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Open Innovation of Small Business in The City of Medan: Alternative Processes Towards Business Model Innovation

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Abstract

Open innovation has become a strategic key element to improve innovation outcomes and commercialization among large companies. However, the relevance and potential of this concept could still be adopted by small-scale companies in Indonesia, especially those facilitated by social media. Research on open innovation for SMEs is limited, but provides important insights. Most research prioritizes in-bound innovation activities and ignores small-scale companies that are often considered radical innovators. Bank Indonesia 2021 data shows 87% of MSMEs were affected by the pandemic, with the majority experiencing a serious drop in sales. Government initiatives to strengthen the resilience of MSMEs through digital transformation have been hampered by low digital literacy. The purpose of this research is to explore the open innovation model for SMEs post COVID-19, especially through digital platforms. The research will focus on SMEs and the empirical analysis is expected to answer research questions on the concept of open innovation, factors influencing adoption, and the readiness of firms' collaboration with external sources. The research method will use descriptive and inferential statistics. The discussion will be supported by relevant literature with theoretical and practical implications.

Keywords

SMEs, Open Innovation, Inbound, Outbound, Innovation Climate, North Sumatera.

1. Introduction

Globalization today is much more complex and fast-moving, but its interconnectedness can be a path to business sector growth. Some of the characteristics of globalization are characterized by the digitalization of business, shorter product life cycles and increased consumer interconnection. Globalization has presented new challenges for business organizations to innovate to achieve competitive advantage and ensure their long-term survival in an increasingly connected world (Tidd & Bessant, 2020). As a consequence of such competition, research on innovation management has recommended and characterized a paradigm shift from the conventional closed innovation model towards an open innovation paradigm (Chesbrough, 2012; Chesbrough et al., 2014). In a dynamic economy influenced by social change and technological evolution, innovation assumes a relevance that can determine economic growth, the creation of competitive advantage and organizational sustainability.

Innovation can be understood as a learning process that results in the exploration of new ideas and subsequently, these ideas can be incorporated into new products/services, processes or methods to improve the performance of the company. The current paradigm shift demands new ways of organizing internal processes and triggers the emergence of open and collaborative innovation models. The emergence of new communication technologies, the increasing mobility of highly qualified employees and the need to reduce costs, have consequences for optimizing internal processes and integrating external processes. It is in this context that the concept of open innovation proposes collaboration between companies, individuals and the public that is encouraged in the creation of new products and services. It will thus promote equitable and sustainable economic growth, an optimized and productive workforce, and decent work for all. In line with the Priority of Sustanability Development Goals (SDGs) point number (eight) which is decent work and economic growth.

The innovation process has been supported by the rapid development and application of a number of Web-based information and communication technologies, which have simplified relationships with stakeholder groups and generated new forms of network collaboration (Hutter et al., 2013). According to McKinsey (2008), 60 to 70 percent of large established firms have integrated customers and external experts into the firm's innovation process. Indeed, most academic studies on open innovation have focused on large-scale businesses that are predominantly engaged in high-tech sectors (Hutter et al., 2013). However, it has also been recommended that open innovation approaches can provide benefits and advantages to SMEs, especially those facilitated by Web-based technologies (Bianchi et al., 2010; Hossain, 2015; Odriozola-Fernández et al., 2019). Previous research on open innovation in SMEs has neglected the potential of Web 2.0 technologies and platforms and related concepts, e.g. crowdsourcing, cocreation, or user innovation communities (Parida et al., 2012; Su et al., 2015). Nonetheless, previous studies have made important contributions to the literature and management practice, and there is a need for additional work to advance knowledge about open innovation models in the context of SMEs (Colombo et al., 2012; Yaqub et al., 2020).

2. Literature Review

Current challenges are related to increasingly expensive and shorter product life cycles, increasing costs of technology development, and increasingly connected customers along with the movement of information faster than ever (Chesbrough, 2017). All of these have contributed to a paradigm shift towards an open approach to innovation that includes the use of inflows and outflows of knowledge sources

aimed at accelerating internal innovation and expanding markets for external innovation (Chesbrough, 2017). Therefore, the open innovation process falls into two directions namely; exploring and capitalizing on better innovation opportunities. In-bound innovation relates to the practice of exploring and integrating external knowledge sources for business development, and out-bound innovation concerns the utilization of technology using external commercial channels (Chesbrough et al., 2014). The different aspects of the open innovation paradigm and their beneficial consequences for SMEs include, for example, increased profitability of innovation, growth or improvement of the knowledge base and customer satisfaction. The open innovation process also emphasizes the important role of online information and communication technologies and Web-based applications (Bianchi et al., 2010). The rapid evolution of these technologies provides several low-cost, interactive options to assist the open innovation process in two ways; facilitating access to external ideas and identifying new market prospects for current ideas. It depends on the business context, including the utilization of social networks such as virtual communities to support the company's open innovation process (Hutter et al., 2013).

