



## Does Innovation Ambidexterity Moderate the Relationship between Intellectual Capital and Innovation Performance? Evidence from Morocco

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**Abstract.** Innovation performance is seen as the backbone of firm's sustained competitive advantages. Scholars of the dynamic capability view suggest that Intellectual Capital (IC), such as human, structural, and relational capital, are the main driving force of a firm's Innovation Performance (IP). The purpose of this study is to investigate the importance of developing firms' intellectual capital and their role in leveling up innovation performance. In doing so, this paper conducts an examination by moderating the variable of Innovation Ambidexterity (IA), namely explorative and exploitative activities. By applying a quantitative and cross-sectional design, the study deploys data feedback from managers and executives of manufacturing SMEs across the Moroccan national territory collected from 286 surveys. The results show that IC has a positive and significant impact on IP, while IA has a positive and significant effect on both IP and IC. The study also finds that IA failed to moderate the relationship between IC and IP. This study contributes to advancing the capability theory by adding the importance of developing and reconfiguring firm's human, structural, and relational capital as the main driving force of innovation performance.

**Keywords:** Dynamic capability view; Human capital; Innovation ambidexterity; Intellectual capital; Innovation performance

### 1. Introduction

Since the past decade, researchers have been emphasizing the critical role of Intellectual Capital (IC) to foster and level up innovation performance capacities to ensure business growth and sustainability. IC has emerged as one of the pivotal pillars for developing the innovation performance of Small and Medium Enterprises (SMEs) and economic growth (Demartini and Beretta, 2020). So far, very little research has been done to assess the effect of IC and its components concerning Innovation Performance (IP) and its consequences on SMEs' business growth (Zerenler et al., 2008). Therefore, firms that seek a successful IP must determine factors that can polish their efficiencies, processes, and capacity to adapt dynamically by learning and leveraging valuable resources to fit the uncertain business environment (Yen et al., 2012). Scholars suggest that firms looking to create and sustain their competitive advantages should emphasize the development of intellectual capital which is defined as organizational practices that enhance the level of innovation capabilities (Tastan and Davoudi, 2015). In addition, Ali et al. (2021a) argue that

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improving the training, skills, knowledge, and intangible characteristics of employees can help firm's IC exploitation, which then leads to creating wealth via business experiences and competitive advantages gain. Scholars have been defining and examining IC in various ways according to its perspective, type, scale, and nature of the industry (Gürlek, 2021; Reza *et al.*, 2021; Ali *et al.*, 2021b). Therefore, firm's IC can be seen as a source of creating benefits and practices through the development of the employees' skills. The possibility of utilizing IC to create valuable outcomes is based on the components of which the IC consists and the outcomes are varied accordingly (Ali *et al.*, 2021b).

Studies (López-Zapata *et al.*, 2021; Agostini *et al.*, 2017; Turner *et al.*, 2015) suggest several components of IC, such as human, relational, technological, and structural capital on innovation performance and organizational capabilities. Due to the strategic role of IC in innovation performance capacities and giving the crucial role of exploration and exploitation activities, this study extends the body of knowledge of IC by exploring the crucial role of IC integration within exploitation and exploration activities in the area of innovation product and innovation processes to level up overall firm performance. Hence, this study fits and bridges the IC theoretical and empirical gaps in the dynamic capability view. The second gap addressed is related to the heavy focus of the existing studies on large firms (Kostopoulos *et al.*, 2015; Turner *et al.*, 2013; Hsu and Wang, 2012; Subramaniam and Youndt, 2005), making Small-medium Enterprises (SMEs), given the limited resources and capabilities, received little attention. It is strategically important to look into it and find ways on how IC dimensions may improve innovation capabilities in SMEs. Furthermore, the existing study on IC in the context of organizational ambidexterity is overlooked and poorly estimated. Therefore, this study addresses this by highlighting the role of the triple dimensions of IC on innovation performance in the existing external impact of innovation ambidexterity.

Firms view innovation as the process of improvement and the art of creating novel ideas and designing new products (Yang and Han, 2021) or the improvement of the workplace environment (Anderson *et al.*, 2014). Hence, it reflects the extent to which employees create value in the process, products, services, and other activities that leads to achieving competitive advantages (Shahzad *et al.*, 2019). Thus, this study aims to examine innovation as the source of enhancing internal firms' structures and enabling business processes, responding to customer needs and market demands (Kamau and Oluoch, 2016). A study by McDowell *et al.* (2018) stated that employees' knowledge and skills are pivotal elements of innovative ideas, products, and practices in developing new streams of production techniques. Therefore, employees with sufficient knowledge are seen to be important strategic intellectual assets that affect firms' business processes and organizational structure to establish new ways of businesses and processes (Wendra *et al.*, 2019; Wang and Kafouros, 2009). Scholars and professionals viewed employees' skilfulness as a significant predictor of IP that resulted from strategic and operational outcomes (Berawi, 2020; Tatiana and Mikhail, 2020). In this regard, IP is viewed as an intermediary construct in which firms plan to facilitate the outcomes generated from the improvement of IP, thereby well-skilled employees help organizations to benefit from IP (Li and Huang, 2019). A recent study found a positive correlation between innovation and performance (Ali *et al.*, 2021). Cabrilo and Dahms (2020) viewed IP as a conditional parameter for determining firms' productivity.

IP has been the core focus of strategic scholars and entrepreneurs since decades ago. Due to its vital role in developing business growth and ensuring the sustainability of businesses, the majority of developed economies pay special attention to developing innovative methods, techniques, and practices that help firms to survive fierce competition

(Ali *et al.*, 2021a). In addition, developed countries committed plans, procedures, and budgets to upgrade employees' skills, knowledge, and level up their mindset to innovate, invent, and enhance national innovation indexes (Hung *et al.*, 2010). This is due to the fact that innovation plays a great role in helping SMEs to survive against large businesses and imported products. Firms need to develop innovative ways and methods that makes to strengthen themselves to survive external challenges as well as local competitions (Ali *et al.*, 2021; Trąpczyński *et al.*, 2018; Wang and Kafourous, 2009). Firms need to upgrade their business processes, product development and functionality, and quality while preparing for pricing competition and opening new markets.

