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Exploring firm-specific deterrents of innovation in micro and small enterprises in Ethiopia

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Abstract

The paper aims to analyze firm-specific deterrents of innovation in Bahirdar city MSEs in Ethiopia. In order to attain the objective of the study, both descriptive and explanatory research method is used. In this paper, the data were drawn from 310 MSEs firms which were selected by using a simple random sampling technique. The data were analyzed using descriptive and inferential statistics which include mean, standard deviation, and binary logistic regression model. From the model summary, independent variables that were incorporated under the current study, contributed 69.6% of the deterrents of innovation in MSEs as represented by the Nagelkerke R-square. This means that those variables explain about 69.6% of the deterrents of innovation of MSEs, whereas other factors not covered in this study contributed 30.4% to the deterrents of innovation. The results have revealed that research and development are the most critical deterrent factor affecting technological innovation of MSEs at a 1% level of significance. Besides, cost of innovation and firm size factors are the next important deterrent factors affecting technological innovation of the enterprises, followed by human resource factors. Contrarily, variables such as organizational culture and perceived risk factors have not been statistically significant and less likely to affect innovation of MSEs in the current study. The government and other stakeholders need to work hard to encourage innovation among MSEs by providing support, including an increased supply of credit, training, technology support, and provision of micro and small enterprise information services.

Keywords: Deterrents of innovation, Micro and small enterprises, Innovation, Entrepreneurship

Introduction

In this era of globalization, a firm's profitability and survival is entirely dependent on their ability to continuous innovation due to technological change, intense competition and short product lifecycles—to look for new and better ways of doing business (Efrat, 2014). van Dijk and Sandee (2002) defined innovation in micro and small enterprises in the context of developing countries as the process by which firms adopt the product, design, process, and method that has already been developed and adopted elsewhere but new to them. Nowadays, innovation has become a critical factor in promoting social and

economic growth and an unprecedented challenge to several organizations and countries around the world (Wong et al., 2005). It is widely regarded as the most important instrument for competitive advantage and the key to driving economic growth that enables countries and individual firms to thrive in today's dynamic business environment (Adam & Alarifi, 2021).

According to the Global Innovation Index report (2017) by Dutta et al. (2019) ranking of countries by region, innovation is still at the initial stage in Africa compared to Switzerland with 66.10%, Sweden with 62.50%, USA with 60.60%, and UK and Netherlands with 59.80% and 58.80%, respectively. In developing countries, particularly those in the sub-Saharan African region, innovation is among the lowest globally due to low spending on R&D, policy problem, lack of finance and skilled personnel, and high cost of innovation. Based on the latest reports of Statista (2020), South Africa stands out as the country with the highest innovation score with 32.67% ranked first in Africa and 60th globally, followed by Tunisia and Morocco with a score of 31.21% and 28.97%, ranking 65th and 75th in the world. Ethiopia, score 18.10%, Niger score 17.80%, and Guinea score 17.32% index points ranked the least in Africa out of 131 countries worldwide.

The Ethiopian government plans to become a middle-income country by 2020–2023 (GTP, 2010). To achieve this goal, the country recognizes the importance of strengthening innovativeness among small and micro-enterprises. Because they are the foundation for the establishment and expansion of open opportunities for employment generation, achieving broad-based, accelerated, and sustained economic growth to eradicate poverty has been and is a key objective of the Government of Ethiopia (MoFED, 2015).

However, regardless of the government's support for the sector, Ethiopia's innovation performance is relatively poor compared to China, Kenya and a group of other low-income countries (Kuriakose et al., 2016). According to the same study, only 68% of large enterprises, 48% of medium-sized firms, and 38% of small enterprises in Ethiopia have product or process innovation. The micro and small enterprises sector is currently at a nascent stage and has a low rate of innovation growth. Based on the reports of Ethiopian Science and Technology Information Centre (STIC, 2015), only 60% out of 1200 SMEs firms reported innovations in the 3-year period of 2012–2014. Dessie et al. (2022) argued that Ethiopia's trifling implementation of innovation from local and national markets and the dearth of radical innovation show that the country's innovation culture is stagnant, which is indicative of traditional evolutionary innovation.

