Antecedents and consequences of open innovation: a conceptual framework

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Received 7 March 2022
Revised 30 August 2022
Accepted 9 November 2022

Abstract

Purpose – Entrepreneurship across sectors has been impacted by the paradigm of open innovation in the last few decades. Although Open Innovation is argued to impact firm performance the strategic building blocks of open innovation are not discussed in the prior literature. This study aims to conceptualize open innovation and identify the antecedents and outcomes of open innovation.

Design/methodology/approach – Using a qualitative study based on open-ended essays solicited from 47 SMEs and startups based out in Europe and the USA, the authors propose an overarching conceptual framework using a theoretical sampling approach adopted to establish data saturation and data analysis was carried out using thematic coding. Market place evidence was used for triangulation of the authors' research framework and to establish the validity of the constructs.

Findings – Building on the entrepreneurial bricolage theory, this study proposes bricolage and Platformization of innovations as antecedents to open innovation. The study also conceptualizes open innovation by identifying three underlying dimensions for open innovation. Next, the study proposes a positive association between open innovation and firm performance. Finally, the authors discuss relevant implications with future research directions of the study.

Practical implications – The practical implication is the development of a sustained competitive advantage enhancing framework for entrepreneurial ventures with the help of open innovation.

Originality/value – With the application of the developed framework for the entrepreneurial ventures, a set of strategic activities related to open innovation can be proposed that would help these ventures to enhance their innovation and marketing capabilities, thereby helping them with a sustained competitive advantage. The present study would also help the policymakers to frame policies that help the firms with a shift toward open innovation.

Keywords Bricolage, Platforms, Platformization, Open innovation

Paper type Research paper

1. Introduction

Small and medium enterprises (SMEs) and start-ups are often constrained by a lack of resources such as capital, managerial prowess, infrastructure and technology to name a few (Acs and Audretsch, 1987; Taymaz and Üçdoğruk, 2009). According to the statistics released by the US Bureau of Labor, more than 50% of SMEs fail to scale and so exit the business within five years of inception (Otar, 2018). In response, SMEs and start-ups adopt

International Journal of Entrepreneurial Behavior & Research

1355-2554
DOI 10.1108/IJEBR-03-2022-0235

resource-construction strategies such as open innovation to generate and maintain growth (Chesbrough and Bogers, 2014). Open innovation is defined as a resource construction strategy whereby SMEs and start-ups can make use of both internal and external ideas to innovate despite limited time and resources (Chesbrough and Bogers, 2014; Enkel *et al.*, 2009). Chesbrough and Bogers (2014) defined open innovation as "*a process that is based on purposefully managed streams of knowledge and disseminated across firm boundaries*." Open innovation provides insights into how firms can harness inflows and outflows of knowledge to succeed with their innovation processes (Enkel *et al.*, 2009).

Although open innovation is an established industry practice and has recently come to the attention of academics, our current understanding of how open innovation can help SMEs and start-ups overcome the lack of resources is limited (Albats *et al.*, 2020). With more and more SMEs and start-ups taking up the practice of open innovation, it is imperative that business leaders develop a thorough understanding of the process before attempting to enact it. Despite this pressing need, present literature on the topic suffers from two key research gaps. First, it has not offered a comprehensive discussion of the various building blocks of open innovation, instead focusing on specific aspects in isolation without considering the overarching framework into which those pieces fit (Beck *et al.*, 2022). As a result, there is a noted call for deeper conceptualization of open innovation (Fisher and Qualls, 2018). Second, prior literature has not yet examined the different antecedents and outcomes of open innovation in the context of SMEs and start-ups.

The present study seeks to address these two research gaps with respect to the implementation of open innovation by SMEs and start-ups. To do this, we adopt a grounded theory approach paired with a qualitative research design in order to propose a conceptual framework for the open innovation process followed by these businesses. We propose three underlying dimensions (outside-in value identification, value co-creation and creative problem-solving), identify two key antecedents (entrepreneurial bricolage and platformization) and consider three major outcomes (innovation capabilities, marketing capabilities and sustainable competitive advantage) of the open innovation process followed by SMEs and start-ups. These findings not only further our understanding of open innovation as a practice but also present a clearer picture of how open innovation helps SMEs and start-ups to build their innovation and marketing capabilities and generate competitive advantage. Furthermore, this study advances theoretical propositions to explain the association between antecedents and outcomes of open innovation and presents relevant implications for both theory and practice.

First, we conceptualize open innovation as a multi-dimensional construct and define it as *a creative problem-solving approach rooted in the principles of value co-creation and outside-in value-identification*. We contribute to the bricolage literature by identifying bricolage as an important antecedent of open innovation and finding that the platformization of technology works in tandem with entrepreneurial bricolage to help resource-constrained entrepreneurs manage the open innovation process (QGurca and Ravishankar, 2015). We find that resource-construction through open innovation requires a particular balance of entrepreneurial bricolage and platformization – while entrepreneurial bricolage helps SMEs and start-ups overcome resource constraints by re-constructing and optimizing available resources, platformization strategies provide access to resources that exist outside of the organization. A combination of these two strategies allows SMEs and start-ups to implement open innovation more efficiently. We further contribute to the open innovation literature by identifying positive outcomes of open innovation such as improved innovation and marketing capabilities and the development of a sustainable competitive advantage.

Section 2 presents the theoretical background of our investigation and reviews the literature related to bricolage, platformization and open innovation. Sections 3 and 4 present our methodology and findings, respectively. Section 5 discusses the findings and identifies their implications. Section 6 reviews the limitations of this study and proposes directions for future research.

2. Literature review

2.1 Open innovation

Business innovation is a well-researched concept that has been discussed and defined along many axes. Academic literature has focused on process and product innovation, incremental and radical innovation, component and systemic innovation, push and pull innovation and – more recently – closed and open innovation (Lee *et al.*, 2010). Open innovation has come to be understood as a novel approach to systematizing innovation and constructing resources. Chesbrough and Bogers (2014) point out the novel logic behind open innovation, which makes use of external knowledge and ideas in addition to internal R&D (see also: Badawy, 2004; Chesbrough, 2003). Traditional innovation models tend to center closed innovation and are largely internally focused and so have been non-receptive to outside ideas and technologies (Herzog and Leker, 2010). Conventional innovation within organizations emphasizes in-house idea-generation and capitalizes on the creative and intellectual capabilities of internal employees, but it is believed that organizations who practice this model of innovation tend to come up short for the simple reason that most businesses are not equipped with the necessary workforce, clientele, technologies and skills. It is therefore necessary for businesses to enter into collaborative relationships with other actors such as suppliers, customers, research institutes, contractors, universities, competitors, start-ups and public institutions (Del Vecchio *et al.*, 2018; Zanjirchi *et al.*, 2019). Such partnerships enhance a company's ability to respond to the complex and dynamic demands of modern markets and construct new resources without relying on direct investment (Nunes and Abreu, 2020).

