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Applying Structural Equation Modelling for Assessing Factors Influencing Innovation Capacity and Business Efficiency

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Abstract

In the context of globalization and competition between businesses in an increasingly fierce international trade environment, participating in production networks and global value chains has become an inevitable requirement for developing each economy, in which business forces play a core and pioneering role. Creativity is critical to achieving significant business success in any business, large or small, in manufacturing, commerce, or service. Implementing innovation and creativity will have a profound and lasting impact on the enterprise's ecosystem. Conversely, companies that fail to innovate risk falling behind and becoming irrelevant in today's rapidly evolving business environment. Therefore, this study aims to analyze the key factors affecting innovation capacity and business efficiency, thereby providing solutions to promote this process. The study applied two methods: qualitative research, conducted through interviews, and focused on ten expert group discussions to adjust the content of observed variables to suit the characteristics of the business. Quantitative research was undertaken in 700 samples of representative managers representing 700 small and medium enterprises to test the model and research hypotheses. The findings show five factors affecting innovation capacity, with a significance of five percent, and innovation capacity affecting business efficiency. This result contributes to academic value and is a reference for research on innovation capacity in Vietnam in the coming years. There are five policy implications and contributions to promoting and building a creative culture in businesses, stimulating creativity and passion. After all, developing an innovative culture in businesses will create the role of individuals and groups with endless intelligence and creative passion for creating unique, different, and valuable products with high added value, significantly contributing to promoting growth in businesses.

Keywords: Structural Equation Modelling, Small and Medium, Innovation Capacity and Business Efficiency

1. Introduction

To effectively integrate into the international economy under the impact of the Fourth Industrial Revolution, Vietnamese businesses are required not only to be able to exploit and effectively use resources but also to Be agile in developing and applying scientific and high-tech advances, innovating, closely linking production and business strategies with scientific research activities and a team of scientists. Based on the General Statistics Office (2023) data, small and medium-sized enterprises (SMEs) make up more than 97% of all businesses in the country. These SMEs provide employment for approximately 36% of the workforce, attract around 32% of the total capital, and generate about 26% of the net revenue in the business sector. To gradually increase the value of revenue from innovation, it is necessary to promote the implementation of preferential policies and encourage innovation activities in SMEs. Let's explore some of the ways that innovation can impact business units from different perspectives.

Product and service innovation: A business interested in innovation – research and development – will create new products and services as well as improve and upgrade these items to make them more valuable on the market. This action will help them meet the ever-evolving needs of today's customers. Businesses appreciate the task of product innovation and will proactively direct their products to the next set of customers and market trends to keep up with market demand. Increase efficiency: Not only creating new products but innovation will also contribute to improving production and business operations processes, leading to increased efficiency and productivity [1]. Enhance the contribution value of all resources to reduce production costs, working time, and product delivery time.

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Competitive advantage: Innovative businesses will have a higher competitiveness than companies in the same industry. Creating or upgrading products and services will compete to attract new customers. Similarly, innovative changes to work processes will reduce costs and time, creating a competitive advantage in price and delivery time to attract cash flow faster. Cost savings: Innovation can also help companies save costs if they know how to invest in the long term. As science and technology develop, there are always many options for raw materials, products, and supporting technologies [2]. Changing and improving the use of resources will save costs in the long term. For example, Microsoft has placed servers containing huge amounts of data under the sea to save the amount of expensive electricity used to cool the system. Improve employee morale: Creativity can have a positive impact on employee morale. When employees can do new things in their work that are effective, they will feel like they want to stay longer and be more motivated. From there, it brings satisfaction to the company and improves the labor efficiency of each person.

Furthermore, in Vietnam, very few quantitative studies directly address the factors affecting innovation capacity; most are qualitative studies that analyze the current situation and propose solutions, reports, and articles to learn from experiences building innovation capacity in other countries. Therefore, this has allowed the author to explore novelty and motivation to conduct research and test the proposed innovation capacity model in the Vietnamese market, specifically in critical southern provinces, with small and medium enterprises as the primary research object. Overall, creativity and innovation can have a significant impact on a business, ranging from saving costs, improving work processes, improving employee morale, improving service quality, enhancing High efficiency, and saving time and effort so that companies can achieve success and long-term growth. From the above arguments, the authors would like to confirm that the research article impacting innovation capacity on the business efficiency of enterprises in Vietnam is necessary because of its importance and contributions to science and practice. This study focuses on assessing factors affecting innovation capacity and the business efficiency of enterprises, which suggests governance implications.

2. Literature Review and Hypothesis Development

2.1. Innovation Capacity (IC)

Innovation capacity is the ability to absorb and assimilate external knowledge, turn it into new or unique ideas, and then use these ideas to pioneer new products while combining them with brands' effective commercialization. Innovation capacity is the sum of an organization's capacity to develop forms of innovation in the market. These are the following capacity groups: research and development (R and D), marketing capacity, production capacity, learning capacity, resource exploitation capacity, and strategy building capacity. Innovative capacity is the process of pursuing profits based on efforts to create new products or services that are accepted by the market [3]. This comprehensive process includes many complex and interacting social activities, such as research, technology deployment, design, manufacturing, marketing, commercialization, education, and training by many related organizations, such as businesses, universities, and state management agencies.

Thus, this study presents his view on innovation capacity, a business's ability to use internal or external resources to produce products and ultimately introduce new products or processes to the market or make changes and improvements to existing products or processes. Thus, innovation capacity focuses only on measuring product and process innovation capacity, as argued above. Product innovation capacity is the introduction of a new product or service to the market that is very different from a business's previous products or has significant improvements on existing products or services [4]. Process innovation capacity is the application of new processes or significant improvements to existing processes. Innovation capacity includes:

Significant changes in technology, equipment, materials, and software. These advancements have significantly impacted various industries, drove innovation, and improved efficiency, sustainability, and user experience. Recreating or changing a product manufacturing or service delivery process involves several strategic steps to ensure efficiency, quality, and customer satisfaction. Continually seeking improvements, businesses can effectively recreate or change their product manufacturing or service delivery processes to achieve better outcomes. Creating new ideas or new products and services to help businesses respond well to changes both internally and externally enhances customer satisfaction and engagement by providing relevant and personalized interactions [5]

2.2. Business Efficiency (BE)

Business efficiency refers to the quality of activities, demonstrating the level of resource utilization in the operation of processes, regardless of the scale and rate of change of each factor. Efficiency can be evaluated from different angles, subjects, scopes, and periods. Therefore, based on each specific angle, various types of efficiency can be distinguished: social efficiency, economic efficiency, economics-society, and business efficiency [6]. In this article, the author discusses business efficiency. Thus, business efficiency reflects the resource utilization required to achieve defined goals. Business efficiency is closely linked to an enterprise's business activities. This reflects the quality of business processes. By evaluating business performance, business managers will know which factors are being implemented in the right direction, bringing about high efficiency, and will try to promote them further in the next financial years. For any stagnant and ineffective factor, the cause will be identified, and a timely remedy will be discovered [7].

