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Support for SME international growth through green innovation subsidies

Case “Innovation support for growth companies” from the Recovery and Resilience Facility (RRF)
subsidy instrument

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Master's thesis

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Master's thesis**Subject:** International Business**Author:** Laura Peltonen**Title:** Support for SME international growth through green innovation subsidies – Case “Innovation support for growth companies from the Recovery and Resilience Facility (RRF) subsidy instrument**Supervisor(s):** D.Sc. Riikka Harikkala-Laihinén, D.Sc. Elina Pelto**Number of pages:** 88 pages (+ appendices 8 pages)**Date:** 24.4.2026**Abstract**

Small and Medium-sized Enterprises (SMEs) play an essential role in national economies especially by providing innovation, growth and job creation therefore this study focuses on SMEs. One major challenge for SMEs is that they have to operate with limited resources. The lack of resources can act as a barrier for SMEs to undertake resource intensive activities such as innovation and internationalisation. Subsidies can act as a valuable external resource to assist firms to mitigate human, financial, marketing, informational, and allied resource constraints. Prior research indicates a positive interrelationship between innovation and internationalisation which is further explored in this study.

This study focuses on the Recovery and Resilience Facility (RRF) which is a temporary monetary instrument by the European Commission. The case for this research is the RRF-subsidy “innovation support for growth companies” which was targeted to R&D projects of Finnish SMEs that promote sustainable development and are seeking growth through exporting. This study was conducted with a qualitative case study approach and representatives from five target SMEs were interviewed regarding their perceived benefits of this subsidy. The main research question for this study is: How does RRF-subsidy support green innovations, R&D, and international growth in SMEs?

Subsidies play a key role in mitigating SME resource constraints by strengthening resources in SMEs. The RRF-subsidy strengthened resources and capabilities in SMEs therefore improving their capabilities to innovate and grow in international markets. Most of the target SMEs assessed that the RRF-subsidy advanced their substantive green innovations. Even though the RRF-subsidy was targeted to especially promote innovation activities, most of the target SMEs perceived that the subsidy advanced their international growth and competence to operate in international markets, thus supporting the use of innovation policy as an export policy and highlighting complementarity between innovation and internationalisation.

The findings of this research give a comprehensive overview of how SMEs benefitted from this RRF-subsidy. Thus, the findings can be useful for SMEs that are planning to apply for similar subsidies. This study provides valuable insights for policymakers in the planning of future subsidy programs, ensuring that the subsidies more effectively address the needs of SMEs. These results and prior research emphasize that public subsidies should be allocated to SMEs.

Keywords: Subsidies, Public Subsidies, SMEs, Green innovation, R&D, Internationalisation

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Tiivistelmä

Tutkimuksen kohteeksi valikoituivat pienet ja keskisuuret yritykset (pk-yritykset), koska niillä on kansantaloudessa merkittävä rooli innovaatioiden, kasvun ja uusien työpaikkojen luomisessa. Resurssiniukkuus vaikeuttaa huomattavasti pk-yrityksien toimintaa. Se voi estää pk-yrityksiä toteuttamasta resurssi-intensiivisiä toimia, kuten innovointia tai kansainvälistymistä. Tukien avulla pyritään poistamaan yritysten henkilöstö-, talous-, markkinointi-, informaatio- tai muita resurssirajoitteita. Aiempi tutkimus osoittaa positiivisen suhteen innovoinnin ja kansainvälistymisen välillä, mihin perehdytään tarkemmin tässä tutkimuksessa.

Tämä tutkimus keskittyy elpymis- ja palautumistukivälineeseen (RRF), joka on Euroopan Komission väliaikainen taloudellinen tuki-instrumentti. Tutkimuksen kohteena on RRF-rahoitteinen Kasvuyrityksien innovaatiotuki. Tuki on kohdennettu suomalaisten pk-yrityksien TKI-projekteille, joilla edistetään kestävä kehitystä ja pyritään vientipohjaiseen kasvuun. Tutkimus toteutettiin kvalitatiivisena tapaustutkimuksena. Pk-yrityksistä haastateltiin viittä edustajaa saadun tuen koetuista hyödyistä. Päättökysymyksenä on: Miten RRF-tuki tukee vihreitä innovaatioita, tutkimus- ja kehitystoimintaa ja kansainvälistä kasvua pk-yrityksissä?

Tuki-instrumentit ovat tärkeitä pk-yritysten resurssien vahvistamisessa. Tulokset osoittavat, että RRF-tuki vahvisti pk-yritysten resursseja ja valmiuksia ja siten paransi niiden kykyä innovoida ja kasvaa kansainvälisillä markkinoilla. Suurin osa kohde-pk-yrityksistä arvioi, että RRF-tuki edisti keskeisiä vihreitä innovaatioita. Vaikka RRF-tuki oli kohdennettu erityisesti innovaatiotoiminnan edistämiseen, suurin osa pk-yrityksistä koki, että tuki edisti niiden kansainvälistä kasvua ja kykyä toimia kansainvälisillä markkinoilla. Tämä tulos tukee innovaatiotukien hyödyntämistä vienninedistämässä ja korostaa innovaatiotoiminnan ja kansainvälistymisen komplementaarisuutta.

Tutkimuksen tulokset antavat kokonaisvaltaisen kuvan siitä, miten pk-yritykset hyötyivät RRF-tuesta. Tulokset voivat olla hyödyllisiä yrityksille, jotka aikovat hakea samankaltaisia tukia. Samalla tutkimus tarjoaa päättäjille arvokasta tietoa siitä, miten voidaan varmistaa, että tuet vastaavat jatkossa paremmin pk-yrityksien tarpeisiin. Saadut tulokset ja aiempi tutkimusnäyttö vahvistavat, että julkisia tukia tulisi jatkossa kohdentaa aiempaa enemmän pk-yrityksille.

Avainsanat: Yritystuet, Julkiset tuet, Pk-yritykset, Vihreä innovaatio, TKI, kansainvälistyminen

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1 Introduction

1.1 Background to the thesis

Small and Medium-sized Enterprises (SMEs) play an essential role in national economies especially by providing innovation, growth and job creation, exceeding what may be expected from their relatively smaller share of international trade than large multinationals (WTO 2018). Globally, SMEs make up 95% of all businesses and are responsible for around 60% of total employment (WTO 2025). In Europe 99% of businesses are SMEs and they employ over 85 million people across Europe (European Commission 2025B). In Finland SMEs account for 98,3% of all enterprises. SMEs play a key role in employing people as they employ 53% of the workforce in the private sector. (Tilastokeskus 2023.) These statistics highlight that the role of SMEs is essential for the economy globally, on European level and in Finland. Because of the importance of SMEs for the economy this study focuses on SMEs.

The European Union's (EU) definition for SMEs which is illustrated in Table 1 is used in this study. The primary factors determining whether an enterprise is categorized as a SME are staff headcount and either turnover or balance sheet total. EU's definition of SMEs is necessary so that SMEs get access to finance and EU support programmes that are targeted especially to these enterprises. (European Commission 2024B.) Clear definition supports transparent and proper allocation of financial support to SMEs in EU (Tilastokeskus 2023).

Table 1 SME definition by the European Union

| Company category | Staff headcount | Turnover | or | Balance sheet total |
|-------------------------|------------------------|-----------------|----|----------------------------|
| Medium-sized | < 250 | ≤ € 50 m | | ≤ € 43 m |
| Small | < 50 | ≤ € 10 m | | ≤ € 10 m |
| Micro | < 10 | ≤ € 2 m | | ≤ € 2 m |

It is widely acknowledged that a significant weakness for SMEs is that they have to operate with resource constraints (Woschke et al. 2017; Garengo et al. 2005; Laforet and Tann 2006) with researchers often pointing to a lack of financial resources in SMEs (Hewitt-Dundas 2006; Keizer et al. 2002). It is crucial for SMEs to carefully assess where they allocate their limited resources. The lack of resources can act as a barrier for SMEs to undertake resource intensive activities such as innovation and internationalisation (Kiss et al. 2018). Subsidies can be utilized as a valuable

external resource in firms assisting them to mitigate human, financial, marketing, informational, and allied resource constraints (Leonidou et al. 2011; Seringhaus 1986).

In this study, subsidies are defined as financial incentives that are provided by governments or other entities that are aimed at supporting certain activities for instance to foster innovation or promote growth in specific industries (Olivier 2024). The term subsidy usually refers to a sum of money that is granted by state or public body. In addition, it should be noted that there is a variety of other terms that refer to the support companies receive including public support (measure), financial support, government assistance, (R&D) subsidy and (innovation/export) policy. These different terms are used in the theoretical part of this study as different terms refer to support measures that are different in some ways.

Increasing number of companies are participating in green innovation activities. Green innovation refers to innovations that contribute to a sustainable environment through the development of ecological improvements (Bigliardi & Bertolini 2012). Green innovation becomes more of an obligation than a choice as companies have to respond to a growing demand for eco-friendly products and services from consumers and global regulatory requirements in their domestic and international markets (Hojnik et al. 2018). Green innovation is viewed as a driver of global competitive advantage and a key element in increasing exports (Martinez-Roman et al. 2019). Governmental R&D subsidies can facilitate substantive green innovation in enterprises by mitigating barriers by reducing costs and resource constraints (Zhao et al. 2024).

Empirical literature indicates a strong positive association between innovation and exporting (Freel et al. 2019). Research on innovation usually overlooks the notion that innovation is an intermediate output that is utilised as means to reach a more extensive goal e.g. improving the competitiveness of a company (Cannone & Ughetto 2014; Freel et al. 2019). Innovation can act as a driver for the decision to export (Freel et al. 2019, 1257). Freel et al. (2019) reinforce the interlinkage of varying innovation and exporting outcomes, which endorses the use of innovation policy as export policy. Šumakarīs et al. (2020) highlight a growing research trend on the interrelationship between green innovations and internationalisation, arguing that the two activities are interlinked. This study further explores green innovation and internationalisation and the interrelationship with these activities.

This thesis looks into the Recovery and Resilience Facility (RRF) which is a temporary monetary instrument by the European Commission. The objective of the RRF-funding is to assist the EU member states to recover from the economic and social damage of the coronavirus crisis. (European

Commission 2024A.) Each EU member state has drafted their national Recovery and Resilience Plan (RRP) for leveraging financial support from the RRF. The funding Finland received has been allocated to many different sectors and organizations. This thesis concentrates on the RRF-program “Innovation support for growth companies”. This funding was allocated to research and innovation projects that promote sustainable development by Finnish SMEs that are seeking growth through exporting (Business Finland 2024A).

1.2 Motivation for the study

With the qualitative research approach this study looks at the case RRF-subsidy in depth thus creating a comprehensive understanding of the perceived benefits of this subsidy. Because the findings of this study highlight the perceived benefits of the RRF-subsidy they can be beneficial for policy makers for the planning and allocation of future subsidies.

The RRF-subsidy is a quite recent policy measure thus there are not yet much research conducted about the effectiveness or the perceived benefits of the subsidy. A few studies regarding RRF have been conducted in other EU countries, but for this study provides a novel approach by focusing on Finnish SMEs that have received the RRF-subsidy. This is a new approach and there are almost no prior research conducted with a scope similar to this study thus increasing novelty value of this study and addressing the research gap.

The effectiveness of subsidies is more often researched with quantitative research approach as it enables to measure numerical data and conduct statistical analysis on the effectiveness of a larger sample of subsidised companies. On the contrary, using qualitative research approach to assess the effectiveness of subsidies is less frequent. However, qualitative case study approach enables the researcher to get an in-depth view of the perceived benefits of the subsidy in the target companies. In this study qualitative approach complements existing quantitative research by offering rich, contextual insights about the effectiveness of subsidies from the perspective of SMEs.

It is typical that quantitative studies regarding the effectiveness of subsidies take a more fixed approach where they measure the impacts on subsidies on a specific scope. For instance, Dimos & Pugh (2016) measured the effectiveness of R&D subsidies and Bai et al. (2019) measured the impacts of government R&D subsidies on green innovation. Whereas, qualitative method enables a multifaceted approach, which is more fitting to this study, as this study investigates the perceived benefits of RRF-subsidy for green innovations, resources and international growth. In addition, including discussion on how future subsidy programmes could be improved.

This study has a unique approach where the perceived benefits of green innovation subsidies for SME internationalisation are explored. Green innovation subsidies are a quite recent research topic, there has already been some research conducted about them (see for example Bai et al. 2019, Zhao et al. 2024, Ren et al. 2023). Internationalisation is one of the most common research topics in the field of international business. It has been a prevalent topic since the 1970s after the introduction of traditional internationalisation models in the foundational literature (e.g. Johanson & Valhne 1977; Johanson & Weidersheim-Paul 1975). Both green innovation subsidies and internationalisation have been studied separately, but there is a lack of research linking green innovation subsidies to SME internationalisation, hence this study addresses the research gap and provides novelty value by combining these topics.

1.3 Research questions

The main research question for this research is: *How does the RRF-subsidy support green innovations, R&D and international growth in SMEs?* The main research question is further divided into sub-questions:

- 1) How does the RRF-subsidy support green innovations and R&D in SMEs?
- 2) How does the RRF-subsidy strengthen resources and capabilities in SMEs?
- 3) How does the RRF-subsidy support international growth in SMEs?
- 4) How could future subsidy programs be improved?

This study explores how the RRF-subsidy supports R&D, green innovations, and international growth in SMEs. The sub-questions divide the main research into smaller parts that are exploring how the RRF-subsidy supported certain functions in SMEs. The first sub-question investigates how the RRF-subsidy supports green innovations and R&D in SMEs. The subsidy was directed for R&D projects of SMEs that promote sustainable development and aim for green innovations. It is interesting to explore how the SMEs perceived that the subsidy supported these functions. Furthermore, according to Bai et al. (2019) government R&D subsidies significantly advance the green innovation of both large companies and SMEs but this advancement is more valuable for SMEs. This study further contributes to the existing literature of the effectiveness of green innovation subsidies for SMEs.

The second sub-question explores how the RRF-subsidy strengthens resources and capabilities in SMEs. It is widely acknowledged that SMEs have to operate with limited resources (Woschke et al.

2017; Garengo et al. 2005; Laforet and Tann 2006) which hampers their operations. Government assistance can act as an external resource and if used properly assists firms in mitigating human, financial, marketing, informational, and allied resource constraints (Leonidou et al. 2011; Seringhaus 1986). As prior literature indicates that subsidies can act as an external resource in firms that can be used to strengthen their resources, thus it is interesting to find out how this subsidy strengthened the resources in SMEs.

The third sub-question investigates how the RRF-subsidy supports international growth in SMEs. Even though this subsidy was a R&D subsidy by nature, this subsidy was directed to SMEs that have the ability and will to grow in international markets. Prior research indicates an interrelationship between innovation and internationalisation (Freel et al. 2019). Thus, it will be intriguing to explore in what ways the subsidy supported international growth in SMEs and is there complementarity between innovation and internationalisation in the SMEs.

The fourth sub-question looks into how future subsidy programmes could be improved. Based on their experiences the SMEs give feedback of their experience on the subsidy and their ideas on how the subsidy programmes could be improved. These insights might be useful for policymakers for the planning of future subsidies so that the subsidy instruments support the needs of SMEs more effectively.

2 The role of subsidies on SME innovation and internationalisation

2.1 SME internationalisation process and models

2.1.1 Internationalisation process

Internationalisation is one of the most widely used terms in international business literature, however regardless of the significance and wide use of the term there is a lack of scholarly consensus for one best definition for internationalisation (Malhotra et al. 2003). In the foundational literature (e.g. Johanson & Valhne 1977; Johanson & Weidersheim-Paul 1975) internationalisation is seen as a gradual process. Even though this definition dates back to the 1970s it is still widely used and relevant today (Rundh 2003; Fernandes et al. 2023).

The firm initially develops within its domestic market and the internationalisation process occurs as a consequence of a series of incremental decisions. It is also assumed that the lack of knowledge and resources are the main obstacles for the internationalisation of firms. (Johanson & Weidersheim-Paul 1975, 306.) Internationalisation is typically used to generally describe the outward movement in an individual firm's or larger grouping's international operations. The common usage could be further expanded by giving the following definition: "the process of increasing involvement in international operations" (Welch & Luostarinen 1988, 36). The close linkage of both sides of the process, i.e. both inward and outward movements in the dynamics of international trade is more emphasized in this broader definition. It is important to highlight that once a company has started its internationalisation process, there is no certainty about its continuation. Actually, evidence suggests that reverse of 'de-internationalization' can occur at any point. (Welch & Luostarinen 1988, 36–37.)

Some scholars, especially in the entrepreneurial research, use the following definition for internationalisation "the recognition and exploitation of entrepreneurial opportunity that leads to new international market entry" (Chandra et al. 2009, 31; Muzychenko & Liesch 2015, 704). This definition highlights the role of the entrepreneur which is a relevant approach for SMEs as the role of the entrepreneur is more significant in smaller companies. To build on (Johanson & Vahlne, 1977: 27), "knowledge of opportunities or problems" is assumed to initiate commitment decisions which consequently motivates the internationalisation decision (Muzychenko & Liesch 2015, 704). Because identifying opportunities is a subjective process (Kirzner 1997), analysis at the individual level is fundamental to understanding internationalisation as a process of opportunity identification and subsequent capture and exploitation. (Muzychenko & Liesch 2015, 704–705.)

The following sections delve into internationalisation models, which are a theoretical tool describing the internationalisation process of a firm. Literature regarding internationalisation process models has a long-standing heritage in international business research, with the earliest most notable model being the Uppsala model (U-model) from the 1970s. The U-model describes internationalisation of a firm as a gradual process. The U-model follows the assumption that firms initially internationalise to markets in closer proximity and gradually expand towards markets that are physically distant. (Johanson and Vahlne 1977; Knight & Liesch 2016, 95–96.)

In the 1980s, companies that internationalize quickly began to attract scholarly attention thus challenging the traditional view of slow and gradual internationalisation (Hedlund & Kverneland 1985; Knight & Liesch 2016, 96). This was leading up to the emergence of foundational literature on born globals and international new ventures (INVs) in the 1990s (Liesch & Knight 2016, 96). These firms internationalise quickly with accelerated process of internationalisation which presents an alternative to the gradual internationalisation model. The fundamental difference between gradual internationalisation and born-global models has to do with the speed of the internationalisation. Key factors that affect the speed are the geographic pattern of entry, mode of entry, and the pattern of their commitment. (Paul & Rosado-Serrano 2019, 831–832.)