Open innovation embraces interoperability to pull from network dynamics to create novel products and services (Tammela and Salminen, 2011). It is based on the notion that conventional boundaries must occasionally be overlooked in order to utilize technological knowledge and resources that are only available externally to an organization (Holgersson and Granstrand, 2017). Current literature classifies open innovation as either inbound or outbound. Inbound open innovation requires an organization to be receptive to ideas and technologies developed by external sources and it allows ventures to license out new technologies without developing them in-house (Bogers *et al.*, 2017). For example, the pharmaceutical industry employs an inbound open innovation approach by encouraging a plethora of opportunities for entrepreneurial ventures in the field of biotechnology (Nambisan *et al.*, 2018). In this way, established companies can benefit from the findings and achievements of smaller and more specific organizations. Outbound open innovation, by contrast, occurs when existing organizations share their resources or technologies with one another and with newer organizations, thereby allowing entrepreneurs to advance their own offerings.

According to prior literature, open innovation – particularly in the case of SMEs – provides the ability to seize a multitude of opportunities arising from external sources (Cohen and Levinthal, 1990). It is believed that increased access to scientific resources, knowledge, information and ideas improves an organization's innovative capacity, thereby reducing costs and generating value (Saebi and Foss, 2015). External partners contribute to the innovation process by offering up resources and capabilities which may differ from those of the innovating business, hence generating a *resource bricolage* (Mahajan and Clarysse, 2013). Open innovation requires SMEs and start-ups to build superior networking capabilities with external stakeholders and make use of their networks in the innovation process, a phenomenon referred to as *network bricolage* (Baker and Nelson, 2005). Collectively, network bricolage and resource bricolage are referred to as *entrepreneurial bricolage,* a practice that we propose contributes significantly to the open innovation process in the context of SMEs and start-ups.

While many SMEs may have the advantage in terms of new technology, they often struggle to scale production and lack sufficient channels for marketing and networking, all of which are important to enter the market (Narula, 2004). In addition to entrepreneurial

bricolage, the literature has also identified *platformization* as a resource-construction strategy for SMEs (Nambisan *et al.*, 2018). Platformization refers to the use of open-source or licensed technologies that act as building platforms and create customized solutions (Nambisan *et al.*, 2018). The process of platformization entails shifting focus from the components and/or technologies of distinct products and services to platforms that act as mediators where transactions are carried out and value is created (Nambisan *et al.*, 2018). Scholars in this field argue that platformization enhances the performance of entrepreneurs and SMEs (Hsieh and Wu, 2019; Santoso *et al.*, 2020; Zhang *et al.*, 2021) by supporting easier access to customers, as well as to other actors who can contribute to problem-solving for the company (Milutinović *et al.*, 2018). Therefore, we conceptualize entrepreneurial bricolage and platformization as the two key building blocks of open innovation.

2.2 Entrepreneurial bricolage

It has been found that a majority of entrepreneurs experience significant resource constraints (Shepherd *et al.*, 2000). Entrepreneurial bricolage literature suggests that businesses frequently face resource constraints and lack the organizational structures, hierarchy, organization and networks to acquire those resources (Barkey and Godart, 2013). Entrepreneurial bricolage is often employed as a solution to these problems, as it fosters innovation by utilizing what resources *are* available in creative ways (Gundry *et al.*, 2011). Several authors view entrepreneurial bricolage as a practice that enables entrepreneurs to tackle resource-related challenges head-on (Baker and Nelson, 2005; Brush, 2001; Duymedjian and Rüling, 2010). Entrepreneurs who engage in this practice are able to shift their focus away from the time-consuming process of attracting investments (Brush, 2001) and concentrate instead on constructing new and necessary resources from the resources that are already available to them (Duymedjian and Rüling, 2010). Such a shift helps the business develop strategies to effectively respond to uncertainties in the market (Baker and Nelson, 2005) and ventures that employ entrepreneurial bricolage tend to not only survive adverse conditions but also flourish in them (Baker and Nelson, 2005).

According to Linna (2013), entrepreneurial bricolage is a practice that takes place unconsciously due to its sheer necessity, as it is often employed by SMEs and entrepreneurs as an immediate response to resource limitation. In line with Linna (2013), Guo *et al.* (2018) and Witell *et al.* (2017) posit that entrepreneurial bricolage helps entrepreneurs to recreate through their limited resources and leads to novel opportunities for combining the resources and creating further possibilities. In fact, entrepreneurs generally appear hesitant to rely on standard resources [1] due to their scarcity. According to Winkel *et al.* (2013), bricolage is an important and relatively reliable business strategy for entrepreneurs: It enables companies to better respond to unforeseen circumstances (Cunha, 2005; Winkel *et al.*, 2013) and provides access to social capital (Bhatt and Altinay, 2013; de Klerk, 2015; Valliere and Gegenhuber, 2014). To utilize bricolage successfully, entrepreneurs often develop a deep understanding of the resources on which they rely (Baker, 2007) in order to devise strategies for overcoming resource constraints (Pierce *et al.*, 2013; Varrichio *et al.*, 2012). The benefits of entrepreneurial bricolage are therefore quite widespread to all involved. Through the amalgamation of skills, abilities and innovative processes (Öberg, 2013; Potts, 2011), companies can create a competitive advantage and ensure that all partners reach their desired goals.

2.3 Platformization

The process of open innovation has benefited from the increasing platformization of technologies both at the hardware and software levels. As mentioned above, platformization refers to the use of various technologies that act as creative platforms and can be used to create customized solutions. These platforms facilitate communications with customers and

other actors who can contribute to problem-solving (Milutinović *et al.*, 2018). Such platforms interact with open innovation to create an ecosystem that supports communications with external entities (Altman and Tushman, 2017) and enhances value co-creation by building on a company's capabilities (Abbate *et al.*, 2021; Ben Arfi *et al.*, 2019; Rho *et al.*, 2020). SMEs often use platformization to create and access necessary resources (Nambisan *et al.*, 2018) as well as create value and conduct transactions (Nambisan *et al.*, 2018). Researchers often agree that platformization improves the performance of entrepreneurs and SMEs (Hsieh and Wu, 2019; Santoso *et al.*, 2020; Zhang *et al.*, 2021) by allowing easier access to both resources and people (Milutinović *et al.*, 2018), augmenting the innovation ecosystem through the sharing and allocation of resources and fostering a culture of cooperation and joint problem-solving (Zhao and Yi, 2021). In general, platforms enable a multitude of dialogues and emphasize the interaction and communication between various actors (Parjanen and Rantala, 2021). Specifically, such platforms can bring various organizations and resources together in the project of idea-generation during open innovation (Hossain and Islam, 2015). According to Raunio *et al.* (2018), platforms orchestrate responsive and user-centric innovation by creating new and better spaces in which these interactions can occur.