Business efficiency is evaluated in the following aspects: general business performance reflects the profit of all business capital, profit of equity capital, profit of sales revenue by period, production capacity of business capital, and production capacity of an expenditure business fee.

Efficiency in each enterprise: Reflects the efficiency of labor use; this helps businesses measure the output produced per labor hour. Higher productivity indicates more efficient use of labor, and businesses can accurately reflect and enhance labor efficiency, leading to increased productivity, reduced costs, and improved overall performance. Efficiency of use of fixed capital and fixed assets involves evaluating how well a company utilizes its long-term investments in assets such as machinery, buildings, and equipment. Besides, business assesses the efficiency of maintenance spending. Lower ratios indicate better maintenance efficiency and asset utilization. Efficiency of use of working capital and current assets, business involves evaluating how well a company manages its short-term assets and liabilities to maintain liquidity, operational efficiency, and profitability. Efficiency of contributed capital. The efficiency in each field does not represent the effectiveness of an enterprise; besides, business involves evaluating how effectively a company utilizes the funds invested by shareholders to generate profits and maximize shareholder value [8]. In this study, the author aims to measure the overall business efficiency of an enterprise because it reflects the level of use of all resources; thus, it can be assessed in general terms and allows the effectiveness of the entire enterprise to be concluded.

2.3. Corporate Culture (CC)

Corporate culture is a very important concept in the modern business environment because it affects the behavior, attitude, and effectiveness of each member of an organization. Corporate culture is also the factor that creates the difference and uniqueness of each business compared to its competitors. Simply put, corporate culture is the entire cultural values of an enterprise built throughout its existence and development of the enterprise, thereby forming rules that affect its operations of businesses, govern the thinking, behavior, and attitude of each member of the business, creating differences between businesses and is considered the unique tradition of each business [9].

Corporate culture has the following benefits: It helps consolidate decisions for businesses, especially difficult decisions, and corporate culture represents the attitude of that business. If the business's products are not good, the attitude of admitting mistakes will win sympathy information from the customer. Therefore, businesses should focus on data-driven decision-making, engaging stakeholders, managing risks effectively, and fostering a positive corporate culture; businesses can navigate difficult decisions more effectively and maintain customer loyalty even in challenging times. Help partners identify the company more clearly and in more detail [10], [11]. The core value of a successful company is shown in the way it serves customers; this is the spirit of service. Create customized presentations and documents that address the specific interests and needs of potential partners. Helps shape the organization's vision, which is the foundation for attracting and retaining the best and most contributing employees of the company. Because, in fact, most candidates are interested in the company's image, ethical values, and culture [12]. The influence of corporate culture on company performance, cohesiveness, innovation, and reputation is predominantly beneficial. An enterprise with a robust culture will own a unique style and character, which will allure and keep top-notch personnel and clients. Hence, the corporate culture has a significant impact on the growth of a corporation, setting it apart from other enterprises in the market. Consequently, the authors proposed hypotheses H1 and H2.

H1: Corporate culture positively influencing the innovation capacity.

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H2: Corporate culture positively influencing the business efficiency.

2.4. Leadership (LED)

Leadership is one of the topics of research interest because of its central and extremely important role in coordinating resources to create outstanding capabilities for businesses. Therefore, scientists have also come up with many definitions based on different approaches to leadership. However, widely accepted definitions are based on influence and interaction approaches. Leadership shapes the quality of relationships between leaders, their colleagues, and their subordinates, benefiting both employees and the business [13], [14]. In particular, when exploring with a deeper perspective, leadership is the process of influencing others, helping them understand and agree on what needs to be done and how to do it. It effectively facilitates individual and collective efforts to achieve common goals [15]. This means that the leader is the one who inspires the team to voluntarily and enthusiastically achieve personal, departmental, and corporate goals. The definition of leadership is very diverse, but they all point to the core role of leadership, which is the success of the business. Accordingly, this study shows that leadership includes the skills to understand leadership situations and help others accomplish business goals [16]. Therefore, leaders need to clearly understand vision and mission and use them as direction for leadership activities. However, to create both high "emotional and rational levels", leadership needs to help subordinates understand the situation and the overall ideals and goals of the business [17]. Leaders and followers cannot participate at a high level, both rationally and emotionally if they do not understand the vision and mission of the organization and what their current work is and means. What do they need to achieve? Therefore, leadership behaviors that help subordinates understand the vision and mission of the organization and the meaning of their work and inspire them to willingly follow the leader's direction are necessary to maintain leadership and business goals. Thus, the authors presented hypotheses H3 and H4.

H3: Leadership positively influencing the innovation capacity.

H4: Leadership positively influencing the business efficiency.

2.5. Technology (TE)

Technology plays a pivotal role in driving company innovation. Notable contributions include promoting operational efficiency, facilitating the development of novel goods and services, increasing flexibility, identifying potential possibilities, raising customer satisfaction, and cultivating a culture of innovative thinking [18]. Technology also furnishes the framework and capacities necessary for the creation of groundbreaking items. Cloud computing platforms provide entrepreneurs the opportunity to utilize robust computer capabilities without necessitating substantial upfront costs [19]. Utilizing big data analytics and business intelligence technologies enables the discovery of consumer analytics, which in turn serves as a source of inspiration for the development of new products. To achieve a competitive edge in today's corporate environment, it is crucial to effectively utilize technology to drive innovation. Companies must actively discover and incorporate emerging technologies, such as automation, AI, and big data analytics, to promote innovation across all areas and operations of the organization [20], [21]. When utilized efficiently, technology's contribution to driving innovation will persist in revolutionizing enterprises, goods, services, and experiences across many sectors and organizations. The future of businesses depends on making the most of technology to drive innovation and improve business efficiency. Thus, the authors presented hypotheses H5 and H6.

H5: Technology positively influencing the innovation capacity.

H6: Technology positively influencing the business efficiency.

2.6. Business environment (EN)

The business environment of an entity refers to the combination of all subjective and objective elements and situations that interact with and impact the business operations of the firm or organization [22]. These elements and conditions interact with each other and impact the business position of the organization to varying extents and in diverse ways [23]. Assessing the business environment is a crucial responsibility for firms, especially for strategic planning departments. It has a significant impact on the organization's future decision-making. When combined with evaluating the internal conditions of the company, analyzing the business environment helps establish short-term, medium-term, and long-term strategic objectives [24], [25]. It also aids in defining specific business goals and selecting effective and intelligent business strategies and environments. Thus, the authors presented hypotheses H7 and H8.

H7: Business environment positively affects the innovation capacity.

H8: Business environment positively affects the business efficiency.

2.7. Human resource development (HR)

The human resources are regarded as the fundamental element that dictates the success of every firm. An innovative and skilled workforce may assist firms in maintaining a strong presence in the highly competitive industry [26]. Human resources play a crucial role in all business operations, including the production of goods and the provision of services. They are responsible for generating material value, such as income and profits, and also contribute to the development of the company's brand [27], [28]. Every person is both a component and a vital part of the organization's functioning mechanism. In order for firms to achieve sustainable growth, it is imperative for managers to prioritize the enhancement of human resources, focusing on both innovative ability and business efficiency [29], [30]. Human resources have a crucial role in both current operational maintenance and future business development. In order to achieve consistent growth, a firm must consistently incentivize its employees to enhance their credentials and stay updated on new information and emerging trends in the sector. Thus, the authors presented hypotheses H9 and H10.