Several studies conducted in Ethiopia revealed that the country's SMEs have low levels of innovation among small and micro-enterprise sector. For instance, the study by Talegeta (2014) demonstrated that various barriers to innovation include the lack of skilled personnel, inadequate R&D, firm size, and high costs of innovation expenditure as significant obstacles. Similarly, Kassa and Mirete (2022) indicated that government support, access to infrastructure, leadership of the owners, entrepreneurial training and the entrepreneurial attitude affected the innovation of service and manufacturing micro and small enterprises. A study by Wakeford et al. (2017) has also identified the main inhibitors of innovation are high costs of technology, inadequate finance, and limited information. Another scholar argued that firm size and access to financial factors significantly affects firm innovativeness of micro and small enterprises in Ethiopia (Gebreeyesus, 2011).

The significance of this study, primarily stems from the fact that research on product and process innovation of micro and small enterprises (MSEs) in Ethiopia in general and the study area, in particular, is limited. Although past studies conducted on the deterrents of technological innovation of MSEs in different countries, the impeding factors could vary from one sector to the other or even from one area to another due to differences in infrastructural availability, administration capability, and the availability and quality of skilled manpower. Besides, prior research also failed to identify the most important elements that hamper technological innovation of small and micro-firms in Ethiopia, with particular reference to Bahirdar city. Such an understanding in the context of Ethiopia is important given the expected contribution to knowledge and practical impact on the country's desire to become a middle-income country. Due to this reason, the current researcher is motivated to conduct this study on factors that deter innovation of MSEs with a focus on product and process (technological) innovation in Bahirdar city. The findings could help policymakers to formulate policies and adjust the existing support programs that will support the needs of innovation in MSEs.

The remaining sections are organized as follows: Section 2 presents a review of the literature on firm-specific deterrents of innovation in MSEs; Section 3 discusses the research methodology, including the research design, target population and sampling design, sources of data and data collection instruments, and the measurement of variables and study analysis. The last two sections, Sects. 4 and 5, presents the results and discussions and conclusions, respectively.

Literature review

Overview and concept of innovation

Innovation has been a subject of interest over several decades to scholars from different disciplines such as economics, business, engineering, science, and sociology. Due to this reason, the concepts have been viewed differently as to what constitutes innovation (Cooper, 1998). Innovation is derived from the Latin word *Novus*, meaning new. It is defined as "the introduction of something new" or a new idea, method, or product (Amidon, 2007; Joe et al., 2005). An innovation is broadly pertaining to the implementation of new or significantly improved product, process, practice, knowledge, marketing method, or technology and their diffusion in business, workplace or organizations (Edquist, 1997; OECD, 2005; World Bank, 2010); whereas, Baregheh et al. (2009) define innovation as the multi-stage process whereby organizations transfer ideas into new or improved products, services or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.

OECD (2005) and Jaramillo et al. (2001) distinguished four types of innovations. Product innovation is the introduction of a good or service that is new or extended uses for existing products with respect to its functional characteristics, component or intended uses. New products are goods and services that differ significantly in their characteristics or intended uses from products previously produced by the firm. Product innovations related to goods include products with significantly reduced energy consumption, and significant changes in products to meet environmental standards. Process innovation refers to the process of introducing a new technique or method for the creation of goods and services. It includes implementing of a new or significantly improved production or

delivery method. Improvement in design, packaging, distribution, promotion and pricing strategy of a product is often referred to as marketing innovation. Its aimed at better addressing customer needs, opening up new markets, or newly positioning a farm's product on the market, and finally intends to increase the firm's sales. Finally, organizational innovation refers to the implementation of a new organizational method in the firm's business practices, workplace, or external relations.

Firm-specific deterrents to innovation in MSEs

Cost of innovation

Innovation is a cost for most firms. In Ethiopia, it is believed that cost of innovation is an important barrier for small and medium enterprises for the fact that the inability of enterprises to acquire equipment and external competence, hire skilled human power and shortage of budget (Talegeta, 2014). Consistent with these findings, Tourigny and Le (2004) found that high cost of innovation is more likely to be perceived as an important hampering factor by large firms as compared to small ones. Similarly, the study by Canepa and Stoneman (2008) revealed that cost of innovation as significant factors for the innovation of SMEs.

Human resource

MSEs significantly contribute the lion's share of GDP in Ethiopia; however, it is believed that many of these firms lack managerial and technical skills, which inhibit their effectiveness and competitiveness in product and process innovation (Talegeta, 2014). Gebreeyesus et al. (2018) found that educational achievements, business experience, and other worker's skills exert a strong influence on the innovation capacity among SMEs. A lack of skilled human power is noted as a high impediment to introduce or implement new or significantly improved technological innovation (Tourigny & Le, 2004).