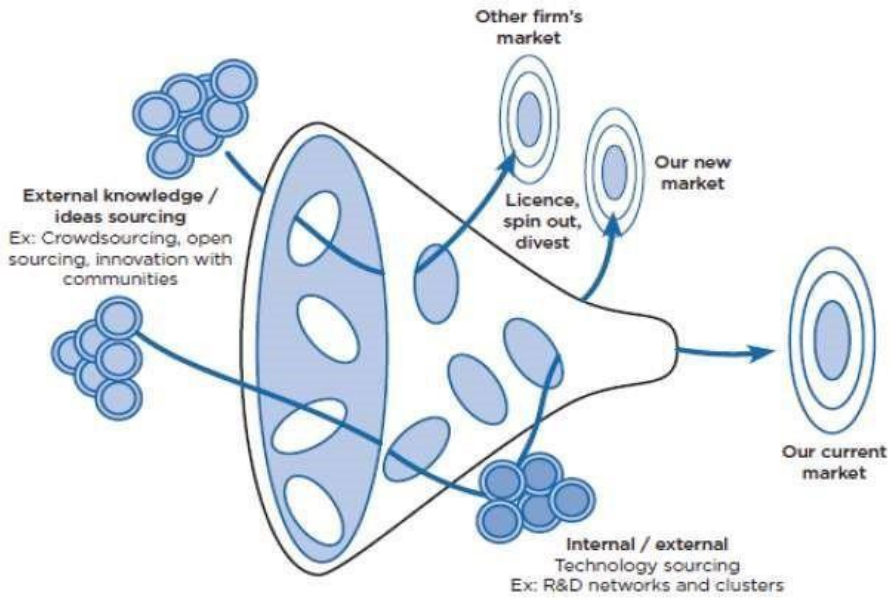

Figure 1. Open Innovation Funnel Model

According to McKinsey (2008), at least 70%, of large companies have implemented open innovation in developing new products and services by relying on Web platforms. Although open innovation initiatives in large companies have been scientifically demonstrated, comparable ideas are worth transferring to SMEs. Small and medium-sized enterprises clearly innovate differently than large enterprises and as a consequence they can benefit from open innovation processes to achieve innovative results (Parida et al., 2012). The theme of SME innovation is particularly interesting, as their contribution to driving economic growth and employment opportunities is increasing. SMEs are the most important source of jobs, they are able to create an entrepreneurial spirit and innovation that will ultimately boost business competitiveness. SMEs are a source of innovation and their success is mainly based on their level of customer orientation, flexibility and ability to detect innovation opportunities quickly. Compared to large enterprises, the

characteristics of SMEs are that they can respond more quickly to market shifts and changes in demand (Bigliardi & Galati, 2018). In addition to SMEs enjoying the benefits of less bureaucracy, their flat hierarchies and efficiency in information exchange will in turn foster a culture that supports innovation (Bocconcelli et al., 2018). SMEs usually rely on more specialized knowledge in a very specific industry or set of products. Due to their limited coverage area, they are closer to the local environment than their larger counterparts (Corsi et al., 2019; Davis & Bendickson, 2021; Kahn & Candi, 2021). This makes it possible for SMEs to tailor and specialize their products, services and innovation processes more accurately to the markets they serve (Bianchi et al., 2010). However, SMEs generally lack the capability and structure to implement and manage the entire innovation process. They will experience more difficulties in the implementation of the innovation process, including commercialization than the creation of the idea itself (Bianchi et al., 2010). SMEs also lack the complementary assets required to market and commercialize innovations that lead to market recognition and spontaneous activity (Purchase & Volery, 2020).

