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Organizational Performance and Sustainability: Exploring the Roles of IT Capabilities and Knowledge Management Capabilities

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Abstract: This study explores the effects of organizational information technology (IT) capability in determining organizational performance and sustainable competitive advantage. Building on the resource-based and knowledge-based views of a firm, the study proposes a theoretical framework. In this framework, organizational IT capability is theorized to strengthen organizational performance and sustainable competitive advantage, directly and indirectly, through organizational knowledge management capabilities. Data collected from the middle and senior managers of diverse organizations in an emerging economy have been used to test the relationships in the framework. To estimate the proposed relationships in the conceptual model, we use structural equation modeling through SmartPLS 3.2. The results confirm that organizational IT capability significantly impacts organizational performance and sustainable competitive advantage. Additionally, organizational knowledge management capabilities partially mediate the relationship between IT capability and the outcomes (i.e., organizational performance and sustainable competitive advantage). The study concludes with a discussion of the implications for academicians and managers.

Keywords: IT capability; IT infrastructure; IS competence; knowledge management; organizational performance; sustainable competitive advantage

1. Introduction

The debate among academicians and practitioners on sustainable competitive advantage (SCA) and perceived organizational performance (POP) appears to have reached a crucial point. In contrast to the traditional organizational systems, modern workplaces are advocating the importance of IT capabilities and knowledge-based systems. In current times, where there is active consideration of SCA among organizations, generally at the same time, the traditional models of organizational dynamics are criticized by those who uphold theories that regard the resources and competencies of a firm as its principal source of competitive advantage. In this article, the authors carry out an analysis of one of the recent and adapted branches of research concerning organizational performance and SCA from the perspective of IT and knowledge management capabilities [1].

While the authors are researching the importance and activity of information technology capabilities (ITC) and knowledge management capabilities (KMC) in forming sustainable business spheres, it is important to highlight the insights of extant literature from the perspective of SCA. The notions of ITC and KMC come from the uses of the resource-based view and the knowledge-based view in the information technology research field [2]. These theories empower the formation of a

framework for assessing the strategic and sustainable information resources of the organization [3]. From the thoughtful perspectives of these theories, organizational resources, such as capabilities and knowledge, are inimitable and valued, which may lead to achieving SCA [4]. Bharadwaj (2000) [5] defines ITC as “the firm’s ability to mobilize and deploy IT-based resources in combination or jointly with other resources and capabilities.”

In the last decade, information and communication technologies (ICT) have gained substantial importance in the emerging economies. Based on insights in the literature, nowadays, organizations are on the move to attain sustainable business momentum. Not only has it stood as the incremental agent of change toward effectiveness in the organizational dynamics, it has also boosted the economic capital of organizations [6]. Sustainability, which is the basis of competitive advantage (CA) for the current eras’ organizations, sparks an environment of opportunity for organizations to compete in their competitive spheres [7]. While working for competitive advantage, successfully integrating IT into various business processes and taking advantage of IT capabilities in the acquisition of SCA have been significant challenges for organizational IT managers [8]. Historically, those organizations who have used their ITCs more efficiently and effectively have succeeded in attaining competitive advantage (CA) in their respective fields [9].

Persistence in performance is an objective that any organization works for in order to sustain a better position in the competitive world. From the perspective of organizational performance and SCA, firms mostly resonate their KMC in terms of IT capability in order to attain sustainability. Not only is it a market myth for organizational sustainability, it is also indeed a new research paradigm in academia, which gives hype to the search for competitiveness as well. No organization can annul the relationship between ITC and SCA in the current era. As a matter of fact, the environment in which enterprises and organizations sleep with different ITs, and wake up with an improved one, cannot afford to overlook the importance of improving IT competence and infrastructure if they want to place themselves in the sustainable business environment (SBE). There exists a lack of knowledge among organizational personnel as to how to overcome hurdles in improving their IT competence and infrastructure. Mostly, the organizations of emerging countries lack this ability, and hence cannot compete in the competitive world. To overcome these hurdles, organizations can deploy a sustainability model in their business processes in order to better grasp the CA [10]. For organizational SCA, organizations should emphasize the KM and its artifacts [11,12]. Indeed, IT innovation helps in the development of a sustainable foundation for organizational competitiveness [13]. In other words, ITC, which sparks KM capabilities, plays an essential part in organizational sustainability [14]. Moreover, to face the challenges in a knowledge-based economy, organizations worldwide are investing in ITC to acquire and maintain necessary IT capabilities [15]. Global IT spending has reached approximately US\$4 trillion annually [16]. Given this huge investment in IT, understanding the roles of IT in improving POP and gaining an SCA is essential.

In the current research, the authors aim to identify the underlying factors of ICT adoption by organizational managers and determine the impact of ITC on POP and SCA. Deploying IT to gain CA and the sustainable benefit is becoming a new trend among modern organizations. This trend has caused many organizations to acquire new competitive technologies for effective and efficient KM. The acquired technologies not only lead to efficiency, but also create improved POP and an SCA [17]. However, the extant literature has different empirical findings when discussing the effect of ITC on POP [18–20]. The mechanism through which the delivery of ITC improves or strengthens POP or SCA has not been fully elucidated [17]. In today’s ever-changing competitive business environments, there is increased stress on organizations to explore new avenues and create advanced profit-generating methods to keep organizational development at a rapid pace. ITC acts as the main driving force behind the success of many firms in a continuously changing business environment, and this aids organizational growth and survival [19]. Recently, IT academicians, working under the academic dynamics of a resource-based view (RBV) of a firm, have urged organizations to enhance their ITC to gain SCA [21]. With the emphasized academic viewpoints on ITC, this concept indicates the

prominence of activating and plugging in IT-based resources to provide organizational significance regarding new resources and other capabilities [22]. The role of ITC in POP is not only an opinion, it has been confirmed by substantial empirical evidence [21,23]. Due to the advancement in modern IT systems, the contemporary workplace has changed and has become more efficient. The majority of organizations have realized the significance of IT and knowledge management in POP and SCA [15,18,19,24]. The literature has mostly discussed the constructive and positive effects of IT capabilities on POP. However, the roles of ITC and KMC in enhancing POP and SCA are not yet well understood [16,20,25]. Moreover, the literature also supports the positive relationship between organizational IT capabilities and knowledge management capabilities (KMCs) [18,24]. Through this research, we intend to explore the significant role of ITC as a driver of POP and SCA. The study will also investigate the role of KMC in an organization's performance. Consequently, the following research questions are addressed:

RQ1. *How does organizational ITC (infrastructure and competence) translate into perceived organizational performance and SCA?*

RQ2. *How does organizational ITC (infrastructure and competence) help in developing organizational knowledge management capabilities?*

RQ3. *How does organizational knowledge management capabilities mediate the relationship between organizational ITC (infrastructure and competence) and outcomes (i.e., perceived organizational performance and SCA)?*

2. Background and Framework Development

Value accumulation through the resource building of any organization is considered as part of the core dynamics of RBV. Some organizations adopt capability building from the perspective of IT competencies and infrastructure, while few retain the ideology of incrementing their knowledge-based resources. There is an urge to work on the resource building mechanism from the insights of RBV; the organizations work for uniqueness, rarity, imitability, and agility in their business models in order to be competitive in the market [26]. Through the insights from the extant literature, the authors believe that ITC resources complement knowledge-based resources, which subsequently help organizations achieve their desired performance and SCA [27]. Moreover, the resource-based theory suggests that firms differ regarding their tangible and intangible assets. Hence, this uniqueness helps organizations in gaining the CA among their competitors [26,28]. ITC, which is considered to include tangible assets, complements human knowledge-building, and the combined execution of both assets thus adds to the POP and paves the path for building SCA.