The following sections presents the two prominent models, U-model and born global model, which describe two opposite strategies (gradual or accelerated) for a firm to expand internationally. These two models were chosen to highlight a traditional model (U-model) and a more recent model (Born global) which is more prevalent in recent literature. These models form a theoretical basis which can be applied for assessing the internationalisation process of the target SMEs which is explored in the findings of this research.

2.1.2 The Uppsala model describing the gradual internationalisation process

The Uppsala Model (U-Model) is a classic internationalization theory by Johanson and Vahlne (1977). Their model of the internationalization process of the firm concentrates on the development of the individual firm, and especially on its gradual acquisition, integration, and use of knowledge about foreign markets and operations, and on its successively growing commitment to foreign markets (Johanson & Vahlne 1977, 23). The considered state aspects of the U-Model are the resource commitment to the foreign markets (market commitment) and knowledge about foreign markets and operations. The change aspects include decisions to commit resources and the performance of current business activities. It is assumed that market knowledge and market commitment influence both commitment decisions and the way in which current activities are

carried out. It is assumed that the firm aims to increase its profits in the long-term, which is assumed to be equivalent to growth (Williamson 1966). The U-Model assumes that the state of internationalization influences how opportunities and risks are viewed which consecutively affect commitment decisions and current activities. (Johanson & Vahlne 1977, 23, 26-27.)

U-model (Johanson & Vahlne 1977) follows a pattern of gradually increasing commitment to international markets in terms of acquisition, integration and the use of knowledge about foreign markets (Paul & Rosado-Serrano 2019, 834). However, this perception has since evolved as in the past decades the external business environment has undergone changes thus the business environment today is considered as a complicated web of relationships and networks, rather than as a neoclassical market with many independent suppliers and customers (Johanson and Vahlne 2009; Paul & Rosado-Serrano 2019, 834). There has been advancements and updates to the U-model (Johanson & Vahlne 1977) including trust building, and new knowledge creation dimensions which assist in developing relationships and networks (Johanson and Vahlne 2009; Paul & Rosado-Serrano 2019, 834). In addition, the element of uncertainty was highlighted which differs from the original view. The correlation between the order in which a company enters foreign markets and psychic distance has weakened. (Johanson and Vahlne 2009; Paul & Rosado-Serrano 2019, 834, 837). The barriers regarding entering psychically distant markets have been alleviated by the trends of globalization, the internet, and other communications innovations, which have reduced the cost of internationalization which has especially advanced and accelerated the internationalisation opportunities for SMEs (Knight & Cavusgil 2004; Knight & Liesch 2016, 94).

2.1.3 The accelerated internationalisation of a born global firm

Knight and Cavusgil (2004, 124) define born globals (BGs) as business organizations that early on in their operations, pursue superior performance internationally from the application of knowledge-based resources to the sale of outputs in various countries. Literature suggests different cutoff points for the internationalization timeframe of born globals e.g. two years (Moen & Servais 2002), four years (Kuivalainen et al. 2012) or up to five years from inception (Braunerhjelm & Halldin 2019). International new ventures and born globals are similar concepts with some differing features. Oviatt and McCougall (1994, 49) defined international new ventures (INVs) as business organizations that from the beginning pursue to acquire relevant competitive advantage from the use of resources and the sale of outputs in multiple countries. The Knight & Cavusgil (2004) definition of BGs emphasizes young companies like SMEs, and the firm as the unit of analysis, and primarily outward internationalization. Whereas the Oviatt and McCougall (1994) INV definition

can refer to different types of new ventures including those launched in older, established MNEs and a broader range of value chain activities and entry strategies. (Knight & Liesch 2016, 94.) The born global model is particularly relevant model for exploring SME internationalisation and as this research focuses on SMEs this chapter discusses the born global model.

Born global firms are notably innovative and view internationalization, or new entry into new markets as an innovative act (Knight & Cavusgil 2004, 126). Innovation results from two main origins: 1. internal R&D rely on the firm's assembled knowledge, and 2. imitation of the innovations of other firms (Massini et al. 2003). The resource-based view (RBV) explains how in the context of an innovative culture, enterprising firms are developing and leveraging knowledge and resulting organizational capabilities (Knight & Cavusgil 2004, 126). The most significant knowledge resources are inimitable, unique and immobile, expressing the distinctive pathways of individual firm (Dierickx & Cool 1989).

BGs generally face challenges in terms of access to resources (Freixanet & Federo 2022), which can be an obstacle given the demand for resources in early and rapid internationalization (Khan & Cavusgil 2024, 5). The most critical resources for facilitating early internationalisation in BGs are knowledge-based resources and international market knowledge. In addition, social capital is one of the most critical resource for knowledge acquisition for product innovativeness (Presutti et al. 2020).

Knight & Cavusgil (2004, 127) presume that young firms that have a prolific innovation culture and inclination to pursue international markets likely internationalize quicker than internationally oriented young firms that lack an innovation culture. Firm's entrepreneurial and managerial knowledge can lead to exceptional performance (Autio et al. 2000). Capabilities-based resources are particularly relevant to born globals, which are generally low in tangible resources, because they are dealing with differing environments across various foreign markets (Luo 2000). Possession of such capabilities is beneficial for firms to diminish their liabilities of foreignness and newness (Oviatt & McDougall 1994).

Technological/R&D capability, management capability and marketing capabilities are especially important for survival and strategic performance (Efrat and Shoham 2012; Khan & Cavusgil 2025, 5). Further, marketing capabilities focused on developing knowledge-based capability can critically enhance strategic performance (Khan & Cavusgil 2025, 5). The use of technology as a competence for interacting with clients is found to advance exporting performance (McCormick and Somaya 2020). Absorptive capacity assists BGs in early internationalization through entrepreneurial and

market orientations, which in turn enhances their innovation performance (Rodríguez-Serrano and Martín-Armario 2019).

BGs international entrepreneurial orientation is a significant characteristic consistently asserted in many studies e.g. (Falahat et al. 2018; Knight and Cavusgil 2004; Weerawardena et al. 2007), which includes their global vision and perseverance and innovativeness and proactiveness that improves their operational performance (Gerschewski et al. 2015). Their entrepreneurial, learning and international growth orientation are widely examined in relation to advancing international performance (Jantunen et al. 2008), whereas competitor orientation for their perceived success (Gerschewski et al. 2015). What is more, global orientation (Cerrato and Piva 2015), entrepreneurial and technological leadership orientations (Knight and Cavusgil 2005) and growth orientation along with learning and entrepreneurial orientations, have also been frequently regarded as defining features for BGs (Jantunen et al. 2008).

BGs' product and service quality focus are key strategies for their financial, operational and perceived success and niche strategy is beneficial for their financial performance (Gerschewski et al. 2015). Consistently, niche strategy is regarded as a principal strategy for product-market scope in internationalization (Cannone and Ughetto 2014; Chetty and Campbell-Hunt 2004). It is argued that smaller BGs implement two strategies, the use of advanced technologies and relational strategies to overcome lack of economies of scale and resources and reluctance to risk taking in rapid internationalization (Freeman et al. 2006). On the other hand, according to Knight and Cavusgil (2004) BGs international performance is attributed to four business strategies, global technology, unique product development, quality focus and leveraging foreign distributors.

Born globals are emerging in considerable numbers worldwide, which is likely reflecting an emergent paradigm, and this holds the potential for born globals to become a leading species in the ecosystem of international trade. The phenomenon of prevailing emergence of born globals appears to be relatively universal with researchers noting it in essentially all major trading countries (Knight & Cavusgil 2004, 125). However, born global firms were characterised by a higher failure rate compared to traditional internationalisers (Onkelinx and Sleuwaegen 2010). The born-global phenomenon is heartening because it indicates the emergence of an international exchange system in which any firm, despite of age, experience, and tangible resources can actively participate in conducting international business. (Knight & Cavusgil 2004, 137.)

2.1.4 Similarities between the gradual models and born global model

Paul & Rosado-Serrano (2019) critically reviewed the studies on the process of internationalization (Gradual Internationalization vs Born-Global), derived from their review article they highlighted elements that coincide between the models. *Entrepreneur characteristics* are present in both models which can act as a catalyst of knowledge acquisition, confidence building and elements that influence making the internationalisation decision. Entrepreneurs could benefit from applying an approach in which they combine trust building, relationships, supply chains, and network to seek, scan and act on international marketing opportunities. The significant influence of *networks* as facilitators of the company's international expansion is crucial in both models. The role of *supply chain* in both of the models imply that the elements of innovation and high technology facilitate international expansion. (Paul & Rosado-Serrano 2019, 847.)

These models are theoretical thus in practice some firms may present overlapping characteristics from both models. For these special cases U-model could be utilised in explaining cases in which firms present born-global characteristics. For instance, a firm can present born-global characteristics but also correlate with the basic assumptions about psychic distance and well-established networks. (Paul & Rosado-Serrano 2019, 834.) Some argue that BGs internationalize primarily on a regional basis (Cavusgil & Knight 2015; Lopez et al. 2009), considering physically close markets at first-stage internationalization before moving to the distant markets (Hashai & Almor 2004). However, there are also arguments for BGs simultaneously entering close and distance markets to pursue their short- and long-term goals (Trudgen & Freeman 2014). (Khan & Cavusgil 2025, 4.)

2.2 Subsidies' role in strengthening resources in SMEs

2.2.1 Resources and capabilities of firms

A basic proposition of the resource-based view is that a firm consists of a bunch of productive resources and capabilities. It is widely acknowledged that a major weakness for SMEs is that they have to operate with limited resources (Woschke et al. 2017; Garengo et al. 2005; Laforet and Tann 2006) with researchers often pointing to a lack of financial resources in SMEs (Hewitt-Dundas 2006; Keizer et al. 2002).

Resources are defined as the tangible and intangible assets a firm uses for choosing and implementing strategies (Barney 2001). Capabilities are complex set of skills and accumulated knowledge that allow firms to utilize their assets and coordinate their activities (Day 1994).

Therefore, capabilities link together multiple organizational resources and enable their deployment in a way that optimizes advantages (Krasnikov & Jayachandran 2008).

Tangible resources and capabilities can be easily observed and quantified. They can be divided into three different subcategories which include financial-, physical-, and technological resources and capabilities. First, financial resources and capabilities refer to the financial assets of a firm e.g. the ability to generate internal funds and raise external capital. Second, physical resources and capabilities include offices, equipment, factories, geographic location, access to raw materials and distribution channels. Third, technological resources and capabilities are skills and assets that create cutting-edge products and services supported by trademarks, patents, copyrights, and trade secrets. (Peng 2013, 51.)

Intangible resources and capabilities are more difficult to observe and quantify than tangible ones. However, it is widely acknowledged that they must exist because firms cannot create competitive advantage solely based on tangible resources. Intangible resources are divided to three different categories which are human-, innovation-, and reputational resources and capabilities. First, human resources and capabilities include the expertise, trust and talents embedded within a firm that are not captured by its tangible systems and structures. Second, innovation resources and capabilities include a firm's assets and skills for researching and developing new products and services as well as to create or restructure a production path or service organization. Third, reputational resources and capabilities are related to a firm's ability to develop and leverage its reputation a stable provider of goods/services, a fair employer, and/or engagement in corporate social responsibility. (Peng 2013, 51.)

The lack of resources slows down SME growth and can be seen as one of the main barriers for SMEs to internationalize, as the internationalisation process requires substantial amount of resources for a firm. Public funding can assist SMEs to overcome resource constraints. SMEs are usually considered as resource-constrained, lacking market power, knowledge and resources to operate successfully in international markets (Hollenstein 2005). Regardless of small size and foreignness, a growing number of SMEs enter international markets (Reynolds 1997). Improved internal organizational capabilities, especially financial, managerial, marketing, and technical capabilities contribute to improve firm's performance for internationalization also, acquiring sufficient financing serves as a buffer against unexpected challenges (Kuivalainen et al. 2010; Bannò et al. 2014, 24–25). One of the main barriers for SME internationalisation is lack of capital, therefore Bannò et al. (2014) argue that by receiving financial support this barrier can be mitigated

but also mention that financial support can be easily converted into alternative needed resources. Public support aims to enhance SMEs competencies and therefore help them to mitigate the liabilities of foreignness, smallness, outsidership and newness (Ciszewska-Mlinarič 2018, 48).

The use of national export- promotion programs and improved export performance are not directly associated but rather benefits are achieved by enhancing firm's resources and capabilities for operating internationally (Leonidou et al. 2011, 20). Government assistance can act as an external resource and if utilized properly assists firms in mitigating human, financial, marketing, informational, and allied deficiencies that hamper export development (Leonidou et al. 2011; Seringhaus 1986). As SMEs have to operate with resource constraints, the findings of prior research (Leonidou et al. 2011; Crick and Czinkota 1995) indicate that national export-promotion programs are more beneficial for SMEs than for large firms.

2.2.2 Public support for SME internationalisation

There are a variety of different public support measures for SME internationalisation. Public support can be either financial or non-financial or combination of both. There is a variety of public financial support instruments providing either direct cash assistance in the form of grants or debt support in the form of credit or loans (De Maeseneire & Claeys, 2012). The internationalisation of SMEs is beneficial for the SMEs themselves but also for the economy (Fischer & Reuber 2003, 69). By definition the aim of public support is to improve the performance of new and small firms and in the context of internationally oriented firms to assist them successfully enter and build the position in foreign markets (Yoo et al. 2012; Ciszewska-Mlinarič 2018, 46–47).

Prior research regarding public support provides multiple interesting insights that can be divided into three primary themes. Firstly, due to the relatively low awareness of public support programmes among SMEs, factors relating to both the awareness and the use of such programmes are frequently studied. Secondly, the effectiveness of public support is often examined, even though it is unclear what type of support (financial versus non-financial) is particularly relevant for SMEs. Thirdly, prior research has also looked into which firms should receive support, and what type of allocation criteria the providers of the public support should use. (Ciszewska-Mlinarič 2018, 46.) From the economic point of view, it can be argued that public support programmes should be targeted to high-growth firms, as they hold the most potential for creating new jobs (Mason & Brown 2013).

There have been plenty of research conducted regarding whether public support pays off. Prior research on this matter offers contradictory results (Yoo et al. 2012). The different approaches in methodologies, dependent variables, operationalisation of public support, and various contexts (country and sector differences) might explain these contradictory results. A lot of prior research has looked into this on single country level, but Ciszewska-Mlinarič (2018) provides more comprehensive approach as she investigates how public support (financial and non-financial) affect the geographic scope and export intensity of SMEs from Old (EU15) and New Europe (the CEE12 region). Extensive approach can minimize the effects of country- and sector differences on the results. (Ciszewska-Mlinarič 2018, 45, 47.)

Public support can also have indirect effect to export intensity with geographic diversification. It is assumed that if the firms using public support rely on more geographically diverse strategies, they can reach higher intensity of exports. Geographic diversification makes firms' operations more complex and up to a point it enhances firm performance. However, at high levels geographic diversification can lead to lower performance gains. (Ciszewska-Mlinarič 2018, 48–49.) This indicates that the relationship between diversification and performance might take the inverted U-shape (Driffield et al. 2008). It can be argued that more extensive scope of export markets enables SMEs to spread risks. Diversification of market might also enable new opportunities to learn, and leverage knowledge and resources in multiple markets, leading to increase in exports. (Ciszewska-Mlinarič 2018, 48–49.)

Ciszewska-Mlinarič (2018, 61) found consistent support for all hypotheses regarding the direct and indirect effect of the use of financial support on SME export intensity. It was found that European SMEs that have utilized financial support public programmes in between 2006 and 2008 would likely increase in 2008 the geographic scope of their exports as well as the level of their export intensity. These results suggest that public financial support programmes positively influence SME exporting, hence it appears that the assumptions of governments and/or governmental agencies are justified well. Furthermore, the existence of the curvilinear relationship between export diversification and intensity in a new context of SMEs, coming from developed and advanced emerging economies of Europe was supported. (Ciszewska-Mlinarič 2018, 61.)

2.2.3 R&D subsidies effects on R&D expenditure

Prior studies provide conflicting findings regarding the presence of a causal relationship between public R&D funding and private R&D. Five possibilities can be identified on how subsidy affects R&D expenditure which are illustrated in Figure 1. Subsidy can cause R&D additionality by

triggering new firm-financed R&D spending over the amount of the subsidy. It is possible that the subsidy yields no effects. This can occur if the firm just adds the amount of the subsidy to their firm-financed R&D expenditures, which remain unchanged. Subsidy can cause partially, fully or over-fully crowding out firm's own R&D expenditures. Partial crowding out happens when the firm uses a part of the subsidy amount in place of own R&D expenditures, hence reducing them. Full crowding out entails firm-financed R&D expenditures decreasing by the total amount of the subsidy. Over-full crowding out occurs when firm reduces their firm-financed R&D expenditures by an amount that surpasses the amount of the subsidy. (Dimons & Pugh 2016, 797 & 799).

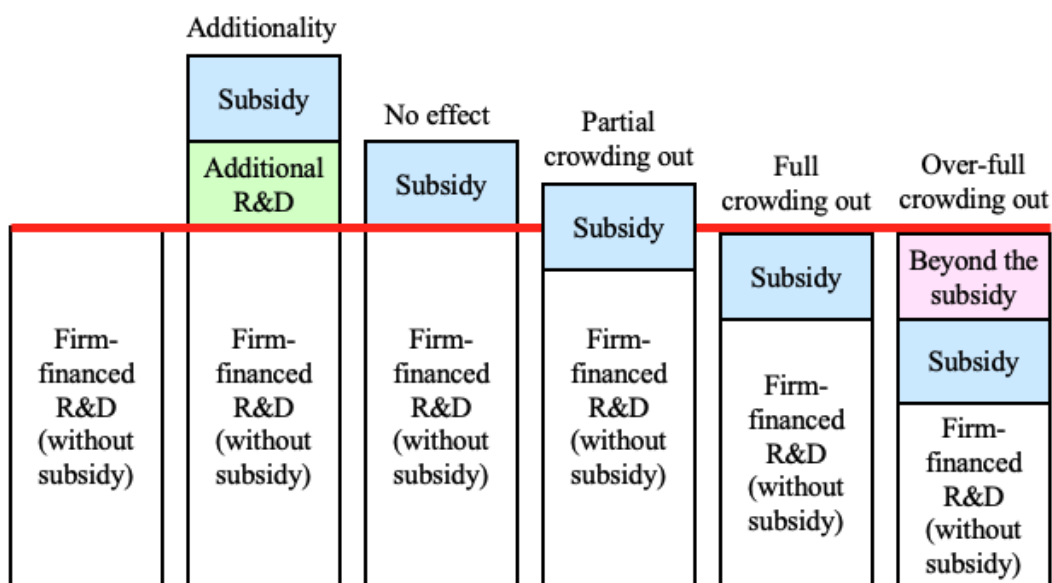


Figure 1 The possible effects of R&D expenditure (Dimons & Pugh 2016, 799)

According to public choice theory, public agencies may act opportunistically (Butler 2012). Public agencies tend to allocate the subsidies to the “best projects” even though these projects would probably succeed regardless of public funding (Dimos and Pugh 2016, 798). This “cherry-picking” strategy will lead to apparent effectiveness of the agency and their programmes (Radicic et al. 2016). Given that R&D subsidies can substantially boost the probability of a firm conducting R&D, cherry-picking could reinforce already capable firms, without activating new firms to undertake R&D (Czarnitzki, 2006).

