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ENHANCING SME PERFORMANCE THROUGH INNOVATION: EVIDENCE FROM A TRANSITION ECONOMY – KOSOVO

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Abstract. *Purpose* – What are the effects of implementing various types of innovation, including product, process, and technological innovations, on the performance of SMEs in the manufacturing sector? This is a question that preoccupies us a lot. This study seeks to examine the individual and integrated effects of these innovations. Indeed, we examine the impact of three categories of innovation – product, process, and technological innovation – on the performance of SMEs in the manufacturing industry.

Research methodology – We used a quantitative approach to execute this research, selecting SMEs at random using self-administered questionnaires. The data collected from 153 manufacturing SMEs was analyzed using hierarchical linear regression to investigate, evaluate, and refine the relation among product, process, and technological innovation and SME performance.

Findings – This study's findings reveal a clear and direct relationship between these three forms of innovation and SMEs' performance. This study also provides empirical evidence that various forms of innovation, either examined individually or as integrated, exert a positive effect on the performance of SMEs in the manufacturing industry.

Limitations – This study focuses on Kosovo-based SMEs, with the assumption of an upright connection between variables. Future studies can examine the existence of reverse causality in a variety of regional, cultural, and industrial settings.

Originality/Value – This study significantly advances existing knowledge by providing useful insights into the complex interplay among product, process, and technological innovation (examined from both individual and integrated perspectives) as well as the performance of SMEs in the manufacturing industry.

Keywords: product innovation, process innovation, technological innovation, SMEs performance, manufacturing industry, transition economy.

JEL Classification: L25, O3, O31, Q55.

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1. Introduction

In the current business landscape, presence of competition has forced SMEs to explore innovative approaches in order to survive (Casals, 2011). Firms are continuously trying to increase their competitive advantage in order to surpass their rivals and show themselves as the best survivors and leaders in their industry (Islami & Topuzovska Latkovikj, 2022).

A comprehensive analysis of the literature reveals that divers' types of innovation collaborate harmoniously to enhance the performance of SMEs, which improves and fosters SMEs' performance in manufacturing industry. In this vein, we seek to discuss the question that

follows: How do product, process, technological innovation, individually and synergistically link with SME performance in manufacturing industry? To answer this question, we explore the causal relationship between product, process, and technological innovation and SMEs performance through the utilization of four models. The first model includes the control variables SME age and SME size. In the second model, the independent variable "product innovation" was incorporated. In the third model, the independent variable "process innovation" was incorporated. Lastly, the fourth model included the variable "technological innovation" as an independent variable. The evaluation of implications among product, process, and technological innovation and the SMEs performance is crucial for recognizing how these three divers' forms of innovation contribute to SME performance in manufacturing industry.

Measuring the innovation-SME performance relationship is important in both academic and practical spheres? First, SMEs are a crucial source of employment, innovation, and economic expansion, and their capacity to advance many sustainable development goals surpasses their size (Endris & Kassegn, 2022; ITC, 2019). In both developed and underdeveloped nations, SMEs are crucial in driving economic growth (OECD, 2018; Ayyagari et al., 2011). Indeed, SME importance is common in the majority of economies, especially in emerging countries (World Bank Group, 2019). According to Ayandibu and Houghton (2017), SMEs "are the engine of growth" and "are essential for a competitive and efficient market" (p. 135). In this vein, the substantial contribution of SMEs to economic development is widely recognized (Neagu, 2016). Thus, the findings of this study make a significant contribution to the development of SMEs.

Second, it is essential to recognize that innovation denotes "the execution of a new or substantially enhanced product (goods or services), process, marketing technique, or organizational method in business practices, workplace structure, or external relations" (OECD, 2005, p. 46). In markets that are unpredictable, ambiguous, and complex, innovation is the foundation for competitive advantage and expansion, particularly when globalization accelerates and competition increases (Hacklin et al., 2018), also is a vital component for SMEs advancement, development, and achievement (Zhou, 2006). Consequently, the significance of innovation for a firm's long-term viability has garnered considerable academic attention, as evidenced by the studies of Lee et al. (2019), Rubera and Kirca (2012), alongside management focus (e.g., Pwc, 2014). Traditionally, innovation has been a key factor in determining business performance (Shouyu, 2017), economic growth (Çütçü & Bozan, 2019), and potential advantages of the interaction among various forms of innovation (Lee et al., 2019). Therefore, it is important to undertake additional research in the domain of innovation (Khattak et al., 2022) and to emphasize the importance of transforming organizational culture to enhance employee involvement in innovative tasks inside their firms (Abduraimi et al., 2023).