H9: Human resource development positively influencing the innovation capacity.

H10: Human resources development positively influencing the business efficiency.

2.8. Innovation capacity affecting business efficiency

Innovation capacity is an important factor that directly affects the business performance of an enterprise. Providing timely information is useful for organizations to make decisions in changing and competitive markets, and aggregated and integrated information has an increasingly essential function in coordination and decision-making. Other studies have shown that innovation capabilities affect performance [27], [28], [29]. The results demonstrate the promoting role of innovation capacity, thereby improving businesses' competitive advantage and business performance [30], [31]. The research results also show that companies must create and maintain innovation capabilities to transform into organizational results, such as organizational performance. Innovation capacity refers to coordinating and using knowledge and experience to develop new ideas, processes, systems, or products/services, thus benefiting customers, businesses, and stakeholders [32]. Innovation capacity is considered a specific and unique factor of each enterprise; it is a means to change businesses and help companies gain competitive advantage and increase business efficiency [33]. Innovative capacity not only helps businesses develop and maintain competitive advantage but is also a key factor in improving business performance. Businesses with strong innovation capabilities will be able to create new value, optimize processes, expand markets, and grow revenue and profits. At the same time, this capacity helps businesses enhance their brand, develop human resources, and adapt to changes in the business environment. Thus, the authors presented hypothesis H11.

H11: Innovation capacity positively influencing business efficiency

3. Research Methodology

To conduct this research, the authors approached the topic research from the following two main directions.

First, the authors will select foundational theories and build a theoretical model to analyze the implementation of innovation capacity and business efficiency in small and medium-sized enterprises in the Southeast region. In this research article, the authors examined the relationship between innovation capacity and business performance. To explain this relationship, the authors used interdisciplinary theories of economics and management, human capital theory, resource theory, and social identity theory to explain the number of influencing mechanisms in the relationship selected for research in the research article [34].

Second, after choosing an appropriate analytical and theoretical framework, the authors conducted an overview and built a scale to conduct surveys and actual interviews with 15 managers at small and medium-sized enterprises. Collected information and data will be analyzed by the author team to test research hypotheses and draw new contributions to current domestic and international research topics. More precisely, the authors have suggested augmentations, modifications, and revisions to theoretical concerns regarding innovation potential and commercial

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efficacy [34]. The study employs both qualitative and quantitative research methodologies. The authors employed a Likert scale consisting of five levels to assess survey items pertaining to the elements influencing both innovation capacity and business efficiency: Strongly disagree: respondents feel very negatively about the statement. Disagree: respondents feel somewhat negatively about the statement. Normal: respondents feel indifferent or have no strong opinion about the statement. Agree: respondents feel positive about the statement. Completely agree: respondents feel very positively about the statement.

The authors used the Likert scale to assess survey items related to the five factors influencing innovation capacity and business efficiency: business environment, leadership, human resource development, corporate culture, and technology. Each survey item was a statement related to these factors, and respondents were asked to indicate their level of agreement using the five-level Likert scale.

Data collection method: The authors will combine different methods to collect data and documents to analyze, compare, and evaluate factors affecting innovation capacity. and business performance with organizational methods and specific techniques used, including:

Desk research: The authors collect documents related to the research topic from domestic and international research works by scholars published in specialized management science journals. Next, the authors performed a comprehensive analysis of the collected documents to generalize and explain perspectives on innovation capacity and business efficiency. Also, from the literature review, the authors proposed an analytical model for their topic.

Questionnaire survey: Through synthesizing previous scholars' research related to the topic of innovation capacity and business performance, the authors designed a questionnaire. To collect data from 700 managers at small and medium enterprises in the Southeast region, the authors surveyed via email from January 2024 to March 2024 and then collected related information to carry out research. In the survey questionnaire, the authors focused on collecting information related to small and medium-sized enterprises in the Southeast region. In order to have a survey questionnaire suitable for the Vietnamese context, the authors combined inheriting a number of scales from previous scholars who conducted research on the research topic with building their own and having a number of scales associated with the characteristics of Vietnam. A stratified random sampling method ensures a proportional representation of businesses from all sectors and regions. The sample size includes 700 business managers, stratified by industry, size, and geographic location, but 646 valid survey questionnaires, reaching a rate of 92.28%. Moreover, the qualitative research methods are employed to construct study content and models, investigate elements, and develop an initial scale via expert interviews and group discussions in order to rectify and enhance the scales and questionnaires utilized in interviews.
The preliminary study results consist of the official questionnaire employed in the research, which encompasses the official rating and its associated components: Corporate culture (CC): it relates to the beliefs, behaviors, values, and norms that shape how employees within an organization interact with each other and conduct their work. Leadership (LED): it relates to the ability of an individual or a group of individuals to guide and influence others toward achieving common goals. Technology (TE): it relates to the tools, systems, and processes that organizations use to manage information, automate tasks, and facilitate communication. Business environment (EN): it relates to all external and internal factors that influence a company's operations, performance, and decision-making processes. Human resource development (HR): it relates to training, career development, performance management, coaching, mentoring, succession planning, and organizational development.
Data analysis: The authors used SPSS 20.0 and Amos software to test the direct influence of factors on innovation capacity and business performance. The authors also used Amos software to process survey data to examine the influence of the mediating variable organizational attractiveness in the relationship between innovation capacity and business performance. Research results after the survey were collected, processed data, and scientific reports with official data of 646 valid survey questionnaires, reaching a rate of 92.28%. Finally, the authors performed a series of tests of the SEM model. In structural equation modelling, various fit indices are used to assess the goodness-of-fit of the model.

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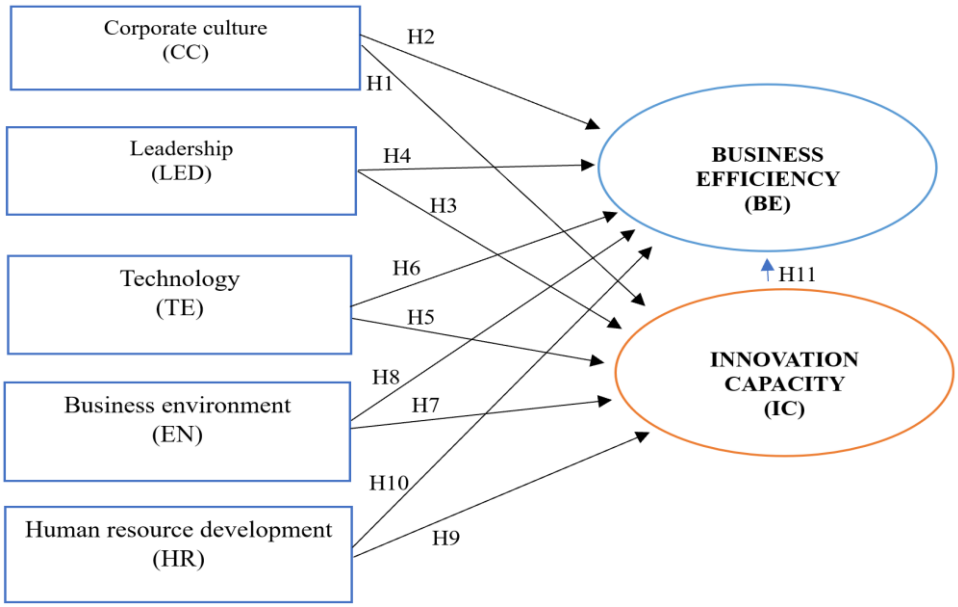