3. Method

We carried out a qualitative study to investigate the nuances of implementing open innovations among SMEs and start-ups. A qualitative study was deemed appropriate for this study first because no established scales for the quantitative measure of open innovations and their outcomes were found and also because a qualitative approach could be used to achieve our three primary objectives: (1) to identify the underlying dimensions of open innovation from the perspective of SMEs and start-ups; (2) to identify key antecedents to the practice of open innovation by SMEs and start-ups; and (3) to identify outcomes of open innovation experienced by SMEs and start-ups. We used open-ended essays – wherein respondents answer structured questions without any predetermined answer sets and are encouraged to provide both detail and examples – to collect qualitative data as this method is a well-established tool recommended for in-depth qualitative insights (Dhir and Tsai, 2017; Gendall *et al.*, 1996; Malodia *et al.*, 2021; Talwar *et al.*, 2020). It is argued that open-ended essays allow participants to share their opinions more freely and hence generate data with a high degree of diversity (Allen, 2017). The use of open-ended essays would therefore enable us to develop a holistic and comprehensive conceptualization of open innovation and platformization in the context of SMEs and start-ups.

3.1 Identifying the participants

Research participants were identified and recruited in several stages. First, unstructured interviews were conducted to investigate the field and draw on the experiences of academic and industry experts to gain a deeper understanding of the topics in question. These in-depth interviews enabled us to identify the core issues related to various stakeholders and prepare questions for subsequent interviews with entrepreneurs, wherein we sampled entrepreneurs based on three qualifying criteria. Participants must (1) be aware of open innovations and platformization; (2) have already carried out open innovation in their business, or else have concrete plans to launch an open innovation project; and (3) have been operating a start-up or SME for at least five years. These qualifying criteria were enforced to ensure that participants had sufficient experience with the relevant processes to be able to share how they constructed their meanings. We reached out to the identified target sample using the Prolific platform. Prolific is an established data-collection platform that supports both qualitative and quantitative research with an extensive panel of high-quality respondents from

diverse backgrounds. We conducted a screening study to recruit participants and obtained a sample of 513 respondents who matched our desired criteria. From this pool, we successfully recruited 47 SME and start-ups entrepreneurs from the USA and UK to participate in the main qualitative study.

3.2 Qualitative data

We used an open-essay approach to collect primary data because open-ended essays allow participants to think and respond with detailed explanations and examples. For this purpose, we developed broad and open-ended questions such as:

> Do you believe in open innovation culture?
>
> Have you ever undertaken an open innovation project in your start-up/business for innovations?
>
> Kindly discuss using suitable examples as to how open innovation has helped you in idea generation and generating insights.
>
> According to you, what are the different tangible benefits of open innovation for your business? Please discuss it using suitable examples.

The open essays were informative and valuable in understanding both macro and micro aspects of open innovation and platformization. The interview protocol aimed to explore the following questions.

(1) How do SMEs and start-ups understand open innovations and platformization?

(2) How are open innovations executed in the context of SMEs and start-ups?

(3) What are the underlying dimensions of open innovation and platformization?

(4) How do open innovation and platformization result in entrepreneurial bricolage?

(5) How SMEs and start-ups benefit from entrepreneurial bricolage?

3.3 Data analysis

Our thematic analysis adopted the Gioia approach (Gioia *et al.*, 2013) to conceptualize the complex phenomena of open innovation and platformization. This method led to the identification of the underlying sub-themes and more clearly defined open innovation and platformization. A panel consisting of two academics, two research associates and an industry expert carried out the thematic analysis. The themes were extracted by analyzing the texts of the participants' interviews and classifying them into suitable dimensions. Zero-order items were identified by carrying out open coding, first-order constructs were identified by carrying out axial coding and selective coding was used to identify second-order constructs. The selective coding led to the identification of three underlying dimensions of open innovation, namely "outside-in value-identification," "value co-creation," "creative problem-solving," and two sub-dimensions of platformization: "off-shelf products" and "open-source technologies." Through this coding we also arrived at a conceptualization of entrepreneurial bricolage based on two sub-constructs, "resource bricolage" and "network bricolage," and finally identified three outcomes: "marketing capabilities," "innovation capabilities," and "sustainable competitive advantage." The results of the thematic coding are presented in Table 1. After these identifications, we consulted with a panel of three academic experts to review our coding and determine the inter-relationships among the second-order constructs. A visual depiction of the theoretical framework we arrived at in the course of this panel meeting is displayed in Figure 1. The inter-rater coding reliability was assessed by two academic scholars and the inter-rater reliability estimates indicated satisfactory reliability kappa value = 0.82 (Artstein and Poesio, 2008) (see Table 2).

Zero-order	First-order	Second-order
I can invite good ideas and insights by involving external people	Outside-in value identification	Open Innovation
Brainstorming and collective evaluation of pros and cons		
Collaborating with customers for technology co-development and improvement		
I could understand the problem from the consumer's perspective		
Partnering with colleges and universities and conducting business case competitions	Value co-creation	
Hackathons help design the products and services		
Design competitions		
Joint sessions with different stakeholders		
It promotes out-of-the-box thinking	Creative problem solving	
Helped me generate a wide range of possible solutions in a concise time		
Looking to individuals outside the focal firm for answers to problems		
Increasing choice with a large number of viable options for business problems		
Using 3D printers for designing	Off-shelf products	Platformization
Used AR-related products available in the market		
Used crypto and NFTs for innovation		
Used PVC-like material for creating vegan leather		
Linux allows a highly portable and scalable operating environment on which to base the tech stack	Open-source technology	
Hadoop was used for processing our customers' data		
I use alchemy to create my brochures		
We use a lot of open-source modelling software		
Helps in building capacity at a low cost	Resource bricolage	Entrepreneurial Bricolage
Open innovation helps in acquiring resources quickly		
Open source technology results in optimizing funds		
Can quickly get collaborators	Network bricolage	
External sources generate a strong network and connections with suppliers, channel partners etc		
External collaboration is a good source of knowledge exchange and network building		
We can quickly find new stakeholders and build teams		
Build competencies with the heterogeneity of viewpoints and exposes innovative ideas	Innovation capabilities	Outcomes
A collaborative environment leads to top-quality ideas that challenge the status quo		
Brand image and credibility	Marketing capabilities	
Improved service delivery, improved performance and speed		
Create customized value for customers		
Increased potential profits	Sustainable competitive advantage	
First mover advantage		
Gaining an edge on our competition and improving bottom-line		

Table 1.
Thematic coding

4. Results of data analysis

The results of the qualitative data analysis are discussed in the following order. First, the conceptualization of entrepreneurial bricolage is discussed along with supporting evidence from the data. Second, the antecedents of entrepreneurial bricolage – including open

innovation and platformization – are identified and explained. Third and finally, the reported outcomes of entrepreneurial bricolage are presented.

