

Collaboration Networks and Sustainable SMEs Performance: The Role Of Digital Leadership as Moderating Variable

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Abstract. The rapid development of technology can be an obstacle for SMEs, only if SMEs cannot adjust advantage of the technological advances. To successfully adjust, SMEs need to have the most-fitted leadership style. The concept of contemporary leadership contributes to and deals with rapid technological developments in digital leadership. Digital leadership adopts digital platforms in the process of achieving performance to achieve organizational success. In addition to digital leadership, SMEs must also be able to take advantage of opportunities by establishing collaboration with various business actors outside the organization such as suppliers, customers, and research organizations even with their competitors. The collaboration will increase knowledge through the exchange of information, which will certainly support the increase in innovation capabilities that lead to sustainable performance. This research was conducted in the city of Medan with research objects, SMEs assisted by the Department of Cooperatives and SMEs in Medan. The purposive population was chosen based on a minimum criterion of 2 years of business, used social media, and business actors who are technology literate and active in target activities. The number of samples to be studied is 180 business people. To test the validity and compatibility of the model, use confirmation factor analysis (CFA). The research method uses a quantitative approach. Quantitative analysis using a structural equation model. This study reveals that digital leadership moderates the relationship between innovation capabilities and sustainable MSME performance, as well as innovation capabilities, mediating the relationship between collaboration networks on sustainable MSME performance. In addition, collaboration networks have a significant impact on innovation capabilities, as collaboration networks have a significant impact on sustainable MSME performance.

Keywords: Collaboration Networks; Innovation Capabilities; SME's Sustainable Performance; Digital Leadership

1. Introduction

The process of globalization, along with ongoing technological improvements, results in increased competitiveness among enterprises. In particular, the rapid development of technology can become an obstacle for SMEs to achieve sustainable performance and play their role as a driving force for the national economy if SMEs cannot take advantage of these technological advances. SMEs that can use social media effectively and efficiently are influenced by their organizational leadership. Leaders that possess a digital mentality exhibit superior abilities in overseeing online operations, including maintaining client connections,

promoting products, resolving issues, and making informed judgments regarding the company's online requirements [32].

The concept of digital leadership is very new. A significant discovery has been made regarding the impact of digitization on performance. The effectiveness of communication between executive levels is enhanced by the integration of digitalization in organizational management, as stated by [12]. This will result in enhanced production, increased customer happiness, and a larger market share. Digital leadership is crucial in formulating the organization's goal and executing strategies to realize that vision by motivating employee enthusiasm and enhancing operational efficiency [9];[31].

Furthermore, alongside digital leadership, the business landscape is undergoing rapid and dynamic transformations. Thus, it is imperative for small and medium-sized enterprises (SMEs) to establish an extensive network in order to enhance their access to diverse sources of information, knowledge, and experiences. SME collaborative networks play a crucial role in achieving success in this research endeavor. The collaboration networks model was derived from the research conducted by [61], which formulated a model for collaboration networks in the context of invention development. Based on reference [61], collaboration networks can be explained by four variables: Suppliers, Clients, Competitors, and Government.

Collaboration networks, as defined by [66], comprise both vertical and horizontal networks. Vertical networks comprise suppliers, rivals, and customers [67];[30];[8], whereas horizontal networks contain of research institutes, universities, and governments, aiming to exchange information, expertise, and experiences to facilitate MSME innovation [56]. Collaborative Networks are highly suitable for Small and Medium Enterprises (SMEs) with constrained resources. Through the establishment of collaborative networks, small and medium-sized enterprises (SMEs) will form cooperative relationships that have the potential to enhance commercial possibilities and foster corporate growth [58];[19].