Third, the objective of the current study is to improve our understanding of the relationship between the performance of SMEs in the manufacturing industry and the interaction among product, process and technological innovation. The linkage among divers' types of innovation and SMEs performance has been characterized in several studies with varied results; some studies have found no significant connection or even a negative relationship (Dunk, 2011; Koellinger, 2008; Santos et al., 2014). Numerous studies have demonstrated

a positive linkage among innovation and SMEs' performance (Alam & Adeyinka, 2021; Bustinza et al., 2019; Tsinopoulos et al., 2018; Gomes & Wojahn, 2017; Roach et al., 2016; Rosli & Sidek, 2013). Some studies, such as Rousseau et al. (2016) found that the integration of process and product innovation results in greater performance improvements than product innovation in isolation. Thus, this study tries to inspect the way by which product, process and technological innovation and SMEs performance are linked.

To summarize, this study seeks to investigate how performance of SMEs in the manufacturing sector relates with product, process, and technological innovation. By examining this relationship, we aim to not only advance academic understanding but also provide practical guidance for businesses seeking to leverage divers' types of innovation as a strategic instrument for fostering SMEs performance and driving success in the ever-evolving market. Moreover, based on these research findings, SME managers may have the capacity to formulate distinct innovation development policies. Consequently, the results of this study will enrich management literature by providing a valuable model that integrates product, process, and technological innovation while connecting these constructs to SMEs performance in the manufacturing industry. The paper proceeds in the following manner: the next Section investigates and discusses the relationships among product, process, and technological innovation, as well as SMEs' performance. The next Section describes the procedures for data analysis and methodology. The final Sections delve into the research's findings, implications, conclusions, and limitations.

2. Theoretical framework and hypotheses development

Regardless of its precise definition and classification, innovation is considered the fundamental capability of a firm to generate value and one of its most important competitive assets, applicable to both large enterprises and SMEs (De Jong & Vermeulen, 2006). SMEs are increasingly recognized as a crucial source of new product development and technology (Hilmersson, 2014). Innovative practices of SMEs are significantly distinct from those of larger counterparts due to variations in their business structures and operations (De Jong & Marsili, 2006).

The literature has extensively analyzed the linkage among innovation and the performance of SMEs, yielding diverse findings. Some research suggests a positive linkage among innovation and the performance of SMEs, while others have identified no significant association or even a negative relationship. Santos et al. (2014) illustrate in a study performed in Brazil that no relationship exists among innovation and the financial metrics of companies, such as return on assets, return on equity, and return on sales. Additionally, some studies suggest that innovation does not influence firm performance (Dunk, 2011; Koellinger, 2008). On the other hand, Rosli and Sidek (2013) found that the SMEs' performance of Malaysian manufacturing sector is much influenced by process as well as product innovation. Rousseau et al. (2016) discovered that the integration of product and process innovation generates more performance improvements than product innovation by itself.

The present study utilizes the research of various authors (Bigliardi, 2013; Battisti & Stoneman, 2010; Varis & Littunen 2010; Birkinshaw et al., 2008; Yeh-Yun Lin & Yi-Ching

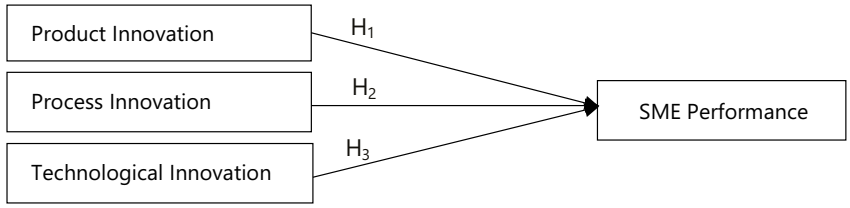

Figure 1. Conceptual framework for testing variables

Chen, 2007) who have conducted analyses on innovation; we adopt a comprehensive perspective to gauge innovation within the framework of our research. Whereas, the assessment of SME performance, as used in their studies by Huo et al. (2014), Islami et al. (2023), Islami and Topuzovska Latkovikj (2022), and Mulolli (2024), involves the evaluation of both non-financial and financial performance dimensions.

Figure 1 illustrates a model that proposes the relationship among product, process, and technological innovation and SME performance. The following section provides an explanation of the research hypotheses. The interrelation among H_1, H_2 and H_3, is illustrated in Figure 1.

