is affected by the organizational learning capability and open innovation. For example, Jiménez-Jiménez & Sanz-Valle (2011) stressed the significant role of organizational learning capabilities in improving firm performance, whereas Gomes & Wojahn (2017) found it otherwise. Thus, there is unclarity in the extant literature (e.g., Gomes & Wojahn, 2017; Jiménez-Jiménez & Sanz-Valle, 2011) vis-à-vis which aspects of firm performance is influenced by the organizational learning capabilities and the open innovation architectures. Therefore, our study attempts to bridge the gaps as it exists in the extant literature in the domain of firm performance parameters namely market effectiveness and profitability of the SMEs. The findings of this study advance and expand the literature to suggest that open innovation is a dynamic capability that mediates on to the linkages between organizational learning capabilities to enhance firm performance.

5.2 Practical Implications

The findings of this study have several practical implications, but we shall list here three key practical implications.

Firstly, SMEs that extensively espouse open innovation practices, both inbound and outbound open innovation, will be more prone to designing and developing new products and services in

association with the external partners or through contracting out their R&D activities. Such a kind of open innovation architecture enhances SMEs' ability to innovate their products and processes by the way of the access to and capitalization on new skills, competences, and knowledge from the external sources (Nedon, 2015). In other words, the findings of this study suggest that open innovation helps SMEs to kill competition, if any, from the rivals and to stay relevant in the markets.

Secondly, we also found that the outbound than inbound open innovation is effective for SMEs while tapping niche market which remains to be inundated with large companies in the emerging markets, including the UAE. Amid global crisis and volatile business environment, such as COVID-19, the findings of this study suggest that the SMEs in the manufacturing sectors need to tend to adopt to outbound innovation as it can enhance the cost savings on R&D activities, reputation for future endeavours, as well as royalty income etc. However, SMEs' owner/managers or future small start-ups should consider the fact that they follow both inbound and outbound open innovation practice as they both are more foreseeably to gain greater values from their knowledge base and technological capabilities (Popa et al., 2017).

Thirdly, improving organizational learning capabilities in the perspectives of managerial commitment, systems perspective, openness and experimentation, knowledge transfer and integration within manufacturing SMEs is vital since they are critical for determining effective open innovation practices, such as inbound and outbound open innovation practice, leading to enhanced firm performance directly and indirectly. Nonetheless, SMEs are not scaled-down forms of larger firms, to which most of the empirical studies has attentive, as SMEs need to cope with different challenges owing to their scale, limited expertise, and resources (Altinay et al. 2016). Hence, organizational learning capabilities of SMEs may not have strong learning capabilities as

found in larger firms in the UAE. Thus, this study provides managerial implications for the SMEs with the lack of organizational learning capabilities by implying the need to be more focused on inbound open innovation practice to enhance the total effect of open innovation on the relationship of organizational learning capabilities with market effectiveness and profitability. The results empirically supported that only inbound open innovation practice mediates the relationship between organizational learning capabilities and firm performance, while outbound innovation practice does not mediate such a relationship between organizational learning capabilities and firm performance.

Overall, the findings of this study confirmed that the owners/managers of the UAE's manufacturing SMEs need to be acquainted with the need of creating a working environment fostering organisational learning processes and capabilities in order to enhance inbound and outbound open innovation activities, thereby improving their market effectiveness and profitability.

5.3 Limitations and suggestions for future research

As any other research, this study also has some limitations that can serve as an avenue for future research. Firstly, the opinions and views of only one person from one entity as either the owner or manager of the SME was surveyed. Future studies could concern research designs which can tolerate data collection from various respondents within one SME. Secondly, firm performance measures were subjective as they were based on seven-point Likert scale responses from owner or managers. Accordingly, it could be interesting to incorporate objective questionnaire items for measuring firm performance, which includes financial performance and non-financial performance. Thirdly, this study takes a static in the form of a cross-sectional view of organizational learning capabilities, open innovation, and firm performance. This makes it

problematic to address the issue of how these variables and their significance may change over the time. A longitudinal view of the study could thus enhance the findings.

Moreover, this study only considered manufacturing SMEs in selecting UAE's SMEs for the survey to reduce the heterogeneity amongst firms. Thus, the finding of this result may not be generalizable to other industries such as trading and service sector. Hence, studies focusing on SMEs in trading and service sector could provide a comparison with the current study's findings.