Figure 1. A research model for factors affecting innovation capacity and business efficiency

The critical factors affecting innovation capacity and business efficiency are presented in figure 1. The results showed five factors. These factors were new in the research model. These indices help determine how well the proposed model fits the observed data. Here are some commonly used indicators: Goodness-of-Fit Index (GFI) > 0.90 indicates a good fit. The model adequately represents the observed data. Root Mean Square Error of Approximation (RMSEA) < 0.08 indicates a reasonable fit. Comparative Fit Index (CFI) > 0.90 indicates a good fit. Standardized Root Mean Square Residual (SRMR) < 0.08 indicates a reasonable fit. Comparative Fit Index (CFI) > 0.9 indicates a good fit. Tucker-Lewis Index (TLI) or Non-Normed Fit Index (NNFI) > 0.90 indicates a good fit. Chi-Square/Degrees of Freedom (χ^2/df) < 5.0 indicates a reasonable fit [34].

4. Result and Discussion

4.1. Current status of innovation activities of small and medium enterprises in Vietnam

Innovation affects every aspect of a business, including production, business operations, models, and financial results; the level of impact depends on the choice of type and level of innovation.

Innovation helps businesses create new products and services, improve product quality, and increase customer satisfaction. When businesses continuously improve and develop, they will have a competitive advantage over other competitors in the market. Applying new ideas and advanced technology to production and business helps businesses attract a large number of customers, thereby increasing sales and revenue. At the same time, the difference in products and services also helps businesses build a strong and prestigious brand image in the market. This innovation strategy has helped the company develop more efficiently. This has helped Tesla build a unique brand that stands out from its competitors in the automobile manufacturing industry.

Innovation helps businesses optimize production processes and exploit all the potential of new technology. The result is improved labor efficiency and reduced production costs, thereby improving the competitiveness of businesses in the market. Walmart Corporation has applied radio frequency identification (RFID) technology to improve inventory management. Using an optimized inventory management process, Walmart can deliver products at the right time and to the right place, thereby improving customer satisfaction and strengthening its competitive position in the retail industry. However, savings through innovation activities need to be reinvested in further innovation in subsequent stages. To maintain sustainable growth, businesses need to continuously invest in innovative solutions to boost their performance and competitiveness in the market.

Innovation has a strong impact on the business development process of enterprises, helping them expand their operations and diversify their sources of income. For enterprises, using innovative measures, it helps them access new

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markets more easily and explore new business opportunities without having to invest a lot of capital. Enterprises can use e-commerce platforms to expand their scope of operations and reach global customers without having to have stores in their home country. The development of digital marketing and communication contributes to simplifying the ability to reach global customers, facilitating business expansion. Innovation helps businesses find alternative sources of income by diversifying their business models. Typically, Nike Corporation allows other companies to use its brand and designs to produce and market Nike-branded products. This approach generates revenue without requiring Nike to invest heavily in production and distribution. This shows that innovation not only expands the company's business but also creates new revenue opportunities for other companies.

The pace of employment growth matches that of production growth. Jobs are mostly generated in export-focused sectors, such as textiles and electronics, within the manufacturing and processing industries. The industries listed have drawn agricultural labor, leading to a shift away from agriculture, reorganizing labor towards more productive activities, and increasing productivity, per the World Bank's evaluation. Approximately 5,000 firms across the country aid in industrial output, with almost 90% being small and medium-sized enterprises (SMEs). Despite the above potential, innovation in Vietnamese SMEs still faces many difficulties and limitations.

Vietnam's ability to innovate and prepare for the 4th Industrial Revolution remains limited. Vietnam's Global Innovation Index (GII) is rated 48 out of 132 in 2022. However, Vietnam lags well behind top innovators like Japan, Singapore, Korea, and Malaysia in global innovation rankings and falls well below China, Indonesia, India, the Philippines, and Thailand. Consequently, significant efforts are required to enhance this index by improving the groupings of factors related to the business environment, capital market and investment, and technological application. The number of creative startups small and medium enterprises (SMEs), remains minuscule. Vietnamese firms lack the potential to generate ideas for developing new goods or manufacturing methods to enhance their competitiveness. While the Vietnamese Government shows more support for innovation activities compared to Thailand and Malaysia, small and medium enterprises in Vietnam allocate a low budget for research and development.

To promote the development of business innovation capacity, the Government needs to develop appropriate policies and support measures for innovative and startup businesses, including the establishment of innovation funds, venture capital, and startup funds. It is necessary to focus on the specific requirements of businesses and avoid ineffective formalities. Policy implementation requires close coordination between ministries, departments, sectors, and localities to achieve the highest efficiency. Support measures can be through the provision of financial support, such as preferential loans, tax reductions, or fee exemptions; technical support, including training, consulting, or sharing of new technologies. In addition, protecting intellectual property rights is also very important in encouraging businesses to invest in research and development. The Government needs to build and improve protection mechanisms, such as granting exclusive patents, controlling copyright infringement, or supporting the settlement of disputes related to intellectual property. The process of building and implementing policies, laws, and support measures requires close consultation and coordination between ministries, departments, sectors, and localities to achieve the highest efficiency.

According to the 2023 Annual Business Survey conducted by the National Statistics Office, small and medium enterprises (SMEs) constitute over 97% of all registered businesses in the country.

Table 1. Descriptive statistics for factors affecting innovation capacity and business efficiency

Code	N	Minimum	Maximum	Mean	Std. Deviation
CC1	646	1	5	2.988	1.043
CC2	646	1	5	3.022	1.019
CC3	646	1	5	3.073	0.982
CC4	646	1	5	3.060	1.014
LED1	646	1	5	3.368	0.889
LED2	646	1	5	3.491	0.980
LED3	646	1	5	3.303	0.986

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LED4	646	1	5	3.351	0.908
TE1	646	1	5	2.971	1.007
TE2	646	1	5	3.012	0.996
TE3	646	1	5	3.059	0.959
TE4	646	1	5	3.034	0.999
EN1	646	1	5	3.034	1.009
EN2	646	1	5	3.020	1.014
EN3	646	1	5	2.989	1.017
EN4	646	1	5	2.978	1.031
HR1	646	1	5	3.265	1.008
HR2	646	1	5	3.290	0.968
HR3	646	1	5	3.178	1.020
IC1	646	1	5	3.291	1.013
IC2	646	1	5	3.325	0.964
IC3	646	1	5	3.207	1.018
BE1	646	1	5	2.341	0.643
BE2	646	1	5	2.413	0.676
BE3	646	1	5	2.376	0.651

