Sustainable Open Innovations

Subjects: Business
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A major significant contribution of the open innovation paradigm is the ability or opportunity for firms to share knowledge and learn to improve on their innovative activities through sourcing of external knowledge or the utilization of the abundant pool of knowledge within the firm. This flow of the most important factor in the open knowledge economy, however, needs focus and institutional backing. Properly designed institutions induce innovation as a matter of competitive necessity. However, weak institutions make transactions within and across firms uncertain and costly, which restricts exchange possibilities.

Keywords: institutional quality ; open innovations ; emerging economy ; capacity utilization analysis

1. Introduction

The implementation of inbound open innovation instruments requires trust in leadership to explore novel knowledge, which promotes innovation by exploration and integration of external knowledge for technological development and exploitation [1][2]. Inbound OI may be most suitable for coping with a complex problem related to knowledge sharing and, therefore, represents a particularly critical aspect of firms' innovation-related activities and process innovation [3]. Leadership shaped by quality of institutions promotes the knowledge search of firms. More so, institutional quality influences firms to open up, to absorb external knowledge for innovation. This is shaped by government institutions, with reasonable pressure through regulation and institutions to influence firm process innovation [4][5][6]. When the institutional quality is high, firms can utilize their capacity, leading to firm innovation performance [7][8][9].

Both the exogenous and endogenous economic growth theories have argued for the solitary role of technological change as a key determining factor of economic growth [10][11][12]. Of general concern however is the impact of institutions, which has seen less attention most importantly in the advent of the open innovation concept. Baumel [13] has argued that differences in institutions play major roles in the economic performance of countries. Bekana [14] also alluded to this postulation that institutional quality influences innovation (see also [15]). The open innovation concept requires a structured framework to thrive, which makes it congruent with the views of the institutional economists. For the institutional economists, institutions serve as a catalyst for growth and sustainability. They influence the values as well as the behavior of economic actors [16]. To this end, quality institutions supposedly lead to capacity utilization as well as create an enabling atmosphere for the adoption of open innovation instruments, which result in the improvement of process innovation of the firm.

Despite the fact that the lack of quality institutions poses a momentous barrier to firm-level innovation, especially for developing countries with emerging economies, to the best of our knowledge, there is a lack of studies analyzing developing economies such as sub-Saharan African countries. This may also be due to the unavailability of relevant current data, whereas these countries have long been perceived as those mostly deficient in the rule of law, with poor regulatory quality and a great deal of corruption. Therefore, there are only a few examples of such studies. For example, Barasa et al. [17] used clustered robust standard errors logistic regression to model firm-level resources' interface with regional institutional quality in East Africa and showed that the institutional environment dictates the effect on firms' resources, observing a positive moderate effect of institutional quality on firm-level resources. Their findings support those of [18], who found that national governance quality moderates the link between firms' internal capabilities and performance in Africa, championing the need to strengthen institutions. It was [19] that made an interesting observation of how firm characteristics such as size and age influence the effect of the institutional environment on firm exportation in emerging economies. Whereas small firms enhance their innovation activities and performance within a very robust and working institution, large companies may be less hit by their deficiencies due to their influence and network allowing them to circumvent the system to their benefit. The analysis looked at input variables of firm innovation alone while completely overlooking the output or outcome variables of innovation. Furthermore, the paper focused on firm export performance

while ignoring the very important element of firms' ability to export efficiently, such as utilizing their capacity, and the crucial role of inbound open innovation.

2. Determinants of Sustainable Open Innovations—A Firm-Level Capacity Analysis

2.1. Inbound Open Innovation Instruments as Predictors of Firms' Innovation

Innovation is an important part of organizational development and strategic retention, enhancing competitive advantage and ensuring sustainability and economic success [20][21]. Collaborating with external partners is crucial in the context of open innovation [22][23] when it comes to social, organizational, and ethical challenges [24][25]. A high level of external collaboration with partners (customers, suppliers, and research institutions) is one of the most important skills that enables firms to engage in sustainable (eco-) innovations [26] that are crucial for sustainable development. According to Naqshbandi et al. [2], leadership trust is important for OI, as is the autonomy of employees to take the initiative in exploring and evaluating novel knowledge. These factors create a recipe for the implementation of inbound OI instruments, which involves the acquisition and leveraging of external inputs (e.g., R and D, knowledge, and other intangible assets such as trademarks, copyrights, and patents) for new product development [27]. It refers to the practice of exploring and integrating external knowledge for technological development and technology exploitation [1]. These practices enable firms' quick responses to market demands in the final use stage and supports their absorptive capacity [28][29].