Innovation capability is a crucial feature that contributes to the sustained performance of small and medium-sized enterprises (SMEs), particularly in developing countries [54]. Several studies have examined the correlation between the ability to innovate and the sustainable success of small and medium-sized enterprises (SMEs). Typically, investigations into the capacity for innovation are conducted within the context of large corporations. Indeed, there is a notable contrast between SMEs and large organizations in terms of resource availability. SMEs typically have restricted resources, whereas large companies have ample resources at their disposal. This disparity enables large companies to effectively employ their resources to enhance their performance [64]. Innovation is recognized as a strategic catalyst for entering competitive markets and enhancing resilience. In addition to being a precursor to sustainable economic development [54]. Hence, the ability to innovate is regarded as the most precious and indispensable intangible resource based on knowledge for the company's survival, competitiveness, and long-term viability.

Thus, small and medium-sized enterprises (SMEs) play a crucial role in fostering sustainable economic growth by generating employment, facilitating innovation, embracing technological progress, and alleviating poverty through wealth accumulation [2]. Furthermore, small and medium-sized enterprises (SMEs) lack experience and are unable to establish connections with larger entities in the market [59]. Thus, it is crucial for SMEs to prioritize the enhancement of their innovation capacity through the acquisition of entrepreneurial knowledge, the adoption of new technologies, and the improvement of their competence. This strategic approach is necessary for SMEs to sustain their market position.

2 Literature Review

2.1 Sustainable SMEs Performance

Corporation performance refers to the degree to which a corporation attains its established objectives. In recent decades, firms have primarily prioritized the economic goal of earning financial returns for shareholders [62]. Businesses are placing greater emphasis on sustainability, making it a central focus for their survival and growth [41];[28]. The overall assessment of business success has two main aspects: financial performance and non-financial performance [56]. Financial performance refers to the evaluation of a company's performance based on its value for money and financial operations. Non-financial performance refers to a company's performance that cannot be quantified in terms of money. This includes factors like brand reputation, customer satisfaction, organizational performance, and innovation activity.

2.2 Innovation Capability

Innovation is a strategic method of transforming a corporation, either in reaction to internal or external modifications or by taking a proactive stance towards environmental conservation [22]. Innovation capability pertains to a company's inclination to embrace novel creations or technologies in comparison to its counterparts [47]. It may also be described as the act of embracing a behavior or concept that is associated with a system, device, policy, process, program, product, or service that is unfamiliar to an organization. The innovation capacity refers to the company's aptitude to effectively utilize innovation in order to provide solutions for enhancing business performance and capitalizing on commercial prospects [43]. Innovation capability refers to an organization's capacity to convert its accumulated knowledge and new ideas into products and business models that successfully accomplish its strategic objectives [14].

2.3 Digital Leadership

The topic of leadership is a fascinating area of study in organizational behavior. Academics aim to establish a theoretical basis for leadership, while professionals strive to adopt and implement leadership models that enhance their organizations' effectiveness [17];[24]. Theories of change and transformational leadership are crucial in driving organizational structural changes and managing the challenges posed by rapid technology advancements [65].

Research focused on practical application has established a connection between digitization and leadership, which aids in understanding and explaining the shifts in leadership perspectives that are brought about by digitalization [32]. Digital leadership include the leadership's capacity to oversee and direct staff's online actions, such as creating product descriptions and resolving consumer inquiries, as well as managing marketing initiatives, problem-solving, and making decisions regarding online business operations [33].

2.4 Collaborative Networks

The Collaborative Network Model was adapted from [61] research that developed a collaborative network model for innovation development. According to [61], Collaborative networks can be explained by four variables: Suppliers, Clients, Competitors, and Research Organizations. Small and medium-sized enterprises (SMEs) have the opportunity to engage in

collaborations with a range of external business entities, including suppliers, customers, research organizations, and even competitors. This collaboration facilitates the exchange of information, thereby enhancing knowledge and ultimately boosting innovation capabilities. Consequently, SMEs are better equipped to achieve successful product launches [8]. Thus, supplier collaboration can enable companies to combine the different experiences and experiences of suppliers to improve solutions or create new methods for product development [3];[13]