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FIGURES

Figure 1: Conceptual Research Framework

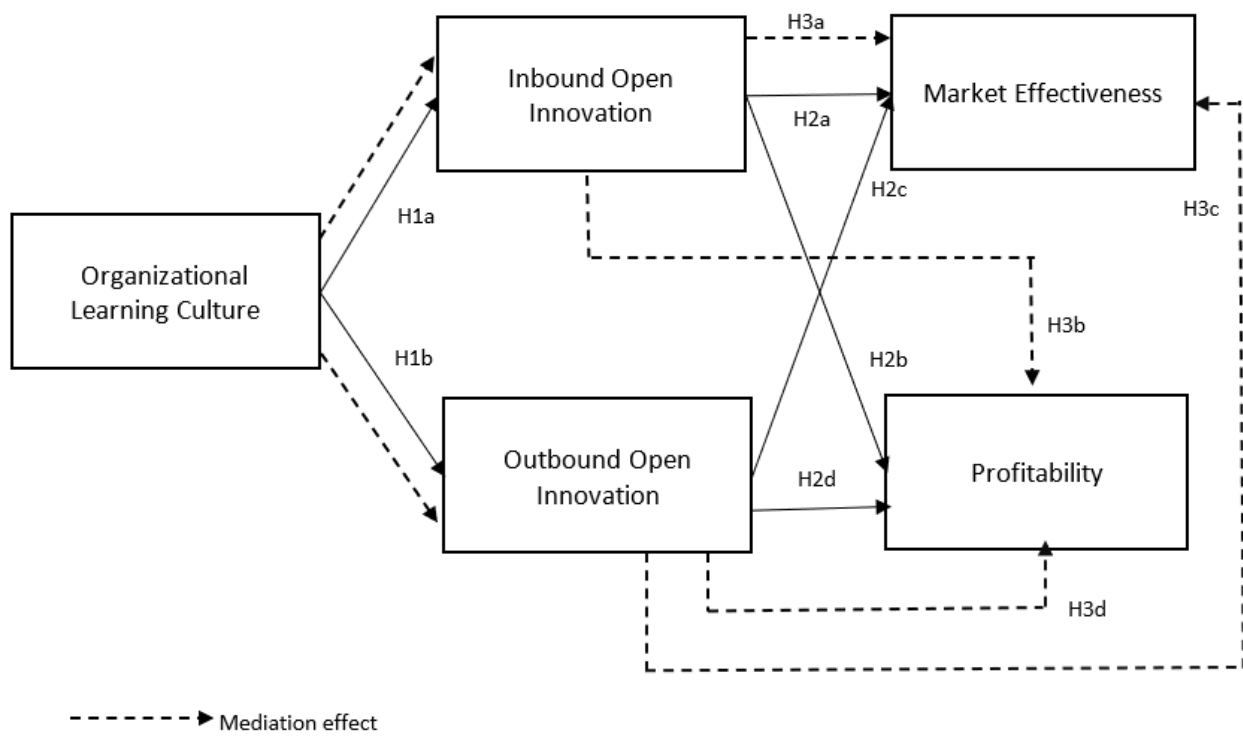
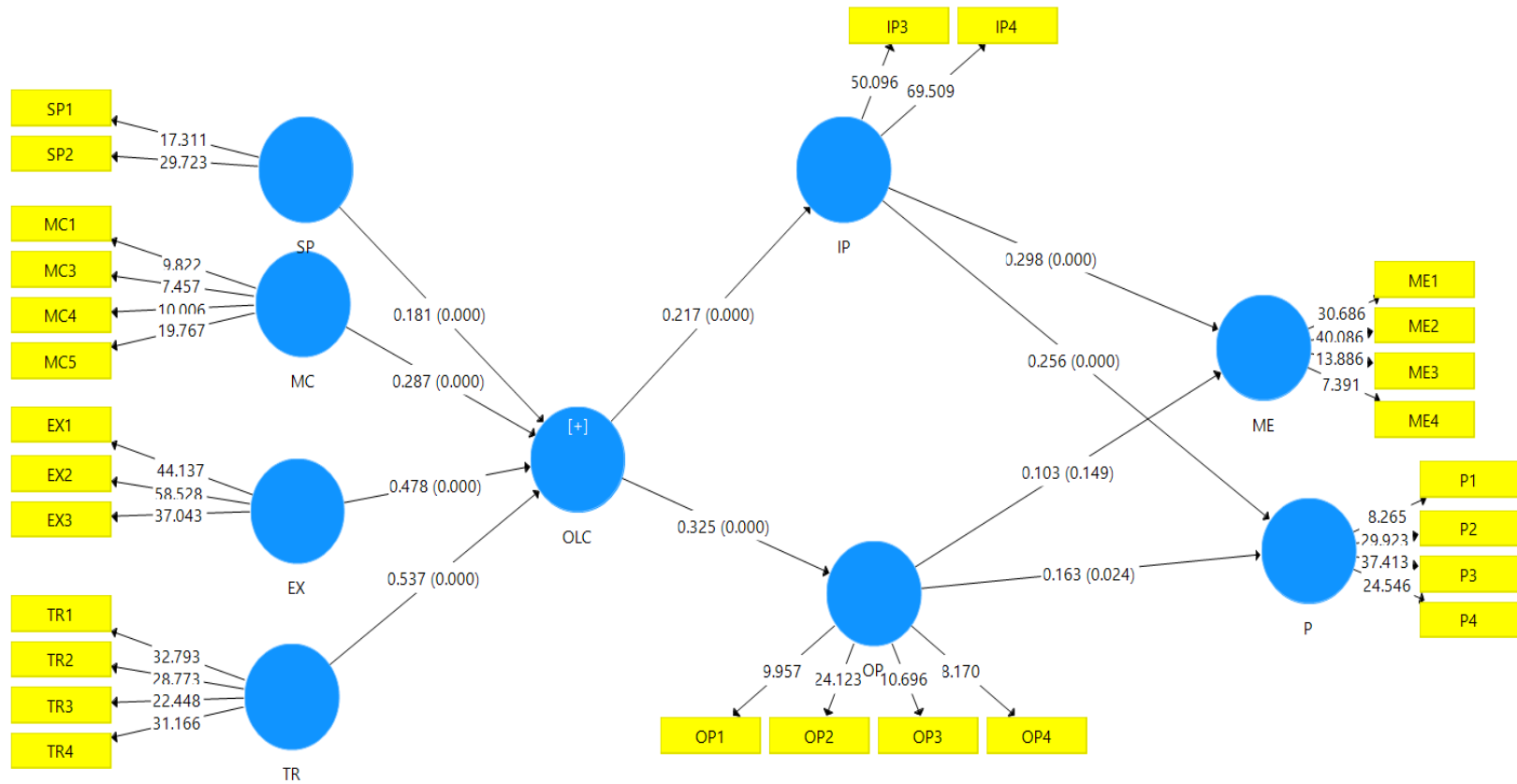