Inbound OI may be most suitable for coping with a complex problem related to knowledge sharing and, therefore, represents a particularly critical aspect of firms' innovation-related activities and process innovation [3]. For example, ref. [30] research on Nigerian SMEs in the oil and gas industry found that inbound OI positively and significantly influences the financial performance of SMEs. Similarly, ref. [31] showed that inbound OI strategies, such as collaborative partnerships with suppliers and customers, are mainly preferred in the case of low-tech SMEs in Ghana.

2.2. Institutional Quality Indicators and Their Role in Enhancing Firms' Innovation

Nowadays, institutions such as governments are progressively putting pressure on businesses to reconsider their business processes in terms of sustainability [32][33]. As a result, businesses are being driven to look for innovative ways to integrate associated aspects of sustainability in terms of organizational performance and environmental resilience [34]. On the one hand, efficient and properly designed institutions can encourage the introduction of variance to the market in the form of innovation as a matter of competitive necessity, while simultaneously stimulating productive behaviors [17][35]. On the other hand, weak institutions often lead to unproductive behaviors. For example, in developing economies, weak institutions make transactions within and across firms even more uncertain and costly, further restricting the range of exchange possibilities [36]. This is in addition to the fact that developing countries are faced with development challenges and must build capacity to achieve sustainable growth, combat corruption, and attract foreign direct investment [37]. The current literature examines the relationship between institutional quality and firm innovation [7][8]. For example, ref. [6] demonstrated the importance of institutions and national economic systems in explaining OI in different contexts. However, with the growing importance of this issue, the question of how to use indicators to measure institutional quality is also growing. Therefore, the number of institutional quality indicators has been expanded.

According to [38][39][40], the tax system indicator and tax administration were used to express institutional quality. On the one hand, a tax system not only provides the necessary resources to build high-quality institutions, but also enables the consolidation of a social contract that gives rise to a more demanding relationship between the state and its citizens [41] [42]. Therefore, taxes represent a crucial variable that affects the institution's capacity to promote efficient equilibria that achieve the maximum social returns permitted by the technological frontier and the legitimacy of institutions. In [43][44], the importance of the rule of law and compliance with regulatory architecture was stressed. It includes an operational, corruption-free, and autonomous judiciary that is able to enforce the law as well as a court system to adjudicate matters concerning certain practices of entrepreneurs and government authorities impairing the operation of SMEs. The author of [16] used the World Bank's Worldwide Governance Indicators as a proxy for institutional quality in the case of OECD countries. He showed that innovation is positively related to voice and accountability, political stability, the absence of violence, and the rule of law, while it is negatively related to the control of corruption; these factors were used to analyze institutional quality in several previous studies.

Corruption differs across countries and may have significantly different effects [45][46][47]. The authors of [48], for example, focused on firms operating in emerging economies (including Morocco) and showed that greater corruption relates to greater capital expenditures. However, they did not find significant results on innovation for emerging economies. Meanwhile, ref. [49] argued that corruption is a key determinant of regulation quality. In the case of African countries, ref.

[17] stated that regional institutional quality plays an important role for firm-level innovation and showed great variation in regional institutional quality in Africa. Study [50] demonstrated that government policy and management strategy barriers are (i) designed to make innovation impossible and (ii) considered to be the most stringent by domestic firms in Morocco.