Likewise, as per the insights of RBV, IT is the prospective source in forming knowledge management capabilities and SCA [22,23]. In underpinning the comprehensive elucidation of the role of IT in obtaining an SCA, the literature has adequately presented their findings in terms of tangible and intangible IT capabilities [29]. Different methodologies, such as the inside-out, spanning, and outside-in processes are proposed to investigate the antecedents of IT resources in gaining an SCA [3]. Past research suggests the building of IT and human capital to develop the organizational knowledge capability, which may result in the improvement of various processes [30]. Another important determinant of SCA is the organizational knowledge capability, which has a basis in the knowledge-based view of the firm. KBV claims that knowledge is an integral part of a firm to create value in its business processes [9]. The organizational investment on the development of knowledge-based resources enhances its KM capability, which eventually leads to SCA [29]. The knowledge management process has been identified among the main causes of SCA in the extant literature [31]. To enhance knowledge management capability, organizations need to develop various knowledge management processes, such as acquisition, retention, sharing, and application [11,32].

In the current era of IT, smart leaders fully understand that IT is a critical part of improving the efficiency and effectiveness of business processes, and thus achieving the required business targets. IT resources, as valuable assets to any organization, can play a significant role in adding value to an organization's products and services. IT covers technical and managerial issues in an organization and helps managers make efficient decisions. The decisions integrate organizational and technological capabilities with knowledge capabilities in approaching SCA. Nowadays, the use of IT at various levels is essential for increasing an organization's productivity and improving POP [16]. IT has led to considerable growth in various organizations. However, with the developments in IT dynamics, researchers believe that certain aspects of this research domain require further investigation [33]. As drafted earlier, there exists scant empirical evidence in the IT literature that IT capabilities contribute to superior performance and SCA. Likewise, it is not clear how organizational KMC can intervene in this relationship among ITC and performance, as well as between ITC and SCA. Additionally, rather than tracing the direct link among infrastructure/capabilities and SCA, it is necessary to explore the process through which infrastructure and capabilities translate more facts in achieving SCA [18].

2.1. Sustainable Competitive Advantage (SCA)

Sustainability, a recent concern for many emerging economies, organizations, and enterprises, is considered a systematic approach in gaining CA [13]. According to a report by the United Nations, sustainable development is defined as "the one that meets present needs without compromising the ability of future generations to meet their own needs" [34]. Organizational sustainability is a perspective on driving organizational business models toward performance. A firm's sustainable CA is the favorable positioning of its products and services, compared with those of its competitors. Sustainability is a new, broad, and systematic subject for mass economies and companies. It is not only a concept, but also an ideology that exhibits continuity in economic, societal, and ecological issues [35]. Among the academic dynamics of IT, sustainability is also a means used by firms to gain SCA. Firms achieve sustainability by staying connected with KM and innovation-based business models. However, knowledge is an individual's belief that increases their ability to take productive actions, whereas KM is a mechanism for using knowledge effectively, e.g., effectiveness in capturing knowledge, efficiency in distributing it, and its effective dissemination across organizations [24,35]. Firms utilize their KMC to attain sustainability in a dynamic competitive business environment. KM is the foundation for identifying the underlying performance issues of an organization and its management process [9,36]. Firms can create sustainable business models by obtaining knowledge about their customers, markets, competitors, and future technologies. Such knowledge serves as a core ingredient in gaining SCA.

Moreover, in the extant literature, the prominence of SCA concerning the long-term success of an organization is addressed from different perspectives [9]. Studies have distinguished the CA in regard to the organizations' internal and external capabilities [37]. The internal capabilities relate to the internal infrastructural or IT capabilities, whereas the external capabilities are related to the decision power of managerial personnel in controlling the market turbulence [38]. There exist slight differences in the notion of SCA and POP. On the one hand, whereas SCA leads to an organization achieving long-term and monopolized competitive benefits among competitors from the perspective of the internal and external environments of the organization, the POP is mostly derived from the internal capabilities of an organization, such as infrastructural changes or the implementation of knowledge-based processes. However, the authors are of the view that there is a very thin line between SCA and POP, which differentiate the two notions.

The model proposed in this research emphasizes the SCA of organizations in a unified manner for the enhancement of organizational sustainability through KMCs. In the extant literature, organizational sustainability is explained in a broader context, which includes the environmental, social, and economic impacts on organizations and their production processes [8]. For many years, IT and KM have been considered foremost concerns among academicians and practitioners in generating SCA. In the

continuously changing business dynamics of today, the IT-empowered KMC of organizations act as the core competence of organizations for further enhancing their performance, innovation, capabilities, and SCA [8,24,36]. Even though the academicians have argued in the extant literature that KM mediates the relationship between IT and firm performance, still, the mediated effect of KM among various IT resources and the competitive advantage of firms is not fully elucidated [36]. In the current dynamics of organizational change, IT is being treated as an enabler of competitive advantage [23]. RBV argues that the implementation of IT may create a substantial difference in the POP [8]. Hence, plugging various ITs into organizational business models is of integral value to the current business paradigms. This study also empirically analyzes the impact of IT infrastructure and IT competence on SCA and POP through KMC in order to highlight potential insights in developing countries. Researchers in the IT field have also argued, from different literature lenses, that IT-based resources have diverse effects. That it causes a gain in the CA with respect to tangible and intangible IT resources was argued by Bharadwaj, Chauhan, & Raman (2015) [22], whereas Felipe, Roldán, and Leal-Rodríguez (2016) [2] presented a multi-dimensional topology in addressing the outside-in, panning, and inside-out processes in subscribing CA over time. The extant literature also shed light on the interplay of IT assignments with IT processes by considering IT capital and human capital [16,30]. Consistent with previous studies, this study also elucidates the use of ITC in shaping KMC, which subsequently creates the POP and SCA.