Figure 2: The structural model



TABLES

Table 1: Construct reliability and convergent validity

Construct	Indicator	Outer Loading	Sample Mean	Standard Deviation	T Statistics	P Values	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
EX	EX1	0.857	0.857	0.019	44.137	0.000	0.820	0.820	0.893	0.735
	EX2	0.875	0.875	0.015	58.528	0.000				
	EX3	0.840	0.840	0.023	37.043	0.000				
IP	IP3	0.898	0.897	0.018	50.096	0.000	0.804	0.821	0.910	0.835
	IP4	0.929	0.928	0.013	69.509	0.000				
MC	MC1	0.722	0.716	0.073	9.822	0.000	0.775	0.819	0.854	0.597
	MC3	0.680	0.669	0.091	7.457	0.000				
	MC4	0.792	0.781	0.079	10.006	0.000				
	MC5	0.882	0.881	0.045	19.767	0.000				
ME	ME1	0.884	0.880	0.029	30.686	0.000	0.815	0.907	0.871	0.631
	ME2	0.885	0.880	0.022	40.086	0.000				
	ME3	0.752	0.749	0.054	13.886	0.000				
	ME4	0.627	0.621	0.085	7.391	0.000				
OP	OP1	0.693	0.689	0.070	9.957	0.000	0.751	0.809	0.839	0.568
	OP2	0.864	0.859	0.036	24.123	0.000				
	OP3	0.744	0.729	0.070	10.696	0.000				
	OP4	0.702	0.690	0.086	8.170	0.000				
P	P1	0.676	0.667	0.082	8.265	0.000	0.830	0.873	0.885	0.660
	P2	0.864	0.859	0.029	29.923	0.000				
	P3	0.874	0.874	0.023	37.413	0.000				
	P4	0.820	0.820	0.033	24.546	0.000				
SP	SP1	0.860	0.854	0.050	17.311	0.000	0.722	0.741	0.877	0.781