4.1 Conceptualizing open innovation

Based on our data, we conceptualize open innovation by identifying three underlying dimensions: (1) outside-in value-identification, (2) value co-creation and (3) creative problem-solving.

4.1.1 Outside-in value-identification. The term outside-in value-identification refers to an idea-generation approach that is driven by customer-centricity. The outside-in orientation places the greatest emphasis on external competencies and resources for building business capabilities and competitiveness (Saeed *et al.*, 2015). In this approach, consumer insights and experiences are captured from the perspective of an outsider that is independent of the business's structure and operation (Inauen and Schenker-Wicki, 2011; Mazzola *et al.*, 2012). Evaluation of the consumer's insights constitutes an embrace of ideas and knowledge that are obtained from external sources, not as a replacement for internal R&D, but in conjunction with it (Chesbrough, 2003).

Innovation literature has long stressed the significance of customer and market orientation as external factors that may enhance a firm's innovativeness (Calantone *et al.*, 2010; Grinstein, 2008) and prior research has also argued that the extent of market orientation is positively correlated to the firm's innovativeness (Frambach *et al.*, 2003; Grinstein, 2008; Tyler and Gnyawali, 2002). Along this line of thought, one of the respondents recalled:

> Open innovation culture is extremely inspiring. We involve our customers and other stakeholders in our innovation process and hence benefit me and my business with the creation of new products that are desired by the target customers. [Respondent #45]

Furthermore, it is argued that an outside-in approach enables entrepreneurs to gain a competitive advantage by giving them a greater understanding of customer needs than their competitors have and providing opportunities to build long-lasting relationships with various stakeholders (Day, 1994). An outside-in approach to identifying value generates insights about both explicit and latent needs, improves understanding of the strengths and capabilities of competitors and leads to novel marketing strategies (Narver and Slater, 1990; Tallman, 1991). For example, in a study on entrepreneurial growth in Singh and Prasad (2014) found that customer-oriented businesses are more likely to attempt to identify competitive innovation strategies.

Prior literature has argued that the outside-in approach significantly affects innovation outcomes (Atuahene-Gima, 1995; Baker and Nelson, 2005; Kahn *et al.*, 2001). In a meta-analysis study, Kirca *et al.* (2005) found that the outside-in approach significantly impacts innovation performance, which in turn impacts business performance, customer loyalty and

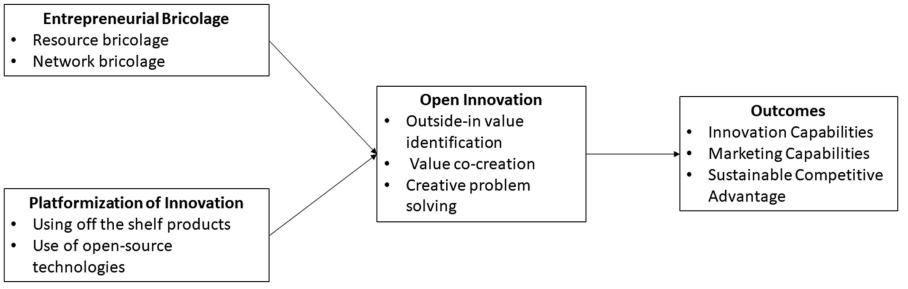

Figure 1.
Theoretical framework

Construct	Operational definition	Literature
Outside-in value identification	The outside-in value identification is an idea generation approach that is driven by customer-centricity. In this approach consumer insights and consumer, experiences are captured from the perspective of an outsider that is independent of the firm's capabilities and an internal evaluation of the insights from consumer	Inauen and Schenker-Wicki (2011), Mazzola *et al.* (2012)
Value co-creation	Value co-creation means firms and their stakeholders jointly develop services, products and experiences to open a novel world of value	Ramaswamy (2009), Ramaswamy and Ozcan (2018), Roser *et al.* (2013), Storbacka *et al.* (2016)
Creative problem-solving	Creative problem solving is generally utilized during the ideation of a new venture and encompasses knowledge, effort, assessment and imagination	Hattenberg *et al.* (2021), McMullen and Kier (2017), Warnick *et al.* (2021)
Off-shelf products	Off-the-shelf products/technology is an alternative approach, in contrast, to indigenously developing new products. The innovation team readily adopts the available components to develop a new product thereby reducing the time and cost	Malodia *et al.* (2020)
Open-source technology	Open source technology refers to technology people can develop and share due to its public accessibility. It is a solution to overcome high costs and lack of flexibility linked to proprietary software	Aminpour *et al.* (2014), Bentley and Chib (2016)
Resource bricolage	Bricolage is identified as a special resource capability that integrates or develops new resources	Gundry *et al.* (2011), Hu *et al.* (2020)
Network bricolage	Network bricolage means finding new and useful contacts. It is done by seeking opportunities with people who were strangers earlier	Baker *et al.* (2003), Salimath and Jones (2011)
Innovation capabilities	The firm's innovation capability means its potential to create outputs that are innovative by nature	Neely *et al.* (2001), Perdomo-Ortiz *et al.* (2006), Saunila (2014)
Marketing capabilities	Marketing capabilities are bundles of skills, accumulated knowledge and specialized processes using which activities are coordinated and the resources are put-together and transformed into value offerings for target markets	Chinakidzwa and Phiri (2020), Tan and Sousa (2015)
Sustainable competitive advantage	Sustainable competitive advantage is a strategy that is difficult for the competitors to imitate and thus creates value as well as above-average performance in the longer term	Almaz (2021), Renukappa *et al.* (2016)

Table 2.
Operational definitions of constructs in the conceptual framework

product quality. A deeper understanding of customers and other market forces provides SMEs and start-ups with access to external knowledge and connects them to changes in the market, thus enhancing their innovation performance (Henard and Szymanski, 2001).