Innovation Ambidexterity (IA) is seen as a firm's capacity to mobilize valuable resources to match business demands (exploitation) while simultaneously responding to fit future business changes (exploration) (Liu *et al.*, 2021). Firms that aim to succeed in the long period are required to develop and leverage incremental and radical innovative business changes (Hayaeian *et al.*, 2022). Acknowledging the importance of ambidexterity and its associated benefits might motivate firms to plan and take efficient strategic decision-making. While research attention to IA has been increasing in the past few years, especially in developed countries, the topic is still understudied for cases in developing countries like Morocco. In addition, Oh and Lee (2020) reported that in developing economies firms are not always able to acquire sufficient knowledge and skills that lead to radical innovation. In the context of North Africa, Morocco might be viewed as an organic laboratory to examine theories that emerged in developed countries regarding individual, organizational, and market behavior (Aguinis *et al.*, 2020).

Explorative innovation fundamentally influences the entire business on the technological side while firms' exploitation refers to the changes occurred in the developed capabilities. The firm's activity to seek new markets and customers is seen as exploratory activity. Maintaining the existing ones, meanwhile, is viewed as an exploitative activity (Chen *et al.*, 2021). Exploration is characterized by high flexibility, tracking customers, associated with risk-taking, radical development, adaptation, and divergent thinking (Hou *et al.*, 2019; Brix, 2018; Andriopoulos and Lewis, 2010). Exploration consists of the creation of new knowledge, the development of new skills and practices, and activities combining it with the existing ones (Carnabuci and Operti, 2013). Bierly III *et al.* (2009) viewed exploration consist of yielding new technologies and developing new products and services; while exploitation refers to firms leveraging new practices, experiential learning, incremental development, and reuse of strategic thinking (Andriopoulos and Lewis, 2010; Smith and Tushman, 2005). Exploitation outcomes depend on the development of new knowledge or existing ones which leads to polished business processes, resource efficiencies, reduced costs, and extension of products and services, thus, leading to enable existing competencies (Ryan *et al.*, 2018). Therefore, exploitation enhances business processes, new product development, and brand reputation (Bierly III *et al.*, 2009; Jansen *et al.*, 2006).

Due to the strategic role of IC on business growth and the crucial impact of IA on innovation performance, literature shows a lack of studies that examine the relationship between IC and innovation performance (Agostini *et al.*, 2017; Beyene *et al.*, 2016; Campanella *et al.*, 2014) IA and innovative performance (Çömlek *et al.*, 2012; Wang and Ellinger, 2011), and more in particular in the existence of IA as an external factor (moderator). IC and IA are regarded as the key driving force for enhancing the capabilities of SMEs' innovation performance. Specifically, launching new products, developing production methods, and increasing firms' flexibility (Fernández-Mesa and Alegre, 2015).

Since this study emphasizes the importance of ambidexterity in the context of North Africa as well as addressing the critical role of intellectual capital as the main driving force of business development. It is not understood the development of intellectual capital in Morocco and which pillar that relies on it to check the progress of innovation performance and business growth. At the same time knowing how ambidexterity leads to enhance the development of IC and IP needed to be examined. Therefore, this study contributes to the body of intellectual capital theory by linking firms' dynamic capabilities and testing the role of ambidexterity as an external influencer. In this context, this research analyses the impact of IC on innovation performance and the critical effect of IA on both innovation performance and IC; as well as assesses the moderating role of IA on this relationship.

This research intends to fill the gap in the ambidexterity literature since some authors have studied the link between IC and IA (López-Zapata *et al.*, 2021; Mahmood and Mubarik, 2020; Turner *et al.*, 2015, 2013; Kang and Snell, 2009) and moderating variables of this relationship such as high-performance human resource management practices (Kostopoulos *et al.*, 2015) and technology absorptive capacity (Mahmood and Mubarik, 2020). Yet, introducing IA as a moderating role between IC and IP has to be specifically addressed. The study introduced IA as a moderating variable in this relationship because we assume that firms' IC might affect the focus of innovation on firms' internal or external environment. Additionally, the author had a great motivation to conduct this research due to its importance to the national policy level and supporting social awareness to educate, support, and increase their citizens' innovative ideas. This research thus provides further empirical contributions to dynamic capability theory, suggesting strategic implications for top management.

This research consists of five sections. Section 2 discusses the theoretical background and hypotheses development. Section 3 emphasizes the methodological setting (e.g., sampling technique, data collection, and measurement variables). Section 4 presents the analysis and findings. Finally, Section 5 discusses the conclusions, the results, hypothesis validation, and elaboration on theoretical contribution and practical implications for academicians, policymakers, and stakeholders.

## 2. Theoretical Background and Hypotheses Development

### 2.1. Intellectual Capital (IC) and Innovation Performance

Industrial Revolution 4.0 (IR4.0) impacts businesses, humans, the workplace, organizational structures, work characteristics, and the way how these factors are interacted and integrated with machines (Yong *et al.*, 2022). This leads to rising in the pivotal role of IC in the heart of IR4.0 and is the reason why academicians and entrepreneurs have claimed that IC is one of the strategic resources for successfully leveraging IR4.0. Hence, IC refers to the firm's capacity to incorporate employees' duties, skills, management practices, human knowledge and intelligence, and other stakeholders that yield business value. Itami and Roehl (1991) coined the term "intellectual capital" or IC in 1969 (Lentjušenkova and Lapina, 2016). Scholars define the term IC as the degree of relative 'intellectual action'. Management researchers viewed IC as the knowledge and skills learned to deal with different organizational factors to create business value. However, the framing of IC as a subject of research is a completely new trend. Kang and Snell (2009) viewed IC as the capability of employees to earn skills, build knowledge, and deliver talented practices to influence firm's competitiveness and growth. Several studies from various contexts explain the concept of IC differently; however, three components of IC are found in almost every definition: HC, RC, and SC (Kang and Snell, 2009; Kamath, 2007; Bontis and Nikitopoulos, 2001). Human Capital (HC), seen as an individual that possesses

and built sufficient knowledge, and earns skills and capabilities, has been studied since the early 1950s (Mubarik *et al.*, 2018). Earlier HC theories and the theory of firms proposed the strategic role of HC at the individual, organizational, and country levels. A variety of studies acknowledged that HC is cognition of knowledge, skills, and practices that are gained over time and refer to individuals' abilities to polish their job-related performance (Mubarik *et al.*, 2018; Kang *et al.*, 2012; Morris and Snell, 2011). Recent studies (Hayaeian *et al.*, 2022; Ali *et al.*, 2021; Gürlek, 2021; Reza *et al.*, 2021; Edvinsson, 1997) suggested that firms are required to improve and develop employees' education, and training, and enable them to integrate with other organizational factors which in turn leads to enhance firm performance (Koroleva *et al.*, 2020). Likewise, HC is viewed also as a combination of individual competencies to deal with and respond to customers' needs, suppliers' problems, and the firms' goals. HC is the firm's knowledge and institutional history which prioritizes strategic objectives and responds to organizational issues. Individual experiences, collective skills, learning orientation, know-how, and management expertise are important drivers for a well-developed HC. Gupta and Roos (2001) argued that HC represents employees' intellectual capacities to respond quickly, adapt to business changes, and find solutions effectively. Authors Diaz-Fernandez *et al.* (2017) supported the definition and pointed out that HC consists of personal attributes such as experience, skills, and knowledge developed over time. It is then HC that plays a fundamental role in business performance and economic growth. In this study, HC refers to the knowledge that builds by individuals, skills, and training provided by firms that strengthen their capacities to increase organizational performance.