2.5 Collaboration networks and innovation capability

Collaborative networks play a crucial role in boosting innovation capacity [69];[11] and comprise four key components: suppliers, customers, rivals, and research institutions [61]. Collaborative networks can be established by leveraging external networks, such as universities, rivals, and governments, which can provide support for innovation [63];[39]. Therefore, establishing a collaborative network with external partners will facilitate the exchange of knowledge, experience, and information, thereby fostering a positive attitude towards change and potentially improving the ability to innovate. Hence, it is anticipated that collaborative networks would have an impact on the ability to innovate.

H₁: Collaboration Networks are positively related to Innovation Capability.

2.6 Collaboration networks dan sustainable SMEs Performance

Facing the pressure of intense competition, SMEs can respond quickly to market demands by working with suppliers to modify existing products [61]. The solution to developing competitiveness and facing challenges in SMEs is through collaborative networks, where SMEs will find the best solutions to face challenges and pressures, creating collaborative networks can help SMEs to be better [34];[25];[21];[66]. Therefore, collaborative networks are expected to influence the sustainable performance of SMEs.

H₂: Collaboration Networks are positively related to Sustainable SMEs Performance.

2.7 Innovation Capability and Sustainable SMEs Performance

There is a scarcity of prior research that examines the correlation between innovation capability and the performance of small and medium-sized enterprises (SMEs) in terms of sustainability. Existing scholarly research indicates a positive relationship between innovation and the performance of manufacturing sector companies [29];[7]. The ability of SMEs to innovate is what allows them to reach a high level of competitiveness in both domestic and international markets [6]. The ability of firms to innovate and effectively handle information in order to develop new techniques, products, and processes is referred to as innovation capability [26]. Hence, the ability to innovate enables organizations to respond to swiftly evolving market trends [18];[49]. Hence, the implementation of creative cooperation is anticipated to have an impact on the long-term effectiveness of small and medium-sized enterprises (SMEs).

H₃: Innovation Collaboration is positively related to Sustainable SMEs Performance.

2.8 Innovation capabilities as a mediator

There are still few studies assessing the mediating role of innovation capability on collaboration networks and sustainable SMEs performance. It can be seen that collaboration networks can increase innovation capability [46];[69];[11], collaboration networks are built through collaboration, with competitors and governments that can support the development of innovation [63];[39]. SMEs that have implemented collaboration networks by utilizing knowledge and information can increase innovation capability [51], and innovation development carried out by SMEs through the creation of new products can encourage sales growth, profits, and market share [37];[57];[55]. Thus, sustainable SMEs performance is largely determined by the ability to innovate. Therefore, it is expected that collaboration networks will affect sustainable SMEs performance through innovation capability.

H₄: Innovation capability positively mediates the relationship between collaboration networks and sustainable SMEs performance

2.9 Digital Leadership as moderating

Although the concept of digital leadership is still relatively new, it has not been studied in depth. In the context of leadership, the theory of change and transformational leadership plays a key role in the mechanisms faced by organizational change and technological developments [65]. Furthermore, digital leadership is also strongly associated with innovation (for example, enhancing creativity and innovation) [35];[5];[44];[50]. Thus, the role of government agencies in strengthening the performance of sustainable SMEs is to facilitate digital leadership training programs for SMEs. Furthermore, digital leadership will accelerate the company's ability to create new ideas, processes, and systems in services to achieve higher financial and non-financial performance. Therefore, as a moderating variable, digital leadership plays an important role in strengthening innovation capability and sustainable SMEs performance

H₅: Digital leadership positively Moderator the relationship between innovation capability and sustainable SMEs performance.