Innovations that have successfully increased the chances of SMEs' survival range from only 22% (Keupp & Grassmann, 2009; Golovko & Valentini, 2011; Bodlaj et al., 2020). Therefore, it is important for SMEs to overcome their small obligations that limit their ability to innovate in order to be more successful. An open innovation approach offers a promising way for small businesses to overcome their difficulties, increasing the success and profitability of innovation which in turn is able to ensure competitiveness and business survival (Hutter et al., 2013). Although extensive research in the field of innovation has provided useful insights, it has been recognized that there are explicit differences between large and small firms, including a lack of research focusing on the concept of open innovation that is more oriented towards small and medium-sized firms (Colombo et al., 2012). SMEs can benefit more from open innovation than large firms due to less bureaucracy, an increased willingness to take risks and a faster ability to react to the changing environment (Parida et al., 2012). The possibility of implementing open innovation in SMEs is lower than in large companies (Ebersberger et al., 2010). In terms of external cooperation for example, SMEs are less involved in strategic alliances with other firms, indicating their lower propensity to collaborate with all types of external partners (Ebersberger et al., 2012). Firm size has become an important consideration when it comes to adopting and implementing open innovation (Adam & Alirifi, 2021). Apart from company size and lack of internal commitment, the biggest barriers to adopting open innovation practices have more to do with organizational and cultural issues (Hutter et al., 2013). More specifically, SMEs challenge to implement open innovation approaches due to the lack of knowledge and awareness of managers or business owners (Parida et al., 2012); and their limited ability to spread risk, SMEs may be hesitant to experiment with open innovation activities.

3. Methods

This research was designed as descriptive and verification research to provide a comprehensive picture of the variables studied, namely innovation climate, open innovation practices, and company innovation. A verification approach is used to test hypotheses regarding the relationship between customers' social participation, mutually beneficial interactions, and resource integration in virtual and conventional communities. The research method used is a descriptive and explanatory survey with a type of causality investigation, which is the cause-and-effect relationship of these variables. This research uses a cross-sectional approach, where information about the sample is obtained directly within a certain time period. The unit of analysis is business owners and managers of SMEs located in Medan, North Sumatra. The population in this research is Small and Medium Enterprises registered with the

Cooperatives and Micro, Small and Medium Enterprises Service in Medan City. Samples were selected using the Structural Equation Modeling (SEM) analysis method. To determine the sample size, calculations were carried out based on general SEM rules, with a minimum ratio of 12 respondents for each research parameter. With 18 parameters (indicators), the minimum sample size required is 216 respondents. However, this figure was increased to around 281 respondents to anticipate possible school dropouts and to account for an adequate return rate. By accommodating a larger sample size, the researcher seeks to increase the statistical power and representativeness of the data, thereby allowing for a more accurate and in-depth analysis of the phenomenon under study. Primary data collection was carried out through field research with initial observations and the use of questionnaires containing structured questions. Two stages of descriptive analysis were carried out to provide an overview of the condition of the analysis unit and inferential analysis using the Structural Equation Modeling (SEM) approach with the help of Smart Partial Least Squares (PLS) software. This method is used to explore causal relationships between variables and test the significance of parameters without assuming a particular distribution. The evaluation stages include outer model analysis for the relationship between indicators and latent variables and inner model analysis for cause and effect relationships between latent variables.

4. Results

The data analysis stage, this study used questionnaires as the main instrument to collect primary data from SMEs in Medan City. Between August 12 and September 12, 2022, a total of 281 questionnaires were distributed to the target respondents. Of these, 217 questionnaires were returned in full, achieving a respondent return rate of 77.22%, which qualified for further analysis. The respondents' profiles show variations in demographic characteristics, business type, education level, and business income. In terms of gender, the majority of respondents are male, reaching 54.37% of the total respondents, while 45.62% are female entrepreneurs. In terms of business type, the cafe and restaurant and retail sectors dominate with 26.27% and 23.96% of the total respondents respectively, followed by the fashion (21.66%) and furniture (19.35%) sectors. Other sectors account for 8.76% of the total respondents. In terms of education, the majority of respondents have high school (37.79%) and undergraduate (33.18%) educational backgrounds, followed by diploma (17.05%) and postgraduate (11.98%). When the data was broken down by business revenue, most SMEs had revenues below Indonesian rupiah 500 million (45.62%), followed by revenue ranges between Indonesian rupiah 501 million and Indonesian rupiah 1.5 billion (34.1%), and Indonesian rupiah 1.51 billion to Indonesian rupiah 2.5 billion (18.89%). Only a small proportion of SMEs have revenues above IDR 2.5 billion, amounting to 1.38% of the total respondents. The data obtained provides an in-depth understanding of the respondents' profiles and the business context of SMEs in Medan City. Further analysis of this data will provide valuable insights into the factors that influence innovation among SMEs, as well as the implications for local economic growth and development.