Structural Capital (SC): refers to those tangible and intangible resources that firms are in need for their daily business operations like software, database, copyrights and patents, IT equipment, trust, culture, and employee efficiencies. SC is the process by which firms are planning to handle their transactions within the entire structural frame (Zangouinezhad and Moshabaki, 2009). Therefore, firm structural capital is the process by which firms can acquire, leverage, and push internal drivers to create business value such as routines, customer files, practices, processes, databases, and the overall image of the firm's structure (Reza *et al.*, 2021). Asiaei and Jusoh (2015) define structural (organizational) capital as a firm's practices to choose which management philosophy should be of interest, intellectual property, information and networking, organizational culture, financial relations, and processes. While Relational Capital (RC) represents the firm's reputation and customer loyalty. Importantly, firms are mobilizing these resources in the proper way to be aligned and connected with different external stakeholders such as suppliers, customers, and others in need. Relational (social) capital is viewed as the backbone that is formed by the existence of firms and their relationship with external partners. Researchers (Mubarik *et al.*, 2018; Mubarik *et al.*, 2016; Mom *et al.*, 2015; Lerro *et al.*, 2014) argued that relational (social) capital is a mixture of a wide range of relationships that links firms with external outsiders such as market relationships, power relationships, and cooperation. Studies by (Mubarik *et al.*, 2019; Lazzarotti *et al.*, 2017) viewed it as trust among employees, flexibility, quick response, and the ability to collaborate with other partners. Hence, it reflects firms' behavior and management practices in terms of connection and interactions, closeness, and loyalty toward downstream clients, upstream suppliers, and strategic partners. It is also acknowledged as external capital built upon brands, customers, reputation, channels, licensing agreements, and satisfaction.

*H1: Intellectual capital positively associated with innovation performance.*

Kang and Snell (2009) stressed that IC is an important factor in successfully implementing strategic exploration and exploitation due to the significant role of

employee's knowledge and skills to level up activities that are connected, particularly, with exploration. Each dimension of IC plays a strategic role in fostering and leveraging innovation exploration and exploitation (Turner *et al.*, 2015). Leveraging both exploration and exploitation requires firms' human capital to involve skilled and knowledgeable employees (Kostopoulos *et al.*, 2015; Kang *et al.*, 2012). Skilled and creative individuals can handle multiple duties and respond to work pressures. Thus, it allows for the simultaneous implementation of exploration and exploitation (Adriansyah and Afiff, 2015; Kostopoulos *et al.*, 2015). Skilled employees usually possess the ability to handle multiple duties (Kang *et al.*, 2012), to respond and handle the often contradictory activities and effectively mobilize appropriate resources needed to fulfill various demands of exploration and exploitation strategies (Kostopoulos and Bozionelos, 2011). On the other hand, firms are in need to use routines, procedures, knowledge systems, hardware, software, and databases representing structural capital; thus, influencing innovation ambidexterity activities at the stage of developing new products and processes (Fu, Flood and Morris, 2016). Because firms' knowledge is embedded in structural capital, it will help not only to deploy current knowledge but also to level up the capacity to create new knowledge and incorporate it within databases and systems (O'Reilly III and Tushman, 2013). Therefore, SC can enhance the deployment of exploration and exploitation strategies. In contrast to SC, relational capital can support firms to determine and deploy exploration and exploitation activities through having access to knowledge, skills, and good practices from the external environment (Gürlek, 2021). Studies (Fu, Flood and Morris, 2016) state that each dimension of IC improves innovation ambidexterity on an individual level. Nevertheless, examining the effect of each IC dimension on an individual level might impede researcher from seeing the entire picture. Therefore, the adoption of a holistic approach is chosen, since IC dimensions complement one another. More importantly, the existence of all dimensions might help firms to gain and increase the aggregative impact of all dimensions on innovation performance. The following hypothesis is generated.

*H2: Innovation ambidexterity is positively associated with intellectual capital.*

Firm's exploitative innovation focuses on the utilization of their existing capabilities, skills, and knowledge to foster innovation outcomes and business performance. That is the development, amelioration, and routinization of existing experiences, practices, and organizational culture during the exploration phases (Ojha *et al.*, 2018). A study by March (1991) suggests that firms should determine their competencies in the exploitative phase to upgrade and develop existing organizational processes, experiences, behaviors, and knowledge. Exploitative innovation help firms to enable their valuable capabilities to fit new innovative product conditions and successfully compete in a specific period (March, 1991). One of the crucial advantages of exploitative innovation is that it supports and allows firms to align and respond to market demands through technological knowledge, especially in the development of products and services (Lane *et al.*, 2006; Lenox and King, 2004). High levels of leveraging knowledge help firms absorb new knowledge to generate superior innovation outcomes and gain competitiveness (Zahra and George, 2002). Exploration polishes the productivity and efficiency of business operations (Eisenhardt and Martin, 2000; Levinthal and March, 1993). Previous studies have shown that exploitative innovation is the source of unique innovation and novel ideas which is not accessible or difficult to imitate by outsiders (Ham *et al.*, 2017; Lee *et al.*, 2012). March (1991) viewed exploratory knowledge as knowledge that is created through learning, searching, and experimenting, characterized by risk-taking, variations, and discovery of flexibilities. The competence of exploration depends on the investment of existing resources to generate new knowledge and upgrade processes and skills, which support firms to respond to

business changes (Bierly III *et al.*, 2009).

Lavie *et al.* (2011) argued that past studies have misunderstood the factors that impede firm's efforts to balance exploration and exploitation activities, while the performance outcomes are highly dependent on how to balance between both activities (Brix, 2018). On one hand, exploration and exploitation require different learning mechanisms which means that firms must distinguish between these two activities and mobilize valuable resources for each activity to level up their outcomes on business and innovation performance (March, 1991). Otherwise, firms also can build a close integration between exploration and exploitation to facilitate and benefit from potential common activities and reduce unestimated outcomes (Brix, 2018). The resource limitation and the high cost associated with ambidextrous activities lead to generating high demands on resources (Kang and Snell, 2009). Firms that attempt to simultaneously obtain benefits from exploration and exploitation while trying to maximize the profit might get negative consequences due to the unexpected changes that may occur during the implementation (Brix, 2018).