Firms may consider public funds as a comparably inexpensive option for financing R&D projects, specifically if application costs are small and the plausibility of selection is high as opposed to other financing sources (Aschhoff 2009). Additionally, as it is the case of many outputs of public policy,

complications in measuring the private and social returns of R&D projects increase information asymmetry between public agencies and private firms (Butler, 2012, 89).

In the meta-regression analysis by Dimos and Pugh (2016, 811) the findings reject crowding out of private investment by public subsidy but also do not show any evidence for substantial additionality. Using subsidy as part of science and technology policy can mitigate market failures by increasing both R&D inputs and R&D outputs in subsidised firms compared to the no subsidy counterfactual. Subsidies are usually not wasted as literature denies complete crowding out. (Dimos and Pugh 2016, 811.) This reinforces that R&D subsidies could be implemented as part of a wider counter-cyclical policy to sustain R&D investment during economic downturns (Hud & Hussinger, 2014). Individual policies can work in the intended direction but result in quantitatively smaller effects than anticipated which might be common for public policies. The effectiveness of subsidies is increasing as time goes by, which might reflect institutional learning. (Dimons & Pugh 2016, 811.)

2.3 Support for green innovations from subsidies

2.3.1 Green innovation as a firm resource

Green innovation (also referred to as eco-innovation or environmental innovation) is generally defined as innovation that mitigates environmental impact (Šumakarīs et al. 2020, 2). In this thesis the term green innovation is used when referring to this phenomenon. Organisation for Economic Cooperation and Development (OECD 2009, 2) defines green innovation as “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method for business practices, workplace organisation or external relations, that results in a reduction of environmental impact, no matter whether that effect is intended or not and the scope of green innovation may go beyond the conventional organisational boundaries and involve broader social arrangements that trigger changes in existing socio-cultural norms and institutional structures”. Moreover, OECD (2009, 2–3) identifies three key aspects of green innovation: First, targets, like products and processes (rely on technological development), marketing methods, organisations and institutions (rely more on non-technological development). Second, mechanisms, that include modifications to practices, redesign and new alternatives, or the innovation of completely new practices. Third, impacts which refer to how the green innovation affects environmental conditions. (OECD 2009, 2–3.)

Green innovation can be viewed as a valuable resource for firms establishing competitive advantage and also simultaneously contributing towards sustainable development. Firms face the dilemma between consuming available resources and preserving them for the future, and green innovation can act as an opportunity to address this. Kharna et al. (2022) examines the sustainable development dilemma of green innovations through the theoretical perspective of the resource-based view of the firm. Looking into green innovation through the lens of resource-based view gives a more concrete view of how firms are using green innovation as a key resource. The emerging major themes which can be identified include green supply chain management, green product design, corporate environmental responsibilities which are further explored. (Khanra et al. 2022, 1395, 1400-1402.)

The first thematic area *green supply chain management* regards environmental concerns in firm's logistic operation decisions to operate sustainably (Gold et al. 2010). Firms applying green supply chain management can gain competitive- and collaborative advantage. Furthermore, applying circular economy principles to firm's operations intertwines with green supply chain management. *Circular economy* is an economic system with a cyclical model for material flow that cuts down negative environmental impacts and gives possibilities for new business opportunities. In contrast to the traditional linear throughput flow model, a circular economy accentuates remanufacturing, reusing, refurbishing, upgrading and repairing along with using renewable and waste-derived energy throughout the value chain. (Miemczyk et al. 2016.) More and more firms are struggling to gain *competitive advantage*, particularly those operating in hypercompetitive environments (Markley & Davis 2007). Green supply chain can be a competitive advantage for a firm, e.g. by lowering expenses by cutting down on their consumption of natural resources, water and energy (Gold et al. 2010). *Collaborative advantage* entails inter-firm knowledge transfer for choosing and monitoring suppliers which might lead to greener process management and supply chain management (Gavronski et al. 2011). (Khanra et al. 2022, 1402, 1404.)

Green product design is the second thematic area (Khanra et al. 2022, 1404). Green products are designed to use minimal energy and resources during production, mitigate environmental impacts during usage, and minimize waste generation throughout a product's lifecycle (Lin 2014). The ability to introduce green product lines can serve as valuable resource for firms aiming to secure sustainable competitive advantages (Duque-Grisales et al. 2020). Green product design is particularly relevant theme for this study as the target companies are producing *eco-innovations*, which contributes to their business performance and knowledge competence. Companies frequently endorse *eco-innovations* in response to governmental regulations and consumer demands, resulting in innovation in product designs, manufacturing methods, and organizational cultures (Lin 2014).

The environmental orientation of a firm can influence the positive impact of eco-innovation on firm profitability. Companies that allocate more organizational resources to green product design may experience improved *business performance*. Yet, the relationship between green product design and business performance is usually complicated and uncertain. (Zhang & Walton 2017.) Investments in green product design might not immediately enhance business performance but rather the benefits could be observed in long term. Issue of balancing between sustainability objectives and profitability goals might be achieved through market *knowledge competence* and strategic-level sustainability orientation (Claudy et al. 2016).

The third thematic area *corporate environmental responsibilities* might involve adhering to best practices and international standards, pollution prevention, recycling and minimizing waste creation (Schoenherr 2012). The main corporate environmental responsibilities circles around reduction of carbon footprint. Even though firms paint their efforts for environmental contribution mostly in a positive light it is important to note that this journey comes with both challenges and benefits for the firm. Due to global warming and climate change pressures for firms to *reduce their carbon footprint* have arisen from many stakeholders (Jabbour et al. 2020). Firms tend to be cautious when investing in environmental sustainability since such investments could diminish their competitiveness by increasing operational expenses (Andersén et al. 2020). For SMEs such investments are especially challenging due to limited resource and competitive environment (Andersén et al. 2020). On the upside firms that meet their environmental responsibilities might acquire a sustainable competitive advantage by developing resources for pollution prevention, product stewardship and clean technologies (McDougall et al. 2019).

2.3.2 R&D subsidies supporting green innovations

Bai et al. (2019, 828) found out that government R&D subsidies substantially prompt the green innovation tendency and performance of energy-intensive firms in their study of Chinese companies. Subsidized firms showed a significantly higher tendency to green innovation compared to the unsubsidized firms. Government R&D subsidies significantly boost the green innovation of both large companies and SMEs but this boost is more valuable for SMEs. The green innovation tendency in the subsidized SMEs increased enormously and green innovation performance has increased astronomically. As the results of Bai et al. (2019, 829) endorse the effectiveness of green R&D subsidies for SMEs, it supports the notion that it would be beneficial to increase the amount of R&D subsidies for SMEs. (Bai et al. 2019, 828-829.)

SMEs should pay closer attention to green innovation and allocate more government R&D subsidies to green innovation activities to thrive in competitive business environment. SMEs have to operate with severe capital constraints compared to large companies. Therefore, SMEs must demonstrate their quality to potential investors when competing for limited funding. (Bai et al. 2019, 821.) Green innovation is currently viewed as emerging and promising business opportunity that is being advocated by governments, investors and media (Mrkajic et al. 2017). After receiving government R&D subsidies SMEs are more equipped to practice green innovation (Bai et al. 2019, 821).

Green innovation activities can be divided into two types: strategic green innovation and substantive green innovation (Zhao et al. 2024, 1379). Strategic green innovation seeks other economic benefits and pursues innovation “quantity” and “speed” to meet relevant government institutional policies (Jiang & Bai 2022). Substantive green innovation intends to advance actual technological progress, reduce pollution emissions, and enhance energy efficiency and it is viewed as “high-quality” green innovation behaviour (Ren et al. 2023).

As substantive green innovation usually requires considerable resource allocation, high uncertainty, and elevated risks, enterprises tend to show little interest for such endeavours (Ben Arfi et al. 2018). Governmental R&D subsidies can diminish these burdens by reducing costs and resource constraints, thus facilitating enterprises to engage in substantive green innovation. However, the findings of Zhao et al. (2024, 1391) indicate an inverted “U-shaped” relationship between governmental R&D subsidies and corporate substantive green innovation. The inverted “U-shaped” curve indicates that the initial positive impact of governmental R&D subsidies on substantive green innovation declines and turns negative as subsidy levels rise above an optimal point. (Zhao et al. 2024, 1391, 1381.)

Zhao et al. (2024, 1391) propose that governmental R&D subsidies have a positive effect on corporate strategic green innovation. It could be assumed that the main aims of enterprise-driven green innovation are improving production methods, pollution control technologies, or creating new products (Zhao et al. 2024, 1381). However, firms often face compliance pressures to meet the objectives of these subsidies (Li, Liu & Liu 2023). Thus, information asymmetry can lead towards adverse selecting behaviour, aiming to secure future subsidies (Ugur & Trushin 2023). Additionally, by meeting the relevant requirements of R&D subsidy policies, firms can show that they are actively involved in green innovation and set themselves up to get future subsidies (Li et al. 2020).

2.4 Interrelationship of innovation and internationalisation

There is strong empirical evidence that innovation policies usually lead to innovation additionality. Innovation is an intermediate outcome, thus innovations contribute to some more extensive goal, such as competitiveness of firms and economies. It is firmly entrenched in the empirical literature that innovation and exporting are positively associated. Whether it is an innovation driving the decision to export, or more seldom, exporting inducing innovation by international learning, there is longstanding and abundant evidence for positive association. (Freel et al. 2019, 1257.)

However, there is also some conflicting research results suggesting that this complementarity might not be as strong in small firms, as resource limitations could obligate managers to choose between two high-risk strategies (Kiss et al. 2018). This is referring the choice for SMEs to concentrate on innovation specifically for domestic market or to allocate less resources for innovation and more into expanding to new export markets (Roper & Love 2002, 1096). Yet, more recent research indicates that innovation and exporting simultaneously can enhance performance even in small firms, in such a way that innovation without foreign market access does not lead to relevant performance improvement (Love & Roper, 2015; Freel et al. 2019, 1257). Or in reverse, exposing small firms to export markets will not improve productivity if it is not complemented by firm-level innovation efforts (Golovko & Valentini, 2011). In particular, the relationship between innovation and export performance is likely to be more evident in smaller firms. (Freel et al. 2019, 1257).

Innovation significantly influences firms' decisions to enter export markets, but, conditional on entering export markets, additional innovation does not increase export intensity (Ganotakis & Love 2011). Exporting can induce innovation in firms as export markets might offer access to new innovation and technology which might be applied to promote innovation activity or that extending the markets over which margins might be earned promotes productivity and offers stronger incentives for investing in innovation (Golovko & Valentini, 2011; Ganotakis & Love, 2012). The ability for a firm to compete in international markets is influenced by the firm's capacity to successfully market new and improved products (Ganotakis & Love 2011, 280).

Cassiman and Golovko (2011, 70) suggest that innovation promotion policies may be an alternative to direct export promotion. If innovation policies can be shown to induce more intensive and continual activity in export markets, the treatment effect can be considerable. Innovation policies might induce changes in export behaviour, and they may be evaluated on that basis. (Freel et al. 2019, 1260.)

Freel et al. (2019) investigated the extent to which innovations induced by policy interventions influence new export activity in their sample of German SMEs. Based on their results the simple conclusion is that new export behaviours can arise from induced innovation. Evidence suggest that the outcomes of innovation policy have a positive influence on both export persistence and growth. Clear evidence suggests a positive relationship between novel product innovation and growing export revenue. (Freel et al. 2019, 1269.) Product innovation has relatively stronger influence over process innovation as a determinant for firms' export success (Dosi et al. 2015). Consistent with Freel et al. (2019) observations of the role of innovation in export persistence Dosi et al. (2015) note that the exports of innovation firms are more resilient towards external shocks than those of non-innovating firms. (Freel et al. 2019, 1267, 1269.)

Research on innovation often overlooks the notion that innovation is an intermediate output that is used as means to achieve a broader goal for instance enhancing the competitiveness of a company (Cannone & Ughetto 2014; Freel et al. 2019, 1269). Findings of Freel et al. (2019, 1269) suggest that incremental product innovation assists in maintaining export market presence, whereas novel product innovation is a driver for export growth. The results of Freel et al. (2019, 1270) reinforce the interlinkage of varying innovation and exporting outcomes, hence the use of innovation policy as export policy is endorsed. Policies designated to growing export markets should focus on new product innovation, whereas policies intending to maintain export positions could be more successful by focusing on incremental innovations by keeping up with competitors. (Freel et al. 2019, 1267, 1269, 1270.)

Taking into consideration the dynamics in economical, ecological and social environments, Šumakaris et al. (2020) argue that both green innovations and internationalization are interlinked and there is a growing research trend on interrelationships between green innovations and internationalization. Some studies examine the direct relationship between green-innovation and internationalization, whereas other studies examine the mediation effect of green innovation (Šumakaris et al. 2020, 4). Companies face a growing demand from consumers and global regulatory requirements for eco-friendly products and services in their domestic and international markets, thus making both internationalisation and green innovation more a necessity than a choice (Hojnik et al. 2018). Green innovation is acknowledged as a driver of global competitive advantage and becomes a key element in boosting exports. There is a high level of risk involved in the development of new products or processes and paradoxically this type of risk can bring on a negative impact on companies' internationalization. (Martinez-Roman et al. 2019.) However, by

making green innovation a key aspect in a firm's strategy can subsequently lower possible risks (Munodawafa & Johl 2019).

2.5 Synthesis of the theoretical framework

The theoretical framework in Figure 2 illustrates key concepts derived from the literature. This study focuses on RRF-subsidy, thus subsidies are presented on a focal point at the top of the framework. Subsidies can be utilised as an external resource that are allocated for supporting to carry out specific activities in firms. The relevant business activities for this study are international growth/internationalisation and green innovation. Internationalisation models are presented (on the left) as theoretical foundation to better interpret what type of role subsidies play in supporting firms to grow internationally. On the right subsidies for green innovation are presented with a list of different green innovation activities to give concrete examples of what type of activities subsidies can support. Similarly, (on the left) list of aims for subsidies for international growth is given to highlight some of the key aims of these subsidies. Finally, at the bottom of the framework, the interrelationship of innovation and internationalisation is highlighted which is supported by the literature.

| | |
|---|---|
| Subsidies | |
| <ul style="list-style-type: none"> • Public or Private • are targeted to support certain activities in firms • can be used as an external resource | |
| <p style="text-align: center;">Internationalisation process and models</p> <ul style="list-style-type: none"> • Gradual or accelerated process • U-model and Born Global | <p style="text-align: center;">Green innovation</p> <ul style="list-style-type: none"> • Innovation that mitigates environmental impact |
| <p style="text-align: center;">Subsidies for international growth (or export support measures)</p> <ul style="list-style-type: none"> • Financial support and Non-financial support • Aims: <ul style="list-style-type: none"> • Improved export performance and intensity, Strengthening firm's resources and capabilities for operating internationally, Improved geographic diversification | <p style="text-align: center;">Subsidies for green innovation</p> <ul style="list-style-type: none"> • Strategic and Substantive green innovation • Subsidies can support green innovation activities in firms, e.g.: <ul style="list-style-type: none"> • Green product design, Eco-innovations, Corporate environmental responsibilities, Reducing carbon footprint, Green supply chain management, Circular economy, Competitive advantage, Collaborative advantage |
| Interrelationship of Innovation and Internationalisation | |

Figure 2 Theoretical framework

The two opposing types of internationalisation processes, the gradual and accelerated process (Paul & Rosado-Serrano 2019), are mentioned in the framework. They provide a foundation for understanding how firms expand internationally, which is essential before examining how subsidies can support international growth. The gradual model Uppsala model (Johanson & Valhne 1977) and a more recent model regarding the internationalisation of a born global firm (Knight & Cavusgil 2004) are presented. This theoretical foundation of internationalisation process and models is applied to the context of the target SMEs as the stage of internationalisation among other things can affect how SMEs perceive the benefits of public support for their internationalisation.

In the literature, it is widely acknowledged that a major weakness for SMEs is that they have to operate with limited resources (Woschke et al. 2017; Garengo et al. 2005; Laforet and Tann 2006). One of the main barriers for SME internationalisation is lack of financial resources thus by

receiving financial support this barrier can be mitigated, moreover financial support can be easily converted into alternative needed resources (Bannò et al. 2014). Tangible and intangible resources and capabilities of firms (Peng 2013) were introduced as this study explores how the RRF-subsidy strengthened resources and capabilities in SMEs. In addition, subsidies effect on R&D expenditure (Dimons & Pugh 2016) was discussed regarding the possible preferred effect of R&D additionality or the undesirable effect of crowding out.

Companies show an increasing interest to green innovation to fill their corporate environmental responsibilities (Schoenherr 2012), and some firms see green innovation as a lucrative novel business opportunity (Mrkajic et al. 2017) that can act as a competitive advantage (Khanra et al. 2022; Markley & Davis 2007). Assessing green innovation through the resource-based view gives a more concrete view of how firms are using green innovation as a key resource. The emerging major themes which were identified included green supply chain management, green product design and corporate environmental responsibilities. (Khanra et al. 2022) Green innovation activities can be divided into two types: strategic green innovation and substantive green innovation (Zhao et al. 2024). Substantive green innovation generally demands substantial resource allocation, high uncertainty, and elevated risks, which reduces enterprises interests to embark on such endeavours (Ben Arfi et al. 2018). Governmental R&D subsidies can mitigate these burdens by reducing costs and resource constraints, thus supporting enterprises to engage in substantive green innovation (Zhao et al. 2024). Regarding the case of this research, familiarizing with literature on how R&D subsidies support for green innovation is relevant as the RRF-subsidy was targeted for R&D projects that promote for green innovations in the target SMEs.