Firms may gain the competitive advantage in the market by increasing its economic profit, as compared to their competitors. CA was defined by Barney and Hesterly (2012) [38] as “the ability for a firm to generate a higher amount of economic worth than the economic worth of their competitors.” Organizational CA may be assessed by comparing its IT resources with those of its competitors. Nowadays, it is a common practice that companies carefully analyze their IT capabilities with their competitors in order to gain the CA [9]. It is indeed a challenging task to maintain the level of IT resources through which a firm can sustain its CA, but a comprehensive strategy of managing and enhancing IT resources can enable organizations to meet this challenge. Barney and Hesterly (2012) [38] argued that there exist two types of CAs, i.e., sustainable and temporary, and the only way to capture the sustainable one is to enhance the organizational IT infrastructure and IT competence. The SCA needs more attention in order to make it unique for any organization; if not, the rivals can create a duplication of the business processes, hence creating an opportunity for losing the SCA. In addition, the continual improvement of IT infrastructure and IT competence can lead to an SCA, which is the subject of the firm’s performance. According to Barney (1991) [37], SCA has certain attributes, such as value, rareness, inability to be duplicated, and non-substitutability. These attributes should be monitored continuously in creating SCA.

2.2. Perceived Organizational Performance (POP)

Chmielewski and Paladino (2007) [39] argued that the POP may be observed from various perspective such as capabilities, quality, the profitability of goods and services, the return on investments, and the reduction of operational costs. The researchers explain that the POP can be achieved by controlling the recently drafted POP antecedents. According to Franco-Santos et al. (2007) [40], performance evaluation can be defined as “the process of quantifying an action, in which the measurement is equated with quantification, and the action is understood as that which leads to performance”. Based on such findings, IT scholars and practitioners have remained interested in determining the links between IT and firm performance. The extant literature shows that considerable progress has been achieved in clarifying such links; nevertheless, significant gaps remain unaddressed [21]. There are a number of studies in the extant literature that have tested the connection between ITC and POP [20,24]. The extant literature argues that firms with a better ITC exhibit better business performance than their competitors [23]. However, some studies have shown that investments in IT are related to a firm’s output, which disregards the ideology of productivity. The relationship between IT spending and financial performance measures have also been thoroughly investigated in

the literature, and different findings have been witnessed [16,33]. Extending the intuition from the RBV, IT scholars have argued that the differences among performances solely depend on the differences in ITC, and not upon differences in IT spending [8,20].

Michael Porter (1980) stated that a firm's performance is based on environmental changes, where new threats can suddenly emerge, and opportunities may not be available for a long time [23]. Hence, the firm's performance is likely to be subjective in its ability to respond to the environmental changes. In such an environment, the IT capability includes IT infrastructure, IT competence, human IT resources, and knowledge assets, which, by being properly utilized, produce the firm's performance [22]. Corporations can further enhance their business outputs and reduce costs by adopting new ITC [23]. The use of ICT exerts an impact on POP [33]. With ITC, firms can increase product differentiation, which results in high revenues, increased POP, and accordingly, an increase in SCA. Therefore, we posit the following hypothesis, based on the preceding arguments:

Hypothesis 1 (H1). *Perceived organizational performance (POP) positively influences organizational sustainable competitive advantage (SCA).*

2.3. IT Capability

ITC is the organizational ability to utilize various resources (i.e., human and technical resources) in improving POP [25]. The literature largely supports the significant impact of ITC on the POP [16,24,25]. Organizational IT capability plays a significant role in strengthening organizational KM processes, which results in an improved overall POP [18]. Enhanced ITC allows managers to capitalize on IT resources and disseminate relevant and new data and information for efficient decision-making.

Moreover, ITC enables organizational KM facilities. Organizations with a better ITC exhibit an advantage over their competitors due to their ability to offer reliable and updated information to organizational managers for immediate decision-making. The literature has identified certain IT capabilities, such as IT infrastructure, IT competence, and IT skills [25]. The succeeding section elaborates the major IT capabilities that have been identified in this research and subsequently posits hypotheses.

2.3.1. IT Infrastructure

Technology infrastructure includes all of the aspects related to the IT capabilities of an organization, such as hardware, software, networks, and data storage. Technology infrastructure is an integral part of IT enhancement, and it acts as an integral mechanism in building POP. The literature has reached a consensus on the role of IT Infrastructure in achieving POP and, consequently, gaining SCA [41]. The lack of significant technology infrastructure may reduce an organization's competitive position, and hence lead to missed business opportunities. In addition, the lack of related IT Infrastructure may act as a major barrier in organizational KM facilities, and subsequently, in the performance of an organization. Thus, investment in IT Infrastructure is essential for any organization. Hence, we posit the following hypotheses, based on the preceding arguments:

2.3.2. IT Competence

The IT competence of an organization may be defined as the organizational members with related IT skills and expertise [41]. The technological competence of an organization's members leads to innovative product development and new services, which subsequently improves POP. If an organization has expert-level human resources, then it may use their knowledge as an SCA and offer additional innovative products to the market. Moreover, employees' knowledge may allow organizations to not only add value to firms' existing products and services, but also help in extending their future offerings. Firms with better IT infrastructure and IT competence perform comparatively

better than their competitors, and are sustainable in the modern technological environment [42]. Hence, we posit the following hypotheses, based on support from the preceding literature:

Hypothesis 2a (H2a). *Organizational IT capability (ITC) positively influences perceived organizational performance (POP).*

Hypothesis 2b (H2b). *Organizational IT capability (ITC) positively influences its sustainable competitive advantage (SCA).*

2.4. Knowledge Management Capability (KMC)

Knowledge is defined as “a justified personal belief that increases an individual’s capacity to take effective action” [35]. The KMCs originate from the various knowledge management processes, such as acquisition, retention, sharing, and application [31]. KMCs constitute the basis of IT capabilities construction, POP, and management process [43]. The KMC is an outcome of ITC (IT infrastructure and IT competence) and a core ingredient for attaining SCA. In certain organizational cases, the knowledge required for attaining the POP and SCA is already available in the organizations, but there exists a lack of ITC (competence and infrastructure) in mobilizing the right performance. To overcome such scenarios, the integration of IT competence and IT infrastructure with the KMCs can lead to the right POP.

It is commonly held that the required knowledge to form productive capability is already available in the companies’ information database. However, the inefficient process that prevents information from being mobilized leads to an unsustainable CA for the firm [9]. This inefficiency could be due to a lack of strategy for KM and its integration with other organizational activities [35]. As for inefficiencies, in our view, the organization should not just rely on the internal knowledge, but rather work things out in relation to external knowledge as well. According to Porter’s view, the innovation sometimes lies in the external environment. KM undoubtedly ignites open innovation, and successful organizations achieve their CA by the creation of those innovative capabilities [36]. While the innovative capabilities help in gaining the CA, they also distinguish organizations from their competitors. Organizations, such as Apple, Amazon, and Samsung are the clear examples of such firms. Apart from the CA, the economic value, in turn, gets topped up when the sustainability and innovation in the organization’s products attract more customers [12]. Hence, innovation leads organizations to achieve what others have not developed or realized, and this becomes the source of competitive advantage for sustainable firms.