Therefore, firms should consider carefully whether to increase the level of ambidexterity to gain advantages associated with it (Hou *et al.*, 2019). Hence, this study proposes that innovation ambidexterity has a positive association with innovation performance. Thus, the hypothesis is:

*H3: Innovation ambidexterity positively associated with innovation performance.*

The intellectual capital notion called non-tangible asset was introduced and received considerable attention from strategic management scholars. It is described as having a pivotal role in IC (Ali *et al.*, 2021a). Later studies (e.g., López-Zapata *et al.*, 2021; Agostini *et al.*, 2017; Turner *et al.*, 2015; Morris and Snell, 2011) focused to improve and develop models that are related to non-tangible assets (Dumay, 2009) from the strategic lens. Since then, numerous studies have been examining IC dimensions, its measures, and its consequences on business performance (Ali *et al.*, 2021a). Over the years, researchers (Paoloni *et al.*, 2020; Buenechea-Elberdin, 2017; Salicru *et al.*, 2007) studied the IC concept from various approaches and methodological perspectives to explore non-tangible assets that cover the holistic dimensions of IC (Kong and Thomson, 2009; Mouritsen, 2004). Theoretical and empirical studies already provided several concepts, dimensions, measures, and outcomes of IC (Crupi *et al.*, 2020; Secundo *et al.*, 2020; Užienė and Stankutė, 2015; Nazari and Herremans, 2007). IC concept is seen as expertise, skills, knowledge, and other soft assets that contribute to innovation performance and business growth (Gürlek, 2021; Hayaeian *et al.*, 2021). Chen *et al.* (2015) defined IC as individual knowledge impacting organizational routines, processes, practices, and culture to improve productivity, competitiveness, new products, flexibility, and responsiveness to customer needs and market demands.

From the Dynamic Capability Perspective (DCP), human capital is the key driving force in building new knowledge and developing employees' intuition to foster firms' knowledge management capabilities (Makhloufi *et al.*, 2021; Nonaka *et al.*, 1995). Firms select and track well-skilled employees to leverage their knowledge and expertise to level up to company knowledge creation (Makhloufi *et al.*, 2021; Grant, 1996). Such utilization involves individual experiences to enhance knowledge capabilities, share novel ideas, and develop an existing database to improve sales growth, track customers, understand competitors' reactions, and estimated market demand changes (Subramaniam and Youndt, 2005). Quintane *et al.* (2011) point out that HC possessing well-advanced skills, practices, motivation, and knowledge is a serious concern for successful exploratory innovation that leads to polished processes, and managerial and product innovation. Employees'

knowledge, skills, and expertise influence their propensity to build new knowledge and combine it with existing ones to generate novel ideas and solutions (Makhloufi *et al.*, 2021; Morris and Snell, 2011). Thus, firms possessing a skilled and creative staff with unique skills help to reframe problems and overcome unexpected threats borne by exploration (Atuahene-Gima and Wei, 2011). Individuals' knowledge and experience play an important role to facilitate firms' capabilities to generate new ideas and solutions and promote the adoption and novel ideas yielded by exploratory innovation (Makhloufi *et al.*, 2021; Cohen and Levinthal, 1990). SC, on the other hand, comprises the ownership of intellectual properties which is crucial to enhancing human capital skills asserting that SC is an important driver to support employees' knowledge creation (Khan *et al.*, 2016). In other words, an appropriate work environment is quite critical to deploy human capital to contribute to developing exploration and exploitation activities (Asiaei *et al.*, 2018). SC provides support to help employees cognition knowledge to explore new opportunities (Chowdhury *et al.*, 2018). In addition, SC is regarded as the key contributor to leveraging organizational culture which allows HC to share and deploy their skills and practices during operations (Widener, 2006). Essentially, SC serves as the fundamental basis of the knowledge directory shared among employees, enabling them to advance their capabilities to foster exploration and exploitation of innovation.

Based on the discussed literature review, the focus and linkage between IC triple dimensions and innovation outcomes in the context of SMEs are generally overlooked. How SMEs with limited resources can develop IC and deploy such knowledge stocks for exploratory and exploitative activities to level up innovative products and processes is understudied. Evidence of the IC and innovation performance path in such contexts is not reliable and confusing in the context of SMEs. Furthermore, addressing the development of IC in developing economies like Morocco is of utmost importance for extending the body of theories with western economies dominating the empirical studies. Therefore, exploring such a work environment would be beneficial for managers to focus and raise attention to developing employees following the firm's objectives and business agenda. Cabrita and Bontis (2008) suggest that the outcomes of IC components may vary from one firm to another due to specific industry characteristics and resources limitation. Several calls have been reported to explore the crucial effect of innovation ambidexterity on IC and firms' outcomes (Farzaneh *et al.*, 2022; Gürlek, 2021; Kang and Snell, 2009; Cabrita and Bontis, 2008). In another study, Agostini *et al.* (2017) also observed that the link between IC and innovation is quite complex and not clear, hence further examination from other contexts and measures is deemed necessary. Research findings from different industries, contexts, and settings may not be reliable references for SME managers since they don't reflect the characteristics, IC development, and employees' cultures in the SME context. This paper attempts to fill the gaps mentioned by addressing the effects of the three dimensions of IC on innovation performance (e.g. products and processes) in the existence of innovation ambidexterity (e.g. exploration and exploitation) (He and Wong, 2004). Hence, we hypothesize (see Figure 1):

*H4: Innovation ambidexterity positively moderates the relationship between intellectual capital and innovation performance*