It is firmly entrenched in the empirical literature that innovation and exporting are positively associated (Freel et al. 2019). However, there is some conflicting research results indicating that this complementarity may not be as strong in small firms, as resource limitations could obligate managers to choose between two high-risk strategies (Kiss et al. 2018). In addition, when focusing specifically on green innovations and internationalisation there is also support that these activities are interlinked (Šumakaris et al. 2020). This interrelationship between innovation and internationalisation will be further explored in this study as the target SMEs conducted innovations in their RRF-projects and it will be assessed whether these innovations were perceived beneficial for their internationalisation.

It is important to present this theoretical framework as it highlights the key concepts regarding this study. The main research question for this research is: How does RRF-subsidy support green

innovations, R&D and international growth in SMEs? The framework reflects the key concepts of the main research question, thus giving a theoretical base to further explore these concepts based on empirical findings. The theoretical part of this study functions as an important foundation to further explore how these key concepts were perceived in the target SMEs to address the research questions. Before the discussion of the findings in fourth chapter, the third chapter will explore the methodology used in this study.

3 Research design

3.1 Qualitative case study approach

This thesis follows qualitative research approach. This approach is the most appropriate choice for this research as this study aims to give a comprehensive overview of the perceived benefits of RRF-subsidy for SMEs. The qualitative research approach was chosen as it would be the most fitting for the study's aim and research questions. Qualitative research is a suitable choice when the research investigates "how", "who" and "why" questions of individual and collective organized action in varying time and context (Doz 2011, 583). Qualitative research allows to develop a comprehensive understanding of a complicated phenomenon (Eriksson & Kovalainen 2011).

Qualitative case study approach is used as a method in this study and the case for this research is the RRF-subsidy "Innovation support for growth companies". A key aspect of all case study research is the construction of 'the case' or multiple 'cases'. A case study explores a bounded system, which can be defined in terms of time and place (e.g. an event, an activity, individuals or groups of people) over time and with detailed, in-depth data collection including many contextually rich sources of information. Research questions aim to understand and solve the case: "what the case is about and what can be learned by studying it". The case is examined in relation to its historical, economic, technological, social, and cultural context. Case study research can present complicated and hard-to-grasp business issues in an accessible, vivid, personal, and down-to-earth style which contributes to the popularity of this research approach. Even though case study research is often associated with qualitative research, quantitative data can also be used to form a case. This indicates that case study research should be viewed more as a research approach or research strategy rather than a method. Many researchers make a key distinction between single-case studies and multiple or collective case studies. (Eriksson & Kovalainen 2011, 115-116, 118.)

Case studies can follow either extensive or intensive case study approach. As this study focuses on a single case which is the RRF-subsidy "Innovation support for growth companies", intensive case study approach is more suitable. Extensive case study research aims at elaboration, testing or generation of generalizable theoretical constructs by comparing multiple cases (Eriksson & Kovalainen 2011, 118). Intensive case study research focuses on finding out as much as possible on one or few cases by providing a thick, holistic and contextualized description. Thick description provides a verbalized interpretation that is able to clarify the reasons behind intricate and versatile details of the case. (Geertz 1973.) The main purpose of intensive case study is to provide an

interpretation. The business researcher acts as an interpreter by both constructing and analysing the case. The goal is to understand and explore the case from ‘the inside’ and to gain a more comprehensive understanding from the perspectives of the people involved in the case. (Eriksson & Kovalainen 2011, 118-120.) In this research the representatives from the target SMEs provide insider approach to the RRF-subsidy. The intensive study approach is fitting for this research as it aims to provide holistic description of the perceived benefits of the RRF-subsidy for SMEs.

The selection of cases plays a fundamental role in case study research design. Due to the intensive nature of data collection methods in case study research, there can be a small number of research units. This relatively small number of research units highlights the importance of the researchers' justification for case selection. Sample selection is ideally strategic rather than random in case study research. Researchers should select cases that give highest amount of information about the research objective. (Bleijenbergh 2010, 62.) The business researcher makes the case by executing the research: by defining the boundaries of the case, the object of study is transformed into object of understanding and interpretation. It is crucial that the researcher pays close attention to the criteria used in defining the boundaries of the case. (Eriksson & Kovalainen 2011, 177.)

3.2 Data collection

The research data can be either primary data which is collected by the researcher, secondary data which refers to existing data or the researcher can use the combination of both primary and secondary data (Eriksson & Kovalainen 2016, 82). This study was mostly based on primary data which was supported by secondary data. Primary empirical data collected by interviews was chosen as the qualitative data source in this study. Primary empirical data in this research was collected through interviews with representatives from the SMEs that got funding from the RRF-subsidy “Innovation support for growth companies”. Interviewing is a suitable method when the research is focusing on a complicated phenomenon, and the aim is to gain a more comprehensive understanding of it. For this study secondary data included e.g. information about the RRF subsidy provided by Business Finland and information about the target SMEs from their webpages. Secondary data was useful for gaining an overview of the RRF-subsidy and the target SMEs, thus also assisting in the in the preparation for the interviews.

Operationalisation table (in Appendix 1 Operationalisation table) was created to ensure that the interview themes aligned with the themes and concepts that were presented as theoretical background. According to Eskola and Suoranta (1998) the foundation of operationalisation is based on the idea that each concept has two definitions: a theoretical definition that connects it to other

concepts and operational definition which connects it to real-life phenomena. The operationalisation framework presents the main research problem and the sub-problems of the study. The framework connects the relevant theoretical background and interview themes to each sub-problem. The interview themes include green innovation, R&D, resources and capabilities, internationalisation, international growth and subsidies.

This study applied the semi-structured interview method for data collection, as it allows flexibility in discussions while still maintaining a structured approach. The semi-structured approach is characterized by its unique flexibility to research specific dimensions while leaving room for new interpretations to emerge by the participants (Galletta 2013, 1-2). While planning the interview questions they were formulated mostly in an open-ended way, meaning they allow the interviewee to answer without suggestion or implication of a preferred answer (Gillham 2000, 67). As the semi structured approach is more flexible, in addition to the planned interview questions also follow-up questions and other questions regarding the discussed topics were used to gain some extra insights during the interviews. The interview questions are specified in the Appendix 2 Interview questions.

In total 44 companies received financial support from the RRF-subsidy program “Innovation support for growth companies”. As Appendix 3 Size of the companies that received funding from the RRF-program “Innovation support for growth companies shows majority of the companies are micro enterprises (20) or small enterprises (15). In addition, six medium-sized companies and three large companies received funding. Those three large companies were first discarded as this study focuses on SMEs. Companies located in the Uusimaa region received the majority of the funding. As presented in Appendix 4 The amount of granted funding in the RRF-program “Innovation support for growth companies” there is a considerable variation in the amount of received grants between smallest 25 000 and largest 1 600 000 euros. The median is 260 688 euros worth of funding.

28 SMEs were contacted and invited to an interview. Out of those 28 only five SMEs agreed to do an interview. The CEOs from each target company were initially contacted and asked whether their company is willing to participate in this study. A suitable interviewee would be the CEO or another representative from the company who was involved in the RRF-project. The interviewees were two CEOs, a CFO, a director of technology and a chief product officer

The interviews were conducted remotely on Microsoft Teams video meeting platform. The interviews were recorded, and Teams automatic transcription were used to assist in note taking. In addition, during the interview notes were taken mostly for backup in case some technical

difficulties would occur in the recordings. Individual interview method was used as it allows the researcher to concentrate on one person at a time to discuss the studied phenomenon. To ensure that communication between the interviewer and interviewee flows smoothly and to reduce the risk of misinterpretation, interviews were conducted in Finnish as it is the first language of both parties. The duration of the interviews ranged from 19 minutes to 47 minutes. The target SMEs, names of the interviewees, their positions, the interview date and the duration of the interview is presented in Table 2.

Table 2 Interviews

| Company | Field of business | Name of the interviewee | Interviewee position at SME | Interview date | Interview duration (minutes) |
|----------|---|-------------------------|-----------------------------|----------------|------------------------------|
| Carbofex | Biochar | Janne Kantero | CFO | 17.9.2024 | 47 |
| Elcogen | Solid Oxide Electrolysers | Matti Noponen | Director of Technology | 26.9.2024 | 41 |
| Kelluu | Sustainable Aerial Monitoring | Janne Hietala | CEO | 8.10.2024 | 19 |
| Sulapac | Sustainable Packaging Materials | Heidi Peltola | Chief Product Officer | 15.10.2024 | 34 |
| ReFaMo | Steel structure fatigue assessment technology | Vesa Aaltonen | CEO | 17.10.2024 | 46 |

The representatives from each participating SMEs were asked if they and their company can be mentioned by name in the study. All of the SMEs agreed to be mentioned by their name in the study. As the representatives agreed to speak under their own name it reduces the risk of them giving false statements or misrepresent their views or knowingly in the interviews.

In the following a short presentation of each of the participating SMEs is presented. *Sulapac* was founded in 2016. Sulapac's mission is to reduce plastic waste globally. Sulapac's materials are eco-friendly with low carbon footprint that is an alternative to plastic packaging materials. Sulapac's materials can be used in a myriad different applications. Their materials are made of recycled content and side stream raw materials. Their materials are bio-based and biodegradable. Their materials leave no persistent microplastics or toxic substances behind. Sulapac's materials are

converted into products using existing plastic processing machinery, which enables practical and resource efficient way to green transition. (Sulapac 2024)

Elcogen provides solid oxide cells and stacks for fuel cell systems and electrolyzers. Elcogen has three product families for emission-free power and hydrogen production. Elcogen's customers include system integrators of residential, commercial and industrial power generator units to green hydrogen production and those with interests in power-to-fuel capabilities. (Elcogen 2024)

Carbofex makes biochar of waste biomass by converting it. Their technology is suitable for biogas, pyrolysis oil and clean energy production. Their facility can produce 1000 tons of biochar and 600 tons of pyrolysis oil per year, and up to 8000 MWh clean energy as part of municipal heating network. (Carbofex 2024)

Kelluu operates in the field of aerial monitoring with autonomous airships delivering high-resolution environmental data from large areas. Kelluu creates high-resolution digital twins of the environment by turning data into clear knowledge. These digital twins help with better analysis and smarter planning, by turning complicated information to practical solutions. (Kelluu 2024)

ReFaMo was founded in 2020. ReFaMo provides steel structure fatigue assessment technology for assets under dynamic loads. Their patented algorithm transforms in real time the data of real loads into fatigue data. The fatigue data can be coupled with some external data e.g. GPS, acceleration or weather data to demonstrate observations about the fatigue process of the structures. (ReFaMo 2024)

3.3 Data analysis

This research uses the thematic data analysis method. Thematic analysis identifies, analyses and reports patterns and themes in the data. The method provides a detailed description of the data set. It is accessible and theoretically flexible approach for analysing qualitative data. As the method is not rooted in any pre-existing theoretical framework, it can be used with different frameworks and different things with them. (Braun & Clarke 2006 77, 79, 81.) The flexibility of the thematic data analysis was one of the key reasons for using this method in this research. The method is fitted for exploring a complex phenomenon in a comprehensive way. This method enabled a comprehensive and detailed analysis of the interview data regarding the case of RRF-subsidy.

For a proper documentation of an interview, it is required to record a high-quality audio recording which would be complemented with a word-for-word transcription (Tuckett 2005). The data

analysis process started with going through the automatic transcriptions of the interviews that were made by Teams. Even though automatic transcription is a useful tool the initial interview data was far from perfect and still needed a lot of editing. There were typos and the transcription tool did not recognise many industry specific terms and the names of the participating companies. After the edits there was total of 52 pages of transcribed text from the interviews.

The researcher must familiarize themselves with the data by diving deep into the content to discern initial themes and important sections (Naeem et al. 2023). An important step is to select relevant parts of an interview and leave out other less relevant parts as it makes the transcript more concise thus also easier to analyse (Lamba et al. 2022). The whole interview data was carefully read through, and some important points were highlighted that caught the researcher's eye. The next step entailed compressing the interview data so analysing it would be more manageable compared to trying to analyse the whole interview data in bulk. In practice compressing the data entailed writing summaries of each interview. Then out of these summaries the most important aspects relating to themes were identified.

Saturation is reached at the point where new data collection no longer provides additional insights (Moore et al. 2026) thus indicating that the data have been fully explored (Naeem et al. 2024). The saturation in this study was reached with these five interviews. The data from these interviews were comprehensive and some similarities started to emerge within the interviews. More data would have likely led to similar findings thus the data for this study was sufficient for analysis. Saturation is important for ensuring that the findings are robust and that the data is used to its full potential for reaching the aims of the research (Naeem et al. 2024).

Essential part of the study's thematic analysis process was creation of themes that can be also referred to as thematization. A theme reflects something significant relating to the research questions (Braun & Clarke 2006, 82). Likewise, in this research the themes emerged from the research questions. The analysis themes were (1) Green innovations and R&D (2) Resources and capabilities (3) Internationalisation and international growth (4) Subsidies. Themes arose from the literature review and also they are in accordance with the objectives of the RRF-subsidy "Innovation support for growth companies" thus combining literature and the case. When going through the interview data, important aspects relating to these themes were further analysed.

There are two main ways for identifying the themes in thematic analysis: an inductive or 'bottom up' way, or in a theoretical or deductive or 'top down' way. In the inductive approach themes emerge from the data and are strongly linked to the data themselves. On the other hand, a

'theoretical' thematic analysis is driven by the researcher's theoretical or analytic interest in the area and is therefore more explicitly analyst- driven. (Braun & Clarke 2006, 83-84.) The theoretical way was employed in this research as the themes were chosen based on the research questions and the literature. The themes were chosen before the data analysis was started and during the analysis data relating to these themes were considered relevant and looked into further.

3.4 Evaluation of the study

The term trustworthiness is used "to describe the strength of the claims to knowledge the researcher is making" (Wellington & Hammond 2021, 187). The researcher can help convincing others and themselves of the legitimacy and unbiasedness of the research by considering different criteria (Lincoln & Guba 1985). This research is evaluated based on the criteria by Lincoln and Guba (1985) which is the most common criteria in evaluating qualitative research. According to the criteria by Lincoln and Guba (1985) trustworthiness can be assessed through four categories: credibility, transferability, dependability and conformability.

Credibility relates to internal validity, indicating how accurately the findings correspond to reality. It can be achieved for instance by prolonged period of engagement, persistent observation, and triangulation. (Lincoln & Guba 1985, 296, 301.) The researcher's familiarity with the topic, collecting sufficient data, ability to consider different perspectives to reduce bias all advance the credibility of the research (Eriksson & Kovalainen 2008, 294). In this study credibility was established by familiarizing with prior research and theory and the case RRF-subsidy.

To avoid misrepresenting the data it should be carefully observed, interpreted and evaluated to gain thorough understanding of it (Lincoln & Guba 1985). As the interviewees spoke under their own name, it reduces the risk of them knowingly misrepresenting their views or giving false statements in the interviews. However, there is a possibility that some interviewees wanted to paint their company in a bit more positive light, hence highlighting positive aspects and overlooking some of the negative ones. Also, some aspects might have been left out from the answers in order to keep them relatively concise.

Triangulation increases the credibility of the research because single sources might present a biased view of the phenomenon (Lincoln & Guba 1985). The theoretical background of this study consists of different subjects: green innovation, resources, R&D, internationalisation, public support and interrelationship of innovation and internationalisation. Diverse theoretical approaches increase the theoretical triangulation of the study. In this study multiple informants were interviewed from the

same perspective which also improved triangulation. Having multiple informants improves the credibility of the research because it allows to confirm information and to notice possible incoherencies in the collected data (Meyer 2001). In addition, an operationalisation table was presented which demonstrated how the research questions, theoretical background, interview themes and analysis themes were connected to each other.

Transferability describes how well the research findings can be applied to other contexts or situations (Shenton 2004, 69). The transferability criterion is not only evaluated by the researcher but possibly the other person who intends to apply the findings elsewhere has the bigger responsibility. In qualitative research transferability entails providing the data which allows evaluations of applicability. As qualitative case studies are by nature highly context-based, transferability might be more challenging compared to other types of research. After all, the aim of truly transferable results may disregard the essential importance of context which is integral to qualitative research. Considering this, specifically in qualitative case study research, transferability can be established by a detailed description of research process and the context of the research. (Shenton 2004.)

In this study transferability was demonstrated by showing a detailed description of the research process including for example information on data collection methods and specific information about the interviews. A detailed description of the case RRF-subsidy was also presented and some information on the interviewed informants and the SMEs they represent. By providing this contextual information reader can estimate whether this research and its findings could be applied to other situations (Lincoln & Guba 1985; Shenton 2004).

Dependability refers to the replicability of the study. As dependability and credibility are closely associated with each other, by demonstrating credibility the demonstration of dependability can be established as well. (Lincoln & Guba 1985, 316-318.) As it was discussed above how credibility in this research was demonstrated, it also contributes supporting the dependability criterion. Dependability can also be demonstrated by describing the research design and implementing the research (Lincoln & Guba 1985, 316–318; Shenton 2004, 70–71). In this study this strategy was applied to improve dependability: The methodology chapter provides a thick description of the planning and execution of this research.

At last, *confirmability* refers to ensuring that the findings and interpretations are actually drawn from the data and not based on researcher's opinion or imagination. To improve confirmability, researcher can give the reader tools with which they can audit the confirmability of the study. These

audit measures include for instance information on data collection and the identified analysis codes or themes. (Lincoln & Guba 1985, 318–328.) Confirmability was demonstrated in this research by describing data collection methods and analysis and providing some direct quotations as support for the discussion in the findings.

3.5 Assessment of research ethics

Ethical considerations need to be taken into account for the research to be considered valid and reliable. In qualitative research ethical dilemmas usually relate to the collection of data or the analysis and use of the data. The researcher – participant relationship and informed consent also need to be taken into account. (Merriam & Tisdell 2015, 237, 261.)

