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EVALUATING THE RELATIVE IMPORTANCE OF FINANCIAL SOLUTIONS SUPPORTING RESPONSIBLE INNOVATION OF SMEs

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ABSTRACT

Along with the global trend of innovation, responsible innovation (RI) has begun to receive more attention from businesses in order to achieve sustainable development in accordance with the context of integrated market economy goes hand in hand with the industrial revolution 4.0. According to statistics of the Organization for Economic Cooperation and Development (OECD) in 2021, small and medium enterprises (SMEs) account for 96% of the total number of enterprises in Vietnam. Responsible innovation in the goal of sustainable SME development becomes the core goal of national economic development. However, the SME's RI in Vietnam in general and in Thai Nguyen province in particular are facing barriers and difficulties, many enterprises have financial difficulties such as capital mobilization or tax barriers. To remove financial difficulties for SME development in Thai Nguyen province, financial solutions to support SME's RI are studied. The research results suggest synchronous financial support solutions from each SME, financial institutions, the State and Thai Nguyen province accompanying businesses.

Keywords:
Small and medium enterprises, responsible innovation, financial solutions, Thai Nguyen.

1. INTRODUCTION

1.1. The necessity of the research problem

According to OECD statistics in 2021, from the perspective of business size, SMEs (using 1-249 employees) account for 96% of the total number of enterprises in Vietnam, employing 47% of the workforce and contributing 36% of the national value added. In particular, SMEs in Thai Nguyen province have developed rapidly in both quantity and quality. As of 2020, the number of SMEs will account for 96.76% of the total number of enterprises, contributing about 40% of the GRDP, creating jobs for more than 86,000 workers (accounting for 42.05% of the total employment in the province). Therefore, sustainable SME development becomes the core goal of economic development in Vietnam in general and Thai Nguyen province in particular.

Along with traditional businesses, innovative start-ups are increasingly asserting their indispensable role in the socio-economic development of the country. Encouraging the development of entrepreneurship allows better exploitation of labor resources, capital, technology and markets in line with the spirit of getting rich, the dream of reaching out to the world of today's young generation. Innovating start-ups following the responsible innovation trend in Vietnam is not out of the world trend, the State and businesses are increasingly interested in the social responsibility of innovation to sustainable development goals. The central policy to support innovative SMEs and RI has been implemented, opening up many development and cooperation opportunities for innovative SMEs such as the Vietnam - Finland Innovation Partnership Program, Project on building innovation policies and developing business incubators ...; and startup events such as Techfest, Demoday, HatchFair, Venture Cup, StartupWeekend, Startup Fair Danang, etc.

In the context of a digitalized and globalized market, RI has become a means of stimulating society and increasing competitiveness for many businesses. However, innovation, especially RI related to research activities is often time-consuming and costly. Therefore, businesses, especially SMEs implementing RI often face financial difficulties when considering the trade-off between the costs and benefits of innovation for businesses.

Financial solutions to develop SMEs in Thai Nguyen province are also included in the overall solutions for SMEs nationwide. However, Thai Nguyen province has specific characteristics and advantages, and at the same time realizes the goals of rapid development to become one of the economic locomotives of the country, the application and implementation of financial solutions to help Thai Nguyen province's SMEs develop also has its own characteristics. Along with the process of economic renovation of the whole country, with its own characteristics, Thai Nguyen province already affirming the importance of financial solutions to support SMEs to innovate responsibly in order to gradually improve the position of the province worthy of being one of the economic - political - cultural centers of the

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country. However, RI seems to be a new concept in Vietnam and there is no specific document of the State mentioned at present. This is a challenge for SMEs in the process of finding opportunities, supporting mechanisms and implementing RI.