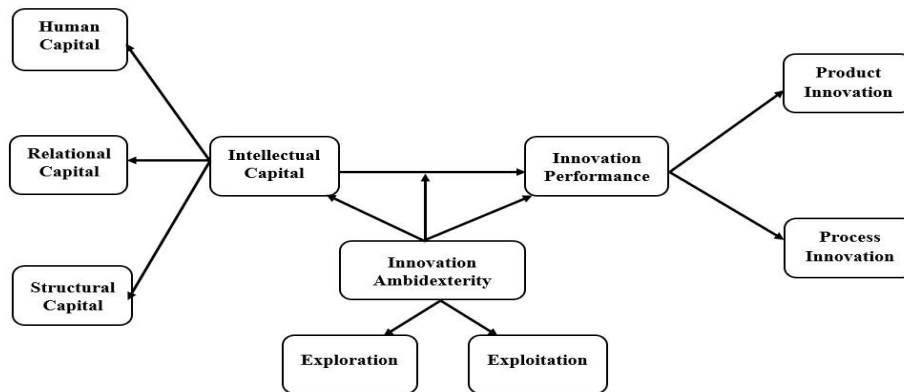


Figure 1 Research Framework

### 3. Methodology

#### 3.1. Sampling and Targeted Respondents

The focus of this research was mainly to investigate the critical role of IC on innovation performance by introducing moderating variables in this relationship. From the official website of Moroccan SMEs report, among 303,000 firms registered 6.7% of firms were operating in the manufacturing sector. The study, therefore, targeted around 20,000 active manufacturing firms listed on the website. The study applied a random sampling technique and based on [Krejcie and Morgan \(1970\)](#), the sample size of 384 companies was determined. This research aims to obtain data from top-to-middle managers to fulfill the objectives of the study. A hardcover letter attached with a questionnaire explaining the importance of the study was sent out to the appropriately selected respondents. A questionnaire was provided in Arabic and English language versions followed up by calls. To avoid a low-response rate and missing surveys, [Wolf et al. \(2013\)](#) suggested researchers add 40% of questionnaires ([Makhloufi et al., 2018](#)) to the total sample size ( $384 + 384 \times 40\% = 538$ ). Consequently, this study used self-administered and postal distribution to collect data. Out of 538 distributed questionnaires, 286 questionnaires were returned, with 12 being incomplete. Therefore, the study response rate was 51.3%.

Data were obtained and measured through a 7-point Likert scale ranging from 1 "strongly disagree" to 7 "strongly agree." To adequately ensure the questionnaire items, an in-depth content validity process was conducted. Four academic experts from the Faculty of Law, Economics, and Social Sciences, Sidi Mohamed Ben Abdellah University, Fez, Morocco were involved in the study process. The study invited two professional experts in the Telecommunication-based industry for an interview. The study benefited from experienced experts to further improve the questionnaire items by distinguishing the research model's construct. The final draft was formulated based on academics and professional experts' output. The final version was then translated into the French Language.

#### 3.2. Measurement of Variables

Following previous studies covering the context of the present research, the authors developed a measurement tool to fit the study context in Morocco. Hence, this research stands on past empirical studies to measure intellectual capital (human capital, structural capital, and relational capital) ([Ali et al., 2021](#); [Ali et al., 2021b](#); [Cabrilo and Dahms, 2020](#); [Mahmood and Mubarik, 2020](#); [Wendra et al., 2019](#)), innovation performance ([Ali et al., 2021](#); [Ali et al., 2021b](#); [Cabrilo and Dahms, 2020](#); [Najafi-Tavani et al., 2018](#)), and innovation

ambidexterity (Jansen *et al.*, 2006). The measurement tool was adapted and adopted to fit the objectives of the study.

### 3.3. Profile of Respondents and Firms

The study approached managers holding middle to upper managerial positions working in manufacturing SMEs across the national territory of Morocco (see Table 1).

**Table 1** Background of respondents and firms

Parameter	Frequency	Percentage (%)
Number of Employees		
Less than 5	43	15.7
From 6 to 75	136	49.6
From 76 to 200	95	34.7
Education		
Diploma	35	12.7
Degree (Bachelor)	168	61.3
Master	71	26
Type of Ownership		
Sole proprietor	51	18.6
Partnership	72	26.4
Private limited	124	45.2
Limited	27	9.8
Position		
Manager of sales and marketing	118	43
Manager of productions	57	20.8
Director of R&D	36	13.2
CEO	63	23

## 4. Data Analysis and Results

Several statistical researchers viewed the Partial Least Square (PLS) as a valuable statistical tool for predicting and assessing measurement and structural models (Henseler *et al.*, 2015). The study consists of mediation and moderation constructs suggesting PLS as appropriate for better predictivity (Albort-Morant *et al.*, 2016). PLS does not require a large sample of data, hence well-fit for this study (Chin, 1998). This statistical tool allows us to examine all the related tests of both measurement and structural models that should be applied to explore the interrelationships among variables and their output, along with determining the model relevancy Q2 through blindfolding procedures (Q2) (Hair Jr *et al.*, 2014).

The study applied an independent samples t-test to detect any possibility of non-response bias (the differences among early and later respondents that probably share the same features). Another inquiry, namely Levene's test, was conducted to check the equivalence of constructs variance, in which the value of 0.05 indicates that the study is free from non-response bias. Thus, the requirement was achieved (Pallant, 2011). Furthermore, the research passed measurement errors to clear the model's entire relationships by assessing Common Method Variance (CMV) through a full collinearity test. The results showed that all values of Variance Inflation Factors (VIFs) were lower than 3.3, indicating that the research model is free of CMV (Kock, 2015).

### 4.1. The Measurement Model: Validity and Reliability

This section consists of two-test, namely convergent and discriminant validity. The study examines convergent validity through several tests such as outer loading, factor loading, and Average Variance Extracted (AVE). Table 2 shows that item loading was higher than 0.707 for all variables (Hair Jr *et al.*, 2014).

**Table 2** Measurement model assessment: Loadings, Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE)

Constructs							
1 <sup>st</sup> Order	2 <sup>nd</sup> Order	Items	Loadings	CA	CR	AVE	
Intellectual Capital	Human Capital	HC1	0.914	0.949	0.961	0.478	
		HC 2	0.912				
		HC 3	0.915				
		HC 4	0.887				
		HC 5	0.926				
	Structural Capital	SC 1	0.864	0.887	0.92	0.693	
		SC 2	0.843				
		SC 3	0.913				
		SC 4	0.887				
		SC 5	0.874				
	Relational Capital	Relational Capital	SC 6	0.412	0.928	0.94	0.616
			RC 1	0.691			
			RC 2	0.748			
			RC 3	0.785			
			RC 4	0.824			
			RC 5	0.868			
			RC 6	0.761			
			RC 7	0.854			
RC 8			0.832				
Innovation Ambidexterity	Intellectual Capital	RC 9	0.800	0.657	0.729	0.589	
		Human Capital	0.666				
		Structural Capital	0.817				
	Exploitation	Exploitation	Relational Capital	0.811	0.899	0.924	0.807
			EXPT 1	0.645			
			EXPT 2	0.859			
			EXPT 3	0.887			
			EXPT 4	0.851			
			EXPT 5	0.857			
	Exploration	Exploration	EXPT 6	0.793	0.927	0.945	0.843
			EXPL 1	0.625			
			EXPL 2	0.886			
			EXPL 3	0.887			
			EXPL 4	0.911			
			EXPL 5	0.926			
	Innovation Ambidexterity	Innovation Ambidexterity	EXPL 6	0.902	0.789	0.791	0.826
			Exploitation	0.902			
			Exploration	0.915			
PROC 3			0.656				
PROD 1			0.407				
PROD 2			0.890				
Innovation Performance	Product	PROD 3	0.869	0.876	0.911	0.57	
		PROD 4	0.881				
		PROD 5	0.819				
	Process	Process	PROD 6	0.824	0.815	0.87	0.57
			PROC 1	0.810			
			PROC 2	0.723			
Innovation Performance	Innovation Performance	PROC 4	0.785	0.901	0.953	0.910	
		PROC 5	0.805				
		Product	0.951				
		Process	0.957				