For qualitative research making sure that informed consent is facilitated is a key ethical point to consider. The principle of informed consent was formalized to assist in creating research relationships that are based on ‘trust and integrity’ and intend to protect individuals’ right to choose whether to take part in research. An important criterion for content’s validity is that an individual’s decision is voluntary and based on transparent and straightforward information about what participating in the research will involve. (Klykken 2022, 795.) In this research informed consent was considered by informing the interviewees about what this research concerns, what topics will be discussed in the interviews, who the researcher is and that the finished research will be available to the public. It was communicated to the SME representatives that participation to this study was voluntary.

Each interviewee was asked whether they like to speak under their own name or wish to be anonymised for this research. All the interviewees in this research agreed to speak under their own name and represent the target SME they worked for. Possibly the main reason why the interviewees felt comfortable speaking under their own name might be that the subject matter for this research was not sensitive, personal nor a threat for business secrets. As all the interviewees spoke under their own name it improved the credibility of this research.

Interviews were recorded which assisted the researcher in note taking. All of the interviewees were asked if they agreed to have the interview recorded beforehand. All interviewees gave oral consent to have the interviews recorded. The interviewees were informed that the collected data and the recording will be only used for this research and only by the researcher themselves.

It is important to manage the research data accordingly and data management plan (in Appendix 5 Data management plan) is a useful tool for describing how the research data will be managed. The

data of this research includes recordings, transcriptions and notes of interviews. The data was gathered by the researcher themselves, and it contains personal information. During the research process the data is stored in the university's network drive and university-provided Seafire Cloud Service. The university's data storage services will take care of data security and backup files automatically. It is important to ensure data arrangement and integrity during the research process. Therefore, the original data files (transcription from the interviews) are kept separate from the data which is utilised in the research process, thus making it always possible to revert back to the original file if needed. After completing the research the data will be stored on a flash drive for 3 years. A more detailed description of a data management plan can be found in Appendix 5 Data management plan.

A few AI tools were used during this research, including Chat GTP and Microsoft Teams automatic transcription tool. The interviews were transcribed by using the automatic transcription tool on teams. The transcription tool was useful but still the researcher needed to manually go through the transcriptions to correct the errors the transcription tool made to ensure that the transcribed text corresponds to the actual answers given by the interviewees. Chat GTP was used for editing some sentences in the text, enhancing language, rephrasing some expressions and phrases and finding synonyms for words. For instance, asking for suggestions for words and phrases that would be suitable to use in academic context, and assistance to rephrasing and finding synonyms to use versatile and rich language and to avoid repeating same words. Examples of ChatGTP prompts that were used can be found in Appendix 6 Disclosure of the use of AI. Nevertheless, whole sentences were always written by the researcher themselves. Using AI tools for providing transcriptions and enhancing linguistic style are both ethical ways to use AI tools as assistance for conducting research. In this research the use of AI tools was minimal, and it is in accordance with the guidelines for the use of artificial intelligence in theses at Turku School of Economics.

4 Perceived benefits of RRF-subsidy for SMEs

4.1 Case description Recovery and Resilience Facility

4.1.1 Recovery and Resilience Facility on EU level and on national level

The case for this research is the European Commission's Recovery and Resilience Facility (RRF) subsidy instrument. EU member states received financial aid from the RRF subsidy program. This section provides an overview of the RRF-program on EU level and how the RRF-program was implemented in Finland. Specifically, this study focuses on the RRF-program "Innovation support for growth companies" which was targeted for Finnish SMEs.

The major European financial support programmes for companies are funded by the European Commission. This thesis focuses on the Recovery and Resilience Facility (RRF) that is a temporary monetary instrument which is a centerpiece of NextGenerationEU. With RRF the European Union (EU) aims to recover from the economic and social damage of the coronavirus crisis. Through the Facility, the Commission raises funds by borrowing on the capital markets essentially issuing bonds on behalf of the EU. The funds are then available to EU states for implementing ambitious reforms and investments that are in line with EU's priorities. This includes making the EU member states economies and societies more sustainable, resilient, and prepared for the green and digital transitions. The RRF also plays a crucial role in implementing the REPowerEU plan that is the Commission's reaction to the socio-economic challenges and disruption in the global energy market resulting from Russia's invasion of Ukraine. (European Commission 2024A)

The total amount of RRF is 723 billion euros which consists of 385 billion euros in loans and 338 billion euros in grants. The RRF entered into force on 19 February 2021. It provides funding for reforms and investments in EU Member States initiated since the beginning of the pandemic in February 2020 up to December 31 2026. EU countries must submit their national recovery and resilience plans with clear milestones and targets regarding the reforms and investments they will implement by the end of 2026. The plans must allocate minimum 37% of the budget to green measures and 20% to digital measures. RRF is performance based which entails that the Commission pays to each country when they have accomplished the milestones and targets for the reforms and investments in their plan. (European Commission 2024A.)

Finland's participation in RRF was driven by a few key reasons. As an export-driven economy, Europe's quick recovery from the coronavirus crisis would benefit Finnish economy as well. RRF

will promote structural reforms that improve EU's global competitiveness. Green and digital transition create opportunities for Finnish companies. (Valtiovarainministeriö 2024.)

Finland gets maximum 2,6 billion euros from the Recovery and Resilience Facility (RRF). The majority of these funds (1,8 billion euros) are aimed towards RRF and the remaining 800 million is allocated to other programs. For the RRF grants Finland's share of payment is approximately 7,2 billion euros. Finland's share of payment for the RRF loans is 6,6 billion euros. Finland's liability would only be realised if the borrowing Member State would not be able to repay its loan or the guaranteeing Member States would not be able to meet their liabilities. (Valtiovarainministeriö 2024.)

Finland's Recovery and Resilience Plan (RRP) is Finland's national plan for leveraging financial support from the EU Recovery and Resilience Facility (RRF). This plan is integrated into the Sustainable Growth Programme for Finland. The Finnish RRP consists of four main pillars that include: 1.Green transition (695 M€), 2.Digitalization (190M€), 3.Raising the employment rate and skill levels (575 M€) and 4.Improving access to health and social services (353 M€). (Finnish Government 2021, 8, 4.) Finnish Ministries and government organizations are granting the RRF funding to the suitable candidate organizations. Business Finland (BF) is a government organization operating as part of Ministry of Economic Affairs and Employment in Finland. Business Finland is one of the key organizations in granting RRF funding to companies. During 2021-2023 Business Finland has granted over 373 million euros worth of RRF funds which is divided to many different sectors (Business Finland 2024B).

4.1.2 RRF-subsidy "Innovation support for growth companies"

This thesis focuses on the RRF program "Innovation support for growth companies". Funding was allocated to research and innovation projects that promote sustainable development by SMEs that are seeking growth through exporting. Business Finland was the organisation responsible for allocating this subsidy. (Business Finland 2024A.) The total funding for this program was 18 million euros (Ministry of Economic Affairs and Employment of Finland 2024). The applying SMEs must fill BF's criteria to be eligible for the subsidy. Figure 3 illustrates the criteria for the RRF subsidy including international growth, stable financial situation, and focus on research and sustainability. (Business Finland 2022.)

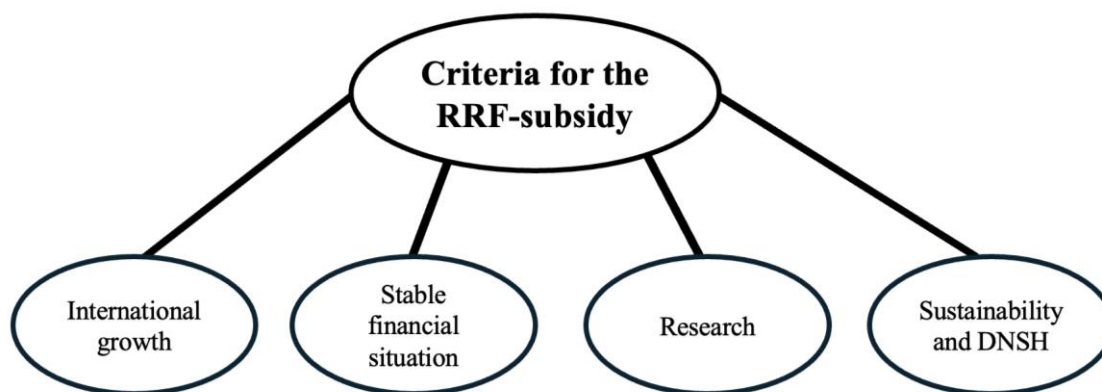


Figure 3 Criteria for the RRF-subsidy

The subsidy is targeted for SMEs that aim for significant growth in international markets. Thus, excluding companies that operate only in domestic markets. RRF funding only covers half of the total project costs, so the SME must be able to finance the other half of the project. In addition, the SME need to be in a stable financial situation moreover companies with major financial issues are disqualified. (Business Finland 2022.)

The most important criterion is that the project must focus on research with more than half of the total project cost directed to research work. The research done in this project should aim for acquiring new knowledge and competence which can be applied for product development later on. That could therefore advance the global competitiveness of the SME. The risk levels in research projects are higher. Thus, receiving this subsidy would alleviate the risks and act as a financial incentive. (Business Finland 2022.)

The aim of these projects should promote sustainable development and low-carbon solutions. These themes should be foundational for the project and not just a byproduct (Business Finland 2022). Moreover, every project provided with RRF funding must fulfil EU's 'Do No Significant Harm (DNSH) requirements. Meaning not supporting or carrying out economic activities that do significant harm to any environmental objective including e.g. climate change mitigation and adaptation, and circular economy. (European Commission 2025A.)

The application needs to be sent through BF's online application system. Application should include the following aspects: current state of the company, growth vision, project objectives, implementation of the project and budget. BF organized multiple webinars regarding the RRF-programs and possibility for the companies to get personalised support to the application process. (Business Finland 2021.)

4.2 Perceived benefits of RRF-subsidy for SMEs' green innovations

One of EU's current objectives is to promote green transition. EU has recognized that companies play a key role in implementing green transition by providing green innovations. In practice, EU fosters this objective by providing subsidy instruments for companies that are actively taking part in green transition by conducting green innovations. EU's Recovery and Resilience Facility (RRF) is one of these monetary instruments that supports green transition of companies.

Environmentally oriented firms are on the forefront of green transition of companies. Most of the target SMEs can be regarded as environmentally orientated firms as sustainable development and green innovations are key to their business. Environmentally orientated firms see sustainability as an opportunity rather than a requirement and they put sustainability in the core of their strategy. Moreover, in accordance with Kharna et al. (2022) these firms recognize that green innovation serves as a valuable resource for firms to strengthen competitive advantage while simultaneously contributing to sustainable development.

Company size played a role on what type of green innovation was the outcome of this RRF-project. Two of the participating micro companies are deep tech startups. The product development phase in deep tech startups is resource intensive. These two startups used the RRF-subsidy for comprehensive technological product development as they still need to further develop their technology.

Kelluu is a deeptech startup operating in the field of sustainable aerial monitoring. Sustainability and green innovations are in the core of *Kelluu*'s strategy. Their strategy is very much in line with the ambitions of the Finnish state, because Finland wants to be known as a pioneer in technological solutions related to solving climate change. *Kelluu*'s technology can replace existing aerial monitoring technologies that are less efficient and not fossil-free. *Kelluu*'s product is carbon neutral, autonomous, safe and does not cause noise pollution. They are creating a digital twin using generative AI and developing data- and cloud solutions of environmental data. This data can be used to solve environmental challenges. *Kelluu* used the RRF-subsidy for overall development of their technology. *Kelluu*'s technology is rooted in improving sustainability thus their green innovations can be regarded as substantive green innovation.

In the Finnish public sector procurement law guides these (acquisitions), it would be possible to put environmental factors in the evaluation criteria, but they are not included. [...] This matter does not only concern us, but it also concerns other greener and carbon-neutral solutions that are not prioritised in any way in procurement or

purchasing. [...] It takes a lot of effort to change traditional ways of doing things. Finland is little behind in this, and we have rigid bureaucracy. There is better customer and market potential abroad, in other parts of Europe, they seem to have higher solvency compared to Finland. (Hietala, Kelluu 8.10.2024.)

One of the key issues regarding green innovations in the field of aerial monitoring is that environmental factors are not included in the evaluation criteria of public sector procurement law in Finland. If environmental criteria would be included in the public procurement law, it would act as an incentive for public institutions to make sustainable acquisitions. As public institutions are a major purchaser this could then increase the demand for sustainable products and services. The potential increase in demand could stimulate more green innovations in the field and positively affect to profitability of the companies that provide sustainable products and services.

ReFaMo provides steel structure fatigue assessment technology for assets under dynamic loads. Similar to Kelluu, ReFaMo is also a deeptech startup. ReFaMo used the RRF-subsidy for overall technological product development. Sustainability and green innovations are not key concerns for ReFaMo. Nevertheless, sectors where they sell their solutions include railways, offshore energy and maritime, so their technology can be used in green energy sector as well.

The RRF-projects of small target companies (Elcogen and Sulapac) were clearly outlined with specific objectives. These projects contributed to green product design. By nature, the projects were material specific and focused on improving specific aspects of their products. By definition Carbofex is still a micro company, but it has surpassed the startup stage. Similar to the small companies, Carbofex's project also focused on material research.

Elcogen operates in the field of solid oxide cells & stacks for fuel cell systems and electrolyzers. Their main product development focuses solely on green innovation thus promoting green transition is a key issue in their operations. Elcogen's innovations can be regarded as substantive green innovations as they operate with green energy which contributes to emission reduction and enhancing energy efficiency.

We are producing green hydrogen with the highest efficiency. Our main product development is focused exclusively on green innovations. We strive to be the most innovative company providing green innovation solutions in the whole world. It is in our DNA. (Noponen, Elcogen 26.9.2024)

In this RRF-project Elcogen aimed developing and finding new material solutions that could improve thermal resistance in their products which is one of their key issues. They researched how

the operational temperature could be increased which in practice entailed looking into how different materials like metals, coating and sealant react under these conditions.

We have been able to find these materials and it was definitely not easy. The materials are basically new innovations from a completely other industry. [...] There are several material developments, that we have done, and we see great potential in them for further development. (Noponen, Elcogen 26.9.2024)

The RRF-project was more time consuming than Elcogen initially planned, nevertheless they were able to find new more thermal resistant materials. Creating a good communication loop with collaborative companies took more time than what was originally planned. This entailed getting the collaborative companies interested in cooperating in the material testing research.

It was challenging for Elcogen to find these new thermal resistant materials. The materials they found were novel innovations from a wholly different industry which they researched further for possible use in their products. There were some unexpected results in the material testing but luckily also positive surprises which is typical for material testing. Overall, the results of this RRF-project were positive as they were able to find new materials with better thermal resistance. They also recognize significant potential for further developing these materials in the future.

We are competing against big industrial processes. We are talking about big investments like millions, tens of millions, hundreds of millions or even billions. [...] Technology must be reliable when entering the industrial field. We must have enough sufficient data to back up that our technology is reliable and worth investing. It involves a lot of testing, piloting and demonstrating in the field. It is what we have to do right now. Getting reliability data from the field is our most urgent need currently. This RRF-project did not help our company to explore this most urgent issue. (Noponen, Elcogen 26.9.2024)

As Elcogen highlights, their most pressing issue with green innovations is to conduct extensive testing to obtain reliability data from the field. They had planned to do more testing within this project including material testing in the final environment. However, since the project took longer than initially expected, they were unable to complete the material testing in the final environment as intended. Elcogen expressed that the RRF-subsidy did not support them in addressing their most pressing challenge which is obtaining reliability data from the field.

Sulapac produces sustainable materials to replace traditional plastics. Sustainability is in the core of Sulapac's strategy. Sulapac's innovation can be regarded as substantive green innovation as they are making sustainable alternatives to plastic packaging materials and therefore reducing plastic waste.

Sulapac exists to provide innovative solutions for green transition. Without it [green innovations] Sulapac would not exist and on the other hand green innovations are in the core [of our business]. (Peltola, Sulapac. 15.10.2024)

Similar to Elcogen Sulapac's RRF-project involved material research, but Sulapac was the only one of the target SMEs whose project included a regulatory side as well. Sulapac's RRF-project had four clear objectives: using carbon neutral waste-based local raw materials, developing cheaper formulations for high-volume products, closing the biogenic carbon cycle with recycled materials, and carbon footprint calculations and compliance.

There is a lot of demand, and I feel like it is increasing constantly. Challenge is how can we compete with prices with non-sustainable bulk plastics. We have to find the right segment that resonates with our value proposition. Even though almost all firms are interested in sustainability, the client company must show interest in implementing their sustainability strategies and visions by allocating resources to sustainable options and also taking into consideration that new materials can be a bit more pricy than traditional solutions. (Peltola, Sulapac. 15.10.2024)

One of the key issues Sulapac faces with their products is how they are able to compete with non-sustainable packaging materials e.g. plastics. Their materials are pricier, and price does affect the packaging material choices of client companies. Receiving this RRF-subsidy assisted Sulapac in tackling this key issue as they were able to research possible cheaper formulations for high volume products with this RRF-project.

Carbofex operates in the clean energy sector by producing biochar and pyrolysis oil. Providing products that facilitate green transition is a key issue that guides *Carbofex*'s strategy. *Carbofex*'s innovations can be regarded as substantive green innovations as they produce green energy by converting waste biomass into biochar which contributes to emission reduction and improving energy efficiency.

It [green transition] is a major issue that guides us. We are in the middle of a green transition. We must strive to minimise our carbon footprint in our own operations. Our products and materials promote green transition. [...] We applied for this subsidy because we had the opportunity. Society wanted to support R&D and we had the urge to start doing research on different inputs. How different inputs could be converted into biochar? What it requires from the process and what possible additives could be needed? (Kantero, *Carbofex* 17.9.2024)

Carbofex's RRF-project was also material specific similar to Elcogen and Sulapac. Biochar is made of input materials from agricultural and industrial side streams. *Carbofex*'s RRF-project focused on researching different potential agricultural and industrial side streams that could be converted into

biochar. During the RRF-project they widened their scope by adding pyrolysis oil to the project. Due to adding pyrolysis oil they also extend the duration of the project.

The RRF-projects of all five target SMEs concentrated on further developing their existing products to better serve the needs of customers and improve to their competitiveness. This type of innovation activity is regarded as incremental product innovation. On the contrary, the other innovation type novel product innovation entails innovating a completely new product or service which was not the aim of these RRF-projects (Freel et al. 2019).