2.1. The effect of product, process and technological innovation on SME performance

Product innovation – is acknowledged as a critical component of value development (Weerawardena, 2003; Han et al., 1998). Product innovation, according to the OECD (2009), is the introduction of a good or service that is unique or greatly improved in terms of its qualities or intended uses. "This covers major improvements in technical specifications, components and materials, integrated software, user-friendliness, or other functional qualities" (see, p. 11). Product innovation, according to Rousseau et al. (2016), helps entrepreneurial businesses to profit by being the first to satisfy customer needs. The interaction among product innovation and firm performance is a topic of interest in a variety of studies with mixed results. Issau et al. (2021) identified a non-significant relationship among SME performance and product innovation, based on data from 281 managers and owners of manufacturing SMEs. Other research established a positive relationship among product innovation and the performance of SMEs. The study by Le et al. (2023) indicated that production innovation, particularly the enhancement of existing products, is a crucial factor influencing the performance of SMEs in Vietnam. According to research on SMEs in the United States, both process and product innovation help SMEs improve performance (Pett & Wolff, 2009). An additional study by Lee et al. (2019) provides empirical evidence that both radical and incremental product innovation activities positively influence firm performance. Drawing from the aforementioned literature review, the present study posits the following hypothesis:

H_1: Product innovation is positively related to performance of manufacturing SMEs.

Process Innovation – as defined by the OECD (2009) refers "to the execution of a new or substantially enhanced production or delivery technique". "This encompasses substantial modifications in equipment, methodologies, and/or software" (p. 12). Process innovation

can be scientifically described as a systematic and regulated series of actions through which new concepts are developed and transformed into tangible innovation (Marzi et al., 2017). Process innovation is essential for achieving competitive advantages, particularly in a volatile business landscape (Linton & Walsh, 2008). Process innovation yields productivity enhancements, superior product quality, and reductions in cost and time (Un & Asakawa, 2015; Martínez-Ros & Labeaga, 2009). Process innovation is a basic source of competitive advantage widely embraced by the manufacturing industry (Nemetz & Fry, 1988). Process innovation development is regarded as more arduous, resource-intensive, and time-consuming to implement (Terjesen et al., 2016). In contrast to product innovation, process-related innovation activities require distinct information search methodologies and managerial judgments (Linton & Walsh, 2008).

Process innovation is particularly vital for small and medium-sized firms (SMEs); their constrained resources and flexibility render the advantages gained from successful process innovation especially advantageous (Aliasghar et al., 2023). The implementation of process innovation is vital for the success of SMEs. The relationship among process innovation and firm performance has garnered considerable attention across numerous scholarly investigations. Aliasghar et al. (2023) conducted a study that involved 124 SMEs in the automotive industry and found that process innovation has a positive connection with performance. A study conducted by Piening and Salge (2015) utilized cross-sectional data from a comprehensive survey of German industrial and service enterprises. The findings of this study indicate that participating in various innovative activities increases the likelihood of effective process innovation, which has a favorable link with financial performance. Another study conducted by Lee (2019) shows that efforts related to process innovation improve business performance. Drawing from the aforementioned literature review, the present study posits the following hypothesis:

H_2: Process innovation is positively related to performance of manufacturing SMEs.

Technological Innovation – pertains to new ideas and principles that are practical and/or commercialized by businesses (Naudé & Szirmai, 2013). Cao et al. (2021) define technological innovation as the creative endeavors undertaken by firms to obtain advanced, innovative technologies and research and development investments derived from human resources, assets, and other elements to achieve core competitiveness in their respective domains. Mytelka and Farinelli (2000) offer an alternative view of technological innovation as the process by which companies gain mastery and carry out the design and manufacturing of new products or services, regardless of whether these goods or services are new to rivals, consumers, or the worldwide market. Technological innovation can reorganize the production components of firms, serving as a crucial element for meeting market demand, enhancing competitiveness, establishing enduring competitive advantages, and attaining sustainable development (Zhang & Aumeboonsuke, 2022).

Technology innovation is crucial for differentiating firm products/services and is essential for enhancing the economic performance of the firm (Akram et al., 2011). However, SMEs in developing nations have obstacles in technological innovation due to their scale and unpredictable circumstances (Wamuyu, 2015). SMEs in various industries have employed innovative technologies like artificial intelligence, big data, new mobile applications, virtual reality and blockchain to adapt and endure during the crisis (Soni et al., 2021; Ameen & Willis, 2016).

Innovative technology is vital for helping SMEs to adapt, endure, and grow during crises and quick changes. SMEs can improve their capabilities, competitiveness, and long-term sustainability by using these technologies successfully.