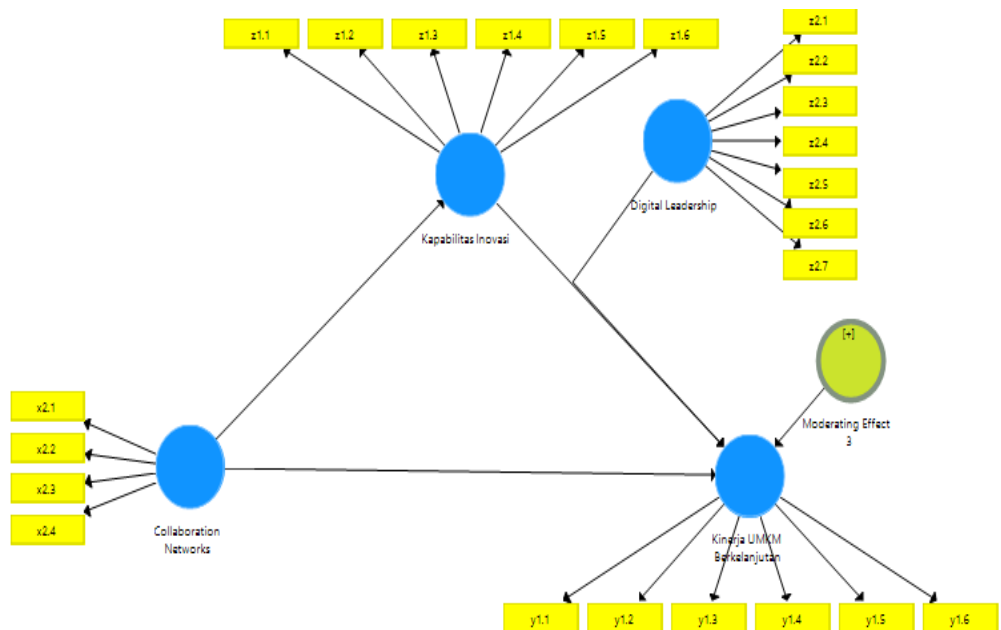


Fig 1. Conceptual Framework

3 Methodology

3.1 Research Methodology

The study was carried out on small and medium-sized enterprises (SMEs) that received assistance from the Department of Cooperatives and SMEs in Medan. The sample size for this study consisted of 180 small and medium-sized enterprises (SMEs). In order to assess the accuracy and appropriateness of the model, the Loading Factor and Average Variance Extracted (AVE) were employed. The hypothesis in this study was tested using the Structural Equation Model (SEM) method, which is a data analysis tool.

3.2 Measures

All study measures are made using a Likert scale of 1 to 5, with 5 representing strong agreement and 1 representing extreme disagreement. All of the measures were created based on previously published research, and their validity and reliability were established. Collaborative networks are evaluated using indicators derived from [37];[38]. Five questions derived from [16] based on [44] were used to evaluate innovation capacities as a mediating construct. Six items were taken from [33] and modified for digital leadership as moderating constructs were used to measure it. Lastly, six questions derived from [46] were used to assess sustainable SMEs performance

4 Result and Discussion

4.1 Results

Validity and Reliability Test

Based on the validity and reliability test, the following results were obtained

Table 1. Validity

	Average Variance Extracted (AVE)
Collaboration Networks	0,742
Digital Leadership	0,632
Innovation Capability	0,703
Sustainable SMEs Performance	0,749

The recommended AVE value is higher than 0.5 [17]. It was found that all AVE values >0.5 indicate that the validity conditions based on the AVE were met.

Reliability

Furthermore, the reliability test was carried out based on the composite reliability (CR).

Table 2. Composite Reliability (CR)

	Composite Reliability
Collaboration Networks	0,920
Digital Leadership	0,923
Innovation Capability	0,934
Sustainable SMEs Performance	0,947

The recommended Composite Reliability value is higher than 0.7 [17]. As we all know, all Composite Reliability values > 0.7 which means it has met the reliability requirements based on Composite Reliability. Then, the discriminant validity was tested using the Fornell-Larcker approach. Table 4.3 presents the results of discriminant validity testing.