Moreover, at present, a large amount of data is being generated by IT. Such data should be organized and processed into meaningful information. This relevant and actionable information may provide exciting insights, which may eventually lead to organizational knowledge development. Knowledge is primarily information that is perceived, discovered, inferred, or understood [31,44]. Knowledge may have different forms and categories [44]. Knowledge in any form, whether explicit or tacit, is an essential source and strength for any modern organization, which helps it achieve SCA [45].

The adoption of organizational KM helps organizations produce additional innovative and competitive products and services. In the technology adoption race, most organizations are attempting to acquire modern technologies. However, only a few are efficiently using these technologies to extract and manage their knowledge resources. Organizations can adopt IT to strengthen their performance and gain SCA. They not only gain an SCA, they also reduce costs for business models, thereby increasing their revenue, creating facilitation among different processes, and driving innovation [8]. However, some scholars believe that investing in IT can increase the spending costs of firms, which causes them to lose their SCA in the market [20]. Given that IT has become identical and global, replicating the ITC of other organizations has become relatively easy [23]. IT and KM researchers have realized the significance of KMCs in increasing organizational performance [36,46].

Mediating Effects of Knowledge Management Capabilities

The extant literature has explained the relationship between KM and POP [24]. Knowledge is disseminated across different complex social parameters, and is difficult to reproduce. From the KBV, scholars believe that KMCs are an integral element of SCA and POP [8,9]. KMCs exhibit a positive relationship with financial performance, organizational effectiveness, innovation, and organizational agility [47]. The impact of organizational KM can be observed at different levels and in different forms, such as improved processes and products. The influence of KM on POP can be direct or indirect, i.e., through employees' learning and improved products or processes. Organizational KM practices can facilitate employees' learning, which results in developing a flexible attitude and enhanced job satisfaction in employees [31]. Thus, KMCs help employees to adapt more easily to the organizational culture, which reduces the turnover rate and increases POP. KM supports various organizational processes by adding innovativeness, efficiency, and effectiveness. Finally, KM enables organizations to offer improved value-added and knowledge-based products. Various KM processes have been proposed in the literature, although a consensus has been reached on four major processes, namely, knowledge creation and discovery, knowledge storage, knowledge sharing, and knowledge application [15,32,44,48].

Similarly, organizations use IT resources in order to improve their POP and CA. The use of IT resources reduces the conventional cost of old processes, increases revenue, and drives innovation [8]. However, the literature also suggests some instances where we do not find any significant relationship between IT and POP [23]. For example, in the early 2000s, IT eroded the SCA of many firms due to the increasing change in the IT commoditization. At that time, the huge amount of money invested in the restructuring of the organization from the perspective of IT also resulted in huge profit losses and failed business processes, which resulted in the loss of competitive advantage in the market.

Moreover, Bhatt and Grover (2005) [49] also found IT infrastructure to be an insignificant contributor to the creation of an impact on the firms' SCA. The extant literature findings on ITC are contradictory, and need essential elucidation in future research in order to produce more convincing insights. IT and KM scholars have rather stressed the significance of KMC for improving organizational performance [50]. One reason for the contradictory findings of the linkage between IT and POP could be the long period that IT takes in projecting POP, and hence the mediating role of KM capabilities should be more researched in order to attain POP and SCA [8]. The extant literature posits that certain organizational resources or organizational capabilities mediate between IT resources and SCA/POP [3]. The absence of KMC can result in negative gains from the investment in IT resources. The aforementioned rationales highlight the importance of KMC as a mediating construct in enhancing the POP and SCA. When ITC enables organizations to create more business process capabilities, it clarifies, at the same time, the significant impact of business process capabilities, such as KMC on POP and SCA [8]. Thus, it is anticipated that KMC works as a mediator between IT resources and SCA. Hence, we posit the following hypotheses, based on the preceding literature support:

Hypothesis 3a (H3a). *Organizational knowledge management capabilities (KMCs) mediate the relationship between organizational IT capability (ITC) and perceived organizational performance (POP).*

Hypothesis 3b (H3b). *Organizational knowledge management capabilities (KMCs) mediate the relationship between organizational IT capability (ITC) and sustainable competitive advantage (SCA).*

2.5. Control Variables

In addition to the aforementioned determinants and mediating factors that lead to POP, other organizational characteristics that influence overall POP may exist, such as organization size and type [51]. For example, the impact of organizational ITC on POP may vary for technological organizations versus non-technological organizations. Similarly, large organizations may better

utilize their ITCs than small organizations, thereby resulting in augmented performance. Therefore, we propose these factors to be incorporated as control variables.

2.6. Conceptual Framework

The proposed relationships are summarized in Figure 1. IT capability is hypothesized to positively influence POP and SCA directly, and indirectly through KMC.

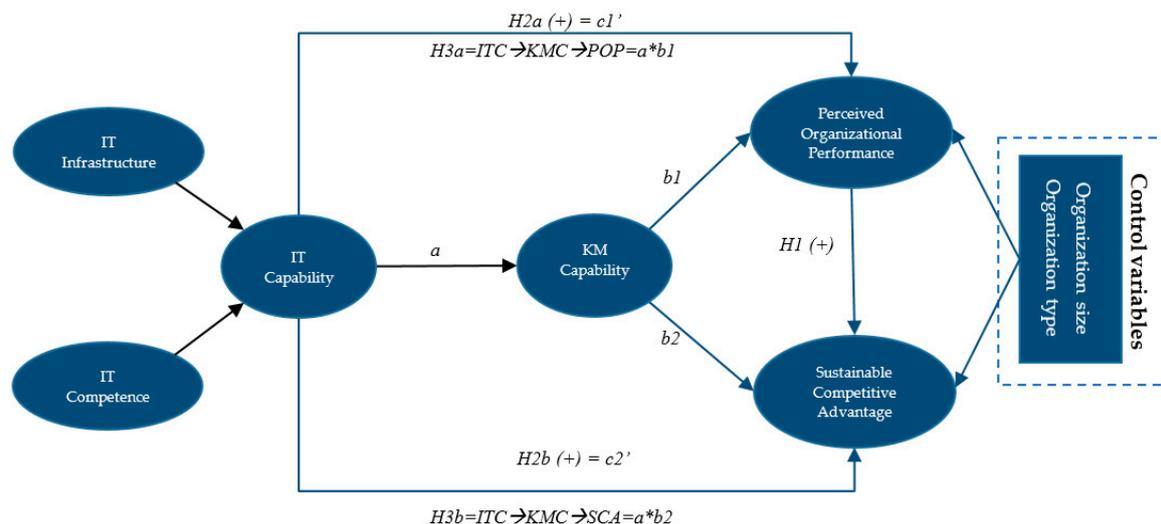


Figure 1. Conceptual model.