Particularly in the case of SMEs, open innovation embraces a multitude of opportunities arising from external sources (Cohen and Levinthal, 1990). At its core, open innovation is rooted in the sharing of knowledge among several actors such as consumers, competitors, clientele, contractors, suppliers and start-ups (Del Vecchio *et al.*, 2018; Zanjirchi *et al.*, 2019). As access to knowledge resources grows, innovation becomes more dynamic and effective, thereby reducing costs and generating value for the innovating business (Saebi and Foss, 2015). Our data reflected the importance of acquiring information and ideas from customers and so outside-in value identification was the first underlying dimension of open innovation identified in this study.

For example, one of the respondents said:

> Yes, I believe in an open innovation culture. I have done an open innovation project on our e-commerce store. A range of products was developed with the help of customer feedback. [Respondent #32]

4.1.2 Value co-creation. The second important dimension discovered in the data analysis is value co-creation. This means that businesses and their stakeholders jointly develop services, products and experiences to create new avenues of value (Ramaswamy, 2009; Ramaswamy and Ozcan, 2018; Roser *et al.*, 2013; Storbacka *et al.*, 2016).

> Creativity-focused companies, use open innovation in a business to add competencies with the help of heterogeneity of viewpoints brought in and expose their business to innovative ideas. Otherwise, in most cases, initiatives are quickly stifled by the inertia of method and the sentimental option to achieve something. [Respondent #21]

Meaningful value propositions are developed through dialogue with stakeholders, which allow for the development of value co-creation frameworks that build on open innovation enhance competitive aspects such as branding (Kleber and Juusola, 2021; Martinez, 2014). Value co-creation entails an active and engaging dialogue about what is valuable to consumers, not just in terms of goods and services, but also in terms of add-on resources such as knowledge and information (Anshu *et al.*, 2021). In a co-creation process, different actors interact and exchange ideas regarding the design, manufacturing, delivery and consumption of the goods or services being offered (Anshu *et al.*, 2021). Open innovation alliances and value co-creation may also involve competitors, enhancing the overall demand in the market (Lu *et al.*, 2013). Value co-creation utilizes the capacities of wider communities to develop products, services and solutions that may be beyond the capabilities of a single business (Mazurek-Łopacińska, 2021). Therefore, companies jointly create value. This is evident from the following comments by a respondent:

> During the Covid-19 pandemic, I had to revisit the concept of open business innovation. This time around, I collaborated with other small businesses in my industry and compared their outcomes with mine. The ones that had better outcomes, I emulated their processes and strategies and then incorporated them into my business. It was not easy for my employees to adopt, but with a constant explanation of the process and the reason we were doing it, they were able to adopt the changes. I have also used the Unilever model to make changes to my small cosmetic business as well. [Respondent #47]

4.1.3 Creative problem-solving. Creative problem-solving is an important enabler of the innovation process (Basadur and Head, 2001). The prior literature suggests several steps in creative problem-solving. For example, Basadur and Head (2001) suggested three stages (problem formulation, solution-finding and planning *cum* execution) and eight steps in creative problem-solving. Open innovation combines external and internal resources and so contributes to both finding solutions to a given problem and also formulating that problem in the first place. The diversity of resources used for these two stages appears to foster creativity in the innovation process and so we argue that creative problem-solving is an important underlying dimension of open innovation.

4.2 Antecedents of open innovation

4.2.1 Entrepreneurial bricolage. The term "entrepreneurial bricolage" has been defined as "making do by applying combinations of the resources at hand to new problems and opportunities" (Baker and Nelson, 2005). According to the above definition, there are three underlying dimensions of bricolage: making do, combining resources and using resources at hand. The idea of *making do* highlights action orientation as an essential dimension of bricolage, as it prioritizes active experimentation and exploration over passively waiting for an optimal solution to appear (Baker and Nelson, 2005). The second dimension, *combining resources*, promotes the creation of synergies by combining resources from different sources (Moultrie *et al.*, 2009; Witell *et al.*, 2017). The third component, *using resources at hand*, stresses the optimization of the resources already at hand (Moultrie *et al.*, 2009).

Prior literature has generally used entrepreneurial bricolage to explain a variety of entrepreneurial activities (Garud and Karnoe, 2003). For example, Baker and Nelson (2005) explained resource construction by entrepreneurs as a function of bricolage and explained how it helped SMEs to create "something out of nothing." Bricolage has also been widely employed to foster innovation (Gundry *et al.*, 2011), as it may solve a variety of problems by utilizing scant resources in a way that is quite visionary. However, no prior research appears to have examined how bricolage contributes to open innovation; examining the impact of bricolage on open innovation would therefore make a significant contribution to this field.

Entrepreneurs reported using bricolage to accomplish a variety of tasks. They found novel ways to utilize scant and critical resources, recognize marketplaces and create value. For example, one of the respondents remarked:

> We regularly have begun to try and collaborate with businesses both within our immediate field and outside of the field for sharing ideas. Not only does this allow us to seek ideas from other companies' smartest employees but it allows us to trade knowledge that will better our business. In the future, this will mean that our business model can be continually improved and built upon. We believe that as a business it will allow us, in the long run, to have an advantage over competitors because we will build a stronger market within the industry. Meetings with external people also allow us to expand knowledge and means that we do not get stuck in the ways of our business due to limited knowledge. [Respondent #43]

Bricolage leads to the development of novel approaches to obtaining and utilizing resources, finding the right markets and offering relevant products and services. Together, these achievements boost the company's overall innovation capabilities (Senyard *et al.*, 2014; Salunke *et al.*, 2013). Innovation capability benefits a company in many ways, by allowing it to rapidly penetrate the market, charge a premium for products, improve profits, gain loyal consumers, reduce costs and improve operations (Boso *et al.*, 2016). It is often argued that innovation capability requires the presence of a network that can assess the viability of the innovation proposal (Edwards *et al.*, 2005). Bricolage is therefore beneficial to the innovation capability of a business, as it constitutes a network in and of itself. Businesses can use this network bricolage to seek expertise concerning solving complex problems or identifying new resources – whether those be products, materials, machines, equipment, or technology. For example, one of the respondents said:

> The cactus leather producer was sighted online by an employee, I didn't even know this material existed. We're also thinking about collaborating with the companies who produce those vegan leather materials, to get new insights on how they can be used in a high fashion environment and maybe getting them to produce special surface structures, thicknesses or colourings for us. [Respondent #43]

The ability of entrepreneurs to provide innovative solutions is largely dependent on their bricolage usage. In line with this observation, Senyard *et al.* (2014) posited that entrepreneurs and managers must know how to assemble resources in novel ways in order to innovate by designing novel solutions. In the words of another respondent:

> We try to look beyond the company's private R&D for information. [Respondent #7]

Because bricolage relies on shared resources to deal with new tasks and challenges (Ferneley and Bell, 2006), it promotes trustworthy relationships, co-creating strategies, participating in networking events and devoting time to effective communication. These findings are in line with those of Li and Wang (2021), who posited that entrepreneurial bricolage improves service capability in entrepreneurship even if resources are constrained.