Table 3. Discriminant Validity

	Collaboration Networks	Digital Leadership	Innovation Capability	Sustainable SMEs Performance
Collaboration Networks	0.861			
Digital Leadership	0.588	0.795		
Innovation Capability	0.825	0.634	0.838	

Sustainable SMEs Performance	0.721	0.722	0.757	0.865
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During discriminant validity testing, the square root of the Average Variance Extracted (AVE) of a latent variable is compared to the correlation value between the latent variable and other latent variables. It is established that the square root of the average variance extracted (AVE) for each latent variable surpasses the correlation value between the latent variable and other latent variables. Therefore, it can be inferred that the study has satisfied the criteria for discriminant validity.

4.2 Bootstrapping

Table 4 Presents the Results of The Bootstrapping Test.

Table 4. Bootstrapping

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Collaboration Networks -> Innovation Capability	0.825	0.823	0.037	22.071	0.000
Collaboration Networks -> Sustainable SMEs Performance	0.208	0.199	0.087	2.382	0.017
Innovation Capability -> Sustainable SMEs Performance	0.250	0.251	0.084	2.980	0,003

According to the findings shown in Table 4.4, the following outcomes are observed:

1. Collaboration networks positively impact innovation capability, as indicated by a path coefficient value of 0.825 in the original sample. This effect is statistically significant, with a P-value of 0.000, which is less than the threshold of 0.05.
2. Collaboration networks have a beneficial impact on the sustainable performance of small and medium-sized enterprises (SMEs), as indicated by a path coefficient value of 0.208 in the original sample. This effect is statistically significant, with a P-value of 0.017, which is below the threshold of 0.05.
3. The Innovation Capability of SMEs has a significant and positive impact on their Sustainable Performance, as evidenced by a path coefficient value of 0.250 (original sample) and a P-Values value of 0.003, which is below the threshold of 0.05.

Table 5 Presents The R-Square Value (Coefficient of Determination) for Each Endogenous Variable.

Table 5. Coefficient of Determination (R-Square)

	R Square
Innovation Capability	0.681
Sustainable SMEs Performance	0.712

Based on the results in Table 5:

1. It is known that the coefficient of determination (r-square) of Innovation Capability is 0.681. This value can be interpreted that the effect of Collaboration Networks on Innovation Capability is 68.1%.
2. It is known that the coefficient of determination (r-square) of the Sustainable Performance of SMEs is 0.712. This value can be interpreted that the effect of Collaboration Networks and Innovation Capability on Sustainable SMEs Performance is 71.2%.

4.3 Mediation Test

Table 6 presents the results of the mediation test.

Table 6. Mediation Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Collaboration Networks -> Innovation Capability -> Sustainable SMEs Performance	0.206	0.206	0.070	2.944	0,003

Based on the results of the mediation test in Table 4.6, Innovation Capability significantly mediates the relationship between Collaboration Networks and the Sustainable Performance of SMEs, with P-Values = 0.003 < 0.05.

4.4 Moderating Test

Table 7 presents the results of the moderating test

Table 7. Moderating Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Moderating Effect (Digital Leadership) -> Sustainable SMEs Performance	-0.117	-0.115	0.029	4.075	0.000

Based on the results of the moderating test in Table 4.9, Digital leadership moderating (strengthening) significantly the effect of Innovation Capability on the Sustainable Performance of SMEs, with P-Value = 0.000 < 0.05. Therefore, the role of digital leadership as a moderating variable is to accelerate innovation capability toward the sustainable performance of SMEs.