At the same time, composite reliability was higher than 0.7 (Chin, 1998). Following (Hair Jr *et al.*, 2017), all constructs' AVE values were greater than 0.5, suggesting that the study passed the convergent validity test. The second test that must be applied to prove the measurement model is discriminant validity. The study used Fornell and Larcker criterion test to compare the correlation between variables with the square root of AVE of a particular construct. As shown in Table 3, the bold values are greater than the values within the respective row and column, suggesting that the measures applied in this research were discriminant. In addition, the results indicated that the outer loading exceeded the cross-loading of all variables and remained valid. Several researchers recently argued that both two previous tests are not sufficient to prove the adequacy of discriminant validity, suggesting the need to perform the Heterotrait-monotrait (HTMT) ratio (Henseler *et al.*, 2015). This test (HTMT) ratio is used to ensure that the model is well-examined by proving the measurement model's effectiveness and adequacy. PLS software allows us to examine the HTMT ratio. Table 3 shows that the values that appeared in the parentheses were less than 0.80, indicating that it fulfills the HTMT ratio values of maximum or below 0.85 (Kline *et al.*, 2012). Following the results of three major test that constitutes the discriminant validity, the study performed and proved it successfully, with the HTMT inference showing a confidence interval of values less than 1.0 for all variables (Henseler *et al.*, 2015).

**Table 3** Fornell-larcker Criterion and Heterotrait-monotrait Ratio (HTMT)

	HC	SC	RC	EXPT	EXPL	PROD	PROC
HC	0.81						
SC	0.65 (0.37)	0.86					
RC	0.32 (0.47)	0.20 (0.68)	0.91				
EXPT	0.35 (0.71)	0.27 (0.21)	0.38 (0.34)	0.75			
EXPL	0.52 (0.46)	0.28 (0.63)	0.63 (0.54)	0.42 (0.05)	0.80		
PROD	0.72 (0.73)	0.33 (0.62)	0.42 (0.50)	0.07 (0.18)	0.58 (0.39)	0.79	
PROC	0.58 (0.61)	0.49 (0.54)	0.53 (0.37)	0.12 (0.26)	0.37 (0.48)	0.67 (0.62)	0.81

Note: HC: Human Capital, SC: Structural Capital, RC: Relational Capital, EXPT: Exploitation, EXPL: Exploration, PROD: Product, PROC: Process.

#### 4.2. Structural Model

Figure 2 and Table 4 present the structural model results. Referring to the output of the PLS statistical tool, these hypotheses were tested. The first hypothesis results indicate a significant and positive relationship between IC and IP ( $B = 0.396$ ,  $t = 4.886$ ,  $p < 0.001$ ). Hence, H1 was supported. IA was positively and statistically significant on IC ( $B = 0.602$ ,  $t = 14.654$ ,  $p < 0.001$ ), suggesting that H2 was supported. In addition, the results showed that IA had a positive and significant impact on IP ( $B = 0.184$ ,  $t = 2.39$ ,  $p < 0.001$ ) suggesting that H3 was supported.

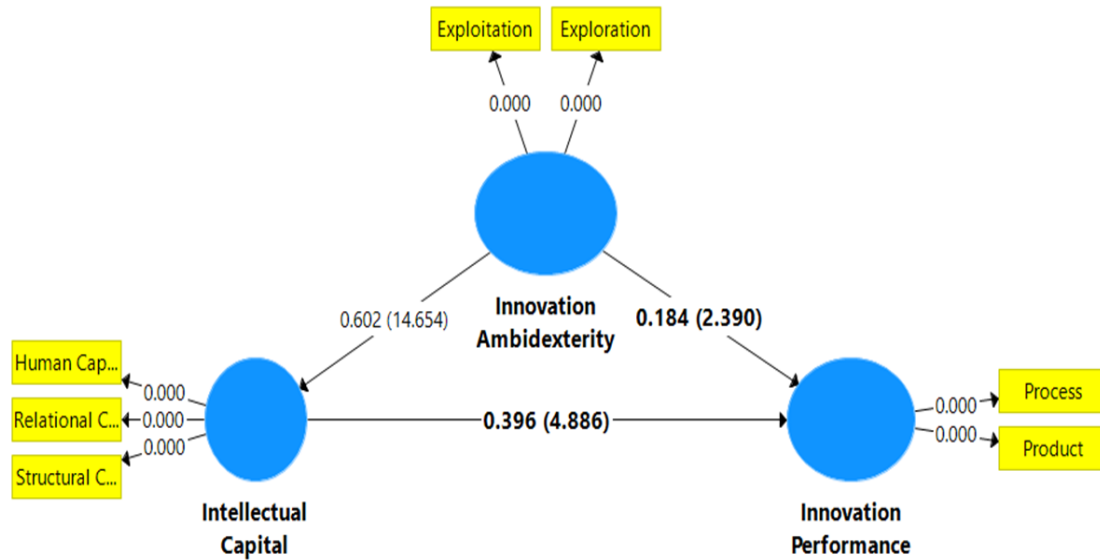


Figure 2 Structural model

Table 4 Structural model analysis results

H	Relationship	Std Beta	T-value (2-tailed)	P-value	f <sup>2</sup>	Decision
H1	IC -> IP	0.396	4.886	0.000	0.138	Supported
H2	IA -> IC	0.602	14.654	0.000	0.568	supported
H3	IA -> IP	0.184	2.390	0.000	0.094	Supported

Note: IC: Intellectual capital, IP: Innovation Performance, IA: Innovation ambidexterity.

4.3. Effect Size of the Model

Testing the effect size of the independent variables on related dependent ones can determine the extent to of these constructs are connected and affected to demonstrate the model's strength (Hair Jr et al., 2014). As presented in Table 4, the effect size of IC on IP was 0.138, and IA on IC and IP was 0.568 and 0.094, respectively, suggesting that the effects were small, strong, and weak, respectively (Sawilowsky, 2009). These constructs explained the high-value variance of R-square (36%) on IA, and IP (27%), indicating reliable relationships between dependent variables (see Table 6).