Discussing the matter of events and useful communication, one of the respondents said:

> I have facilitated large-scale, person-to-person round table events to stimulate new ideas to solve long-standing problems via collaborative working amongst charities and social enterprises. This has included brainstorming techniques and collective evaluation of pros and cons. [Respondent #10]

Baker *et al.* (2003) acknowledge the role of professional and personal networks in strategy formulation. This type of "networking" with pre-existing connections is the strategy termed as "network bricolage." At the inter-organizational level, entrepreneurial bricolage is "collective, mutually adaptive and a process that emerges gradually. Improvement in a technology happens when networked actors go through a sequence of small wins" (Garud and Karnøe, 2003). In the line with the above discussion, we found in our data analysis that entrepreneurial bricolage is conceptualized as a combination of two particular types of bricolage: *resource bricolage* and *network bricolage*. Bricolage is deemed useful in accentuating the innovation capabilities of a venture and network bricolage in particular enables businesses to leverage existing networks to seek expertise in problem-solving. During field interviews, one respondent said:

> We are regularly invited to presentations and working sessions with the start-ups and seeing businesses in the start-up stages and the problems and issues faced helps us to have a real-life understanding of these matters. Networking is enabled and we can use their resources and knowledge in the context of our roles and vice versa.[Respondent #7]

Bricolage also creates means by which managers can shift from relying on existing resources to exploring new opportunities for innovation, as it creates synergies between physical resources and skills and is characterized by the sharing of ideas and knowledge. This also helps to improve the scalability of a venture (Banerjee, 2015). For example, a respondent said:

> The tangible benefits are being able to develop and market our products and learn from other company's successes. The sharing of information has allowed our initial start-up phase to accelerate beyond a homogeneous development process. [Respondent #22]

As a result of these findings, we advance the following proposition.

> *Proposition 1.* Bricolage fosters resource-construction by resource-constrained SMEs and start-ups and facilitates the open innovation process.

4.2.2 Platformization. Platformization is rooted in the concept of modular technologies and is discussed primarily in the engineering and product innovation literature (Nambisan *et al.*, 2018). Modular architecture is the key principle of platformization and involves creating a pool of shared and standardized components that are designed with plug-and-play interface and can be used across multiple products and services (Nambisan *et al.*, 2018). Platforms are designed to encourage different stakeholders to develop complementary products and services which may in turn enhance the value of the platform by creating an ecosystem of open-source technologies and components (Nambisan and Sawhney, 2011). Such platforms enable SMEs and start-ups to adopt open APIs and standard components to innovate new products and services while keeping product development costs under control (Nambisan, 2017). However, prior research has overlooked the contribution of platforms to open innovation.

In the context of open innovation, platforms act as co-creation spaces that facilitate interactions between various actors in the innovation ecosystem, including the users (Abbate *et al.*, 2019; Rho *et al.*, 2020). These platforms serve as a hub for the co-creation of knowledge through the tools, activities and services they offer as intermediaries. Platforms can also help businesses to find partners or source funding for their projects (Abbate *et al.*, 2019). Platform ecosystems have become prolific with the commencement of the digital economy. These platforms not only employ external innovation but also augment their value with the development of new complementary technologies (Eckhardt *et al.*, 2018). In the data analysis, the use of open-source technologies was found to be the first dimension of platformization. For example, one of the respondents said:

> Hadoop was used for processing our customers' data that was stored in our database management tool. We collaborated with customers in the utilization of the data they had gathered and stored in our database product. We asked them to help improve our data collection and storage methods by asking how easy or tough it was to use each feature of our database and how efficient it was to access data sets and whether it was easy to sort through large amounts of data in extracting what they wanted for their reports. [Respondent #15]

The second important dimension that emerged from the data analysis was the use of off-the-shelf products or technologies. This approach offers an alternative to the internal development of new products or systems; instead, the innovation team readily adapts available pre-made components to develop a new product, thereby reducing the time and cost (Malodia *et al.*, 2020). For example, one of the respondents commented:

> I have used Augmented Reality. This has allowed me to shape the way my training manuals are designed. Rather than being one dimensional, certain parts of the training manual are brought to life, which makes the training programme not only much more informative and user friendly but fun as well. [Respondent #6]

Bricolage and platformization can shape entrepreneurial progress for both types of venture. Platforms make it possible to allocate reusable and shared resources, a process that is favorable for the growth of the innovation ecosystem (Baldwin and Clark, 2000; Zhao and Yi, 2021).

By their nature, platforms entail some degree of openness and it is through this openness that digital platforms provide opportunities for entrepreneurs. Together, bricolage and platforms have created a wide variety of opportunities for entrepreneurs and their businesses, from facilitating innovation within new businesses to building co-creative alliances on existing platforms. Still, our understanding of these new forms of entrepreneurship remains incomplete (Nambisan *et al.*, 2018).

The interplay between bricolage and information systems has paved the way for platforms that support open innovation. These platforms provide easier access to both customers and other creative actors (Milutinović *et al.*, 2018) and together with open innovation ecosystems promote communications with external stakeholders (Altman and Tushman, 2017). They also support value co-creation by enabling businesses to interface with a variety of stakeholders (Abbate *et al.*, 2021; Ben Arfi *et al.*, 2019; Rho *et al.*, 2020). Such ecosystems support knowledge co-creation by acting as intermediaries with the capabilities to offer developmental activities, tools and services. They also help firms to carry out innovative projects by allowing them to search for partners or funding (Abbate *et al.*, 2019), to say nothing of the potential for sharing ideas and knowledge. Such platforms are also marked by the presence of value-adding complementors that create supporting technologies (Eckhardt *et al.*, 2018). Thus, platformization and bricolage create opportunities in terms of the development of new products, services, problem-solving, funding and improving systems and processes (Santoso *et al.*, 2020). Platforms further provide fora in which businesses can

acquire, assimilate and transform dispersed knowledge. Hence, based on these findings, we advance our second proposition.

Proposition 2. Platformization reduces the cost and time requirement for innovating new products and services, which in turn facilitates open innovation among SMEs and start-ups.