Firm size

Innovativeness increases with firm size. A survey study in an attempt to understand the effect of firm size on innovation practice of manufacturing MSEs in Ethiopia uncovers a significant association between firm size and innovativeness (Gebreeyesus et al., 2018). As shown in the same study, while 74% of medium-sized firms reported introducing new technology in the last two years (prior to the survey), only 48% micro and 64% small enterprises have yet to do so. Size of the business which could be measured in terms of enterprise capital, quantity of hardware or software the company have, and financial and human recourses, are basic restraining issues for firms to engage in innovation (Gebreeyesus, 2011).

R&D

This study also considered research and development (R&D) as one factor affecting technological innovation among SMEs. Research and development is usually used as a proxy variable for measuring innovation performance in many empirical studies. Studies have shown that R&D is vital for micro and small firms to innovate new technologies, imitate technology and gain competitive advantage (Kamalian et al., 2011; Talegeta, 2014). However, if those firms don't have adequate engagement in R&D, it can

be challenging to perform well in creating new technology or adding values to existing products (Szczepańska-Woszczyna, 2014). Therefore, inadequate R&D is a barrier for SMEs at the industry and at specific small and medium enterprise technological innovation.

Organizational culture

Schein (1992) defined organizational culture as values, beliefs and principles that provide norms of expected behaviors that members of the firm should follow. A review of the literature indicates that organizational culture is a building block that encourages the employees' innovation capacity, tolerates risk, and supports personal growth and development, which is very important antecedent for innovativeness in SMEs (Menzel et al., 2007). Martins and Terblanche (2003) noted that supportive organizational culture climate encourages creativity of employees of enterprises to think in innovative ways of solving problems and finding solutions.

Perceived risk

Small innovative companies face high risks when they launch innovative products and implement innovative processes. Scholars agreed that most innovation projects may not be started, delayed, or abandoned because of lack of confidence, risk of bankruptcy, high costs of external capital in the form of a risk premium, and the low value of intangibles in case of liquidation (Gomes et al., 2006). Besides, Hall (2002) asserts that innovation initiatives are riskier than physical investment projects. Consequently, outside investors require a risk premium for the financing of innovation activities.

Research methodology

Research design

The goals of scientific research, in broad terms, are description, prediction, and understanding/explanation to acquire new knowledge (Marczyk et al., 2010). In order to attain the objective of the study and answer the research questions, both descriptive and explanatory research method is used. Explanatory research method is preferred because it helps to conduct relations that permit drawing valid inferences about the relationship between two or more variables. Descriptive research helps to determine the degree to which certain variables are related to actual phenomena (Hair et al., 2009). The current study also adopts a quantitative approach to statistical information and primary data for analytical purposes.

Population and sampling design

A total of 310 enterprises were taken as a sample from a total population of 1372 micro and small enterprises from which 810 are micro and 562 are small, based on the data obtained from Bahirdar city technique and vocational development offices (Fasilo Sub City). The researcher divided the total population based on the size of enterprises to make the sample size proportional to the study population and applied a simple random sampling technique. Accordingly, 183 respondents were selected from micro-enterprises and the remaining 127 were from small-sized enterprises.

The representative sample size was determined using Yamane (1967) sample size determination formula calculated as follows:

$$n = \frac{N}{1 + N(e)^2},$$

where n = sample size, N = Target Population, and e = the acceptable sampling error at 0.05.

Hence, $n = \frac{1372}{1+1372(0.05)^2} = 309.70 \approx 310$.

Sources of data and data collection instruments

In the present study, both primary and secondary sources of data were obtained from relevant sources that helped to achieve the stated objectives. The primary data were generated from the study's subject using a structured schedule questionnaire measured by Likert scale statements adapted from (Talegeta, 2014). Respondents were asked to indicate the degree of agreement and the extent to which they found barriers using five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. In order to triangulate the study and supplement the primary data collected, secondary data sources were also used gathered from policy documents, journals, books, published and unpublished materials, and different websites.

Measurement of variables of the study

The dependent variable of the current study was innovation (product and process), whereas cost of innovation, human resource, firm size, R&D, organizational culture, and perceived risk were independent variables of the study. Study variables were measured using five scaled response categories ranging from strongly disagree (1) to strongly agree (5). The scales were then grouped into two dichotomous categories and discussed separately as follows (Table 1).