1.2. Literature review

There have been many studies related to financial solutions to support SME's AI, which have been published as follows:

- Research on financial solutions to support SMEs

Research by Nguyen Truong Son (2014) "Development of SMEs in Vietnam today", Nguyen Thi Hoang Ly (2019) "Development of SMEs in Hoa Binh province" has confirmed the solution of accessing capital to support technological equipment innovation, expanding networks in the context of lack of financial resources of SMEs in Vietnam. Research by Bach Duc Hien (1996) "Using financial tools to encourage and orient the development of Vietnamese SMEs ", Ha Quy Sang (2010) "Financial and accounting policies to develop SMEs in Vietnam" has also explored policies and financial tools to support SME development.

Research by Ngo Mai Linh (2015) "Financial solutions for SME development", Ngo Xuan Thanh (2019) "Policy for mobilizing, distributing and using financial-credit resources for SMEs in Vietnam", Nguyen Thi Hien (2019) "Supporting SMEs to effectively access bank credit capital", these works have analyzed financial - credit solutions to support SME development and proposed solutions to improve the effectiveness of these solutions for Vietnamese SMEs.

- Studies on financial solutions to support SME's RI

Research by Halme and Korpela (2014) "Responsible innovation towards sustainable development in small and medium-sized enterprises: A resource perspective" has attempted to explore "Does lack of resources prevent innovation in the direction of sustainability in SMEs or can innovations be created with scarce resources?" The results show that the SME's RI is the result of a combination of different resources, including financial resources from the enterprises themselves and social capital from financial support solutions of stakeholders.

Empirical findings of Auer and Jarmai (2018) showed that financial supports based on the criteria of RI serve as a driving force for the integration of RI practices in SMEs, whose capital is highly dependent on external funding sources. For example, Black Rock – one of the largest global investment management groups claims a commitment to "become a responsible corporate citizen and take into account environmental, social and governance (ESG) issues"[1]. The European Commission has been promoting RI as a priority in the Framework Program on Research and Innovation "Horizon 2020", "Science with and for Social Programs" through the grants[2].

The studies of the above authors have approached the research through the issues of financial solutions to support SMEs at different times with different research angles. These studies are valuable sources for the author to suggest and determine the research objectives of the article. However, most of these studies only focus on financial solutions related to credit, industry regulations, etc. The lack of a study assessing the relative importance of financial solutions based on the view of enterprises to implement effective financial solutions to support SMEs in case of limited resources. Therefore, this study focuses on exploring the relative importance of solutions such as tax solutions, credit solutions, and investment fund solutions from the perspective of SMEs.

2. Research Methods

The data used in the article is collected from a survey of 30 SMEs in accordance with the criteria of RI such as a closed-loop safe food business model from farm to customer, eco-tourism, … in Thai Nguyen through a questionnaire designed in accordance with the analytical hierarchical process (AHP). AHP is one of the multi-criteria decision making methods developed by Thomas L. Saaty (1980). The AHP is applied in the productive, political, social and other fields to infer scale scales from pairwise comparisons. The scales are taken from the main Eigen vectors and the consistency ratio (CR) is taken from the main Eigen value. Complex unstructured decisions are put into a linear hierarchical structure, so that consensus can be reached in choosing the most important criteria (Govindan et al., 2014). This method is summarized as follows (Saaty, 1980; Sara et al., 2015):

Step 1. State your goals and identify key factors. This study assesses the relative importance of selected financial solutions.

Step 2. Set the inverse pairwise comparison matrices. This step compares each important factor with all others in relative importance based on Saaty's 9-point scale (Table 1). The main questions of the pairwise comparison survey are presented in Table 2.