Table 1 displays the outcomes of descriptive statistical analysis on the variables that impact innovation capacity and business efficiency. These variables include minimum and maximum mean values of 1.0, 5.0, and 3.0. The standard deviation was around 1.0. Small and medium enterprises (SMEs) do not have a central position in the innovation system, and there is a limited number of technical goods that have been successfully brought to market. Currently, Vietnamese goods consumed domestically or exported are still complex because of their different characteristics, mainly in terms of price. A significant number of new enterprises have been founded, with only 23.9% focusing on science and technology and a small percentage being classified as innovative startups. Vietnamese small and medium enterprises are aware of and actively try to develop but lack collaboration and assistance from universities and research organizations. This survey carried out annually, gathers data from a stratified random sample of companies across various sectors. The classification of SMEs follows the criteria set by the Ministry of Trade, which defines SMEs as businesses with fewer than 250 employees and annual revenue not exceeding $50 million. The data collection involved mailed questionnaires and online submissions, ensuring a comprehensive representation of the business landscape.

Moreover, policies should be developed to support training and foster the provision of high-quality human resources to serve the innovation needs of businesses. The current State of innovation in Vietnamese enterprises in recent times shows that the lack of high-quality human resources is one of the main reasons for the limited creativity of enterprises. To encourage enterprises to develop high-quality human resources, the State needs to develop policies to support both time and funding for training and development, have preferential policies for engineers and researchers to transfer jobs, and implement public-private partnership programs on research and development. In addition, enterprises must strengthen cooperation and order high-quality human resources with universities, academies, research institutes, and international training institutions at home and abroad, creating conditions for students and interns to practice at enterprises to gain practical experience.

Table 2. Testing Cronbach's alpha for factors affecting innovation capacity and business efficiency

Code	Items	Corrected Item-Total Correlation	Cronbach's alpha if Item Deleted
Corporate culture (CC): Cronbach's alpha is 0.941		-	-

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CC1	Learning and sharing culture	0.849	0.927
CC2	Work environment and leadership style	0.828	0.933
CC3	Values and beliefs with building and maintaining a positive work environment	0.848	0.927
CC4	Continuous improvement and quality culture	0.917	0.905
Leadership (LED): Cronbach's alpha is 0.863		-	-
LED1	Enterprises are leaders in innovation in their industries	0.753	0.809
LED2	Enterprises operate in a broad product field, and motivational ability	0.703	0.829
LED3	Employee evaluation and development	0.645	0.853
LED4	Problem-solving skills and team-building skills	0.751	0.809
Technology (TE): Cronbach's alpha is 0.941		-	-
TE1	Evaluate the effectiveness of technology use in achieving business goals	0.859	0.923
TE2	invest in research and technology development and apply modern technology	0.852	0.926
TE3	Using artificial intelligence and machine learning	0.85	0.926
TE4	Evaluate and drive technological innovation initiatives to improve processes and products	0.878	0.917
Business environment (EN): Cronbach's alpha is 0.914		-	-
EN1	Easy access to loan capital and preferential interest rates for innovation activities	0.870	0.866
EN2	The Government creates conditions for companies to train and develop	0.844	0.875
EN3	Evaluate macroeconomic factors affecting business operations, such as interest rates, inflation, and exchange rates	0.790	0.894
EN4	Evaluate legal regulations affecting business operations, such as labor laws and consumer protection laws	0.717	0.919
Human resource development (HR): Cronbach's alpha is 0.894		-	-
HR1	Quality of human resources with job performance	0.761	0.877
HR2	Training program development and improvement	0.868	0.785
HR3	Enhancing employee satisfaction and commitment	0.753	0.884
Innovation capacity (IC): Cronbach's alpha is 0.911		-	-
IC1	Significant changes in technology, equipment, materials, software	0.823	0.870
IC2	Recreating or changing a product manufacturing process or service delivery process	0.873	0.830
IC3	Create new ideas or new products and services to help businesses respond well to changes both internally and externally	0.771	0.914
Business efficiency (BE): Cronbach's alpha is 0.850		-	-
BE1	Efficiency of use of fixed capital and fixed assets	0.719	0.790
BE2	Efficiency of use of working capital and current assets	0.740	0.770
BE3	Overall, reflects the efficiency of labor and human use	0.698	0.810

The results in table 2 show that the Cronbach's alpha coefficient for business efficiency (BE) is 0.850, whereas the Cronbach's alpha coefficient for corporate culture (CC) is 0.941. Furthermore, it is important to mention that all Cronbach's alpha values surpassed the threshold of 0.7, suggesting strong internal consistency. These policies contribute to improving the quality of human resources and enhancing cooperation between enterprises, training institutions, and scientific and technological organizations, thereby promoting the comprehensive development of enterprises that contribute to the development of the national economy. The Government needs to develop and deploy programs and campaigns to increase awareness, habits, and awareness of the importance of innovation for people and businesses. In addition, the Government needs to develop a comprehensive and sustainable set of evaluation indicators to encourage businesses to innovate, promptly commend and reward businesses with outstanding achievements in innovation, and create mechanisms to replicate and share successful models and experiences in innovation. For businesses, it is necessary to overcome the resistance to change in organizational culture, create endogenous motivation, encourage creativity, and build a flexible environment to adapt to market fluctuations. From there, practice initiative and creativity, don't be afraid to experiment, be willing to accept risks, and learn from failures.

4.2. Testing Factors Affecting Innovation Capacity and Business Efficiency

Figure 2 illustrates the testing parameters that impact innovation capacity and company efficiency, with a significance level of sig < 0.01. The indicators in the model satisfy the requirements and serve as the scientific foundation for the

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authors to further analyze the structural model equation. Besides, the development and application of science, technology, and innovation in Vietnam and the business community have made remarkable progress. Scientific and technological research results are applied faster, more widely, and more effectively in production, business, and social life, improving national competitiveness and gradually changing the growth model to rely more on the application of science, technology, and innovation.