Most of the target SMEs are environmentally orientated thus providing green innovation solutions that promote green transition supports their strategic aims. Receiving this RRF-subsidy supported substantive green innovations in majority of the target SMEs which was in accordance with the targets of the RRF-subsidy. The target SMEs are creating substantive green innovations in green energy, sustainable packaging materials and environmental data solutions. Therefore, it is natural that the RRF-projects of these SMEs aimed for substantive green innovation rather than strategic green innovation. Strategic green innovation seeks other economic benefits and pursues innovation “quantity” and “speed” to align with relevant government institutional policies (Jiang & Bai 2022). Substantive green innovation is regarded as “high-quality” green innovation behaviour because it intends to advance actual technological progress, reduce pollution emissions, and improve energy efficiency (Ren et al. 2023). Substantive green innovation usually requires considerable resource allocation, high uncertainty, and elevated risks which can diminish enterprises’ interests for such endeavours (Ben Arfi et al. 2018). Regardless of these risks the SMEs conducted innovations because sustainability is in the core of their strategy. In line with Zhao et al. (2024) the subsidy assisted them as governmental R&D subsidies can alleviate these burdens by reducing financial and resource-related constraints, thus supporting enterprises participating in substantive green innovation.

4.3 Perceived benefits of RRF-subsidy for SMEs’ resources and capabilities

4.3.1 Effects of the RRF-subsidy on the R&D expenditure

Business Finland’s aid covers maximum of 50 percent of the total project costs according to the terms of this subsidy (Business Finland 2024A). It is typical for public subsidies to cover only some percentage of the total project costs and not the entire costs. In the majority of the target SMEs the other half of the project costs were funded internally. This entails that the SMEs must use their own funds for the project.

In one micro company the remaining half of the RRF-project was financed through venture capital investments. If a project has received public funding, it can increase the credibility of the project plan because it has undergone a level of external validation. Public subsidies can reduce perceived investment risks, making projects more attractive to venture capitalists and other private financiers. Public funding can serve as a catalyst for securing additional investments, as investors may be more inclined to support projects that have already gained institutional backing. This illustrates that when a company receives public subsidy it might encourage other investors to invest in a project that is partially publicly funded.

Would it have been possible for us to increase our R&D expenditure this fast without receiving the RRF-subsidy? Probably not. This subsidy has assisted us to increase our R&D expenditure faster which has been our aim. (Nojonen, Elcogen 26.9.2024)

One SME told that by receiving this subsidy they were able to increase their R&D expenditure faster which has been their aim. The increase was planned to happen either way, but this subsidy triggered the process. This supports the notion that R&D subsidies can increase R&D expenditure and therefore lead to more investments.

Two of the SMEs told that they would have not been able to implement the RRF-projects at this scale without the funding. For instance, Sulapac conducted extensive RRF-project that had four different objectives. Without the additional resources from this subsidy, it would not have been possible for them to conduct this major R&D project including all four objectives. Both of the SMEs assessed that even without the subsidy they would have most likely conducted some material testing at a smaller scale. Nevertheless, they both highlighted that it would not have been comparable to the RRF-projects the SMEs were able to execute with the additional resources from the subsidy.

We could have maybe done some small-scale testing but it would not at all have been comparable. We would not have been able to implement this project without this funding. (Peltola, Sulapac. 15.10.2024)

On the other hand, one SME told that they would have most likely done the R&D endeavours that were conducted in these projects even without receiving the subsidy. The SME assessed that receiving the subsidy facilitated and accelerated the R&D process and gave them additional resources.

We would have probably come up with some other way of carrying out this [project] maybe in a smaller scale or slower even without having received the RRF-funding because this is so essential for our business. But the key effectiveness of the funding is precisely that it provides a bit more resources. There are always too few resources and

too little funding. Operating with scarce resources increases risks of not being able to successfully carry out projects. (Hietala, Kelluu 8.10.2024)

As the discussion in this section illustrates in all of the target SMEs the RRF-subsidy triggered more firm financed R&D spending beyond the amount of the subsidy. As public R&D subsidies can trigger more R&D expenditure the effects of the subsidies can be greater and long lasting. Therefore, leading to the additionality effect on R&D expenditure (Dimons & Pugh 2016, 799). According to (Dimons & Pugh 2016, 799) when a firm receives R&D subsidy, it can lead to additionality, no effects or crowding out. Literature rejects complete crowding out which indicates that subsidies are generally not wasted (Dimos & Pugh 2016, 811).

Some of the SMEs mention that the innovations done in these projects were so central for developing their business that they would have tried to find some other way of doing these innovations if they would have not received the funding. The key benefit of this funding to SMEs is that it gives additional resources. Too little resources in SMEs hinders their operations, on the contrary the additional resources from this subsidy aided them to conducting these projects faster and more efficiently.

4.3.2 Subsidies strengthen resources and capabilities in SMEs

The RRF-subsidy is monetary aid targeted for R&D thus strengthening the financial resources in the target SMEs. In addition to strengthening financial resources, this subsidy strengthened also other types of tangible and intangible resources and capabilities in the SMEs. Three SMEs highlighted that the vast amount of new knowledge acquired while conducting this RRF-project has been the most important outcome. Even though this was a R&D-project by nature, novel knowledge and competence has been acquired as a spillover effect to other departments as well in one SME.

[In this RRF-project] we have gained a huge amount of new knowledge about the capabilities and suitabilities of different materials. (Kantero, Carbofex 17.9.2024)

The additional resources from this subsidy also enhanced the tangible resources and capabilities of target SMEs. For instance, in one SME the financial support received from this RRF-subsidy was basically divided to three big parts, that included salaries, equipment acquisitions and external specialist services. One other SME was able to use the RRF-funding to build their test infrastructure to better suit material testing. These investments strengthened the tangible resources and capabilities of the target SMEs. One of the technological advancements of this R&D project is going to be patented. A new patented technology enhances competitiveness and also improves the intangible resources of a firm.

One SME was able to hire four new employees supported by this subsidy. Moreover, the research done in this R&D project led to three commissioned master's theses regarding this project in one SME and one commissioned master's thesis in another SME. Employees can be regarded as tangible resources as they are physical beings. However, especially when considering specialists, the key competence of the employee is in their expertise which is considered an intangible resource.

The lack of resources makes it more difficult for SMEs to innovate and grow and subsidies play a key role in mitigating the resource constraints by strengthening the resources of SMEs. The findings of this study indicate that RRF-subsidy strengthened resources and capabilities in SMEs therefore improving their capabilities to innovate and grow in international markets. This aligns with Leonidou et al. (2011) arguing that the use of national export- promotion programs does not directly improve export performance but instead benefits arise from strengthening firm's resources and capabilities for operating internationally. Moreover, government assistance can act as an external resource and if firms use it well it can assist them to mitigate human, financial, marketing, informational, and allied deficiencies that hinder export development (Seringhaus 1986; Leonidou et al. 2011).

To summarize, the findings of this study shows that in all of the target SMEs receiving this RRF-subsidy triggered more firm financed R&D spending over the amount of the subsidy which leads to the additionality effect on R&D expenditure. Due to the additionality effect the impacts of subsidies can be greater and prolonged. Receiving this RRF-subsidy strengthened both tangible and intangible resources and capabilities of SMEs. Public support plays an important role of strengthening the resources and capabilities of SMEs as the additional resources from subsidies can mitigate financial barriers, enable innovation, assist to scale operations and enhance competitiveness domestically and internationally.

4.4 SME internationalisation and RRF-subsidy's benefits for SMEs' international growth

4.4.1 Internationalisation stages in the target SMEs

One of the criteria of this RRF-subsidy "Innovation support for growth companies" is that these SMEs should possess the capabilities to grow in international markets. Therefore, it is interesting to explore what are the current internationalisation stages in the target SMEs, what plans these SMEs have regarding internationalisation and how this subsidy supported international growth in the target SMEs. These five target SMEs are an illustrative sample to explore as all of them are in

different stages of their internationalisation process. Furthermore, it is intriguing to explore how the internationalisation stage affected how the benefits of this subsidy were perceived in the SMEs.

Whether the SME had already internationalised, affected how they perceived the RRF-subsidy supported their international growth. Four of the target SMEs that had already internationalised assessed that receiving the RRF-subsidy and getting additional resources was beneficial for them and improved their capabilities for their international growth. Only one of the target SMEs did not think that receiving this RRF-subsidy supported their international growth. This SME was the least internationally experienced that has not yet started their internationalisation process. To conclude, this subsidy was beneficial for improving international growth in SMEs that had already internationalised. On the other hand, for a SME that have not yet internationalised did not assess that this subsidy improved their international growth.

Two of the deeptech startups were in the earliest internationalisation stages. ReFaMo is at the earliest stage as they currently just operate in domestic markets. However, ReFaMo has begun to engage in international business by collaborating with big Finnish companies that operate internationally. ReFaMo plans to start the internationalisation process but at the time of the interview they are at an early startup stage and still lack resources and capabilities to fully start the internationalisation process.

The other four target SMEs have already ventured into international markets and all of these SMEs state that the majority of their sales is directed to international markets. As the SMEs have internationalised at an early stage of the firm, they can be regarded as born global firms. Furthermore, innovativeness played a key role in the target SMEs' business operations. Thus, supporting Knight & Cavusgil (2004) as innovativeness is one of the key defining characteristics of born globals and they view internationalisation as an innovative act.

The second deeptech startup Kelluu is also in early stages of their internationalisation process. Kelluu is a true born global as they aim for rapid internationalisation already in the startup stage. The born global mindset is common in tech companies. The main reason behind this in Kelluu is that the Finnish aerial monitoring market is small, thus operating in the international market of aerial monitoring gives more fruitful business opportunities. Kelluu has done their first market entry to Sweden in 2024. The aviation regulation is synchronised at EU-level which makes operating in the European markets easier for Kelluu. Moreover, Kelluu has an eye for internationalisation opportunities beyond the European market, as some negotiations have already taken place regarding possible market entries to North America, South America, Australia and Asia.

The current market area for Carbofex is the Nordic countries and Northern Europe. 90% of their sales are for international markets and only 10% to the domestic market. European markets are currently most important for Sulapac. Sulapac manufactures their materials in Finland and Central Europe. Sulapac is interested in entering new markets in USA, Asia and Middle East.

Elcogen's internationalisation strategy is the most geographically diverse. Contrary to the other target SMEs, Elcogen is the only one that has already entered markets beyond Europe. As Elcogen has already entered to the Asian market it is the most experienced in international business. 20% of their sales goes to domestic market, 40% to other EU-countries and 40% to South Korea and China. Two large international companies have invested in Elcogen. One of those companies were South-Korean and the other from the United States. It is in those investors' interests that Elcogen continues to internationalise in the South Korean market and starts the internationalisation process in the United States. In addition, Elcogen is interested in possible market opportunities in the Middle East.

4.4.2 Perceived benefits of RRF-subsidy for SMEs' international growth

Both innovation and internationalization are resource intensive activities. As SMEs are constantly struggling with scarce resources subsidies play an important role on facilitating these activities. The RRF-subsidy "Innovation support for growth companies" was aimed for sustainable R&D projects of growth companies. Even though the RRF-subsidy is a R&D subsidy and not a direct export support measure, it was mentioned in the funding call that the applying companies should have the ability to grow in international markets. Therefore, this section explores how did the RRF-subsidy support international growth in the target SMEs.

The benefits of export promotion programs can often be realised after a long period of time have passed. In addition, programmes may also have indirect benefits through spill-over effects, which further complicates the measurement of benefits. This RRF-funding is still quite recent measure therefore long-term benefits may be difficult to assess at this point. It is possible that at this stage the SMEs were not able to identify all the effects and spillover effects that the subsidy had for their internationalisation. However, four out of the five target SMEs perceived that the RRF-subsidy was beneficial for their international growth and global competitiveness. These SMEs were also able to identify some of the perceived benefits for their international growth.

The RRF-projects of target companies aimed at incremental improvement of their products. Incremental product innovation aims at holistically improving existing products. This type of innovation enhances the overall competitiveness of company in domestic and international markets.

This RRF-project aimed to holistically improve our product. The material innovations made during this project improved our competitiveness and enhanced our capabilities to operate globally. (Nojonen, Elcogen 26.9.2024)

Freel et al. (2019, 1269) suggest that incremental product innovation facilitates in sustaining export market presence, whereas novel product innovation boosts export growth. SMEs assessed that the incremental innovations they made in this RRF-project improved their competitiveness and also strengthened their capabilities to operate globally. This experience is supported by Freel et al. (2019) who argues that policies that are intended to sustain export positions may be more beneficial by focusing on incremental innovations that assists keeping up with the competitors.

As all of the target SMEs' RRF-projects aimed at incremental product innovation, these projects enhanced their global competitiveness. In the target SMEs these innovation projects assisted in maintaining export market presence. However, according to Freel et al. (2019) novel product innovation is a stronger driver to export growth compared to incremental product innovation. If the projects had focused on novel product innovations the linkage to export growth might have been stronger.

The product development process is resource intensive, and the lack of resources can slow down the process for SMEs. Additional resources from a R&D subsidy can accelerate the product development process. Receiving subsidies can be especially useful for startups and SMEs because they need the additional resources the most to facilitate their product development process. The extra resources from subsidies assist in product development, thus their products will be ready to international markets faster. This can therefore speed up the process for new market entries.

Of course, our technology develops faster, will be available faster and is ready for international markets faster. [...] You have to go through the development path so that you have a product or service that you can deliver. The process has been accelerated with this subsidy. (Hietala, Kelluu 8.10.2024)

Born global startups tend to aim to internationalise as soon as possible which was also reflected in the internationalisation plans of the target SMEs. This entails that the start for internationalisation process would occur right after product development and piloting. If a startup that plans to internationalise this rapidly receives R&D subsidy, their product development phase will be accelerated and subsequently they are able to start their internationalisation process and first market

entries sooner. As innovation and internationalisation are both resource intensive activities, the lack of resources act as a major barrier for SMEs to combining these activities. Subsidies can mitigate the resource constraints that SMEs face and therefore speed up these processes.

One of the key research areas for Sulapac within the RRF-project was chemical recycling of their materials. In the sustainable material industry, the recyclability of materials is essential. To be able to operate in the international and European markets the company must be able to prove the recyclability of their materials. When a company has been able to prove the recyclability, they gain access to specific packaging labels and sustainability certifications.

Absolutely, this RRF-project enabled us to research chemical recycling which is essential especially for packaging materials. Recyclability of our products is important in international business. Within this RRF-project we were able to start conducting this research on a larger scale and it has borne fruit, we have been able to prove our products recyclability and to find right partners. (Peltola, Sulapac 15.10.2024)

Sulapac will now be able to prove the recyclability of their materials. International partners value packaging labels as they give extra credibility. This will enhance Sulapac's capabilities to internationalise as it will be easier for them to assure the recyclability of their materials to new international partners.

The additional resources and the innovations from the RRF-subsidy enhanced the global competence and international growth in most of the target SMEs which was in accordance with the objectives of the RRF-subsidy. With the additional resources of this RRF-subsidy the SMEs were able to conduct incremental innovations to further develop their products that improves their global competitiveness which in turn facilitates international growth. The additional resources to the product development phase are important especially for startups. By receiving R&D subsidy the product development process can be accelerated, and the product/service will be ready for international markets faster. This will therefore speed up the internationalisation process and new market entries. One SME was able to prove the recyclability of their products thus they will gain access to certain packaging labels. This will bring extra credibility that international partners will value and it will help the SME to internationalise.

4.4.3 Considering global compliance in SME internationalisation

Cutting down plastic waste is an important sustainability aim. The enormous amount of plastic waste that ends up in nature and breaks down to microplastics is a major environmental threat. A lot of this plastic waste is from plastic packaging materials. Sulapac is one company that saw this issue

as a business opportunity. Sulapac manufactures sustainable packaging materials that can be used as an alternative for plastic materials.

Our biggest challenges currently stem from changing EU-regulations. Even though it is in EU's best interests to enable green transition, in practice the many changing regulations makes it more complicating, and the many changing regulations might not sync. It feels like the paper and packaging waste regulation (PPWR) sort of dismisses EU's climate targets and bioeconomy targets by strongly driving for the use of plastics and mono-materials as they are easier to recycle. This RRF-project assisted us to better investigate those changing regulations. (Peltola, Sulapac 15.10.2024)

Sustainable packaging materials is a new field that emerged from the demand for alternative packaging materials to plastics. As plastic waste is seen as a major environmental threat governments and intergovernmental organizations are trying to provide new regulation to ensure the use of more sustainable packaging materials. Even though the intention behind these new regulations is good, they can complicate operating within the field. As there are new regulations emerging regarding to packaging waste, a company operating in the field must be up to date with those.

The changing EU regulations is one of the biggest issues hindering Sulapac's business and also causing compliance issues to them. Within this RRF-project Sulapac was able to investigate the new and upcoming EU-regulations. As Sulapac is more acquainted with PPWR EU-regulations it assists them in conducting business in the EU area and facilitates internationalisation to other EU countries.

This finding regarding one of the target SMEs using part of the RRF-subsidy for compliance research was unexpected. The subsidy "Innovation support for growth companies" was targeted for SMEs that are creating solutions to improve sustainable development and have potential for international growth. Based on the materials provided by Business Finland (BF) the assumption was made that these RRF-projects involve technical green innovations. As assumed, this was the case in most of the target SMEs.

A definition for global compliance is presented here in the findings chapter as global compliance was an unexpected finding and therefore the term was not included in the literature review. According to Vollm (2023): "Global compliance refers to adhering to overarching standards or regulations that apply universally across regions or industries." When a company operates internationally, they need to take into account global compliance. For Finnish SMEs the easiest way to start the internationalisation process is to internationalise to some EU-country. The EU area is

one internal market and the trade policies within EU countries are unified. This makes it easier for companies to practice international business within EU.

Companies need to take global compliance into account when internationalising. Large companies already have legal teams that deal with compliance issues regarding internationalisation. It is typical that the main expertise in SMEs that have only a few employees is often based on business or engineering. SMEs often lack legal expertise. Due to resource constraints, it might not be possible to hire a legal expert or even buying compliance consulting services can be too expensive for SMEs.

As global compliance plays an important role in internationalisation, it can be argued that SMEs do not get sufficient support for global compliance issues they face. Support for compliance could be better facilitated in SME export promotion programmes. There might be a need for compliance-focused financial instruments for SMEs. In addition, SMEs could benefit from buying global compliance consulting services.