4.3 Outcomes of open innovation

The key outcomes of open innovation that emerged from the data are the expansions of *innovation capabilities*, *marketing capabilities* and *sustainable competitive advantage*. Innovation capability refers to a business's ability to create outputs that are innovative by nature (Neely *et al.*, 2001; Perdomo-Ortiz *et al.*, 2006; Saunila, 2014). There appears to be a positive association between open innovation and innovation performance (Chen *et al.*, 2011; Laursen and Salter, 2006). For example, according to one of the respondents:

> My business required a lot of creative thinking and analysis. The process is scientific and requires enormous effort and time. I interviewed many clients and business owners about their opinions on certain cosmetic products. I had to do a lot of analysis. Also, it is worth noting that it requires patience to pull it through. The transformation and result did not happen overnight but when they started to surface, it was worth all the stress. [Respondent #18]

Marketing capabilities are bundles of skills, accumulated knowledge and specialized processes through which activities are coordinated and resources are transformed into value offerings for target markets (Chinakidzwa and Phiri, 2020; Tan and Sousa, 2015). Our data suggested that open innovation expanded these capabilities. For example, one of the respondents said:

> We improved our service delivery, performance and speed. A clear example is that we have been able to deploy systems that are capable of turning around service and these services are fundamental to business growth. [Respondent #28]

These findings are in line with those of Li and Wang (2021), who posited that entrepreneurial bricolage improves marketing capability even in conditions where resources are constrained. Bricolage plays an important role in transforming SMEs into open innovation-based businesses and so improves innovation capability (Jayawardhana, 2021).

Finally, it was also found that open innovation creates sustainable competitive advantage. Sustainable competitive advantage is a strategy that creates value as well as above-average performance in the longer term and cannot easily be imitated by competitors (Almaz, 2021; Renukappa *et al.*, 2016). Open innovation allows entrepreneurs and managers of SMEs to optimize their resource use, thus gaining a competitive advantage over competitors. In the words of one of the respondents:

> We can directly concern ourselves with our clients to engage in needs that have not yet been met. Some of the tangible benefits of our business have been increased potential profits, higher name recognition and most significant company growth. We have been able to put our name on the map and increase the customer base. [Respondent #40]

These findings support those of Albats *et al.* (2021), van Lieshout *et al.* (2021) and Musiello-Neto *et al.* (2021). Albats *et al.* (2021) propose that open innovation allows SMEs to transform their businesses and Musiello-Neto *et al.* (2021) argue that in the presence of the right organizational strategy, open innovation leads to competitive advantage. Van Lieshout *et al.* (2021) investigate the link between open innovation and competitive advantage through the lens of dynamic-capability. The study found that SMEs can achieve a competitive advantage by using open innovation to develop their dynamic capabilities and develop innovative value propositions. Based on these findings, we advance our final proposition.

Proposition 3. Open innovation is positively associated with the firm capabilities (marketing capabilities and innovation capabilities) and sustainable competitive advantage.

5. Discussion and implications

Having reviewed the extant literature in the domain of open innovation, the present study conceptualizes open innovation as a function of three underlying dimensions: (1) outside-in value-identification, (2) value co-creation and (3) creative problem-solving. Although current literature in this domain largely lacks in terms of coherent conceptualization, it has been noted that outside-looking value identification, along with customer-centricity and market orientation, can enhance a company's innovativeness (Calantone *et al.*, 2010; Grinstein, 2008). Outside-in value-identification is therefore an important facet of open innovation. Prior research has also indicated that the value co-creation frameworks developed by engaging with stakeholders promote the competitive aspects of open innovation (Kleber and Juusola, 2021; Martinez, 2014). An active and engaging dialogue to understand what is valuable to the consumers in terms of products and services, as well as add-on resources, is important for open innovation (Anshu *et al.*, 2021). Through the lens of open innovation, even collaboration with competitors can improve market demand on the whole (Lu *et al.*, 2013) as it can result in solutions to complex problems that are beyond the capabilities of a single business (Mazurek-Łopacińska, 2021). As is evident from the data, many SMEs endorse the joint creation of value by emulating one another's processes and strategies to create better value for their own products or services. Therefore, value co-creation is also a crucial aspect of open innovation. The final dimension of open innovation is creative problem-solving, which the literature has identified as an important enabler of the innovation process (Basadur and Head, 2001). Open innovation requires the creativity to combine external resources with internal resources in novel ways to solve an established problem. As a result, the creative aspect is likewise an important component of open innovation.

In addition to deepening our understanding of open innovation, this study also attempts to clarify the nature of the relationship between bricolage and open innovation. Guo *et al.* (2018) point out that using bricolage might not always be best practice as it may lead to the elimination of standard resources from a business's portfolio and impede performance, but Baker and Nelson (2005) frame bricolage as a form of resource-construction that enabled resource-constrained SMEs to create something out of nothing. Despite these academic disputes, bricolage has been widely utilized by entrepreneurs to foster innovation (Gundry *et al.*, 2011). In seeking to examine how bricolage contributes to open innovation, we found that bricolage helps firms to innovate by enabling the design of new solutions.

Both open-source and license-based platformization technologies act as enablers of resource-construction (Nambisan *et al.*, 2018) as they play the role of a mediator that facilitates transactions, hosts discussions and helps to create value (Nambisan *et al.*, 2018). The extant literature has indicated that entrepreneurial and SME performance is improved with platformization (Hsieh and Wu, 2019; Santoso *et al.*, 2020; Zhang *et al.*, 2021), due to better access to various actors (Milutinović *et al.*, 2018). We found that bricolage and platformization complement each other in the management and implementation of open innovation projects. Our data revealed that SMEs and entrepreneurial ventures capitalize upon the synergistic relationship between bricolage and platformization in order to more successfully carry out open innovation.

The key outcomes of open innovation were found to be improvements in innovation capabilities, marketing capabilities and sustainable competitive advantage. A business's innovation capability is its potential to create innovative outputs (Neely *et al.*, 2001; Perdomo-Ortiz *et al.*, 2006; Saunila, 2014). This was found to be improved via open innovation.

The second important outcome of open innovation was an increase in marketing capabilities, bundles of skills, knowledge and specialized processes (Chinakidzwa and Phiri, 2020; Tan and Sousa, 2015). Finally, it was also found that open innovation improves overall business performance by creating a sustainable competitive advantage. These findings are in line with Albats *et al.*, (2021), who argued that to be competitive, SMEs need to transform their businesses with the help of open innovation (Albats *et al.*, 2021). Our findings also resonate with Musiello-Neto *et al.* (2021) who argue that in the presence of the right organizational strategy, open innovation leads to competitive advantage. SMEs achieve a competitive advantage by developing their dynamic capabilities to change the value proposition, with the help of open innovation.