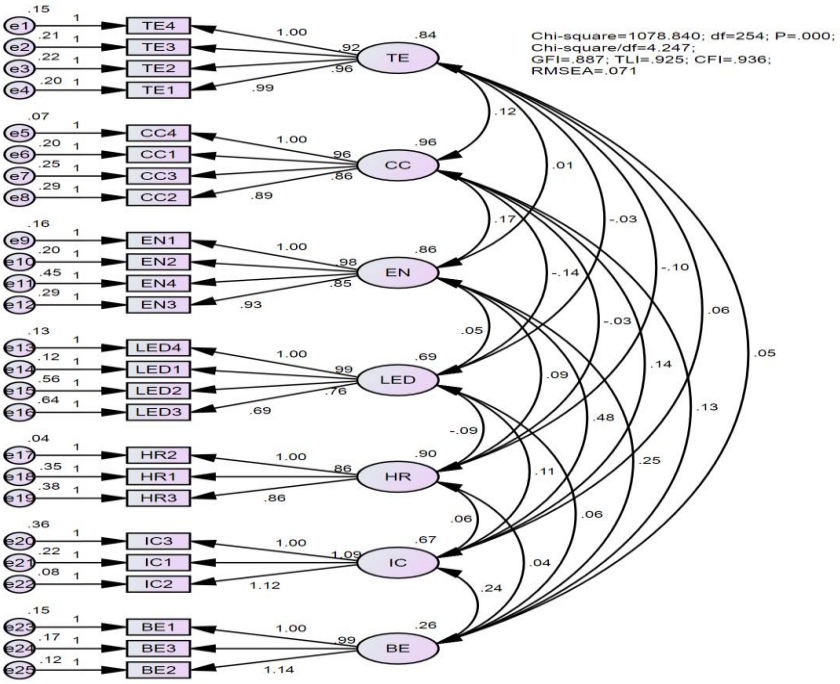

Figure 2. Testing confirmatory factor analysis for factors affecting innovation capacity and business efficiency

Management agencies have gradually innovated thinking in science and technology management and innovation in the direction of taking businesses as the center, research institutes, and universities as subjects focusing on research and development. Through resources, the mobilization of investment resources for science and technology and innovation is increased; businesses are supported in research, application, innovation, and technology transfer; and products are developed along the value chain. The general awareness of businesses and people about the role of science, technology, and innovation in production and life has changed significantly.

Table 3. Testing SEM model for factors affecting innovation capacity and business efficiency

Relationships			Standardized estimate	S.E	C.R	P	Results
IC	←	CC	0.075	0.028	2.705	0.007	Good
IC	←	LED	0.144	0.033	4.410	***	Good
IC	←	TE	0.073	0.030	2.413	0.016	Good
IC	←	EN	0.540	0.036	14.866	***	Good
IC	←	HR	0.077	0.037	2.083	0.037	Good
BE	←	LED	0.057	0.022	2.636	0.008	Good
BE	←	TE	0.040	0.020	1.983	0.047	Good
BE	←	EN	0.153	0.028	5.469	***	Good
BE	←	HR	0.054	0.025	2.183	0.029	Good
BE	←	IC	0.214	0.032	6.666	***	Good

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Relationships			Standardized estimate	S.E	C.R	P	Results
BE	←	CC	0.054	0.019	2.902	0.004	Good

*** Significant at 1 percent level.

Table 3 shows that the normalized beta coefficients positively impact innovation capacity and business efficiency. However, the normalized beta reflects the priority when implementing governance implications. Some businesses have prioritized investing, absorbing, and applying modern scientific and technological achievements in production, innovating machinery, equipment, and technology, creating new steps to improve product quality products, and increasing labor productivity and business competitiveness. The highest to lowest standardized beta coefficients are business environment (0.540), leadership (0.144), human resource development (0.077), corporate culture (0.075), and technology (0.073), respectively.

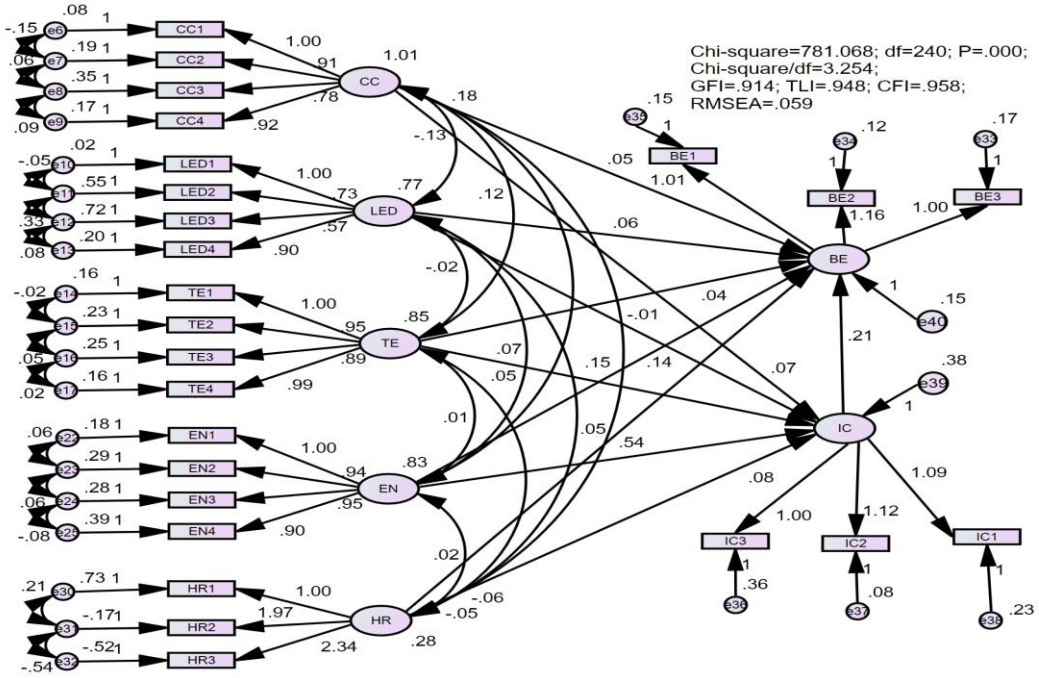

Figure 3. Testing research model for factors affecting innovation capacity and business efficiency

The findings in figure 3 illustrate the evaluation of various factors influencing innovation capacity and business efficiency. When the recommendation is made, priority is given to the business environment. Structural equation modelling is a complex statistical method used to examine and determine relationships between variables in a complex theoretical model. Statistical results show that the indicators in the model meet the requirements and satisfy the conditions for setting out policy implications. This is the test result, and 11 hypotheses were accepted with a significance level of 5%.

Table 4. Testing Bootstrap for factors affecting innovation capacity and business efficiency

Parameter			SE	SE-SE	Mean	Bias	SE-Bias	C.R
IC	←	CC	0.026	0.001	0.072	-0.002	0.001	-2.000
IC	←	LED	0.036	0.001	0.139	-0.005	0.004	-1.250
IC	←	TE	0.030	0.001	0.068	-0.004	0.003	-1.333
IC	←	EN	0.045	0.001	0.537	-0.003	0.004	-0.750
IC	←	HR	0.043	0.001	0.073	-0.004	0.003	-1.333
BE	←	LED	0.022	0.000	0.054	-0.003	0.003	-1.000

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Parameter			SE	SE-SE	Mean	Bias	SE-Bias	C.R
BE	←	TE	0.025	0.001	0.038	-0.002	0.003	-0.667
BE	←	EN	0.031	0.001	0.153	0.000	0.001	0.000
BE	←	HR	0.029	0.001	0.046	-0.008	0.006	-1.333
BE	←	IC	0.037	0.001	0.217	0.003	0.002	1.500
BE	←	CC	0.030	0.001	0.052	-0.002	0.002	-1.000

Table 4 presents the results of a Bootstrap test with 50,000 samples to analyze the impact of various factors on innovation ability and company efficiency. The test was conducted at a significance level of 0.05. The results of the Bootstrap test, performed 50000 times, are provided in Table 4, along with the number of observations. Therefore, the magnitudes of the C.R column do not surpass 2, indicating that the discrepancies in the estimations are minimal and lack statistical significance at a 5% level. Thus, the estimated results of the model are reliable. Promote businesses' open innovation activities, increasing research and development capabilities and supply-demand. The innovation is an important requirement in the business development process. In the context that the innovation ecosystem is still weak and incomplete, to solve this difficulty, the Government and businesses need to have strategic thinking, choose an innovation model suitable for businesses, connect with the science and technology environment, participate in the innovation ecosystem to quickly respond to customer needs, improve business efficiency.