Data analysis and model specification

The data collected in the study were analyzed with the help of a statistical package for social science (SPSS) version 26, which is used to tabulate and analyze the valid responses. Moreover, the findings were analyzed using a logistic regression model and the mean and standard deviation data. The model is selected for analysis because the dependent variable has a dichotomous scale. The dependent variable of the study is

Table 1 Description of the variables in the model

Study variables	Notation	Measurement
Cost of innovation	CI	0 = low cost, 1 = high cost,
Human resource	HR	0 = skilled, 1 = unskilled
Firm size	FS	0 = small, 1 = micro
R&D	RD	0 = adequate, 1 = inadequate
Organizational culture	OC	0 = strong, 1 = weak
Perceived risk	PR	0 = low perceived risk, 1 = high perceived risk
Innovation of MSEs	INN	0 = if the firm introduce technological innovation, 1 = if not

technological innovation, and hence, it is coded as the value 0 for "if the firm introduce technological innovation" and 1 for "not". The model is selected for analysis because the dependent variable has a dichotomous scale.

The binary logistic regression model is given as follows:

$$Y_i = \begin{cases} 1, \text{if the firm does not introduce technological innovation} \\ 0, \text{if the firm introduces technological innovation} \end{cases}$$

$$Y_i = \frac{e^{\beta_0+\beta_i X_i}}{1+e^{\beta_0+\beta_i X_i}},$$

where Y is the dependent variable which takes dummy variable where "0" stands for if the firm introduce technological innovation" and "1" for "not", β_0 = constant, β_i = coefficients of explanatory variables and X_i = explanatory variables.

The binary logit model used in this study is described as follows:

$$\text{Logit}(Y) = \beta_0 + \beta_1 \text{CI} + \beta_2 \text{HR} + \beta_3 \text{FS} + \beta_4 \text{RD} + \beta_5 \text{OC} + \beta_6 \text{PR},$$

where Y is the dependent variable which takes dummy variable where "0" stands for if the firm introduce technological innovation" and "1" for "not", CI = cost of innovation, HR = human resource, FS = firm size, RD = research and development, OC = organizational culture, PR = perceived risk.

Results and discussion

Response rate

As clearly indicated in Table 2, some returned questionnaires were invalid and rejected to analysis. This was due to a few respondents missing important items on the questionnaires. The number of rejected invalid questionnaires account for 2.25% of the total distributed questionnaires. The invalid questionnaires (7) and the uncollected ones (8) produce the total non-response rate, which is calculated to be 4.84%. In addition, Table 4 shows that 95.16% of respondents completely filled-in and returned the questionnaire genuinely. Groves et al. (2009) defined the response rate as the percentage of eligible sample cases cooperating in a survey. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate, a rate of 60% is good and a response rate of more than 70% is very good. This response rate was therefore considered sufficient for making

Table 2 Response rate

Items	Response rate	
	No.	Percent
Sample size	310	100
Collected	302	97.42
Uncollected	8	2.58
Rejected due to incompletion	7	2.26
Utilized for analysis	295	95.16

Source: Own survey, 2021

inferences and drawing conclusions from the research data. The analysis of response rate is presented in Table 2.

Analysis of respondents' background information

As presented in Table 3, from the total of 295 respondents, 227 (76.9%) were male, and the other 68 (23.1%) were female. Regarding education, the highest frequency was from respondents with a diploma and degree, representing 80.7% of the total respondents followed by 8.1% completed secondary school, 5.4% second degree and above and 4.1% completed primary school. Only 5 (1.7%) identified as illiterate among the total respondents. Moreover, the majority of the enterprises were formed as sole proprietorship (53.6%), and majority of them (59.0%) were categorized as micro-enterprises scale of operation than the other category. Finally, 121 (41.0%) of the enterprises operates in the sector of metal and wood works, 68(23.1%) in food and beverage, 50 (16.9%) in textile and garment, and the remaining 39 (13.2%) and 17 (5.2%) in construction and urban agriculture, respectively. The primary data collected about the demographic characteristics of respondents are summarized as follows.