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[1] https://www.blackrock.com/corporate/responsibility

[2] https://newhorrizon.eu/

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Table 1: Satty's 9-point scale

The level of impact on the absolute scale	Meaningful
1	Equal importance of one factor over another (EQI)
3	Moderate importance of one factor over another (MI)
5	Essential or strong importance of one factor over another (SI)
7	Very strong importance of one factor over another (VSI)
9	Extreme importance of one factor over another (EI)
2, 4, 6, 8	Intermediate value between two adjacent scale values

Source: Saaty (1980)

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Table 2: Key questions of the pairwise comparison survey

Factor X	EI[a]		VSI		SI		MI		EQI		MI		SI		VSI		EI[b]	Factor Y
	9:1	8:1	7:1	6:1	5:1	4:1	3:1	2:1	1:1	1:2	1:3	1:4	1:5	1:6	1:7	1:8	1:9	
Tax	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Credit
	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Investment fund
Credit	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Investment fund

Note: [a] EQI (1: 1) = equal importance, MI (3: 1) = moderate importance, SI (5: 1) = essential or strong importance, VSI (7: 1) = very strong importance and EI (9: 1) = importance of factor X relative to factor Y.

[b] MI (1:3) = moderate importance, SI (1:5) = necessary or strong importance, VSI (1:7) = very strong importance, and EI (1: 9) = extreme importance of factor Y compared to factor X.

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After collecting the answer sheets of experts, the pairwise comparison matrix A was built to calculate the importance of each of the important factors and was determined as:

$$A = [a_{ij}]_{nxn} = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ 1/a_{12} & 1 & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ 1/a_{1n} & 1/a_{2n} & \dots & 1 \end{bmatrix} \quad (1)$$

Where: a_{ij} are the positive elements of the pairwise comparison matrix, ij = 1, 2, ..., n, and n is the number of critical factors. The matrix satisfies the inverse property $a_{ij} = 1 / a_{ji}$ and the diagonals are equal to 1.

Step 3. Calculate the relative impact of the factors. After constructing the positive inverse matrix, the eigenvalues (W_i) were calculated using the normalization of the geometric mean of the rows (NGM). NGM is calculated as:

$$Wi = \frac{\left(\prod_{j=1}^{n} aij\right)^{\frac{1}{n}}}{\sum_{i=1}^{n}\left(\prod_{j=1}^{n} aij\right)^{\frac{1}{n}}} \quad (2)$$

Based on the level of impact of each factor, it is possible to rank the relative impact of all important factors.

Step 4. Check the homogeneity ratio (CR). To ensure that the pairwise comparison matrix is consistent, CR is calculated as follows:

$$CR = CI/RI \quad (3)$$

$$CI = (\lambda_{max} - n)/ (n - 1) \quad (4)$$

Where: CI (Consistent index) represents the consistency index, RI (Random consistent index) represents the random consistency index (Table 3) is the index of the pairwise comparison matrix randomly generated according to the quantity factor and max is the maximum eigenvalue. If CR ≤ 0.1, the consistency of the pairwise comparison matrix is acceptable (Saaty, 1991), suggesting that decisions are based on normalized values.

Table 3: Random Consistency Index

Order of matrix (n)	1	2	3	4	5	6	7	8	9	10
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Source: Saaty (1991).

3. Research results and discussion
3.1. Data collection

This study focuses on SMEs in Thai Nguyen, with special interest in SMEs implementing innovation according to the criteria of RI. Through several email and phone contacts, 30 experts agreed to the questionnaire. These experts are the managers who directly run the business. They are the key stakeholders implementing innovation and have the experience and knowledge to assess the relative importance of financing solutions to support SMEs. The detailed profiles of the experts are shown in Table 4.

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Table 4: Detailed profiles of experts

Stt	Basic information	Distribution	Number of experts	Ratio (%)
1	Age	21-30	6	20
		31-40	15	50
		41-50	9	30
2	Education level	College	5	16.67
		University	18	60
		Graduate	7	23.33
3	Sex	Female	9	30
		male	21	70

Source: Author 's collection

An expert questionnaire was constructed for data collection. After several rounds of questionnaire survey, the group experts' qualified anonymous responses were then used in the AHP analysis.