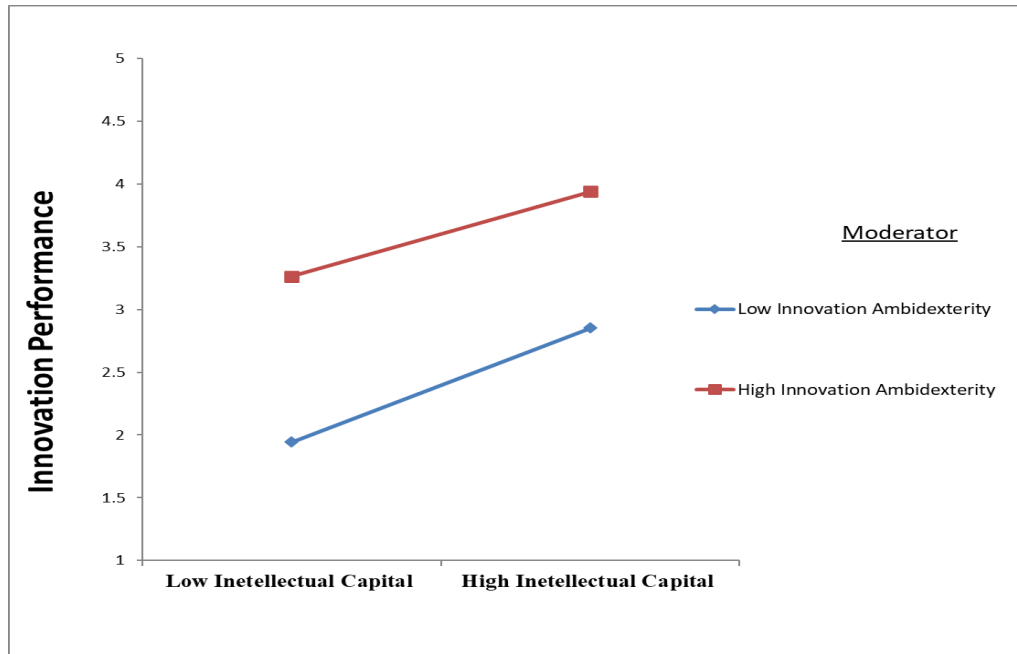
4.4. The Moderation Effect of IA

The study utilized the product indicator approach (Henseler and Fassott, 2010) to determine the strength of the moderation effect of Innovation Ambidexterity (IA) between IC and IP.

Table 5 shows that innovation ambidexterity was negative and insignificant in the relationship between IC and IP (B = -0.059, t = 0.933, p<0.001). Thus, H4 is rejected. Figure 3 showed that the presence of the moderator variable, IA, negatively affected the intensity of the relationship between IC and IP (B = -0.059; t = 0.933). This result suggested that higher IA would negatively influence IP.

Table 5 Results of the moderation effect of innovation ambidexterity

	Relationship	Beta	T-Value 2 tailed	P-value	f <sup>2</sup>	Decision
H4	IC*IA -> IP	-0.059	0.933	0.000	0.058	Rejected



**Figure 3** Moderation effects

Using Smart-PLS 3.0, this study applied blindfolding procedures (Geisser, 1975) to determine the predictive relevance of Q2 value for IA and IP. Chin (1998) suggested that values greater than zero can predict that the model is relevant. The nearer the Q2 value is to 1 would indicate the model's greater relevance (Chin, 1998). As stated in Table 6, the values of IA and IP's predictive relevance were 0.18 and 0.24, respectively. As shown from these Q2 values (Table 6), when IA is more relevant (which suggests more power), IP's influence is more significant.

**Table 6** Results of variance explained by constructs and predictive relevance (Q2)

Construct	Variance Explained R <sup>2</sup>	Predictive Relevance Q <sup>2</sup>
Innovation Ambidexterity (IA)	0.362	0.18
Innovation Performance (IP)	0.278	0.24

**5. Discussion**

This study aims to predict the crucial role of innovation ambidexterity on the relationship between intellectual capital and innovation performance. The study advances the body of knowledge of intellectual capital theory by examining the role of innovation ambidexterity as a strategic dynamic capability that enables firms to level up innovation capability and business growth. This study showed the importance of innovation ambidexterity in developing both intellectual capital and innovation performance and at the same time emphasizing the pivotal role of enabling the relationship between IC and IP. This study ground from the body of dynamic capability and intellectual capital perspectives. It is among the pioneer's research that emphasizes the role of the dynamic capability to polish a firm's human, relational and structural capital. The study findings elaborate on the important role of firms developing valuable capabilities to integrate and help firms' intellectual capital to advance their businesses.

From Table 4 and Figure 2, the findings indicate the IC has a positive and significant impact on IP, thus supporting H1. Similar to past findings (Agostini et al., 2017; Lerro et al.,

2014; Morris and Snell, 2011; Zerenler *et al.*, 2008), the first hypothesis was confirmed, where intellectual capital plays a significant role in developing firms' capacities to reach a certain level of innovation performance. Recently, SMEs in Morocco witnessed considerable development in terms of human capital, e.g. more training provision, improvement in IT skills and organizational knowledge, in addition to the changes and reconfiguration of the structural system (Chawki and Lemqeddem, 2021; Rachidi and El Mohajir, 2021; Makhloufi *et al.*, 2018; Cegarra-Navarro *et al.*, 2010), which in turn leads to advance firms absorption to innovation changes and uncertainty. It then leads to increase innovation capacities and enhances firms' business growth (Ali *et al.*, 2021b). Furthermore, the study findings revealed that innovation ambidexterity recorded a positive association with IC and IP (Table 4 and Figure 2). Hence, H2 and H3 were confirmed. Past studies (López-Zapata *et al.*, 2021; Wendra *et al.*, 2019; Kostopoulos *et al.*, 2015; Turner *et al.*, 2015) argued that exploration and exploitation innovation lead to improving firm's human, relational, and organizational capital which in turn resulted in superior innovation outcomes and business performance. The findings of this study confirmed that Moroccan SMEs acquire sufficient awareness and knowledge about the importance of developing innovation capacities to achieve superior performance. Moreover, grounded in the dynamic capability view and seeking to extend the body of intellectual capital theory, the study introduced and tested the moderating effect of innovation ambidexterity on the relationship between IC and IP. The result revealed that the interaction path was negative and insignificant. In addition, it is expected that Moroccan firms still suffering to acquire enough organizational capabilities that help to exploit valuable innovation activities to explore new opportunities that fit business changes and ensure firm performance.