However, in some research concluded that technological innovation had an adverse impact on firm performance reducing it (Leung & Sharma, 2021; Vithessonthi & Racela, 2016). In this line was also the study from Zhang and Aumeboonsuke (2022), illustrated through empirical analysis that technological innovation is negatively correlated with performance of the firm, indicating that innovation activities hinder firm success. Our focus on this part of the study is to measure the positive relationship among technological innovation and SME performance. This relationship among technological innovation and SME performance has garnered a topic of interest in a variety of studies. In a research of 204 SMEs conducted by Chege and Wang (2020), the findings revealed that technology innovation influences environmentally conscious owners, positively impacting the company's performance. Another study suggests that technological innovation positively impacts firm performance. The research advises that entrepreneurs need to design innovative strategies to enhance firm performance (Chege et al., 2020). Also Xu et al. (2019) discovered that technology positively influences the performance of enterprises in China's manufacturing sector. Drawing from the aforementioned literature review, the present study posits the following hypothesis:

H_3: Technological innovation is positively related to performance of manufacturing SMEs.

3. Methodology

This research employs a quantitative methodology grounded in a positivist framework. The study utilized a cross-sectional research approach and extensive questionnaire surveys to identify potential cause-and-effect relationships among research variables. A self-administered questionnaire collected the data (Mustafa et al., 2022). The data utilized in the present investigation were analyzed utilizing the robust IBM SPSS v.26 Statistics program, in accordance with its characteristics. The research methodology "evaluation strategy" is implemented. The data were collected from SMEs operating in Kosovo; 300 SMEs were chosen at random based on their compliance with our selection criteria. Firms contacted were required to have at least ten full-time employees. We gathered the data using an online questionnaire and invited SMEs to participate via mail, phone, or internet.

This comprehensive analysis involved the utilization of various statistical tests to examine different aspects of the data and test the research hypotheses. The statistical tests employed in the analysis include: descriptive analysis, convergent and discriminant validity, t-test, ANOVA, correlation matrix and hierarchical linear regression. It is important to note that this study employs a similar approach and adheres to a comparable procedure for testing research hypotheses as that of Islami et al. (2023).

3.1. Data

The study's sampling frame was sourced from the Kosovo Agency of Statistics (KAS), n.d. registry. Established in 1948, the KAS is the official national statistics bureau of Kosovo. It is important to address the question: why Kosovo? The rationale for choosing Kosovo as a

research setting is that organizations in Kosovo often face significant turbulence, complexity, uncertainty, instability, and adverse situations (Islami, 2021a). The region in which Kosovo is located is notorious for its high levels of conflict and challenges, which can complicate commercial operations due to increased uncertainties and risks. Therefore, firms are compelled to engage in innovation as a means of thriving and expanding within the market. Out of the pool of ten thousand SMEs that are registered with KAS, 300 firms were picked at random based on our selection criteria. Participants were directed to fill out the questionnaires exclusively by high- and middle-level managers with broad responsibilities in SMEs, who responded authoritatively to questions about product, process, and technological innovation and SME performance (non-financial and financial performance). The survey used the subject approach, which relied heavily on respondents' self-evaluation (Islami & Mustafa, 2023). This method is useful for collecting large amounts of data on all innovation outputs and activities (Lee et al., 2019; Mairesse & Mohnen, 2010). The data was collected between the months of March and May 2023.

The cover letter that accompanied the questionnaires conveyed to the participants the study's objectives, ethical considerations, data confidentiality, and potential contributions. The use of follow-up phone calls and mailings, as advised by Frohlich (2002) and Islami (2021a), led to an improvement in the response rate. With 153 responses in total, the study attained a response rate of 51% of the overall sample, suggesting that the investigation was successful. The current study has implemented strategies to address the possibility of non-response bias that could have occurred throughout the data gathering process. The study obtained a response rate of 51%, which is regarded rather elevated. These findings indicate that the sample used in the investigation is probably representative of the entire sample (Podsakoff et al., 2003). The demographic statistics of the respondent SMEs in the survey is detailed (see Appendix A).

3.2. Measurement

The study utilized validated scales for measuring product, process and technological innovation, SMEs performance. These scales were sourced from various studies such as: (a) Bigliardi (2013), Battisti and Stoneman (2010), Varis and Littunen (2010), Birkinshaw et al. (2008), Yeh-Yun Lin and Yi-Ching Chen (2007) for innovation; (b) Alves and Lourenço (2022), Islami (2021a, 2021b), and Huo et al. (2014) for non-financial performance; and (c) Islami (2021a, 2021b), Gölgeci and Kuivalainen (2020), Mulolli et al. (2020), Huo et al. (2014), Qi et al. (2011) and Flynn et al. (2010) for financial performance. In cases where the existing literature was insufficient in providing consistent and trustworthy items, new items were developed by utilizing the authors' understanding of the constructs, observations gathered from on-site visits to SMEs, and discussions with notable executives and scholars. Thus, modifications were made to those components to suit the objectives of the present research.