Model diagnosis of the binary logistic model

Table 4 presents the overall test of the model using Omnibus Tests of Model Coefficients. It is used to check the goodness of test for the logistics regression. The Chi-square test is highly significant (Chi-square = 209.445, df = 6, $p < 0.000$). This indicated that the overall model provides a statistically significant relationship between the dependent and independent variables. The coefficient of determination is a measure of how well a statistical model can possibly predict future outcomes. The coefficient of determination, R2 is the square of the sample correlation coefficient between consequences and expected

Table 3 Respondents' background information

No.	Type of variables	Category	Frequency (n = 295)	Percentage	Cumulative percentage
1	Gender of owners	Male	227	76.9	76.9
		Female	68	23.1	100.0
2	Level of education	Illiterate	5	1.7	1.7
		Primary school	12	4.1	5.8
		Secondary school	24	8.1	13.9
		Diploma and degree	238	80.7	94.6
		2nd Degree and above	16	5.4	100.0
3	Form of ownership	Sole ownership	158	53.6	53.6
		Partnership	137	46.4	100.0
		In cooperative	0.0	0.0	100.0
4	Scale of enterprise	Micro	174	59.0	59.0
		Small	121	41.0	100.0
5	Type of business	Food and beverage	68	23.1	23.1
		Metal and wood works	121	41.0	64.1
		Textile and garment	50	16.9	81.0
		Urban agriculture	17	5.8	86.8
		Construction	39	13.2	100.0

Source: Own survey, 2021

Table 4 Omnibus tests of model coefficients

		Chi-square	df	Sig
Step 1	Step	209.445	6	0.000
	Block	209.445	6	0.000
	Model	209.445	6	0.000

Source: Own survey, 2021

Table 5 Model summary

Step	− 2 Log-likelihood	Cox and Snell R-square	Nagelkerke R-square
1	176.983[a]	0.508	0.696

[a] Estimation terminated at iteration number 6 because parameter estimates changed by less than .001

Source: Own survey, 2021

values. As such, it explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable, innovation of MSEs that is explained by all the six independent variables.

Regarding the model summary, Table 5 presents of the Cox and Snell R-square and Nagelkerke R-square values, which are both methods of calculating how much variation in the outcome variable is explained by the model. Based on the Nagelkerke's R-square, it can be inferred that the independent variables that were incorporated under this study, explained 69.6% of the deterrents of innovation in MSEs as represented by the R2. This means that those variables contributed about 69.6% to the deterrents of innovation of MSEs, whereas other factors which are not covered in this study contributed 30.4% to the deterrents of innovation.

Logistics regression analysis

This study used binary logistic regression analysis (logit model) to identify deterrents to innovation in micro and small enterprises. The data collected from the schedule questionnaire which focuses on the deterrents of innovation that affect small and medium enterprises were analyzed using binary logistic regression model as follows. The model is selected for analysis because the dependent variable has a dichotomous scale.

The logistic regression output revealed that cost of innovation is found to have negative and significant influence on the technological innovation of micro and small enterprises of the study area. This implies that as the firm's innovation cost increases, the firms' technological innovation capability decreases. The study logistic result of the cost of innovation odds ratio is (B) = 3.377 with a 95% CI of 1.257–9.077, which indicates that technological innovation of enterprises can be decreased 0.143 times as far as the cost of innovation increase. Having resources and capabilities is necessary for firms to engage in innovation. To own those capabilities, enterprises incur huge money. As a result of huge money requirement to own those resources and capabilities, the firm may not be in a position to own and engaged on innovation. Hence, the high cost of innovation becomes a major obstacle to micro and small enterprise technological innovation. This result is consistent with the findings of Talegeta

(2014), Mugogo and Midala (2020), and Ndesaulwa et al. (2017). Therefore, high cost of innovation is an impeding factor to technological innovation in micro and small enterprises.

Skilled human resource with creative & innovative ideas improves the level of innovation of micro and small enterprises (Gebreeyesus et al., 2018; Talegeta, 2014; Tourigny & Le, 2004). This idea is consistent with the current finding. The result of this research indicates that enterprises which employed skilled employees were 2.893 (OR = 2.893) times higher to engage in innovation than those firms which have less skilled employees while controlling other variables. The reason is that innovation activity is learning process that is closely related to skills and competencies available and effectively mobilization within and outside the firm.

Another essential variable of the study was firm size. Size of enterprises which could be measured in terms of financial and human recourses is important restrain factor for firms to engage in innovation. The logistic regression result revealed that Exp (B) = 2.996, with 95% CI of 1.303–6.886. This means that firm size affect positively innovation engagement of MSEs by 2.996 times. This result was consistent with the findings of Gebreeyesus et al. (2018) and Gebreeyesus (2011) who uncovered a significant association between firm size and innovativeness. This factor is particularly acute for micro-enterprises to engage in innovation activities than small or medium firms because lack of sufficient R&D budget and difficulty in access to finance.