3. Method

3.1. Instrument

To measure the five latent constructs in the conceptual model, the scales have been adapted from well-established literature. IT infrastructure and IT competence have been measured using four items, each from [8,25,52]. Knowledge management capabilities have been measured using four items, and are adapted from [8,53]. POP has been measured in terms of organizational success, market share, growth, profitability, and innovativeness using the scale adopted from [33,46]. Finally, SCA has been measured using five items adapted from de Guimarães, Severo, and de Vasconcelos (2018) [29]. All of the items in the latent variables have been measured using a seven-point Likert scale, ranging from “strongly disagree” to “strongly agree” (see Appendix A). Before the final data collection is conducted, the scale has been pretested on a sample of 50 participants, with demographics similar to those of the final sample.

3.2. Participants

Pakistan has been selected as a field of current study, mainly for two reasons. First, the majority of the studies relating to the subject have been conducted in economically developed countries, and relatively few studies have been conducted in the emerging or developing economies. Specifically, no such study has been conducted in Pakistan. In the recent past, Pakistan has seen great development in ICTs, making it a suitable context for this research. With the profound interest in the technological shift among Pakistani IT companies, Pakistan is an adequate choice for this study. Second, the researchers had easy access to the Pakistani business firms for data collection, as Pakistan is the country of origin of the researchers.

We have collected data from IT-related as well as non-IT-related firms, such as manufacturing and services from different industrial parks in major Pakistani metropolitan cities. We focused on these sectors for two reasons: First, to abstain from the selection bias of the industry, and secondly, because of the undeniable importance of the IT capability in improving organizational performance

and SCA. Our target was to collect data from middle and senior managers, as we believe that they are very knowledgeable about the various organizational processes. Through an online survey, the purposive sampling technique was followed to record responses from the middle and senior managers of various Pakistani organizations. The respondents were informed about the goals of the study, given instructions, which were laid out in the questionnaire, and were assured of the privacy of their responses.

The targeted organizations have already adopted ICT. Hence, the respondents can share their personal experiences rather than just their expectations. Among the 365 completed surveys, 19 were discarded due to no pertinent or atypical cases. The final sample consisted of 346 responses, with 65.9% males. In this sample, more than 57.5% of the respondents were under the age of 35 years. About 60% of the respondents were private sector employees, and 73.1% were middle managers. Of the respondents, 40.2% were working in IT-related firms. The sample size is relatively small, yet these data are sufficient to run a path model in SmartPLS, with five latent constructs of 22 items [54]. Larger samples are preferable, yet in recent literature, we can find examples of similar studies, such as [8,19,36], with comparable samples. The details of the participants' demographics are presented in Table 1.

Table 1. Sample characteristics.

Measure	Item	Frequency	Percentage
Gender	Male	228	65.9
	Female	118	34.1
Age	Less than 25 years	139	40.2
	25–34 years	60	17.3
	35–44 years	57	16.5
	Above 44 years	90	26.0
Number of employees	Fewer than 100	94	27.2
	101–500	218	63.0
	More than 500	34	9.8
Organization type	Public	138	39.9
	Private	208	60.1
Position	Middle manager	253	73.1
	Senior manager	93	26.9
Industry type	IT-related	139	40.2
	Non-IT related	207	59.8
N = 346			

4. Data Analysis

We have used structural equation modeling (SEM) through SmartPLS 3.2 to assess the relationships in the conceptual model [55]. We selected SmartPLS for our analysis, because it follows the variance-based SEM approach, which is comparatively less sensitive to sample size than other applications that use covariance-based SEM approaches, such as AMOS [56]. In this study, IT capability has been conceptualized as a second-order construct in terms of IT competence and IT infrastructure. Therefore, before testing the hypothesized relationships, the reliability and validity of the first and second-order constructs were examined [57].

The construct reliability and validity values for each of the first-order and second-order constructs are presented in Table 2. The Cronbach's alpha and composite reliability measures for each of the

constructs are higher than the recommended value of 0.7 [58]. Moreover, the average variance extracted for each construct is higher than the recommended value of 0.5 [59]. Hence, the scale fulfills the reliability and validity requirements.

Table 2. Reliability and validity of first and second-order constructs.

First Order Constructs	Indicator	First Order Measures				Second Order Measures			
		Loadings	T-Values	CR(α)	AVE	Loadings	T-Values	CR	AVE
IT competence	COM1	0.83	49.50	0.89(0.83)	0.67	0.88	60.20	0.88	0.78
	COM2	0.84	44.63						
	COM3	0.84	40.66						
	COM4	0.76	27.63						
IT Infrastructure	INF1	0.87	47.17	0.90(0.86)	0.54	0.89	67.32		
	INF2	0.87	58.79						
	INF3	0.86	49.27						
	INF4	0.79	32.83						
KMC	KMC1	0.85	46.62	0.91(0.87)	0.72				
	KMC2	0.82	37.35						
	KMC3	0.86	51.16						
	KMC4	0.86	56.17						
POP	POP1	0.81	38.14	0.93(0.91)	0.74				
	POP2	0.87	65.75						
	POP3	0.86	53.53						
	POP4	0.87	66.42						
	POP5	0.88	66.97						
SCA	SCA1	0.81	37.91	0.91(0.88)	0.68				
	SCA2	0.85	53.16						
	SCA3	0.82	32.88						
	SCA4	0.82	38.24						
	SCA5	0.81	36.08						

Note: α = Cronbach’s alpha, CR = composite reliability, AVE = average variance extracted, IT = information technology.

In addition to construct reliability and convergent validity, the scale must achieve discriminant validity [59]. To establish discriminant validity, the average variance extract (AVE) for each construct should be greater than the shared variance among constructs. The square root of each of the five constructs is greater than the correlation of the other constructs, as shown in Table 3. Thus, discriminant validity is established.

Table 3. Discriminant validity of first order constructs.

Constructs	ITCOM	ITI	KMC	POP	SCA
IT Competence (ITCOM)	0.816				
IT Infrastructure (ITI)	0.561	0.845			
KM Capability (KMC)	0.456	0.553	0.838		
Perceived Organizational Performance (POP)	0.479	0.421	0.529	0.858	
Sustainable Competitive Advantage (SCA)	0.547	0.527	0.632	0.628	0.821

Note: Diagonal elements are the square root of AVE, whereas off-diagonal values are inter-construct correlations.