The participants provided their responses on a Likert-type with five point's scale that ranged from 1 to 5. The present investigation employs a set of constructs and measurements, which are listed in Appendix B. To ensure questionnaire reliability, an English language specialist produced the English version first, which was then analyzed and translated into

Albanian by an experienced Kosovan management professor. Another English professor and an English-speaking HRM professor translated the Albanian version into English. The back-translated version was analyzed for differences in comparison to the English version. The Albanian questions were rephrased to correspond with their English equivalents.

3.3. Construct validation

The current data analysis and result investigation has followed several steps in its approach. Research constructions were defined and the unidimensionality of the scale confirmed using exploratory factor analysis (EFA). The underlying dimensions were found via a principal factor analysis with varimax rotation. Appendix B display only loadings above 0.50 (>.50) (Hair et al., 2019) for convenience.

Based on the preliminary factor analysis, it was found that none of the item displayed a low loading on its respective factors. The findings show that all of the items had loadings on their respective factors that surpassed the recommended level of 0.50. Furthermore, none of the components showed cross-loadings with other factors. The data's adequacy was confirmed by conducting the KMO and Bartlett tests, as indicated by the results presented in Appendix B.

Then, Cronbach's alpha was utilized to evaluate the reliability of product, process, and technological innovation, and SME performance, in the setting of assessing their respective reliabilities. Table 1 presents the quantities of items and reliability coefficients for each construct, as well as the means and standard deviations. Cronbach's alpha values ranging from 0.6 to 0.8 are considered acceptable (Shi et al., 2012). The reliability coefficient for all constructs exceeds the prescribed threshold of 0.6, thereby confirming the acceptability and reliability of the measurement items.

Table 1. Means, standard deviations and reliability of the product, process and technological innovation and SME performance (source: authors)

Construct	# Items	Cronbach's alpha (reliability)	Mean	St. Dev.
Prod_Inn	2	.736	3.954	1.082
Prcs_Inn	3	.735	3.939	.893
Tech_Inn	2	.655	3.974	.960
SME_Per	11	.814	4.066	.846

4. Hypotheses testing

Table 2 illustrates the correlations between the main constructs. The correlation among variables was significant and under the value 0.7. The research revealed that the variance inflation factors (VIFs) of the variables related to product, process, and technological innovation and SME performance were below 10. This indicates that multicollinearity is not a concern, aligning with the results of Kutner et al. (2005) and Acquaah (2007). Initially, the study focused on assessing the direct effects of divers' types of innovation on SMEs' performance.

Table 2. Main variables' correlation matrix (N = 153) (source: authors)

Variables	Prod_Inn	Prcs_Inn	Tech_Inn	SME_Per	SME_age	SME_size
Prod_Inn	1					
Prcs_Inn	.680**	1				
Tech_Inn	.602**	.691**	1			
SME_Per	.489**	.625**	.574**	1		
SME_ag[e]a	.110	.153	.195*	.066	1	
SME_size[b]	–.064	–.019	.101	.111	.039	1

Note: *$p < 0.05$; **$p < 0.01$.
[a]Log of the number of years since establishment.
[b] Log of number of employees.

The hypotheses of this research are tested through a series of hierarchical linear regression analyses. For the purpose of testing, four models were generated in their totality. The control variables SME age and SME size were included in Model I. The independent variable "Prod_Inn" was added in Model II. The independent variable "Prcs_Inn" was added in Model III. The independent variable "Tech_Inn" was added in Model IV. The variable that was influenced by Prod_Inn, Prcs_Inn, Tech_Inn was SME performance as a depended variable. The regression findings are presented in Table 3.

Model I evaluates the linkage among SME Performance and the control variables. Similarly, the findings suggest that SME age has a non-significant and positive relationship with SME performance ($p > 0.10$), while SME size has a non-significant and positive relationship with SME performance ($p > 0.10$).

In Model II, the incorporation of Product Innovation enhances the explanatory power of Model I, as evidenced by the F-test for the change in adjusted R^2 ($R^2 = 24.3\%$, $F > 17.405$, $p < 0.001$). Consequently, it is evident that "Prod_Inn" significantly influences the performance of SMEs in the manufacturing sector. The findings demonstrate that "Prod_Inn" has a positive and significant relationship with innovation ($p < 0.001$), hence supporting Hypothesis 1 ($\mathbf{H_1}$↑).

In Model III, to assess the direct impact of "Prcs_Inn" on SME performance, this variable was incorporated into Model II, resulting in a marginally significant change in the explanatory power of Model II, as seen by the F-test for the change in adjusted R^2 ($R^2 = 15.2\%$, $F > 25.881$, $p < 0.001$). The regression analysis indicates that "Prcs_Inn" exerts a positive and significant impact on SME performance ($\beta = .568$, $p < 0.001$), hence supporting Hypothesis 2 ($\mathbf{H_2}$↑).