Descriptive statistics provide an overall picture of respondents' answers to each statement instrument used to measure each research variable. The statement instrument was measured using five answer categories with a Likert scale related to the respondent's agreement or disagreement with the statement given. The five point scale given by respondents can measure accurately. There are three variables in the spotlight, namely innovation climate, open innovation practices and firm innovativeness which are measured through research questionnaires. Descriptive statistics focus on describing respondents' answers and are not generalized.

Table 1. Descriptive Statistics Variables

Variable	Total F	Total %	Mean	Classification
Innovation Climate				
IC.1	217	100	3.67	Good
IC.2	217	100	3.66	Good
IC.3	217	100	3.64	Good
IC.4	217	100	3.69	Good
Innovation Climate			3.67	Good
Open Innovation Practices				
OI.1	217	100	3.73	Good
OI.2	217	100	3.75	Good
OI.3	217	100	3.73	Good
OI.4	217	100	3.72	Good
OI.5	217	100	3.76	Good
OI.6	217	100	3.68	Good
OI.7	217	100	3.71	Good
OI.8	217	100	3.76	Good
Open Innovation Practices			3.73	Good
Firm Innovativeness				
FI.1	217	100	3.76	Good
FI.2	217	100	3.67	Good
FI.3	217	100	3.65	Good
FI.4	217	100	3.70	Good
FI.5	217	100	3.68	Good
FI.6	217	100	3.77	Good
Firm Innovativeness			3.70	Good

Table 1, provides general information that the innovation climate, open innovation practices and innovation of SME companies are classified as good with an average score of 3.67 on a 5.00 scale, 3.73 on a 5.00 scale and 3.70 on a 5.00 scale. Inferential statistical analysis in the study was carried out using the structural equation method. Given the complexity of the research model used, as well as the distribution of data that does not meet the normal distribution, solving structural equations is done using the partial least square (PLS) method. PLS analysis is carried out by paying attention to construct consistency and validation of indicators for each construct through outer model analysis.After ensuring that the research model meets the criteria for a good outer model, the analysis continues by looking at the influence between variables through inner model analysis.Data analysis was assisted by the SmartPLS version 3.0 statistical program.

Outer Model (Measurement Model) analysis is carried out to find the appropriate model from each indicator to their respective constructs so that the estimates made on the inner model are not biased.The reliability and validity of each indicator is measured to assess whether the measurement model meets the requirements of convergent validity for reflective constructs.The results of testing the validity of factor loading show that all factor loading values are greater than 0.7, meeting the validity requirements.Similarly, validity based on AVE at second order, shows that all AVE values are greater than 0.5, ensuring construct validity.Reliability measures based on CR at the second order stage also showed satisfactory results, with all CR values greater than 0.7. Similarly, the calculation of Cronbach's alpha at second order showed values that met the reliability requirements. Discriminant validity testing with the Fornell-Larcker approach for the second order also shows that the square root value of AVE for each latent variable is greater than the correlation value

between other latent variables, confirming discriminant validity. Table 2 presents a tabulation of the measurement model results.

Table 2. Tabulation of Measurement Model Results (Outer Model)

Constructs	Items	Item-loading	AVE	CR rho a	CR rho c	C.A	Discriminant Validity	R^2
Innovation Climate	IC1	0.856	0.674	0.840	0.892	0.838	0.699	
	IC2	0.809						
	IC3	0.807						
	IC4	0.809						
Open Innovation	OI1	0.742	0.561	0.888	0.911	0.888	0.744	0.365
	OI2	0.753						
	OI3	0.763						
	OI4	0.791						
	OI5	0.730						
	OI6	0.759						
	OI7	0.736						
	OI8	0.714						
Firm Innovativeness	FI1	0.778	0.581	0.855	0.892	0.855	0.720	0.493
	FI2	0.780						
	FI3	0.797						
	FI4	0.765						
	FI5	0.717						
	FI6	0.731						