4.1. Hypotheses Testing

We used SmartPLS 3.2, with a bootstrapping technique, to calculate the path estimates and corresponding t-values, p-values, and confidence intervals [55]. The direct, indirect, and total effects of various relationships in the conceptual model, along with t-values, p-values, and confidence intervals,

are presented in Table 4. The results indicate that POP positively influences organizational SCA ($\beta = 0.359$, $p < 0.000$); thus, H1 was accepted. The direct effects of IT capability were significant on both POP ($\beta = 0.292$, $p < 0.000$) and SCA ($\beta = 0.279$, $p < 0.000$); therefore, H2a and H2b were accepted. ITC was also found to have a significantly effect on KMS ($\beta = 0.598$, $p < 0.000$). Furthermore, KMC significantly affected POP ($\beta = 0.344$, $p < 0.000$) and SCA ($\beta = 0.243$, $p < 0.000$).

Table 4. Path model results.

Hypothesis	Relationship	Coefficient	t-Values	p-Values	BBCI	
					Lower	Upper
Direct Effects						
H1	POP -> SCA	0.359	7.894	0.000	0.267	0.442
H2a	ITC -> POP	0.292	5.065	0.000	0.183	0.405
H2b	ITC -> SCA	0.279	5.648	0.000	0.187	0.381
-	ITC -> KMC	0.598	17.564	0.000	0.529	0.663
-	KMC -> POP	0.344	6.284	0.000	0.229	0.446
-	KMC -> SCA	0.243	4.669	0.000	0.147	0.341
-	Org_Size -> POP	0.005	0.113	0.910	-0.082	0.086
-	Org_Size -> SCA	0.042	1.132	0.258	-0.042	0.109
-	Org_Type -> POP	0.051	1.095	0.274	-0.040	0.140
-	Org_Type -> SCA	-0.010	0.262	0.794	-0.079	0.059
Indirect Effects						
H3a	ITC -> POP	0.205	5.904	0.000	0.139	0.277
H3b	ITC -> SCA	0.324	9.199	0.000	0.255	0.392
Total Effects						
-	ITC -> POP	0.498	11.500	0.000	0.412	0.579
-	ITC -> SCA	0.602	16.255	0.000	0.527	0.672

Note: ITC = IT Capability, KMC = Knowledge Management Capability, POP = Perceived Organizational Performance, SCA = Sustainable Competitive Advantage, BBCI = Bias Corrected Confidence Interval.

Apart from the latent constructs, two control variables, i.e., organization size and type, were included in the conceptual model to control their confounding effects. The results indicate that none of these variables significantly impacts POP or SCA (Table 4). The small sample size may be one of the reasons behind the insignificant effects of the covariates. Thus, caution must be exercised in generalizing these results.

4.2. Mediated Effects

To examine the mediating effects of KMC, we have examined the indirect effects of ITC on POP and SCA. The direct effect, indirect effects, and total effects of ITC on POP and SCA are presented in Table 4. The results indicate that the indirect effects of ITC on POP ($\beta = 0.205$, $p < 0.000$) and SCA ($\beta = 0.324$, $p < 0.000$) through KMC were significant. Thus, KMC mediates the relationship between the ITC and the outcome variables (i.e., POP and SCA). To identify the type of mediation (i.e., partial or full), we have observed the change in the effect size of ITC on the POP and SCA. In both cases, the total effects of ITC on POP ($\beta = 0.498$, $p < 0.000$) and SCA ($\beta = 0.602$, $p < 0.000$) were significant (Figures 2 and 3). However, after introducing KMC as a mediating variable, the effects of ITC on POP ($\beta = 0.292$, $p < 0.000$) and SCA ($\beta = 0.279$, $p < 0.000$) diminished, but remained significant. Thus, KMC partially mediates the relationship between ITC and POP, as well as that between ITC and SCA. Hence, H3a and H3b were accepted. The SmartPLS path model results are shown in Figures 2–4.

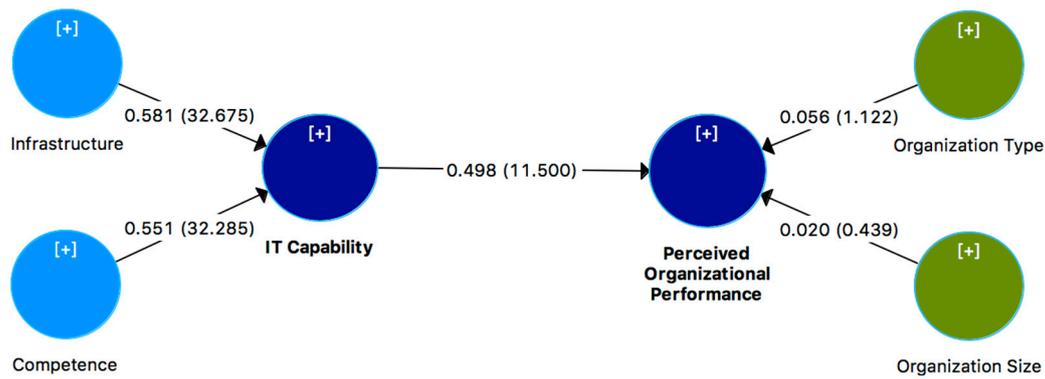


Figure 2. Total effects of IT capability on POP.

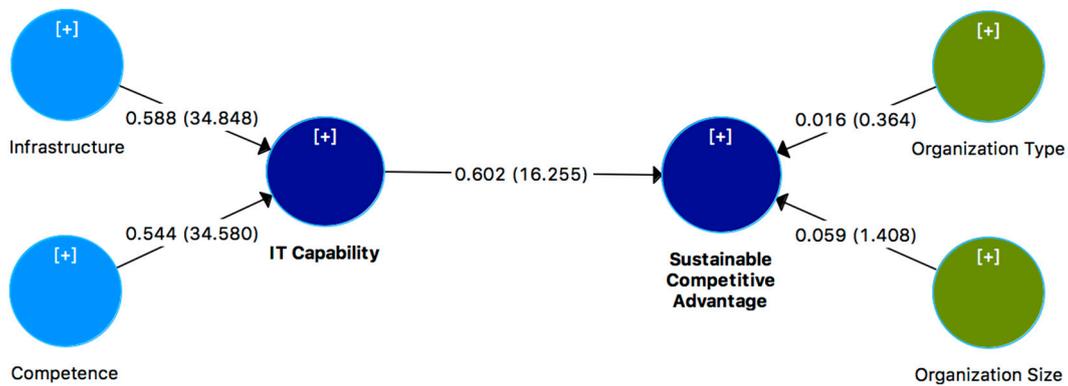


Figure 3. Total effects of IT capability on SCA.