4.4.4 R&D and internationalisation as a simultaneous process

One of the target SMEs provided a critical view to the assumption that R&D would automatically improve internationalization. They emphasize that the type of R&D needs to be taken into consideration. For example, local applications can clearly enhance internationalisation. They also highlight the role of sales instead of R&D when considering internationalization. This interviewee thinks that, even though there is some connection between R&D and internationalization, this connection tends to be overly highlighted in their opinion.

Not [R&D] in itself but a little bit. Of course, the actions [of R&D and internationalization] are connected. Developing a pilot of a product assists in internationalization. In R&D-projects it is not allowed to do anything that is related to sales. [...] In Finland people tend to think that product development is the key to everything. (Aaltonen, ReFaMo 17.10.2024)

A company needs to have a proper understanding of their market therefore it would be important for the company to do sales early on and to get customer feedback. If a company does too much R&D at a too early stage, without sufficient amount of sales it can lead to product development that is not in touch with the needs of the customers. Doing sales and getting customer feedback from domestic and international markets is needed so that companies can develop products that answer to the demands of their customers. Without sufficient customer feedback the company may need to re-develop their products.

There is also the dilemma that if the company does too much product development too early on [...] when they do not have enough customer feedback, customer experience and understanding of their market. It will inevitably cause the company to re-develop, re-piloting and to do things over again. (Aaltonen, ReFaMo 17.10.2024)

According to this SME, conducting R&D and internationalisation as simultaneous processes would be the most optimal way. They present an example of how they think the subsidies should support R&D and internationalisation as simultaneous processes.

Those [R&D and internationalisation] should go hand in hand. First a small subsidy for product development. Then a bigger targeted export support for a market entry. There they would do a pilot and collect customer feedback. Followed by more R&D and two new targeted export support subsidies. (Aaltonen, ReFaMo 17.10.2024)

This suggested example of a possible subsidy model takes into consideration the continuity between different subsidies. The process could start with a small subsidy for product development which would be followed by a larger, targeted export support subsidy to facilitate a new market entry. At this stage the company could conduct pilot projects and gather valuable customer feedback. Based on the insights of the customer feedback the company would conduct more R&D. After that the company would receive additional targeted export support subsidies that would facilitate the internationalisation of the firm. This suggested subsidy model takes continuity better into consideration as SMEs need the extra resources from subsidies in different stages. This continuity would support R&D and internationalisation as a simultaneous process in SMEs.

The preceding discussion on the relationship between R&D and internationalisation is summarized as follows. One SME argued that the connection between R&D and internationalisation is overly highlighted. They also challenged the assumption that R&D would automatically improve internationalisation. If a company does too much R&D at a too early stage without sufficient customer feedback, it can lead to product development that is not properly in touch with the needs of the customers. The SME emphasises that R&D and internationalisation should be done as simultaneous process. An example of a possible subsidy model is presented that supports the simultaneous process and takes the continuity between different subsidies better into consideration.

4.5 Development ideas for future subsidies and the application process

4.5.1 Evaluation of the application process for the RRF-subsidy

Business Finland (BF) was responsible for allocating this RRF-subsidy “Innovation support for growth companies”. Therefore, BF also organized the application process for this RRF-subsidy. All of the target SMEs have had previous experience on applying to similar public subsidies through BF. The target SMEs feel that the BF application processes for different subsidies have been similar. As the target SMEs have had a lot of previous experience on applying for subsidies, they did not feel like the application process for this RRF-subsidy was difficult. For one SME the most challenging part of the application process that they needed to consider the most was explaining how they are able to cover the other half of the costs of the project.

The application process can be challenging to a company that is applying for the first time. It can be a little time consuming if you don't know what they are going to ask and how to answer to those questions. We had applied so many times that it feels relatively simple. We know what to put on it so there will be high chances of passing. It was by no means insurmountable. (Kantero, Carbofex 17.9.2024)

Two of the SMEs highlighted the interactive nature of BF's application process. The application process involves presenting the project plan to a BF representative and getting feedback. The SMEs think that this feedback is really valuable as it indicates if something needs to be changed or if the idea still needs further development. On the other hand, if the project plan is good the BF representative lets them know that there are good chances of passing.

I think it is good that in BF it has always been in people talking to each other rather than templates talking to each other. [...] Of course, the company must have a good project plan, but the most important thing is that when we go to present the project plan to a BF representative, they give us feedback. What is good about it? What aspects need to be changed? Is this idea completely stillborn? They will directly tell if the idea needs to be developed further to receive the funding. Or if things look good, they will say that there are good chances of passing. I think it is extremely important that the process involves discussing with people and not just sending a form to a mailbox and hoping for the best. (Noponen, Elcogen 26.9.2024)

Getting feedback during the application process makes the application process overall more transparent. These feedback sessions give clarity and guidance to SMEs as they receive direct insights into what the funding organization is looking for which assists them to refine their proposals accordingly. These personal feedback sessions also give SMEs tailored support to ensure that the project plans are aligned with BF's criteria. If the BF representative gives positive feedback, it can act as a confidence boost for the SME as they are reassured that their project plan

has a realistic chance of passing. If the feedback indicates that there are still parts of the project plan that need to be further developed there is still opportunity for the SME to work on these issues before submitting the final version of the plan. Without the modifications done based on the feedback the project plan might have been rejected therefore interactive feedback can reduce wasted efforts.

In addition, engaging with BF representatives allows SMEs to network and build relationships that might be beneficial for future funding opportunities. One of the SMEs told that a BF representative contacted them about this RRF-subsidy and encouraged them to apply for it. This supports the notion that networking can improve funding opportunities.

One target SME gave a critical view of the application process for BF subsidies. This SME argues that BF should more openly share the exact application criteria for subsidies. They think that the official application criteria BF announces is ambiguous and funding decisions are based on more specific criteria that is not publicly available to the applying companies. As this SME regards the application criteria a bit ambiguous it makes it more difficult to answer to the criteria precisely.

This process has so called “broken telephone -problem”. We do not know the exact application criteria, so we are not able to answer to it exactly. Also, we do not know how well the BF representative understands our plan. This can make the application process foggy. (Aaltonen, ReFaMo 17.10.2024)

Unlike two other SMEs that preferred the interactive nature of BF application process, one SME has some critique towards it as well as some unsatisfactory experiences of application interviews. On a few occasions the BF employee has not understood their business or project plan. On another occasion the BF employee just bluntly told that they do not think that the SME will be chosen for the subsidy after a short discussion. The SME felt like this comment was impolite and even a bit rude. In that case the SME did receive the subsidy they applied for even though a BF-representative told them that it seems that the SME’s application does not completely fill the criteria, and they would still need to modify it. In this one SME’s experiences the BF application process has been inconsistent and ambiguous.

In conclusion, all of the target SMEs felt like that the application process to this RRF-subsidy was not difficult. The SMEs also assessed that the application processes for other SMEs have been quite similar comparing to this. Two of the SMEs highlighted the interactive nature of BF’s application process, and they regard the feedback session with BF representative useful. One of the target SMEs felt ambiguity towards the BF application criteria.

4.5.2 Suggestion on how subsidy programs could be improved in the future

The target SMEs provided some suggestions on how subsidy programmes could be improved in the future. These SMEs have first-hand experience of using subsidies therefore they can provide valuable insights on possible improvements for subsidy programmes. This section delves into their suggestions of these possible improvements.

This RRF-subsidy “Innovation support for growth companies” was aimed for SMEs R&D projects that promote sustainable development. This entailed conducting product development research that would lead to green innovation solutions that could be used to improve the SMEs products. For instance, three of the target SMEs conducted material testing in their RRF-projects. They tested different qualities and features of materials in order to find out what type of material would work best in their products. This is the first stage in the product development process and by conducting this type of research it creates a foundation for further product development.

When I think about what could be improved, instead of focusing on the RRF-subsidy itself the key is to think what comes after that. Because the purpose was to create a foundation for product development. But then, of course, the product development phase also needs follow-up funding. It does not come automatically, we must find the next subsidy-instrument, so that we can implement the R&D results into practice.
(Peltola, Sulapac 15.10.2024)

Conducting research was in the core of these RRF-projects. Although the research results were promising, and the SMEs gained a lot of new knowledge, the results were not yet finished product innovations. Further product development is needed that the new material innovations can be commercialised. In practice this entails merging the new material innovations into their products. After the initial R&D efforts the second stage occurs where based on the R&D results a new product is being innovated, a new product prototype is piloted and then it is finally launched to the markets. Figure 4 illustrates the two stages of the R&D process.

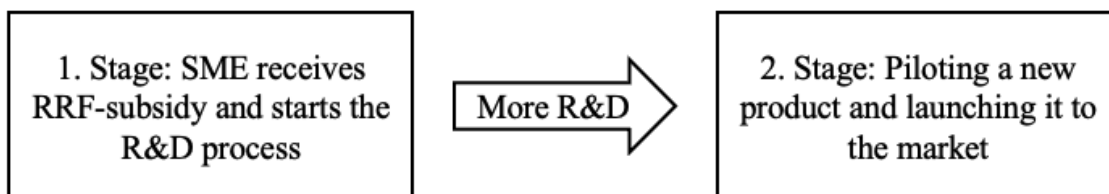


Figure 4 Stages of the R&D process

Two of the SMEs noted that BF has many subsidy instruments that are aimed towards R&D projects similar to this RRF-subsidy. However, the same SMEs point out that even though there is plenty of R&D subsidy instruments available, the issue is that there is lack of public support for the next stage of product development which entails introducing a new prototype to the market. This RRF-project is only part of a longer R&D process and there needs to be further R&D endeavours in order to reach the final results. This type of continuity should be better taken into account in the subsidies to secure that there would be a possibility to get follow-up funding for R&D projects to ensure that the R&D project can continue.

Our company tends to be at the stage where instead of R&D-project we would more need a pilot-project for prototyping. BF could think can something really be done regarding those instruments. Pretty clear comment that always comes up is that BF assists companies in product development, but not in the next stage, that is more of a “valley of death”, when trying to introduce the first prototype to the markets. Different countries support their companies in many ways in that stage. I would hope that BF could look at it a little differently. (Nojonen, Elcogen 26.9.2024)

The second stage which entails piloting a new product prototype is also resource intensive. It can be more challenging and slower for SMEs to turn the research results into new product prototypes due to lack of resources. Public subsidy instruments for piloting new product prototypes would alleviate the resource constraints and give additional resources for implementation in SMEs. The worst-case scenario is that due to the lack of resources it would not be possible to continue conducting R&D and hence research results would not be commercialized. Fortunately, all of the target SMEs assessed that the RRF-subsidy was beneficial for their R&D so the subsidy has not been wasted.

Two of the SMEs argued that the subsidies granted in Finland are quite small compared to other countries. One SME pointed out that some of the largest public subsidy providers globally include China and within the EU Germany. As other countries grant larger subsidies, it places Finnish firms to unfair competitive position in international markets. Small amounts of granted subsidy and small project sizes hinder the ability of Finnish SMEs to compete effectively in European and global markets which can potentially slow down growth and innovation. Larger subsidy sizes would give Finnish firms better possibilities to compete with international firms.

Compared to other countries the amounts of granted subsidies are quite small in Finland. This puts us in unequal competitive position compared to our international competitors. [...] The small subsidy amount and project size limits our possibilities to be competitive in European or global markets. (Hietala, Kelluu 8.10.2024)

The economic perspective has been taken into account in the allocation of this RRF-subsidy as it was directed to growth companies. This is supported by Mason & Brown (2013) as they argue that

from an economic perspective, it can be suggested that public support programmes should be directed to high-growth firms given their strong potential to create new jobs.

One of the SMEs argue that it would be more beneficial to allocate public subsidies to SMEs rather than to large companies. Large companies tend to be financially sound thus they should be able to operate without public subsidies. As SMEs have to operate with limited resources, public subsidies are vital for SMEs for growing and being able to undertake R&D projects whereas big companies should be able to fund their R&D projects without public support. One SME also argues that SMEs are more agile and faster innovators compared to large companies in which the innovation processes are slower.

I do not understand why they [public agencies] would have to play it safe. If they decide that they want innovations, they have to raise risk levels and be willing to take risks. I would argue that if they were more willing to take risks and allocated subsidies to smaller companies, with this careful allocation it would be possible to reduce the total monetary amount spent. (Aaltonen, ReFaMo 17.10.2024)

One of the SMEs highlight that public agencies should be willing to take risk in subsidising the R&D projects in SMEs. The project sizes tend to be smaller in SMEs therefore SMEs are able to innovate in projects that are on a smaller scale compared to large companies. Thus, subsidising the projects of SMEs can be a more cost-effective option. With careful assessment in the allocation process of subsidies, it might be even possible to lower the total monetary amount of granted subsidies if they could be allocated better and targeted to SMEs.

Furthermore, Butler (2012); Radicic et al. (2016); Czarnitzki, (2006) describe the possible issues that might arise with “cherry-picking” strategy. According to public choice theory public agencies may act opportunistically as they tend to allocate subsidies to the “best projects” although these projects would likely succeed without public funding (Butler 2012). This “cherry-picking” strategy will lead to apparent effectiveness of the agency’s programmes (Radicic et al. 2016). Considering that R&D subsidies can strongly enhance the profitability of a firm conducting R&D, cherry-picking could favour already capable firms, without activating new firms to undertake R&D (Czarnitzki, 2006).

When comparing the risk levels, large companies’ projects are less risky whereas risk levels rise in SMEs’ and startups’ projects. This opportunistic approach and cherry-picking might lead to public agencies favouring R&D projects of large companies as they are a less risky to invest in. However, these “best projects” of large companies might have succeeded even without the public subsidy. Whereas for SMEs it might not be possible to undertake big R&D projects without public subsidy.

In this section suggestions for future subsidies were discussed. Two of the SMEs argued that the project sizes in subsidies should be larger in Finland as small project sizes put Finnish companies into unfair competitive position in international markets. Two of the SMEs highlighted the need of follow-up subsidy for piloting a new product prototype to the markets. This type of continuity between subsidies would facilitate the commercialisation of R&D endeavours. It is also argued that subsidies should be allocated to SMEs rather than to large companies as SMEs benefit the most from subsidies.

4.6 Summary of the main findings

The SMEs used this RRF-subsidy for projects that supported their core product development and provided solutions for green innovations. The RRF-projects of all target SMEs concentrated on incremental product innovation which entails further developing their existing products to better meet the needs of customers and advance competitiveness. In these RRF-projects the target SMEs provided substantive green innovation in the fields of green energy, sustainable packaging materials and environmental data solutions.

The additionality effect on R&D expenditure was supported by the findings on this research, since in all of the target SMEs receiving this RRF-subsidy triggered more firm financed R&D spending over the amount of the subsidy. Due to the additionality effect the impacts of subsidies can be greater and extend over a longer period. This subsidy strengthened both tangible and intangible resources and capabilities of the target SMEs. Public subsidies play a key role in strengthening the resources and capabilities of SMEs as the additional resources from subsidies can alleviate financial barriers, enable innovation, assist to scale operations and improve competitiveness domestically and internationally.

The target SMEs were in different stages of their internationalisation process. This subsidy was perceived beneficial for improving international growth and enhancing global competence in SMEs that had already internationalised. On the other hand, one SME that have not yet internationalised did not perceive that this subsidy enhanced their international growth. Within these RRF-projects the SMEs conducted incremental innovations to further develop their products that advances their global competitiveness which subsequently supports international growth. Additional resources from the RRF-subsidy accelerated the product development process thus products/services will be ready for international markets faster. Consequently, speeding up the internationalisation process and new market entries. One SME used a part of the RRF-subsidy for compliance research. Global

compliance needs to be taken into account as part of the internationalisation process and it can be argued that SMEs do not get sufficient support for the global compliance issues they face.

The interactive nature of BF application process was highlighted and regarded getting personal feedback for the project plan useful. It was pointed out that the sizes of subsidized projects could be increased as small project sizes places Finnish firms to a competitive disadvantage in global markets. The need for follow-up R&D subsidy for piloting a new product prototype to the markets was mentioned. Continuity between subsidies would facilitate smoother commercialisation of R&D endeavours to the markets. It was argued that subsidies should be allocated to SMEs rather than to large companies as SMEs benefit most from them.

5 Conclusions

5.1 Theoretical contributions

The findings of this study confirm that the additional resources from this subsidy improved SMEs capabilities to innovate and grow in international markets. RRF-subsidy strengthened resources and capabilities in the target SMEs, which answered sub-research question 2. In addition, that finding of this study support Leonidou et al. (2011) and Seringhaus (1986). It is widely acknowledged that a major weakness for SMEs is that they have to operate with limited resources (Woschke et al. 2017; Garengo et al. 2005; Laforet and Tann 2006) with researchers often pointing to a lack of financial resources in SMEs (Hewitt-Dundas 2006; Keizer et al. 2002). Government assistance can be utilized as an external resource that supports firms in alleviating human, financial, marketing, informational, and allied deficiencies that hinder export development (Leonidou et al. 2011; Seringhaus 1986). Even though Leonidou et al. (2011) and Seringhaus (1986) focus on government assistance for exports in their research, it can be argued that different kinds of subsidies strengthen the resources and capabilities of firms.

Most of the target SMEs assessed that the RRF-subsidy advanced their substantive green innovations, thus supporting sub research question 1. That finding is consistent with the results of Bai et al. (2019) stating that government R&D subsidies significantly advance green innovation of both large companies and SMEs, but this advancement is more valuable to SMEs. For some of the target SMEs it would not have been possible to carry out these R&D projects at this scale without the subsidy. These R&D projects aimed at substantive green innovation, which often necessitates considerable resource allocation, high uncertainty, and elevated risks which reduces enterprises' capabilities to engage in such endeavours (Ben Arfi et al. 2018). The additional resources from this RRF-subsidy enabled the SMEs to implement the R&D projects more efficiently. This finding aligns with (Zhao et al. 2024) as governmental R&D subsidies can diminish burdens by reducing costs and resource constraints, thereby facilitating companies to pursue substantive green innovation.