Finally, in Model IV, the addition of "Tech_Inn" to Model III resulted in a marginally significant change in the explanatory power of Model III, as evidenced by the F-test for the change in adjusted R^2 ($R^2 = 2.1\%$, $F > 22.434$, $p < 0.05$). The findings demonstrate that "Tech_Inn" exerted a positive and significant influence ($p < 0.05$) on SME performance, hence supporting Hypothesis 3 ($\mathbf{H_3}$↑). The results of this study are presented in Table 4.

Table 3. Regression results analysis on SMEs performance (N = 153)[a] (source: authors)

Dependent Variable SME Performance								
Variables	Model I		Model II		Model III		Model IV	
	β	(*t*-value)[b]	β	(*t*-value)	β	(*t*-value)	β	(*t*-value)
SME_size[c]	.062	(.762)	.006	(.078)	–.036	(–.567)	–.054	(–.850)
SME_age[d]	.108	(1.339)	.143	(2.017)*	.129	(2.041)*	.102	(1.615)
Prod_Inn			.498	(6.998)***	.091	(.998)	.056	(.611)
Prcs_Inn					.568	(6.185)***	.431	(4.003)***
Tech_Inn							.223	(2.345)*
R^2	.016		.260		.412		.433	
Adjusted R^2	.003		.245		.396		.414	
Change in adjusted R^2			.243		.152		.021	
F-test for change in adjusted R^2			48.975***		38.253***		5.500***	
p-value for R^2 change	111		.000		.000		.020	
Model F	1.228		17.405***		25.881***		22.434***	

Note: "for the change in adjusted R^2 and *F*-test change in adjusted R^2, Model II is compared with Model I. Model III is compared with Model II. Model IV is compared with Model III".
[a] "The coefficients are standardized regression coefficients".
[b] "Critical values of the t distribution for a = 0.10, α = 0.05, α = 0.01, and α = 0.001 (two-tailed test) are $^{+}$= 1.65, * = 1.96, ** = 2.58, and *** = 3.30, respectively".
[c] "Log of number of employees".
[d] "Log of the number of years since establishment".

Table 4. Hypotheses test results (source: authors)

Hypotheses – (Path)	Results
Direct effects	
H_1: Product Innovation → SME Performance	Supported
H_2: Process Innovation → SME Performance	Supported
H_3: Technological Innovation → SME Performance	Supported
Control paths	*Coefficient* (*t-value*)
SME size → SME Performance	.062 (.762)
SME age → SME Performance	.108 (1.339)

5. Discussion and research implications

The current research study explored the relationship among divers' types (product, process and technological) innovation, and their impacts on the SMEs' performance in manufacturing industry. The objective of this research is to expand and reproduce previous studies conducted in two main domains, encompassing product, process, and technological innovation and SMEs' performance in manufacturing industry. The findings revealed a positive and significant relationship between the performance of SMEs in the manufacturing industry

and the application of specific kinds of innovation (product, process, and technological innovation), or a combination of these kinds of innovation. The results suggest that SMEs can achieve success by leveraging different items of (product, process and technological) innovation. The present study's results align closely with findings of those authors (e.g., see Aliasghar et al., 2023; Le et al., 2023; Xu et al., 2019; Rousseau et al., 2016), which reveal a significant and positive relationship among different forms of innovation and the SMEs' performance.

These results contribute valuable insights to the management literature and can be utilized by both academics and practitioners for further analysis. The theoretical significance of the research is highlighted by providing a direct view of the link among product, process, and technological innovation on SME performance. It validates the strategic involvement of product, process, and technological innovation by the proposition that the integration of those divers' types of innovation into SME management can enhance SME success and improve perceptions of such management. The managerial implications establish the foundation for developing an integrated model that involves the amalgamation of different types of innovations to foster SMEs development and achieving competitive advantage through the effective utilization of product, process and technological innovation and SME performance, resulting in a synergistic result.