Based on these findings, we have developed a conceptual framework of entrepreneurial bricolage (the combination of resource bricolage and network bricolage) and analyzed its antecedents and outcomes. The multidimensional and multi-faceted nature of the conceptual framework contributes to the body of knowledge on this topic and may be of considerable utility to various stakeholders, such as managers, entrepreneurs, policymakers, platform technology providers, employees, universities and students. Under the right conditions, entrepreneurial bricolage paired with platformized open innovation could transform the entrepreneurial landscape and improve business performance across the board.

5.1 Theoretical implications

Our findings offer several theoretical implications. First, the theoretical framework of entrepreneurial bricolage that we have developed brings together the scattered findings on its antecedents and outcomes into a cohesive whole. In addition, the key constructs in the study are multilevel and multidimensional.

Second, we identify avenues by which platformized open innovation leads to capacity-building in start-ups and SMEs.

Third, the framework we propose may enable scholars to develop tools for assessing the success of an entrepreneurial venture or SME based on the level of entrepreneurial bricolage. A multi-item scale based on dimensions highlighted here would be of considerable use.

Fourth, our study identifies entrepreneurial bricolage as a combination of network bricolage and resource bricolage and so can be seen as a cornerstone for the study of different types of bricolages. Certain studies consider network bricolage to be different from the regular networking approaches used in business and believe it to pertain exclusively to exploring new contacts (Baker *et al.*, 2003; Salimath and Jones, 2011). Other scholars, meanwhile, believe that network bricolage refers more broadly to the ways in which businesses utilize their existing networks and contacts. This study constitutes an important step in the further exploration of how different types of bricolages impact businesses.

Finally, we posit that open innovation and platformization enhance the marketing and innovation capabilities of businesses and create a sustained competitive advantage.

5.2 Practical implications

In addition to the theoretical contributions, our study offers several practical implications. First, it provides a nuanced view of the usefulness of entrepreneurial bricolage. The findings indicate that bricolage helps entrepreneurs and managers of SMEs to utilize resources optimally and also improves the scalability of their ventures. Managers could therefore focus on building a culture in which people are open to exploring the external resources and capabilities available to them. This builds on the organizational ambidexterity view (O'Reilly and Tushman, 2013), which posits that businesses should not only make use of existing resources but also actively explore new ones. It also appears important for entrepreneurs and

managers to support and inspire their employees to make decisions regarding the division of time between continued use of internal resources and the search for external resources (Carmeli and Halevi, 2009).

Second, it is clear from the study that platformization complements entrepreneurial bricolage. From our analysis, it is clear that platformization can improve access to expertise, technology and resources and also enhance funding opportunities for start-ups and SMEs. Entrepreneurs and managers should therefore focus on strengthening their participation in bricolage with the help of platform ecosystems. Platforms and open innovation ecosystems support communications with external individuals, including customers and other potentially useful actors. However, an important implication for managers is the decision on how to regulate such platform use, especially when there is a different socio-economic context as well as the law of the land in consideration. It should be noted that due to their proliferation, platforms have developed unique designs and architectures – this variation may make it challenging to maintain data security across certain platforms. In addition, some platforms are focused on exploration while some others are oriented toward commercialization (Nambisan *et al.*, 2018). Businesses must identify the right platforms for their needs and also establish guidelines for their regulation (Babun *et al.*, 2021). Given appropriate policy measures, platformized entrepreneurial bricolage could improve open innovation and transform the business landscape by improving performance across the board.

Third, the proposed conceptual framework could also serve as a roadmap for the organization and enactment of initiatives for improving innovation capabilities and marketing capabilities and creating sustainable competitive advantage. The proposed framework could help policymakers, entrepreneurs and managers to evaluate the desired outcomes of open innovation and identify strategic courses of action.

Fourth, the framework also provides a clearer understanding of the multi-dimensional nature of platformization, entrepreneurial bricolage and open innovation. Such an insight is useful for building a unified framework to enable business to take into consideration factors such as outside-in value-creation, value co-creation and creative problem-solving while implementing open innovation.

Fifth, this study indicates the importance of bringing together diverse stakeholders such as organizations, universities and funding agencies to promote innovation. When asked about the nature of open innovation implementation, one respondent described partnering with a local business college to hold a student competition based on scaling a similar kind of business. Such insights are useful for designing strategies and policies to enhance the participation of various actors in the open innovation ecosystem.

Sixth, based on the framework proposed, it may be possible to develop policies that act as guidelines for improving the entrepreneurial ecosystem in a given country. In addition, smaller government departments can come together to strengthen the entrepreneurial ventures and SMEs in the country. Our framework could also encourage a sense of collective ownership among relevant actors.

6. Limitations and future research directions

No study is devoid of limitations, but in many cases such limitations indicate avenues for future exploration. First, this study focuses specifically on open innovation in start-ups and SMEs using insights gathered from their members. Therefore, only limited conclusions can be drawn about the similarities or differences that may characterize open innovation in other businesses. In order for these findings to be generalized, they would first need to be tested by studies conducted on a greater sample size encompassing different types of business in different contexts.

Second, although we have endeavored to develop a cohesive theoretical framework of entrepreneurial bricolage and have identified some important propositions, this study does not examine the framework empirically. Future scholars in this area can examine the model empirically to determine its applicability. In addition, quantitative measures can be developed to assess levels of open innovation and platformization. For example, a multi-item scale based on the dimensions highlighted here could enable research on certain dimensions that cannot be investigated in a qualitative study. Also, for greater generalizability of the results, future research should assess and test the propositions across various macroeconomic contexts. Furthermore, it should be noted that all participants in the present research belonged to one of two economically developed nations. Future research should focus on other groups to assess applicability of the proposed framework and comparative studies across nations can be conducted to help policymakers develop strategic courses of action to respond to innovation-related opportunities.

Third, this study classifies entrepreneurial bricolage as network and resource bricolage, but other valuable typologies for entrepreneurial bricolage, such as internal and external bricolage, have also been identified. Future research can examine the classifications and impacts of other types of bricolage. This is especially important given the ambiguity of the definition of network bricolage. For example, several studies consider network bricolage different from the regular networking approaches used in business (Baker *et al.*, 2003; Salimath and Jones, 2011). Such exploration could enhance our understanding of this concept.

Finally, future research should identify and investigate the innovations that appear to have the greatest impact on a business's performance and also investigate other variables that may affect the relationship between open innovation, platformization and business performance. Empirical testing of such relationships would significantly enhance the robustness of the framework.

Note

1. Standard resources refer to the conventional resources that entrepreneurs utilize to establish and expand their businesses. These resources encompass financial resources, human resources which can be employees or partners and physical resources like equipment or office space. However, entrepreneurial bricolage is used as a resource construction strategy when these standard resources may not be available.

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