3.2. Assessing the relative importance of financial solutions: AHP analysis
To find out the relative importance of financial solutions through a pairwise comparison, experts were asked to rate the importance of financial solutions to the ability of SMEs to support RI based on Saaty's 9-point scale. After the AHP evaluation process mentioned in the research methodology, the ranking of the important financial solutions in terms of their relative importance is calculated. As shown in Table 5, the relative importance is for the credit solution (0.508), followed by the investment solution solution (0.312) and the tax solution (0.180). In addition, after calculating the maximum eigenvalue (λ_{max}) and the consistency index (CI) of each pairwise comparison matrix, the value of the CR consistency ratio for each matrix was evaluated by 30 experts is less than 0.1, indicating that the consistency of each pairwise comparison matrix is acceptable.
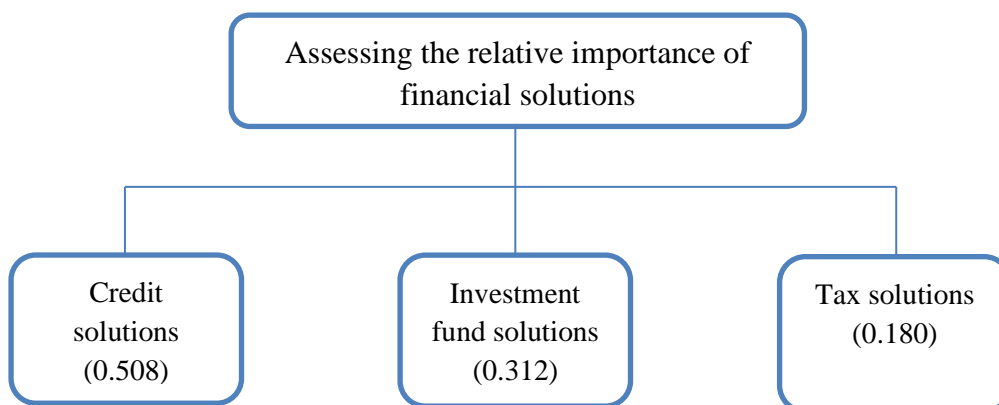
Figure 1: The relative importance of financial solutions to support SME's AI.

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Table 5: Ranking order of financial solutions in terms of relative importance

Critical factors	Relative importance weights	Ranking order
Tax solutions	0.180	3 [rd]
Investment fund solutions	0.312	2 [nd]
Credit solutions	0.508	1 [st]

Source: AHP analysis.

4. Conclusion

According to the results of AHP analysis, among the three important financial solutions, the credit solution has the highest relative importance (0.508), followed by the investment fund solution (0.312) and the tax solution (0.180). In the initial stage of implementing and encouraging SMEs to integrate environmental and social values into their economic activities, credit support policies need to be improved as well as the need for more advisory council; answering difficulties in the process of finding and mobilizing credit for SMEs. In addition, SMEs also realize the importance of investment funds and tax solutions.

The ranking results on the relative importance of financial solutions are valuable in proposing solutions from the authorities as well as from SMEs themselves in an effort to find financial resources in considering integrating social responsibility issues into business innovation. Focusing on financial solutions by its importance will increase the effectiveness and efficiency of financial solutions. Building an innovative mindset is a long-term solution to create environmental and social values for the sustainable development goals of SMEs. Along with that, the credit solution for SMEs through preferential credit policies and regimes for SMEs is a solution that needs to be carried out synchronously from the central to local levels. Another suitable approach is to establish long-term strategic partnerships with NGOs pursuing sustainable development goals to attract financial resources from these organizations. Besides, tax incentives can promote SMEs to implement RI.

This study contributes to the current literature on assessing and ranking the importance of financial solutions to support SME's RI. Future studies can expand this research by specifically studying further criteria inside financial solutions to suggest optimal support solutions to facilitate the process of SME's RI. Furthermore, future studies can expand the scope of the study by comparing the financial solutions used in this study with SMEs in developed countries or conducting research in the context of multinational companies.

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