Table 2, presents the validity test of factor loadings which shows that all factor loading values are greater than 0.7. This means that in the second order, the validity measure based on the loading value meets the validity requirements. Likewise, the validity requirements are based on AVE in second orders, showing that all AVE values are greater than 0.5. This confirms that the AVE value Overall has met the validity requirements. Furthermore, the reliability measure is based on CR at the second order stage which shows that the overall CR value is greater than 0.7. This result means that it meets the reliability requirements based on CR. Likewise, the calculation of Cronbach's alpha in the second order shows that all CA values are greater than 0.7. This result can be interpreted as meaning that the results of reliability testing based on Cronbach's alpha have met the reliability requirements. Testing discriminant validity using the Fornell-Larcker approach for second order shows that the square root value of AVE for each latent variable is greater than the correlation value between that latent variable and other latent variables. These results lead to the conclusion that the calculations from the test have met the requirements for discriminant validity. Furthermore, the R-Square value presented in Table 2 shows that the R-Square value of firm innovativeness (Y) is 0.493. These results explain that innovation climate (X) and open innovation practices (Z) are able to influence firm innovativeness (Y) by 49.3%. The R-Square value of open innovation practices (Z) is 0.365. This means that innovation climate (X) is able to influence open innovation practices (Z) by 36.5%.

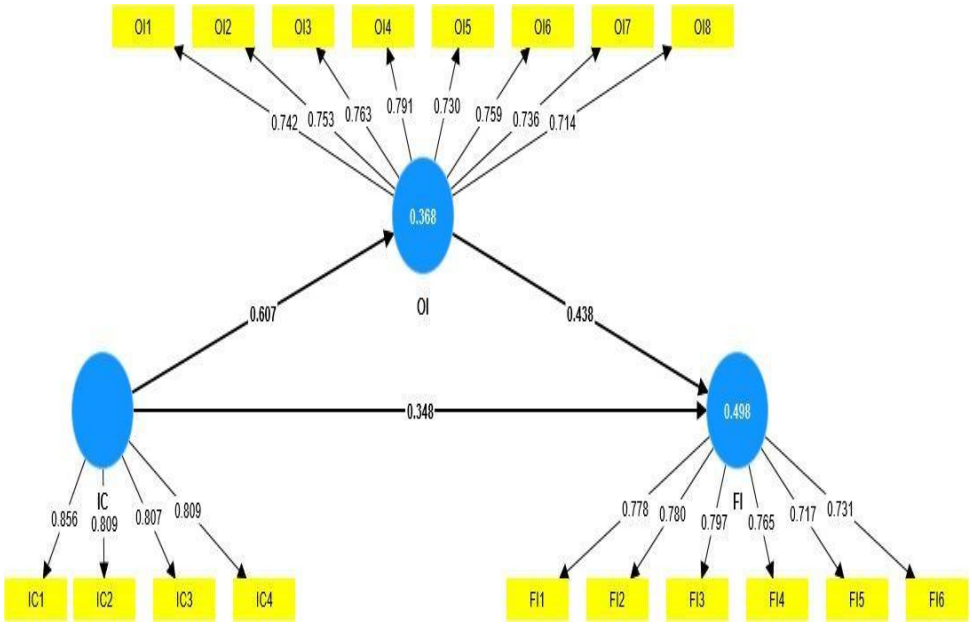

Figure 2. Validity Testing based on Second Order Factor Loading

The significance of the influence test and path coefficients are summarized in the measurement model results in Table 3.

Table 3. Structural Model Results

	Correlation	Original	Mean	Std. Deviation	t-value	*p*-value	Support
H1	IC -> FI	0.613	0.616	0.069	8,897	0.002	Supported
H2	IC -> OI	0.607	0.610	0.074	8,239	0,000	Supported
H3	OI -> FI	0.438	0.444	0.109	4,011	0,000	Supported
H4	IC – FI (indirect)	0.266	0.271	0.078	3,400	0.001	Supported

*** *p* -value < 0.01

Table 3 shows that the results of the significance test for each hypothesis are that innovation climate (X) has a significant positive effect on company innovation (Y), with a p value of (0.000 < 0.05). This confirms that the proposed hypothesis (H1) is accepted. Innovation climate (X) has a significant positive effect on open innovation practices (Z), with an acceptable p value (0.000 < 0.05). This confirms that the proposed hypothesis (H2) is accepted. Open innovation practices (Z) have a significant positive influence on company innovation (Y), with a p value of (0.000 < 0.05). This confirms that the proposed hypothesis (H3) is accepted. Open innovation practices (Z) significantly mediate the relationship between innovation climate (X) and corporate innovation (Y), with a p value of (0.000<0.05).