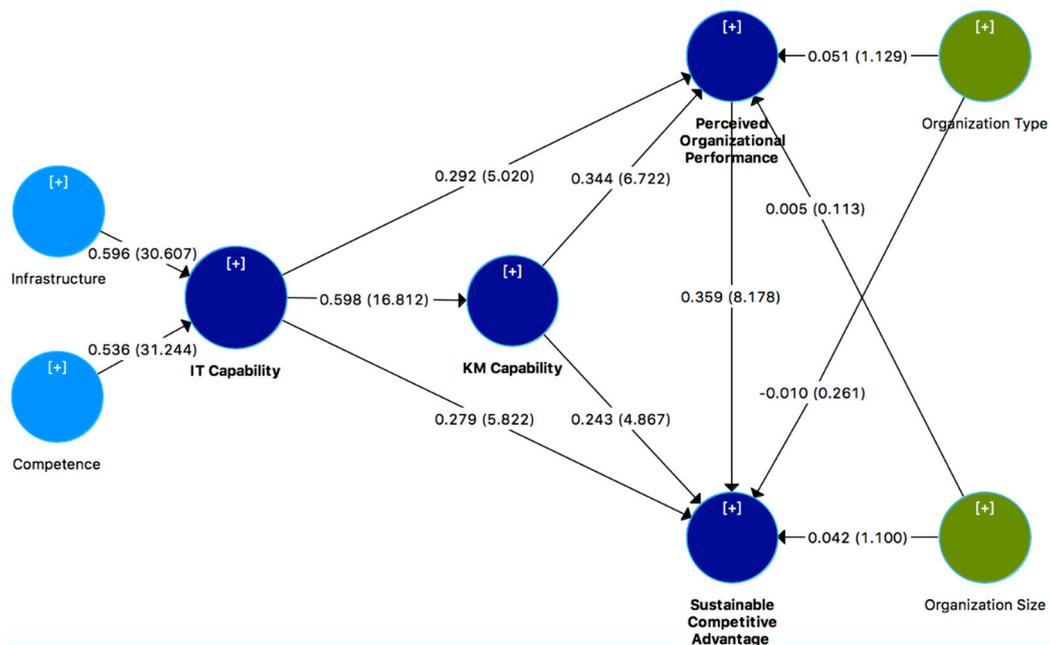


Figure 4. SmartPLS path model results.

4.3. Importance-Performance Map Analysis of Path Modeling Results

To evaluate the importance and performance of each of the predictors and mediating variables in explaining SCA, we used the importance-performance map analysis (IPMA) module of SmartPLS 3.2 [60]. Importance-performance map analysis (IPMA) allows the researcher to augment the PLS-SEM structural model results that are related to the importance of each underlying construct, with

the corresponding performance of each latent variable score on a scale from 0 to 100 [61]. We performed IPMA together with all of the direct antecedents of SCA. Among the three antecedents of SCA, ITC has significantly higher performance for the target construct, i.e., SCA over the KMC and POP, as shown in Table 5. Likewise, among the three predictors of SCA, ITC has the highest importance ($\beta = 0.603$, $p < 0.001$). This implies that ITC plays a significant role in achieving SCA.

Table 5. Importance-performance data.

Constructs	Importance	Performances
IT Capability	0.603	64.520
KM Capability	0.366	51.120
Perceived Organizational Performance	0.359	52.108

Note: Total effects are standardized values.

The importance and performance of each of the antecedents of the target construct, i.e., SCA, are graphically demonstrated in Figure 5.

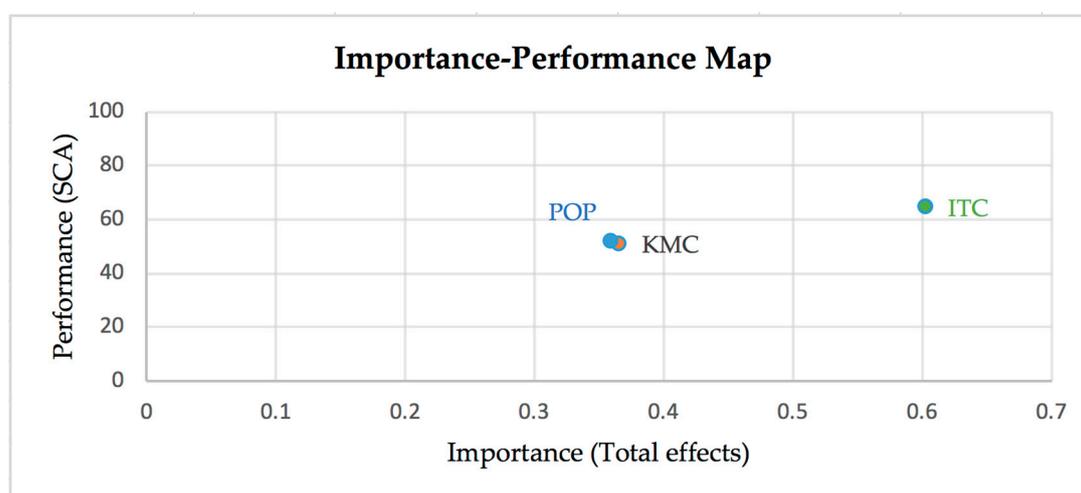


Figure 5. Importance-performance map. Note: ITC = IT Capability, KMC = Knowledge Management Capability, POP = Perceived Organizational Performance, SCA = Sustainable Competitive Advantage.

5. Discussion

Most of the studies in technology acceptance and adoption have been conducted in economically advanced countries. This study contributes to the literature by conducting this research in an emerging economy (i.e., Pakistan). This study is the first to examine the impact of organizational IT capability on organizational outcome (i.e., POP and SCA) in the Pakistani organizational context. This study also investigates the intervening role of organizational KMC on the relationship between ITC and the organizational outcome, i.e., POP and SCA.

The only by-product that organizations grasp from the innovative and competitive ITCs is, at present, the SCA. Concurrently, organizations seek to upsurge their abilities in dealing with the uncertainties that stand as obstacles to gaining SCA and catering to the rapid change in the market [13]. Moreover, KMC, which is enhanced by the adaptability of ITC, navigates organizations toward POP and SCA [12]. In making use of the advantages of ITC, KMC compels organizations to innovate very often, which creates an opportunity to create a sustainable business environment. The results suggest that, at present, organizations are required to immediately respond to any market change in order to avoid missing any opportunity enhancement and lagging behind in terms of SCA. Organizational ITCs, which are based on IT infrastructure and IT competence, can significantly impact the overall performance and SCA. Our results are in line with previous research, which shows that

ITC may lead to improved performance [17,19]. Moreover, our results find support from the extant research [8] in relation to the relationship between ITC and SCA. Our results confirm that organizational KMCs positively influence POP. This finding is in accordance with previous research [24]. We also observe a significant positive effect of KMC on SCA. Previous research on KMC and SCA also supports this relationship [9].