This result validates the importance of organizations' investment in human (Makhloufi *et al.*, 2018), social and structural capital, as the basis for developing organizational capabilities that enable the exploration of new knowledge and exploitation of current knowledge simultaneously, which in turn allows the balanced development of radical and incremental innovations (Makhloufi *et al.*, 2017). SMEs in Morocco are suffering from financial and strategic resources that eventually impede their performance and innovation capacities (Bakhouche, 2021; Rachidi and El Mohajir, 2021; Asli *et al.*, 2020). Furthermore, other studies (McDowell *et al.*, 2018; Agostini *et al.*, 2017; Asiaei and Jusoh, 2015; Chen *et al.*, 2015) indicated that intellectual capital possesses a major role in upgrading and leveraging valuable capabilities that might help to foster innovation and business performance. Local studies (Rachidi and El Mohajir, 2021; Adama and Nadif, 2013; Cegarra-Navarro *et al.*, 2010) studying Moroccan firms from different perspectives such as dynamic capabilities, resource-based view, and intellectual capital suggested that firms need to strengthen their organizational capabilities, i.e. enabling knowledge creation, leveraging valuable innovative practices, employee mindset, managerial skills and flexibility of business processes, to fit business changes and uncertainty (Makhloufi *et al.*, 2018).

Even though innovation ambidexterity positively and significantly influences both IC and IP, the moderating effect of IA failed to strengthen the relationship between IC and IP. Studies stated that contexts and business environments, facilities, and acquiring enough resources would be one of the major reasons for this negative relationship. In the Morocco context, firms are suffering and might be reluctant to leverage valuable capabilities because of limited resources or because of a strategic mindset of managers and entrepreneurs to mobilize resources for exploration and exploitation activities due to the unexpected return from the investment.

### 5.1. Theoretical Contribution

This study focuses on the strategic role of intellectual capital and innovation ambidexterity to improve firms' innovation performance. The study extends the body of intellectual capital by emphasizing the effect of dynamic capabilities of innovation exploration and innovation exploitation to enhance the outcomes of innovation performance (Alkhatib and Valeri, 2022). In addition, the study provides significant evidence about the role of innovation capabilities such as exploration and exploitation activities to develop a firm's human, structural, and relational capital to polish innovative products and innovation processes. The study, therefore, advances the body of intellectual capital knowledge and seeds important evidence about the need to develop dynamic capabilities such as innovation ambidexterity. In fact, from dynamic capability theory, IA is seen as the backbone of innovation performance success and business growth. Thus, this research argued that by introducing IA as an external factor that increases the relationship between IC and IP, firms can have beneficial strategic and operational outcomes. Theorizing and measuring IC and IA in a single mode is an early attempt to fill the gap in the previously overlooked research topic. This study is expected to provide important evidence about the importance of the relationship between IC and IP in light of IA.

This research illustrated theoretical insights which address the effect of different intellectual capital dimensions on innovation performance. It is among the fewer empirical studies that tested the theory and empirically predicted the proposed relationship. The findings of this research are expected to motivate managers and professionals to develop exploration and exploitation activities and select valuable resources that might support the performance of innovation outputs in long term. This study introduced innovation ambidexterity as a moderating variable between IC and IP and more in particular from the context of developing economies. To conclude, from the literature review and the findings, this study discussed these gaps namely (1) existing studies still face debates about the relationship between IC and innovation measures due to the limited resources, context differences, and the development of IC; (2) existing studies focus on large firms abandoning the development of IC and IA in SMEs sector, which might be due to limited resources and inability to directly observe activities related to exploration or exploitation activities; (3) the findings of the existing studies examining the linkage of IC and IA are confusing and inconsistent, and it is unclear whether IA was introduced as an external enabler factor to strengthen the path between IC and IP, especially since IC is significantly influenced by the development of human, relational, and structural capital.

### 5.2. Practical Implication, Limitations, and Recommendation for Future Research

This study suggests that IC dimensions such as human, structural, and relational capital should be understood as strategic resources that influence and improve firms' innovation outcomes. Managers and executives are advised to revisit and upgrade their strategies, namely selecting and developing valuable capabilities to mobilize and leverage them, thus contributing to superior innovation performance (Konno and Schillaci, 2021). Because of the limitation of capabilities and access to strategic locations and facilities, Moroccan firms needed to find alternative collaborations either with neighboring countries or Western firm counterparts to advance their skills and innovation capacities to fit the globalization of business markets. Local studies (Chawki and Lemqeddem, 2021; Rachidi and El Mohajir, 2021; Asli *et al.*, 2020; Adama and Nadif, 2013; Cegarra-Navarro *et al.*, 2010) argued and suggested that Moroccan SMEs, in particular, are in need for help and is seeking alternative ways to prove and ensure their sustainability of businesses. This study addressed strategic issues recognized by strategic management scholars and entrepreneurs related to firms' intellectual capital, ambidexterity, and innovation outcomes. Moroccan SMEs are advised



to join clusters and industrial zones to level up their networking and cooperate with others to avoid establishing a home-based business. This can help them acquire capabilities and skills to support technological innovation and product development.

Although this empirical study supported the direct hypotheses between IA, IC, and IP, the results also show some limitations. IP is seen as a strategic backbone of a firm's business growth. The findings of the study supported that the close interaction of IC and innovation ambidexterity would improve the creation of business value and empower employees' skills, knowledge, and best practices. To highlight the importance of developing dynamic capability and its role in fostering IC dimensions to better predict innovation outcomes over time, a longitudinal study is needed.

This study targeted all manufacturing firms in Morocco; therefore, the findings are affected by the differences in terms of acquiring valuable resources and leveraging certain capabilities. Future studies should include also firms with sufficient resources. The findings indicate that IC and IA explain 24% of the total variance in IP, which means that other explanatory variables need to be discovered (up to the remaining 76%). Hence, this study recommends future research to explore and examine other factors such as organizational culture, government support, technological capabilities, and open innovation.

## 6. Conclusions

To conclude, this research investigated the important role of IA in the relationship between IC and IP in a single model which was an overlooked gap in IC and firms' ambidexterity literature. In addition, the present findings provided theoretical and empirical evidence on the effect of IA and IC on IP and the moderating role of IA in Moroccan SMEs and large firms.

Hence, this study develops and extends past frameworks concerning IC and IA literature which expand the body of intellectual and ambidexterity literature. Future research is needed to estimate the role of IA in developing, upgrading, and leveraging firms' IC in the proper sides of innovation performance outcomes.

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