5. Discussion

The results provide empirical evidence that innovation climate has a positive and significant influence on firm innovativeness with a path coefficient of 0.613 and a significance level of 0.000. An innovative corporate environment is characterized by

employee involvement to allocate their time and resources to produce innovative solutions including sharing or exchanging knowledge. In turn, the contribution of these employees can make the company produce more innovative products or processes. Innovative companies have characteristics such as reducing the cost of developing new products or processes or being able to reach the market with time and cost efficiency. The explanation of the empirical results supports the arguments of research conducted by Popa et al. (2017), an organizational environment that encourages employee innovation capacity and creativity reflects a culture of innovation. The culture of innovation rests on the values, beliefs, and assumptions shared by company members to facilitate the innovation process (De Castro et al., 2013; Popa et al., 2017).

The study proved empirically that innovation climate has a positive and significant effect on open innovation practices with a path coefficient of 0.607 and a significance of 0.000. Empirically, this result can be articulated that when companies have an innovation climate, it indicates that companies have been able to direct their employees to work in work groups. Ultimately, the situation makes it possible for companies to adopt open innovation in their companies. The results of this study reinforce the findings by Popa et al. (2017), SMEs with a strong innovation climate are more likely to utilize open (inbound) innovation to increase their own collective knowledge. The findings provide empirical evidence for this study suggesting that the innovation environment plays a major role in finalizing the management system for the exploitation of technical knowledge either through patents or intellectual property rights, which determines the firm's commitment to open (outbound) innovation (Popa et al., 2017).

The study proved empirically that open innovation practices have a positive and significant effect on firm innovativeness with a path coefficient of 0.438 and a significance of 0.000. This finding provides additional evidence for the research stream that states the relevance of increasing SME innovation by adopting open innovation practices (Ramirez-Portilla et al., 2017). The results of this study support previous findings that reveal that although in general open innovation (inbound) shows a higher effect on open innovation (practices) than open innovation (outbound), which suggests that not all innovation practices have an equally important influence on SME innovation outcomes (Ramirez-Portilla et al., 2017). These results also show that inbound innovations such as buying technical services, conducting technology searches, and training personnel externally are considered very important. Similarly, selling technical or scientific services based on the firm's experience is considered more important than outbound innovation. These results corroborate that SMEs that use knowledge search, acquisition and sourcing activities as well as knowledge sharing practices to increase their innovation rate (Ramirez-Portilla et al., 2017).

The study proved empirically that open innovation practices mediate the relationship between innovation climate and firm innovativeness with a path coefficient of 0.266 and a significance level of 0.001. These empirical results can be articulated that innovative firms are substantially determined by the existence of an innovative corporate climate, such as skilled and competent employees bridged by open innovation practices. Companies that tend to prioritize open innovation (inbound) mean that they directly involve external partners to generate innovation. In other words, SME innovation initiatives rely heavily on the contributions of external partners. For example, utilizing research and development results from external partners for new, more innovative products, systems or services. Meanwhile, companies that adopt open innovation (outbound) mean that they tend to better benefit from the results of their innovation by looking to sell trade licenses to external parties. For example, certain brands, recipes or processes. In detail, these findings also corroborate previous research arguments that show that the innovative

climate of firms is a key determinant in their innovation performance (Popa et al., 2017). Thus, the more a firm's innovation climate improves, the stronger the firm's innovation focus, where open innovation practices bridge the relationship.

6. Conclusion

This study highlights the importance of open innovation practices to enhance innovation focus within SMEs, supported by the firm's innovation climate. Important implications are found for the literature and managerial practice, as most previous studies have focused only on large firms. This study makes an important contribution by enriching the literature on open innovation in the context of SMEs and testing a broader research model. The results confirm that SMEs need to pay attention to innovation climate and open innovation practices to improve innovation effectiveness. However, this study has limitations, such as the use of a limited sample from one city and province only, as well as the cross-sectional nature of the study. To improve the validity of the findings, future studies may expand the sample and consider a longitudinal approach.

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