4.3. Research result discussion

Based on the above results, the structural equation modelling analysis findings verified five characteristics influencing innovation capacity and business efficiency: Business environment (0.540) shows the highest standardized regression coefficient among the five factors, and priority should be given to implementing policy implications. Evaluating and analyzing the business environment will help businesses establish a strategic vision for future business development (short, medium, and long term), build the right goals, choose the correct direction, and create an innovative, effective business environment. A good business environment assessment will help businesses understand what opportunities they need to seize and what challenges they need to overcome.

Leadership (0.144) shows the second standardized regression coefficient among the five factors, and priority should be given to implementing the second policy implication. Leadership is a process in which a leader orients individuals in the group to perform work, go in the right direction, build a spirit of cohesion, work harmoniously to work together, and develop to achieve common goals. Human resource development (0.077) shows the third standardized regression coefficient among the five factors, and priority should be given to implementing the third policy implication. The human resource development process nurtures employees' capacity, skills, and attitudes. This helps increase the organization's value performance.

Corporate culture (0.075) shows the fourth standardized regression coefficient among the five factors, and priority should be given to implementing the fourth policy implication. Besides, corporate culture is also one of the essential factors that create the distinct value of a business. A business with a good culture will be more trusted by customers and partners. Technology (0.073) shows the lowest standardized regression coefficient among the five factors, and priority should be given to implementing policy implications last. In general, applying new technology in production is complex and needs to be done thoroughly. However, if done correctly, this process can help businesses improve production efficiency, increase competition, and adapt quickly to the market.

This finding underscored the need for a flexible research strategy to build models to support businesses investing in science and technology development, innovation, and creating relationships along the supply chain. Increase the effectiveness of preferential regulations for businesses investing in science and technology development, such as incentives for research results, new science and technology development and products, and new science and technology services. Focus on improving relevant institutions to strengthen connections between more productive export enterprises and domestic suppliers, creating conditions for domestic enterprises to invest in developing and applying science and technology modern science and technology, improving productivity, quality, production, and business efficiency.

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First, business environment (0.540) with sig. < 0.05, hypotheses H7 and H8 accepted in table 2 and table 3 [35], [36]. Develop and effectively implement a mechanism for using economic capital to support innovation and technology transfer. Complete and strictly implement regulations on enterprises establishing science and technology development funds. Consider this a mandatory requirement for state-owned enterprises and an encouraged activity with preferential support for businesses of other economic sectors. Encourage private individuals to establish or cooperate with the State to establish venture capital funds for research and development activities of new and high technology. At the same time, it focuses on effectively preventing the import of outdated technology that harms human health, resources, environment, socio-economic, national defense, and security. Therefore, the Government needs to implement many policies and programs to support innovation in science and technology, such as the Vietnam Innovation Support Program, which supports value chain research through scientific and technological research.

Secondly, leadership (0.144) with sig. < 0.05, hypotheses H3 and H4 accepted in table 2 and table 3 [37], [38], [39]. Raise awareness about the urgency of building and perfecting institutions to promote business investment in science and technology development. Party committees and authorities at all levels need to be more deeply aware of implementing the policy of science and technology as a top national policy, first of all by creating an institutional environment to promote businesses to invest in scientific development technology and innovation. Strengthen the roles and responsibilities of agencies and organizations in building management mechanisms, creating a favorable environment to promote businesses to invest in science and technology development and innovation. While leadership may have a lower direct impact than the business environment, its influence is still crucial. Leadership sets the vision and direction for the company, which can foster an innovative mindset. Influential leaders can inspire and motivate employees, creating a supportive environment for innovation. Moreover, leadership impacts other factors, such as corporate culture and human resource development, indirectly enhancing innovation capacity and business efficiency. At the same time, it promotes the potential for innovation and application of modern technology in the fields of management and promoting sustainable development. The State needs to continue to build and improve policies and mechanisms to support and encourage organizations, individuals, and businesses to invest in research, development, transfer, and application of scientific and technological advances. Accordingly, businesses following the approach of seeking development prospects are the types of businesses that are most adaptable to change to increase innovation capacity and business efficiency. Therefore, strategic management is considered the future vision of a business. If managers do this consistently, they will be more aware of industry trends and challenges. Administrators can be better prepared to face future challenges by implementing strategic planning.

Thirdly, human resource development (0.077) sig. < 0.05, hypotheses H9 and H10 accepted in table 2 and table 3 [40], [41]. Thus, management mechanisms, investment methods, and financial mechanisms should be strongly innovated. Promote the implementation of the ordering and bidding mechanism for implementing science and technology tasks, as well as the mechanism of allocating funding to the final science and technology products according to output results. There is a mechanism to promote technological innovation and the application of new and modern technology; support for importing source technology, high technology, purchasing designs, hiring domestic and foreign experts in priority fields; support businesses in buying technology from domestic research institutes and universities. Investing in human resource development ensures employees have the skills and knowledge necessary to innovate. Training and development programs can lead to a more competent and adaptable workforce. Although the direct impact is modest, a well-trained workforce can drive significant improvements in innovation and efficiency over time. Focusing on human resource development can also lead to better employee retention and satisfaction, further contributing to a positive and innovative work environment. Business leaders should establish and enhance a strategy for business development based on knowledge, with the aim of cultivating a management-oriented corporate culture that promotes the integration of employees into a creative environment and encourages information sharing. Create and efficiently execute a system to utilize economic capital for the purpose of promoting innovation and facilitating the transfer of technology while also providing training for highly skilled individuals. Enact and enforce comprehensive legislation for the establishment of scientific and technology development funds by firms, making it obligatory for corporations to comply with this obligation.

Fourthly, corporate culture (0.075) with sig. < 0.05, hypotheses H1 and H2 accepted in table 2 and table 3 [42], [43]. Moreover, corporate culture is the synthesis of value concepts, ethical standards, business philosophy, behavioral

codes, business ideas, management methods, and rules and regulations adopted by all members of the company. Enterprises accept and comply. Corporate culture takes comprehensive human development as the ultimate goal. The core of corporate culture is the corporate spirit and value perspective of the business. Along with the development of a socialist-oriented market economy and the transformation of business mechanisms, businesses must become autonomous production and business units. Corporate culture, although not the most significant factor, plays a vital role in shaping the behaviors and attitudes of employees toward innovation. A culture that encourages experimentation, risk-taking, and open communication can lead to higher levels of creativity and innovation. Moreover, a robust corporate culture aligned with the company's innovation goals can enhance employee engagement and collaboration, indirectly boosting business efficiency. Businesses seeking to stand firm in fierce market competition must build a corporate culture. During the development process, every business strives to build a system of value perspectives for workers, officials, and employees to accept, creating harmony within the business and a cultural atmosphere. Actively promote the cultural strengths of the collective and strengthen the internal resources and strength of the enterprise. Corporate culture is a stage of development of modern corporate management ideology, representing a shift in technical and brand development strategies to create products with high cultural content. Therefore, it can be considered that corporate culture is the most important element of contemporary corporate practice.