Managerial implications – the study's managerial implications underscore the importance of acknowledging the necessity for SMEs to integrate various forms of (product, process and technological) innovation, into their operations. Although several SMEs acknowledge the importance of this requirement, there is still a significant difficulty in converting this acknowledgment into successful implementation methods. An important challenge is the confusion that individuals at SMEs face when it comes to the precise techniques for adopting various forms of innovation. This misconception frequently stems from a limited comprehension of the entire range of viable innovation practices. The present research provides a valuable instrument for managers to evaluate the comprehensiveness of their extant product, process and technological innovation. Through a concept, development, and validation process, the proposed methodology attempts to establish a comprehensive and trustworthy metric for the product, process and technological innovation and SME performance construct. The paper proposes for integrating various types of innovation into a unified framework to improve SME performance. In order to effectively tackle this challenge, it is imperative that SME managers place a high priority on enhancing their expertise in innovation management. Through this approach, they are capable of efficiently integrating various forms of innovation; thereby generating favorable impacts on SMEs' performance. This approach recognizes the multifaceted nature of innovation and its potential impact on SMEs. Instead of viewing product innovation, process innovation and technological innovation as separate entities, a unified framework acknowledges their interconnectedness and seeks to leverage synergies among them. Therefore, it is recommended that manufacturer's managers to establish a strategic plan enhancing knowledge and skills in innovation management and to navigate complexities associated with integrating different innovation types. Ultimately, the effective integration of various types of innovation can drive positive outcomes for SMEs. It can help increase product quality, operational efficiency, market positioning, and overall competitiveness. By embracing

innovation management as a strategic priority, SMEs may seize new development possibilities and thrive in dynamic business environments.

Furthermore, it is critical for SMEs to see innovation as an ongoing process rather than a one-time activity. For long-term success, innovation strategies must be continuously evaluated and refined based on feedback, market dynamics, and emerging trends. By addressing these managerial implications, SMEs may better navigate the complexity of innovation implementation and maximize the potential of innovation to enhance their firm's performance and competitiveness.

Finally, the research findings provide useful insights regarding the functioning of SMEs in Kosovo and similar regions. Besides, the results help managers identify innovation strategies that are more effective in promoting SMEs performance. Enhancing the internal environment of SMEs is vital for increasing the innovation efficiency of manufacturers. To attain this objective, it is essential to execute the adoption of effective product, process and technological innovation.

6. Conclusions

The present research adopts an interdisciplinary perspective to comprehensively investigate the effects of product, process, and technological innovation on the performance of SMEs in manufacturing industry. This work addresses two research questions: (a) Is there a significant connection among the performance of manufacturing SMEs and the implementation of specific types of products, process, and technological innovation? (b) Does the use of a mix of product, process, and technological innovation in manufacturing SMEs show a positive relationship? A comprehensive, valid, and reliable tool was developed to assess the link among product, process, and technological innovation and SMEs performance for the purpose of examining these matters. We conclude that implementation of different types of innovation can enhance SME performance in manufacturing industry. Actually, our hierarchal regression study has determined that product, process, and technological innovation have a significant influence on SME performance in manufacturing industry. This research provides empirical evidence that various types of innovation, when separate and mutually reinforcing, have a positive and direct effect on the performance of SMEs.

This research provides empirical evidence that product, process, and technological innovation have a positive and direct impact on SME performance. These results enhance the current understanding about the innovation-SMEs performance interface and offer substantial practical guidance for strategic managers and firm managers. In order to effectively tackle this challenge, it is imperative that SME managers place a high priority on enhancing their expertise in innovation management. These findings enable them to efficiently integrate various forms of innovation, resulting in positive impacts on SMEs' performance.

Ultimately, the findings of this research significantly enhance our understanding of the interplay between SMEs and product, process, technological innovation. Additionally, the study provides helpful suggestions for managers of SMEs. Furthermore, this study greatly advances academic contributions by clarifying the relationship among product, process, and technological innovation, as well as its effects on SMEs' performance in Kosovo and the surrounding region.

6.1. Limitation and future research

Despite the substantial contributions it has made to both academic and practical domains, this research study is constrained by various limitations. The limits that have been highlighted have revealed possible directions for future studies. First, it is fundamental to acknowledge that the present research may impose limitations on our ability to infer causality among measures of product, process, and technological innovation and performance indicators. An extension of the design timeframe could be implemented. For future research to further elucidate these findings, a longitudinal methodology that is more meticulously devised may be implemented. Longitudinal research may yield more substantial insights into the evolution of innovation and performance across time. This can be done by a three-stage design, the collection of firm-level data before and after the adoption of product, process, and technological innovation, followed by the collection of performance data after a specified period of time. By comparing data before and after the adoption of product, process, and technological innovation and analyzing their impact on SME performance in the subsequent period, researchers can establish more robust causal links between product, process and technological innovation and performance of SMEs.

Second, this study investigates three forms of innovation: product, process, and technological innovation. However, the study may have overlooked several potential confounding variables that could influence the association between innovation and SME performance. Future studies may widen the scope of the innovation field by looking into a number of internal and external factors, as well as new categories that could influence SME innovation. Future investigations may incorporate any justifiable supplementary endogenous or exogenous element into the framework and may conduct longitudinal analyses that would allow researchers to track the dynamic interplay between innovation and performance over time to scrutinize the interrelation among variables.