In numerous empirical studies, research and development (R&D) are frequently used as a proxy variable for predicting innovative performance. It is undeniable that adequate R&D increase subsequent innovation if MSEs make rational decisions on the level of R&D expenditure (Ndesaulwa et al., 2017). The current study revealed that for a unit increase in research and development investment, it is expected a 0.012 increase in odds of innovation improvement of MSEs who have adequate R&D funds, keeping other factors constant. The odds of technological innovation of MSEs who have adequate R&D funds were about 0.012 times higher than the odd of technological innovation of MSEs who do not have adequate R&D budget. As shown in Table 6, research and development strongly associate with innovation of MSEs in the study area. Organized R&D office and equipped staff are considered as an important factor that enable firms to introduce innovation. In line with this finding, Kamalian et al.

Table 6 Results of the logit model of deterrents to innovation of MSEs

		B	S.E	Sig	Exp(B)	95% C.I.for EXP(B)	
						Lower	Upper
Step 1[a]	CI	− 1.217	0.504	0.016	3.377	1.257	9.077
	HR	1.062	0.520	0.041	2.893	1.043	8.023
	FS	1.097	0.425	0.010	2.996	1.303	6.886
	RD	4.418	0.580	0.000	0.012	0.004	0.038
	OC	0.793	0.620	0.201	0.453	0.134	1.524
	PR	− 1.385	0.658	0.135	0.250	0.069	0.909
	Constant	2.718	0.936	0.004	15.151		

[a] Variable(s) entered on step 1: CI, HR, FS, RD, OC, PR

Source: Own survey, 2021

(2011) and Talegeta (2014) have shown that R&D vital for micro and small firms to innovate new technologies, to imitate technology and to gain competitive advantage.

From the model summary, independent variables that were incorporated under the current study, contributed 69.6% of the deterrents of innovation in MSEs as represented by the Nagelkerke R Square. This means that those variables explains about 69.6% to the deterrents of innovation of MSEs whereas other factors which are not covered in this study contributed 30.4% to the deterrents of innovation. The results have revealed that research and development are the most important deterrent factor affecting technological innovation of MSEs at 1% level of significance. Besides, cost of innovation and firm size factors are the next important deterrent factors affecting technological innovation of the enterprises followed by human resource factors. Variables such as organization culture and perceived risk factors have not been statistically significant and less likely to affect innovation of MSEs in the current study.

Conclusion and recommendation

Innovation affects firms' ability to compete successfully in an increasingly dynamic market. The study attempted to identify important deterrents and factors affecting innovation among micro and small enterprises in Bahirdar city, Ethiopia. Both primary and secondary sources of data were obtained from relevant sources that helped to achieve the stated objectives. The data collected were organized, analyzed, presented and discussed using descriptive statistics. Moreover, the findings were analyzed using a logistic regression model. Key results of the study are therefore summarized hereunder.

Accordingly, the logistic regression output revealed that cost of innovation, human resources, firm size, and R&D factors most likely to affect the technological innovation of the enterprises at statistically significant level. The present research also sheds light on that research and development are the most important deterrent factor affecting technological innovation of MSEs at 1% level of significance. This may be explained by the fact that firms that do not have adequate engagement in R&D, it can be challenging to perform well in the introduction of creating new technology or adding value on existing products. Besides, cost of innovation and firm size factors are the next important deterrent factors affecting technological innovation of the enterprises followed by human resource factors. It was revealed that the high cost of innovation is an impeding factor to technological innovation. Similarly, it was uncovered that a significant association between firm size and innovativeness was found, innovative performance increased with the increase in size. To the contrary, variables such as organizational culture and perceived risk factors have not been statistically significant in affecting innovation of MSEs in the current study.

The results of the study may be helpful for both MSEs and government offices concerned micro- and small-scale enterprise development. The finding can be used in the development of public policy aimed at strengthening and encouraging innovation among MSEs to provide support including an increased supply of credit, training, technology support, and provision of micro and small enterprise information services.

For further and future research, potential research areas are suggested as follows:

- Future researchers are encouraged to conduct a study on restraining factors for MSEs' innovation by incorporating or only considering non-technological innovation (market and organization innovation).
- Future studies could also be developed by conducting a comparative study between different countries and/or industries.

Abbreviations

MSEs	Micro and small enterprise
GDP	Gross domestic product
R&D	Research and development

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Author contributions
The author undertook this research paper independently. The author also read and approved the final manuscript.

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