5 Discussion

The study's findings suggest that collaborative networks exert a beneficial impact on the capacity for invention. The findings of this study corroborate the outcomes of other research, indicating that collaborative networks have the potential to foster creativity [69];[39]. Specifically, the study affirms that an augmentation in the prominence of collaborative networks leads to a corresponding increase in innovation. Consequently, by utilizing a Collaboration Network, small and medium-sized enterprises (SMEs) will have access to diverse and significant sources of information [63]. It provides possibilities for small and medium-sized enterprises (SMEs) to acquire information. The study's findings are corroborated by the discovery that establishing connections between suppliers, clients, competitors, and research institutions forms a collaborative network model that facilitates the creation of innovation [61];[66].

The research findings indicate that innovation capability plays a crucial role in enhancing the performance of sustainable MSMEs. Furthermore, the results demonstrate a positive correlation between innovation capability and the performance of sustainable MSMEs. The findings of this investigation align with the statement [29];[7]. This demonstrates a strong positive association between innovation and performance. Companies that allocate resources to cultivating their innovation potential are more likely to achieve future success [54]. The ability of SMEs to innovate is a crucial factor in their ability to achieve a high degree of competitiveness [6]. Empirical research in the context of small and medium-sized enterprises (SMEs) consistently reveals a positive association between innovation capabilities and SME performance. The findings of this study are corroborated by [1];[23], which contend that small and medium-sized enterprises (SMEs) can enhance their performance by augmenting their innovation capacity through knowledge acquisition and technology adoption.

Moreover, the ability to innovate serves as an intermediary factor that influences the impact of collaborative networks on the performance of small and medium-sized enterprises (SMEs) in terms of sustainability. The findings of this study demonstrate that collaboration networks established by small and medium-sized enterprises (SMEs) with external entities, including customers, suppliers, competitors, and the government, have fostered the exchange of knowledge, expertise, and information, thereby promoting innovation and ultimately enhancing the long-term performance of SMEs. Collaboration networks offer significant opportunities for SMEs to enhance their performance by leveraging imported inputs and fostering the generation of innovative solutions to address challenges.

Furthermore, digital leadership plays a crucial role in influencing and regulating the connection between innovation capabilities and the sustainable performance of small and medium-sized enterprises (SMEs). This finding enhances the examination of leadership and the success of small and medium-sized enterprises (SMEs). This outcome has enhanced the significance of digital leadership in the capacity for innovation and the sustainable performance of small and medium-sized enterprises (SMEs). The discovery demonstrates that digital leadership enhances the connection between the ability to innovate and the sustainable performance of small and medium-sized enterprises (SMEs). The implementation of digital leadership will expedite the company's capacity to generate innovative ideas, develop novel processes, and establish efficient service systems, while enhancing both financial and non-financial performance. Therefore, digital leadership utilizes resources efficiently to attain a lasting competitive edge, resulting in the optimal utilization of organizational resources and improved efficiency.

6 Conclusion

This study focuses on and adds to the existing but limited research focused on the moderating influence of digital leadership. This study helps address several deficiencies, namely from the standpoint of small and medium-sized enterprises (SMEs). Furthermore, this study has effectively validated the impact of collaboration networks on the sustainable performance of SMEs, with innovation capabilities acting as a mediating factor. It also highlights the importance of providing information to enhance innovation, which in turn influences the performance of SMEs. The study discovered that digital leadership acts as a moderator in the connection between innovation capability and the performance of sustainable small and medium-sized enterprises (SMEs). Digital leadership entails expediting the company's capacity to generate novel concepts, procedures, and frameworks in order to attain both monetary and non-monetary accomplishments. Small and medium-sized enterprise (SME) owners should recognize the significance of adopting a modern leadership approach, such as digital leadership, to enhance the ability to innovate and improve the long-term performance of their SMEs.

Acknowledgements

We express our appreciation to Universitas Sumatera Utara for providing us with the chance and research funds through the TALENTA Grants 2022. Additionally, we would like to convey our gratitude for the support provided by the Research Institute of Universitas Sumatera Utara. This research is highly beneficial for enhancing our proficiency and advancing our careers as teachers at Universitas Sumatera Utara.

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