Third, while the current study focused solely at the direct relationships among three forms of product, process, and technological innovation and SME performance, it provided valuable insights into these relationships. However, there is room for future research to look into additional dimensions of these relationships. Future research can delve into mediating relationships by employing an integrative and holistic methodology to investigate the phenomenon of reverse causality to determine whether SMEs' performance influences the adoption of product, process, and technological innovation.

Finally, this study focuses solely on SMEs in the manufacturing sector in Kosovo. Also, this study examined product, process, and technological innovation, performance, and SME across a single industry. Given the variations in the application of performance metrics and product, process, and technological innovation across industries, SME sizes, and age groups, this study is unable to elucidate the specific ways in which they enhance the performance and competitiveness of SMEs in distinct contexts and countries. This merger can be evaluated across various geographical, cultural, and industry contexts. Intriguing disparities may exist between nations and their causes. Islami (2021b) suggests comparing the cultures of Western countries to those of developing and transitional economies.

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Author contribution

The contributions of the authors are as following:

Enis Mulolli was responsible for data collection. The data analyzed on this paper were collected by him for his doctoral thesis.

Xhavit Islami conceived the study and was responsible for the design and development of the data analysis, and for data interpretation.

Medain Hashani in the revised version of the paper was responsible for financial data analysis and interpretation, and corresponding with the journal.

We give the final approval of the version to be published.

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We confirm that this work is original and has not been published elsewhere nor it is currently under consideration for publication elsewhere. We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). And that it is responsible for communicating about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from: medain.hashani@aab-edu.net.

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APPENDIX

Appendix A. Characteristics of sample SMEs (N = 153) (source: authors)

Characteristics	Number	*Percent (%)*
Industry sector		
Food	30	19.6 %
Textile	11	7.2 %
Construction	42	27.5 %
Chemical	4	2.6 %
Other	66	43.1 %
Number of employees		
10–49	94	61.4 %
50–249	59	38.6 %
Firm age		
≤10	32	23.6 %
11–20	41	30.1 %
>20	63	46.3 %

Appendix B. Instruments for product, process and technological innovation and SME performance (source: authors)

Types of Innovation (KMO test = 0.880; Bartlett test: Approx. $\chi 2$ = 469.52, df =21, Sig. =.000). "To what extent did your company use the following statement in last year?" "*Please, for each item indicate the degree of your agreement or disagreement*", (*evaluate from 1 – "not at all" to 5 – "to an extreme extent"*).		
Innovation (*Product, process and technological innovation*)		Loadings[a]
(Prod_Inn_1)	In our firm, a lot has been invested in the development of new products.	.723
(Prod_Inn_2)	Our company has developed a new method of working for the production of products.	.816
(Prcs_Inn_3)	Our firm has generated a new form of work organization which results in more effective costs.	.710
(Tech_Inn_4)	The use of digital technology in the field of marketing has contributed to the success of our company.	.682
(Prcs_Inn_5)	We have developed a new strategy to realize our firm's objectives.	.747
(Tech_Inn_6)	In our company, we have invested in technological advancements that improve the effectiveness of the work.	.804
(Prcs_Inn_7)	The latest innovations or changes implemented by our firm have given us a competitive advantage in the market where we operate.	.820
SME Performance (*Non-financial and financial performance*) (KMO test = 0.847; Bartlett test: Approx. $\chi 2$ = 703.50, df = 55, Sig. = .000).). "To what extent did your company use the following statement in last year?" "*Please, for each item indicate the degree of your agreement or disagreement*", (*evaluate from 1 – "not at all" to 5 – "to an extreme extent"*).		
(Non_FinPer_1)	The overall product quality has been improved.	.727
(Non_FinPer_2)	Responsiveness to customers has been increased.	.771
(Non_FinPer_3)	Customer satisfaction with the service to him has increased.	.854
(Non_FinPer_4)	The delivery speed of the product has been increased.	.704
(Non_FinPer_5)	Delivery dependability has been improved.	.756
(Non_FinPer_6)	Our firm's market share growth has increased.	.763
(FinPer_1)	Growth in return on investment has been increased.	.838
(FinPer_2)	Sales of products/services have increased.	.810
(FinPer_3)	Return on sales (ROS) has been increased.	.579
(FinPer_4)	Our company's profit has increased.	.799
(FinPer_5)	Manufacturing cost has been reduced.	.599

Note: [a] "The cutoff values suggested by Hair et al. (2019)."