Finally, technology (0.073) with sig. < 0.05, hypotheses H5 and H6 accepted in table 2 and table 3 [44], [45]. Therefore, strengthen links between science and technology organizations and businesses in carrying out the tasks of applied research, technological innovation, and human resource training associated with application requirements in practical production and business development business and market needs. Strengthen the implementation of public-private cooperation mechanisms, co-sponsoring the implementation of science and technology tasks. Technology's direct impact may seem small, but it is a critical enabler of innovation. Technological advancements can streamline processes, improve productivity, and open up new opportunities for innovation. Adopting new technologies can also enhance the capabilities of human resources and support the implementation of innovative ideas. Furthermore, technology often serves as the backbone for effective communication and collaboration, essential for fostering a creative environment. Assign ownership of the results of scientific research and technological development using the state budget to the agency in charge of science and technology tasks, and at the same time, have a mechanism for reasonable distribution of benefits between the State host agency. Create conditions for science and technology organizations to borrow capital from funds or credit institutions to promote innovation, research, and development of science and technology. The results of this study emphasize the importance of IT in supporting and promoting businesses to apply modern software. Without IT, it is difficult for employees to achieve wide-ranging, integrated, and complex information provision.

5. Conclusions and Recommendation

Small and medium enterprises currently account for over 95% of the total number of Vietnamese enterprises and have made great contributions to the country's economy. However, in the context of international integration, these enterprises are facing many difficulties and limitations in competition, so solutions are needed for them to contribute better to the country's socio-economic development. The findings indicated that the standardized beta coefficients had a favorable influence on both innovative ability and company efficiency. However, the normalized beta indicates the level of importance when applying governance consequences. The standardized beta coefficients, ranked from greatest to lowest, are as follows: business environment (0.540), leadership (0.144), human resource development (0.077), corporate culture (0.075), and technology (0.073). Thus, the authors provide policy recommendations for improving innovation capacity and business efficiency. The novelty of the article lies in its five innovation capacity and business efficiency determinants. The study's findings can help policymakers and enterprise managers apply research results to develop innovation capacity and business efficiency policies. To improve the innovation capacity of Vietnamese businesses, it is necessary to focus on recommendations such as improving the business environment, leadership, human resource development, corporate culture, and technology. Finally, another small contribution is the development of a scale of factors, such as innovation capacity, government support, internal human resources, strategic vision, and technology application, by adding observed variables for new next to the original scale. In addition, the article also systematizes and presents the concept of innovation capacity following the practice of small and medium enterprises, which is the ability of an enterprise to use internal resources or outside the business to produce and introduce completely new products or processes to the market or make changes and improvements to existing products or processes.

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While the business environment has the most decisive influence, leadership, human resource development, corporate culture, and technology are interrelated and collectively contribute to building a robust innovation capacity and improving business efficiency. These factors, though individually less significant, can synergistically enhance an organization's overall innovation potential and operational effectiveness when aligned and optimized. Recognizing their roles helps in creating a comprehensive strategy that leverages all aspects of the business to drive innovation and efficiency with policy recommendations following:

On the part of SMEs, once supported and encouraged by the State, they need to seize the opportunity to enhance their competitiveness, not only for the survival and development of the business but also to contribute to consolidating and improving their competitiveness. The overall competitiveness of the economy enhances the country's integration capacity and socio-economic development. More precisely, the objective is to enhance the skills and knowledge of business owners, directors, and managers in the areas of business administration and strategic management. Entrepreneurs must consistently acquire new information and essential abilities, such as competitive management, business leadership, change management, presentation, negotiation, and communication skills, in order to remain competitive in the market and tap into the knowledge economy. Focus on competitive strategy and strategic abilities, including strategic management, risk management, management sensitivity, business analysis, forecasting, and strategic development orientation.

Establish and foster strategic alliances and collaborations among Vietnamese enterprises to enhance the quality and competitiveness of their products in the market. Effective implementation of business association and cooperation requires the adoption of suitable measures and formats. The fundamental objective is to effectively reconcile the interests of all parties participating in the partnership. Only when we do this can we genuinely enhance the efficiency of the cooperative organization, generating a harmonious collaboration that benefits all firms in the economy to enhance the country's ability to compete globally and increase efficiency in integrating with the international community.

Fostering a corporate culture that cultivates a healthy, optimistic, and professional atmosphere is consistently the catalyst for enhancing the innovation and competitiveness of firms. Improving corporate culture is a strategic process that involves enhancing the work environment, fostering positive relationships, and aligning organizational values with employee behavior.

Concentrate on cultivating a skilled workforce inside the organization to fulfill the demands of technical advancements, manufacturing, and business operations. Engage in the global business network by offering a variety of high-quality products and services. Enhance the training, nurturing, and development of personnel in organizations to align with the demands of enterprise growth by equipping them with new knowledge and skills in technical expertise, operations, and information technology.

The State establishes a conducive environment to promote and facilitate the establishment and growth of commercial connections. The Government promotes the enhancement of both vertical and horizontal connections and collaboration. It also supports the establishment of customer ties and strategic collaborations to foster long-term export development.

Acknowledging these limitations is essential to provide a realistic perspective on the research findings. The study offers valuable insights into the factors influencing innovation capacity and business efficiency. However, the sample size may not be large enough to generalize the findings to all businesses or industries. The results may be biased if the sample does not represent the broader population. Using self-reported surveys can introduce response bias, where respondents might provide socially desirable answers or may not accurately recall or assess their situations. Therefore, these limitations highlight areas where further research is needed to deepen the sample size, and surveys validate the results across different contexts over time. This balanced approach helps interpret the findings appropriately and encourages ongoing investigation into the complex dynamics of innovation and business efficiency.

6. Declaration

6.1. Author Contributions

Conceptualization: L.P.N., N.Q.H., and P.T.T.; Methodology: L.P.N., N.Q.H., and P.T.T.; Software: L.P.N.; Validation: L.P.N., N.Q.H., and P.T.T.; Formal Analysis: L.P.N., N.Q.H., and P.T.T.; Investigation: L.P.N.; Resources:

N.Q.H.; Data Curation: P.T.T.; Writing Original Draft Preparation: L.P.N., N.Q.H., and P.T.T.; Writing Review and Editing: L.P.N., N.Q.H., and P.T.T.; Visualization: L.P.N.; All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6.3. Funding

The authors received financial support for the research by Lac Hong University.

6.4. Institutional Review Board Statement

Not applicable.

6.5. Informed Consent Statement

Not applicable.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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