There exist significant direct impacts of ITC on POP and SCA. However, the mediated effect translates into greater significance. The mediated results support the findings of Melville et al. (2004), which indicate that the intermediate business processes, such as KMC, mediate between IT resources and POP. Moreover, by integrating the insights of RBV and KBV, this study also testifies to the finding of extant research studies, which argue that IT capabilities, combined with KMC, result in achieving CA [3]. This results also indicates that, by linking technology among business partners and organizations, a more clarified view of how to gain CA is obtained [19]. Thus, IT-based linkages require KM processes to create SCA effectively.

In this information age, without the smart use of ICTs in managing various organizational processes is a challenging task. Thus, the efficient use of IT is indispensable for an organization that intends to become a strategic player in this age of intense competition. The efficient use of IT may help organizational managers to improve not only their performance, but also their overall POP by improving various business processes [62]. Moreover, we also conclude that researchers working under the academic insights of RBV theory believe that firms should develop their IT aptitude to attain SCA in the market. The identification of ITCs in developing new IT infrastructure is an integral mechanism for improving internal and external efficiencies. Moreover, keeping things strategically aligned with a company's SCA is considered the moral responsibility of a firm's managerial personnel. At present, the concept of IT capability and competence should address the importance of intranet communication in firms, which can lead to innovative ideas for facilitating SCA. The deployment of IT-based technology resources helps in augmenting employees' capabilities, which contributes to POP and SCA. Lastly, we also conclude that other exogenous IT attributes should be considered in sustaining the ITC of firms. These IT attributes typically come with many opportunities and threats revolving around the organization. However, if these attributes are not addressed properly, outside threats can lead organizations toward less SCA. These IT attributes are discussed in the IS literature in different ways, such as in terms of market turbulence, competitive intensity, and technological changes, which significantly impact POP and SCA.

5.1. Implications

This research offers significant implications for organizational IT managers and policymakers. ITC plays a significant role in POP and SCA. IT managers need to develop strategies to build strong ITC through various initiatives, such as training and development. For decades now, firms have opted to adopt new technologies in their competitive business spheres. The infrastructural changes that have been observed in organizational workplaces have reshaped the strategic objectives of many firms. Infrastructural changes are mostly implemented in relation to IT, which has enhanced POP. Moreover, in the modern competitive business environment, firms are under pressure to enhance their market share. Therefore, firms should increase their ITC for the development of their performance. Firms must develop strategies to sustain CA by leveraging their intellectual assets to achieve optimal performance.

Organizations need to leverage their knowledge-based resources to develop a knowledge-based economy. Organizations may enhance their overall performance and gain sustainable CA by counting on organizational intellectual assets to offer improved and innovative products and services. Organizational managers may develop various strategies and services to add value to their products by utilizing knowledge-based resources. KM investments in various KM processes can help an organization attain SCA.

Our results specify that the KMC mediates the relationship between organizational ITC and the outcome, i.e., POP and SCA. This result highlights the importance of organizational KMC.

Thus, organizational managers should invest in developing employee KMCs. Moreover, both tacit and explicit knowledge are important and play significant roles in the performance of modern organizations. However, we believe that tacit knowledge, which is cognitive, may be more important in developing KMC. Thus, organizational managers should encourage their employees to participate in communities of practice. This recommendation will help them develop their tacit knowledge and support an active knowledge culture.

5.2. Limitations and Future Research

Although we selected a diversified sample, the respondents may not be representative of all of the organizations in Pakistan. We mainly focused on organizations that have already adopted ICTs. Thus, results may vary for those organizations that have not yet adopted these technologies, or for those that are at the initial stage of technology adoption. Moreover, these results may also vary for various organizations at different levels of ICT adoption. For example, differences may exist in employee attitudes toward technology adoption between organizations that have recently adopted ICTs, and organizations in which employees have been using these technologies for many years. Future research may draw such comparisons at various levels of technology adoption. Similarly, the results may also vary depending on organization size, i.e., small versus large organizations.

A relatively small sample is one of the limitations of this study. Future research may test the proposed model with a larger and more diversified sample to further extend the validity of the results. Future research may also expand the current framework by incorporating RBV into a firm. RBV argues that, in addition to IT resources, a number of other factors, such as organizational structure and culture, also play critical roles in POP. Thus, future research may explore the roles of these factors in the relationship between IT capability and POP. In this research, we have considered the overall mediating role of KMC. Future research may fragment KMC in terms of several processes, such as acquisition, retention, sharing, and application, and explore the mediating effect of each of these constructs.

6. Conclusions

These empirical findings have useful implications for academicians and the practitioners. The study advances the debate on the integration of the RBV and KBV of a firm by jointly investigating the ITC and KMC in order to explain the SCA. Sustainability is a major concern for both academicians and practitioners. In the recent past, ICTs have emerged as a major source of sustainability in contemporary organizations. Building on resource and knowledge-based views, this study contributes to the literature by exploring the antecedents of SCA from the perspective of an emerging economy. The study proposes a comprehensive framework by incorporating organizational ITC and KMC to explain POP and SCA. In this framework, organizational KMC has been proposed as a mediator between the ITC and the outcomes (i.e., POP and SCA). Following a quantitative research approach, we collected data from the middle and senior managers of various public and private organizations in which ICTs have already been integrated in the business processes. The results obtained from variance-based structural equation modeling confirm ITC as a major predictor of organizational POP and SCA. In addition, the mediation analysis results support the intervening role of KMC in the relationship between ITC and POP as well as between ITC and SCA.

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Appendix Instrument

IT Infrastructure [8,25,52]

1. My organization has adequate data management services and architectures.
2. In my organization, the network communication is sufficient with good connectivity, reliability, and availability.
3. My organization has the latest organizational IT application such as ERP to support various processes.
4. In my organization, IT staff effectively and efficiently coordinate the IT infrastructure and manage its relationship with business units.

IT Competence [8,25,52]

1. My organization has an adequate IT skill base.
2. The staff in my organization knows how to solve problems related to IT.
3. The staff in my organization can evaluate and control IT projects.
4. The staff in my organization have the ability to quickly integrate new IT into our existing infrastructure.

Knowledge Management Capability [8,53]

1. My organization has processes in place to distribute knowledge throughout the organization.
2. My organization has formal processes to share the best practice among the different fields of activities.
3. My organization can generate new knowledge from existing knowledge.
4. My organization has processes for using knowledge to develop new products or services.

Perceived Organizational Performance [33,46]

1. Compared with the competitors, our company is more successful.
2. Compared with the competitors, our company has a higher market share.
3. Compared with the competitors, our company is growing faster.
4. Compared with the competitors, our company is more profitable.
5. Compared with the competitors, our company is more innovative.

Sustainable Competitive Advantage [29]

1. Our revenue with new products/services is much better than to our competitors.
2. Our operation cost, during production and/or service delivery, is inferior to our competitors.
3. The profitability of new products/services is much better than our competitors.
4. Our new products/services incorporate knowledge and concepts of environmental sustainability.
5. Our new products/services are produced and offered respecting the entrepreneurial social responsibility precepts.

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