	SP2	0.907	0.907	0.031	29.723	0.000				
TR	TR1	0.811	0.810	0.025	32.793	0.000	0.795	0.798	0.866	0.618
	TR2	0.787	0.786	0.027	28.773	0.000				
	TR3	0.763	0.762	0.034	22.448	0.000				
	TR4	0.784	0.785	0.025	31.166	0.000				

Table 2: Discriminant validity

	EX	IP	MC	ME	OP	P	SP	TR
EX	0.857							
IP	0.108	0.914						
MC	0.091	0.147	0.773					
ME	0.154	0.296	0.325	0.795				
OP	0.262	-0.021	0.115	0.097	0.754			
P	0.574	0.252	0.107	0.079	0.157	0.812		
SP	0.240	-0.048	0.189	0.059	0.402	0.096	0.884	
TR	0.453	0.241	0.145	0.129	0.173	0.538	0.021	0.786

Note: Managerial commitment (MC); Systems perspective (SP); Openness and experimentation (EX); Knowledge transfer and integration (TR); Inbound open innovation practices (IP); Outbound open innovation practices (OP); Market effectiveness (ME); Profitability (P)

Note: Bold figures reflects the square root of AVE

Table 3: Discriminant validity (HTMT Criterion)

	EX	IP	MC	ME	OP	P	SP	TR
EX								
IP	0.134							
MC	0.121	0.183						
ME	0.170	0.333	0.407					
OP	0.320	0.138	0.149	0.106				
P	0.695	0.282	0.126	0.106	0.198			
SP	0.302	0.070	0.240	0.086	0.541	0.130		
TR	0.551	0.295	0.178	0.146	0.211	0.650	0.106	

Note: Managerial commitment (MC); Systems perspective (SP); Openness and experimentation (EX); Knowledge transfer and integration (TR); Inbound open innovation practices (IP); Outbound open innovation practices (OP); Market effectiveness (ME); Profitability (P)

Table 4: Path Coefficients of direct effect

Direct Effect	Path Coefficient	Sample Mean	Standard Deviation	T Statistics	P Values	Hypothesis testing
OLC -> IP	0.217	0.221	0.061	3.522	0.000	H1a: Accepted
OLC -> OP	0.325				0.000	H1b: Accepted
IP -> ME	0.298	0.301	0.055	5.421	0.000	H2a: Accepted
IP -> P	0.256	0.261	0.058	4.382	0.000	H2b: Accepted
OP -> ME	0.103	0.104	0.071	1.445	0.149	H2c: Rejected
OP -> P	0.163	0.167	0.072	2.264	0.024	H2d: Accepted

Note: Organisational Learning Capability (OLC); Managerial commitment (MC); Systems perspective (SP); Openness and experimentation (EX); Knowledge transfer and integration (TR); Inbound open innovation practices (IP); Outbound open innovation practices (OP); Market effectiveness (ME); Profitability (P)

Table 5: Path Coefficients of indirect effect

Indirect Effect	Path Coefficient	Sample Mean	Standard Deviation	T Statistics	P Values	Hypothesis testing
OLC -> IP -> ME	0.065	0.067	0.025	2.579	0.010	H3a: Accepted
OLC -> IP -> P	0.055	0.060	0.026	2.164	0.031	H3b: Accepted
OLC -> OP -> ME	0.033	0.035	0.025	1.322	0.186	H3c: Rejected
OLC -> OP -> P	0.053	0.059	0.032	1.652	0.099	H3d: Rejected

Note: Organisational Learning Capability (OLC); Inbound open innovation practices (IP); Outbound open innovation practices (OP); Market effectiveness (ME); Profitability (P)