2.3. Influence of Institutional Quality on Firm Openness

Moreover, a number of studies [4][5][6] have found that institutional pressures also shape the extent of the external knowledge search (firms' openness) that firms can undertake and how this knowledge can be captured for innovation; government usually is the entity wielding the pressure. Study [51] posited that normative pressure associated with regulation and institutions positively influences the likelihood that firms will engage in innovation activities, specifically in environmental innovation. Such pressures, which include political pressures and legal coercion or strict regulations and enforcement, are viewed as determining the openness of firms to external knowledge for innovation [6].

These findings suggest that when governmental institutions work with positive intent and put reasonable pressure on firms, they largely influence firms' innovation behavior [52]. Specifically, for manufacturing firms, a series of compliance regulations and standards in products, including environmental protection regulations, is mostly imposed and thus prevalent. However, firms may respond differently to a given institutional pressure when subjected to the same regulations [53] due to their location, affiliation, and so on.

Study [54] conducted a cross-sectional analysis of firms in nine European Union countries and found that institutional pressure emanating from regulatory pressures serves as an incentive for product and process energy efficiency innovation of firms.

The authors of [17] found that regional institutional quality moderates the effect of firm resources on innovation. They examined the moderating role of institutions with regard to the transformation of firm-level resources, including internal R and D, human capital, and managerial experience, into innovative outputs using firm-level data from the WBES and the Innovation Follow-up Survey for three countries in East Africa: Kenya, Tanzania, and Uganda. In an earlier similar study, the authors of [55] examined how cooperation with universities and research institutes impacts the ability of Chinese emerging market enterprises to develop innovations. The results of their analysis of the evolution of institutions across sub-national Chinese regions revealed that sub-national institutional variations have a profound impact on the relationship between academic collaborations and firms' innovation performance. However, their analysis failed to touch on institutional quality.

2.4. Institutional Quality, Capacity Utilization, and Firm Innovation Performance

As we have already demonstrated, the quality of institutions affects the utilization of firms' resources, which enables firms to use their internal capabilities and resource base for the efficient creation of innovation. However, as the authors of [9] showed, in their assessment of more than one hundred countries across the globe, the quality of institutions (expressed by corruption and informal competition) influences capacity utilization. They concluded that institutional quality weakens firm capacity maximization; in particular, corruption shows the weakness of external institutions (government institutions). In the case of Zambia, a study [56] involving microenterprises sought to ascertain whether corruption was a more or less serious problem for registered firms, but concluded that unregistered firms are as susceptible as registered firms to pay bribes. However, government officials' corruption activities may discourage the registration of a firm [57][58] even to the extent of delays when managers refuse to grease the palms of corrupt bureaucrats, leading to a reduction in firm capacity utilization. To a great extent, officials' strong, fair, and professional attitudes, which signal the quality of the institutions they represent, have enormous influence on not just the firm's capacity utilization, but also—and most importantly—its process innovation.

In addition, firms' effective and efficient use of capacity affects their process innovation. Inefficiencies associated with government institutions may create higher transaction costs, which in turn hinders firms' utilization capacities, as [7] argued that they reduce the firms' ability to use productive resources optimally. Thus, firm input allocations suffer, thereby plunging firm capacity utilization [9]. This means that a firm's capacity utilization has a direct effect on its innovation performance.

Figure 1 illustrates the conceptual model and indicates the stated hypotheses based on the strand literature reviewed herein.

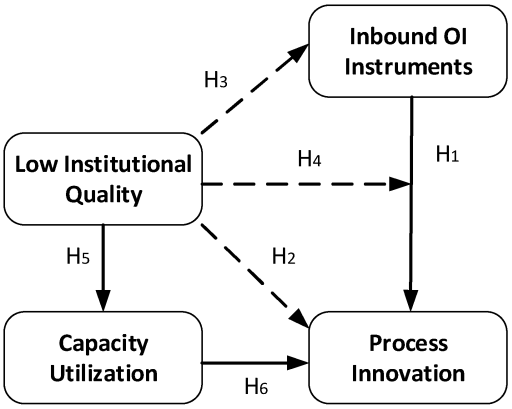

Figure 1. Conceptual Framework. Solid lines indicate positive effects; dashed lines indicate negative effects.

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