Most of the target SMEs have internationalised early on in their operations thus they can be regarded as born globals. These target SMEs fit the Knight and Cavusgil (2004) definition for born globals as business organizations that early on in their operations aim to achieve superior performance internationally from the application of knowledge-based resources to the sale of outputs in multiple countries. Innovativeness is a predominant characteristic in the target SMEs

thus, aligning with born globals being regarded as innovative and viewing internationalisation, or new entry into new markets as an innovative act (Knight & Cavusgil 2004).

In most of the target SMEs receiving this RRF-subsidy was perceived beneficial for international growth and exports. Therefore, findings of this study reinforce the interlinkage of varying innovation and exporting outcomes, thus the use of innovation policy as export policy is endorsed (Freel et al. 2019). Innovation and international growth are resource intensive high-risk strategies. Subsidies give additional resources to SMEs that they need for carrying out these activities effectively. The SMEs assessed that this RRF-subsidy gave them additional resources to conduct innovations, that simultaneously advanced international growth and capabilities to operate in international markets, thus answering the third sub-research question. However, there is also some conflicting research results suggesting that the complementarity between innovation and exporting may not be as strong in small firms, since limited resources might obligate managers to decide between two high-risk strategies (Kiss et al. 2018). Nevertheless, according to (Love & Roper 2015) more recent research indicates that innovation and exporting simultaneously can improve performance even in small firms, which was supported by the findings of this study.

Complementarity between innovation and exporting (Freel et al. 2019; Love & Roper 2015) in most of the target SMEs that are also regarded as born globals were reinforced by the findings of this study. However, one target SME who have not yet internationalised did not assess that receiving this RRF-subsidy improved their international growth. This might indicate that innovation subsidies improve international growth only in SMEs that have already started their internationalisation process. The complementarity between innovation and internationalisation might be stronger in born global SMEs.

This study contributes to existing body of research by filling research gaps. Discussion regarding addressing research gaps is presented in the following. The RRF-subsidy is a quite recent policy measure hence existing body of research regarding the effectiveness or the perceived benefits of the subsidy is yet small. This study offers a novel approach by focusing on Finnish SMEs that have received the RRF-subsidy. There is almost no prior research conducted with a similar scope which increases novelty value and addresses the research gap.

This study applies a unique approach by exploring the perceived benefits of green innovation subsidies for SME internationalisation. Both green innovation subsidies and internationalisation have been researched separately, but there is a gap for research linking green innovation subsidies

to SME internationalisation, hence by combining these topics this study addresses the research gap and provides novelty value to the existing literature.

With qualitative case study approach this study provides an in-depth view of the perceived benefits for SMEs of a subsidy. Literature regarding the effectiveness of subsidies is more commonly researched with quantitative research approach as it allows to measure numerical data and conduct statistical analysis on the effectiveness of a larger sample of subsidised companies. The qualitative findings of this study complement existing quantitative research by providing contextual insights about the effectiveness of subsidies from the perspective of SMEs.

5.2 Practical implications

The practical implications of this study are divided to managerial implications and policy implications. The managerial implications are directed to SMEs that are eligible to apply for subsidies whereas the policy implications are directed to policymakers that are planning subsidy instruments and allocating subsidies.

As *managerial implications* for SME representatives the findings of this research give a comprehensive overview of how the target SMEs benefitted from this RRF-subsidy. It is beneficial for SME representatives to familiarise themselves with the findings of this study when they are assessing whether their company should apply for a subsidy that is somewhat similar to this RRF-subsidy, as the findings of this study can indicate in what ways SMEs benefit from subsidies.

Public subsidies act as a valuable external resource for SMEs to undertake R&D projects, which might have been difficult to implement efficiently and on a larger scale without the additional resources of the subsidy. These subsidised R&D projects enhance product development and induce innovations. For the target SMEs this RRF-subsidy enabled them to conduct R&D projects focused on substantive green innovations.

Implementing subsidized projects can lead to R&D additionality in SMEs which entails that the subsidy triggers R&D spending over the amount of the subsidy. The additionality effect on R&D subsidies makes the effects of the subsidies greater and longer lasting. The findings of this study corroborate the R&D additionality effect which was the outcome in all of the target SMEs.

The additional resources from subsidies strengthen different kinds of tangible and intangible resources and capabilities in SMEs. Because SMEs have to operate with resource constraints, subsidies play a key role in strengthening resources in SMEs. As subsidies strengthen resources and

capabilities in SMEs it subsequently improves the SMEs capabilities to innovate and grow in international markets.

Receiving subsidies can have spillover effects that enhance international growth in SMEs, therefore SMEs striving to grow internationally benefit from applying for subsidies. Even though this RRF-subsidy was a R&D subsidy by nature the most of target SMEs perceived that the subsidy was beneficial for their international growth. The additional resources from subsidies and the innovations the SMEs were able to conduct with this RRF-subsidy advanced the target SMEs global competitiveness and therefore was perceived beneficial to advance international growth in the target SMEs. Improved capabilities to internationalisation can be seen as a spillover effect of this subsidy as the main aim of it was to promote R&D activities. The findings of this study indicate that R&D subsidies can indirectly advance the international growth of SMEs.

To conclude the managerial implications, the subsidy was perceived beneficial in SMEs in many ways, thus highlighting the ways in which SMEs benefit from similar subsidies. The target SMEs were able to implement large R&D projects with this subsidy that induced green innovations. Receiving a R&D subsidy can also lead to R&D additionality which was the case in all of the target SMEs. As SMEs have to operate with resource constraints, subsidies play a key role in strengthening resources and capabilities in SMEs. The most of target SMEs perceived that this subsidy was beneficial for their international growth and improved their global competitiveness. The findings of this study emphasize that SMEs benefitted from the RRF-subsidy in the ways described, thus it is encouraged that SMEs should apply for subsidies and they benefit from them in many ways.

This study provides *policy implications* for policy makers in addition to managerial implications. As presented above SMEs benefit from subsidies in many ways. For instance, subsidies strengthen resources, enable undertaking large R&D projects, enhance innovativeness and competitiveness, and improve capabilities to grow in international markets. As the findings of this study give a comprehensive overview of the benefits SMEs get from subsidies the results emphasize that public subsidies should be allocated to SMEs.

In addition to the insights on the perceived benefit of this RRF-subsidy for SMEs, the findings of this study also present SMEs views on how subsidy instruments should be improved. These findings can provide valuable insights for policymakers in the planning of future subsidy programs, ensuring that the subsidies more effectively address the needs of SMEs, thus answering the fourth sub-research question.

Public agencies should have an interactive application process where SME can present their project plan to public agency representative and get personalised feedback. In the feedback session SMEs can get advice on how to improve their project plan or reassurance that their project plan already meets the objectives. The findings of this study emphasize that most of the target SMEs preferred the interactive nature of the Business Finland application process and regarded the personalised feedback useful.

Increasing the amount of granted subsidy in Finland would assist in strengthening the competitive position of Finnish firms in international markets. Subsidies granted in Finland are relatively small compared to other countries which places Finnish firms at a disadvantage when competing in global markets.

Subsidy instruments should support both R&D and internationalisation as simultaneous process and facilitate the continuity between these two activities better. In practice this entails that the company needs to do sales in domestic and international markets to get customer feedback so that they can further develop their products to better meet the needs of customers. R&D and internationalisation activities are intertwined which should be better reflected in the subsidies.

The findings of this research highlight that continuity between R&D subsidies should be better facilitated in subsidy instruments for SMEs. Two of the target SMEs argue that there are plenty of subsidy instruments that support the first stage of R&D however to the second stage of R&D there is less public support available. The first stage of R&D involves initial R&D endeavours that create a foundation for further product development. Whereas the second stage entails piloting a new product and launching it to the market. SMEs need additional resources to both first and second stage of R&D. In order to facilitate a smooth R&D process continuity between subsidies should be considered. If an SME does not receive subsidy to the second stage of R&D, it can slow down the piloting process and in the worst case the SME would be unable to commercialise R&D results due to lack of resources.

Public subsidies should be allocated to SMEs rather than to large companies. SMEs need the additional resources from subsidies the most as they have to operate with limited resources whereas large companies tend to be more financially sound and thus are not so heavily dependent on subsidies. In addition, SMEs are more agile and faster innovators compared to large companies where innovation processes tend to be more time-consuming. The sizes of subsidized projects are naturally smaller in SMEs than in large companies. It might be even possible to lower the total

monetary amount of granted subsidies by targeting them to SMEs and by doing careful assessment in the allocation process.

5.3 Limitations and suggestions for further research

This research explored the perceived benefits of the RRF-subsidy for SMEs employing qualitative case study approach. The sample for this study consisted of five target SMEs that were interviewed. Even though the sample for this study is relatively small, small sample sizes are typical for qualitative case studies as they provide an in-depth description of a phenomenon. The small sample size and case specificity restrict the generalizability of the findings of this research. As suggestion for further research, the effectiveness of the RRF-subsidy for a larger number of SMEs could be assessed by employing quantitative methods.

This study focuses on Finnish SMEs experiences with the Recover and Resilience Facility which is an EU-wide policy instrument. This study only covers the perceived experiences of Finnish SMEs thus presenting a geographical limitation. For future research, a comparative study involving SMEs from other EU member states could provide a broader understanding of the RRF's impact across different national contexts. Such research would help assess whether the perceived benefits identified in this study are consistent across countries or influenced by local implementation practices, policy environments, and market conditions.

Subsidies can bring about indirect spillover effects that might be hard for the SME representatives to assess. The SMEs were able to identify some spillover effects for this RRF-subsidy, but it is possible that in addition there were some spillover effects that the SMEs were not able to identify. The RRF-subsidy is a quite recent measure, therefore at this stage it might be difficult for the SMEs to assess the long-term effects of the subsidy for innovation and internationalisation. As a suggestion for further research a longitudinal study could examine the long-term effects of this subsidy for innovations and international growth.

This study focuses on SMEs and presents the perceived benefits of the RRF-subsidy for SMEs. The findings of this study highlight how SMEs benefitted from the RRF-subsidy. And as policy implications it is suggested that as this study shows that SMEs benefit from subsidies in many ways public subsidies should be allocated to SMEs. However, this study only focuses on SMEs, thus the experiences of large companies are not included. For this study the SME focus is natural as the RRF-subsidy “Innovation support for growth companies” is targeted to SMEs. A suggestion for

further research would be to conduct a comparative study on the effectiveness of subsidies for SMEs and large companies.

6 Summary

Small and Medium-sized Enterprises (SMEs) are central to national economies particularly by providing innovation, growth and job creation (WTO 2018), thus supporting the choice that this study focuses on SMEs. One key challenge for SMEs is that they have to operate with resource constraints. A lack of resources may constrain SMEs' capacity to engage in resource intensive activities such as innovation and internationalisation (Kiss et al. 2018). Subsidies can function as an important external resource that supports firms to alleviate human, financial, marketing, informational, and allied resource constraints (Leonidou et al. 2011; Seringhaus 1986). Prior research suggests a positive interrelationship between innovation and internationalisation which is further examined in this study.

This study focuses on the Recovery and Resilience Facility (RRF) which is a temporary monetary instrument by the European Commission that aims to assist the EU member states to recover from the economic and social damage of the coronavirus crisis. The case for this research is the RRF-subsidy "Innovation support for growth companies" which was targeted to R&D projects of Finnish SMEs that promote sustainable development and are seeking growth through exporting.

This study employs qualitative case study approach. Representatives from five target SMEs that received the RRF-subsidy were interviewed regarding the perceived benefits of the subsidy. The interview data was analysed with thematic method. The main research question for this study is: How does RRF-subsidy support green innovations, R&D, and international growth in SMEs?

Subsidies play an important role in reducing SME resource constraints by strengthening resources in SMEs. The RRF-subsidy strengthened resources and capabilities in SMEs thus enhancing their capabilities to innovate and grow in international markets. Most of the target SMEs assessed that the RRF-subsidy improved their substantive green innovations. Although the RRF-subsidy was an innovation subsidy by nature, most of the target SMEs perceived that the subsidy improved their international growth and competence to operate in international markets, hence endorsing the use of innovation policy as an export policy and highlighting complementarity between innovation and internationalisation.

The findings of this study provide an in-depth overview of how the target SMEs benefitted from this RRF-subsidy. Therefore, the findings can be useful for SMEs considering applying for similar subsidies. This study offers relevant insights for policymakers in the planning of future subsidy

programs, ensuring that the subsidies more adequately support the needs of SMEs. The results of this study emphasize that it would be beneficial to allocate public subsidies to SMEs.

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Appendices

Appendix 1 Operationalisation table

| Research Problem | Sub-problems | Theoretical background | Interview themes |
|---|---|--|---|
| How does the RRF-subsidy support green innovations, R&D and international growth in SMEs? | How does the RRF-subsidy support green innovations and R&D in SMEs? | 2.3, 2.3.1, 2.3.2. and 2.4. | Green innovation and R&D |
| | How does the RRF-subsidy strengthen resources and capabilities in SMEs? | 2.2., 2.2.1., 2.2.2. and 2.2.3. | Resources and capabilities |
| | How does the RRF-subsidy support international growth in SMEs? | 2.1, 2.1.1, 2.1.2, 2.1.3, 2.1.4., 2.2.2 and 2.4. | Internationalisation and International growth |
| | How could future subsidy programmes be improved? | 2.2., 2.2.1., 2.2.3., 2.3.2. and 2.4. | Subsidies |

Appendix 2 Interview questions

Introductory questions

1. Could you first introduce yourself, tell about your current position in the company, previous positions and your study background?
2. Would you like to tell more about the company? When was the company founded? What field you operate in? What kind of product or services the company provides?

RRF program “Innovation support for growth companies”

3. Why did your company decide to apply for this RRF subsidy?
4. Which R&D project have you applied for the subsidy? How important is the project for your company?
5. What type of innovation is the expected outcome of this R&D project? Is the aim to achieve incremental product innovation or novel product innovation?
6. What are the objectives of this R&D project? (Would you assess that the objectives of this project will be met?)

7. How have this R&D project progressed so far? And what are the upcoming stages of this R&D project?
8. Is there a risk that this R&D project would fail or that all the objectives for this project would not be completely met? Can you briefly explain some risks you can identify?
9. Have there happened some unexpected things during the project? E.g. have there been a need to apply for additional funding?
10. How was the application process? What is your view on the criteria? Was the process demanding? Did the preparation for the application foster the development of the idea for the project?
11. How could the subsidy program be improved in the future? (What kind of changes could improve it?) Are you going to apply for similar subsidies in the future?

Green innovation

12. How does sustainable development and green innovation align with your company's overall strategy and long-term goals? (Have these things been part of the company's business from the beginning? Or have the company involved itself later on?)
13. What are specific sustainable outcomes expected from this R&D project? Does this R&D project help your company to achieve some of your sustainability goals?
14. How do you view the demand of green products in your target markets?
15. How do you see the role of green innovation evolving in your industry over the next 5-10 years?
16. What challenges does your company face in pursuing green innovation, and how this subsidy helped to address these challenges?
17. What do you perceive would to be the main benefits of R&D and innovation subsidies for your company's green innovation and R&D?

Resources

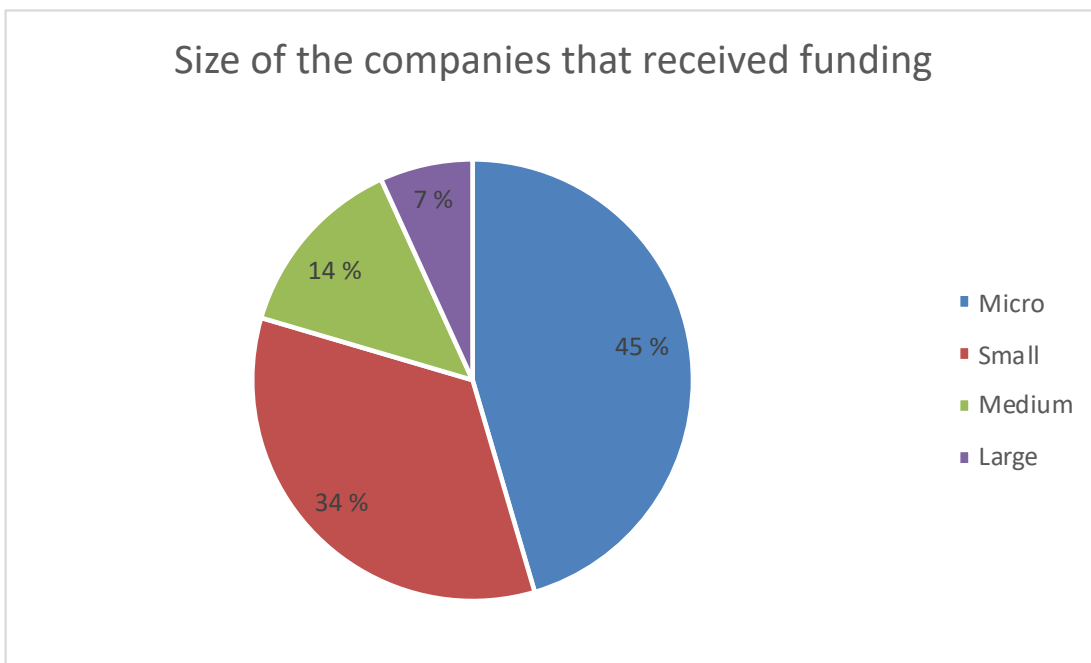
18. How important is the role of (public) innovation subsidies in accelerating the innovations within your company?
19. (In what things did your company use the subsidy for e.g. investments, recruiting or acquiring new know-how?) How vital do you view this subsidy for implementing this R&D project? Would your company have done this R&D project to some extent or totally without the subsidy?
20. How did this subsidy affect the way this project was executed? (Have your company had executed this project the exactly the same way even without funding or did the criteria for this subsidy direct the implementation of this project?)
21. RRF support was limited to a maximum of 50% of the total cost of the R&D project. How did you acquire the other 50% of the funding? Internally or externally?
22. What happened to your company's own R&D expenditure after receiving this funding? (additionality, no effect, crowding out)

International growth

23. What stage of internationalisation are your company in currently? (Do you just operate in domestic markets? Have there been just a few international customers? Or is exports already a common practice and internationalisation process under way?)
24. What kind of plans and aims does your company have for internationalisation?
25. How this subsidy improved your company's competitiveness in domestic and international markets? (Is this innovation aimed towards international or domestic markets or both?)
26. How does this subsidy advance the international growth of your company? (Does this innovation have demand in export markets? Does this subsidy have some benefits regarding possible entry to new international markets?)
27. Do you think that the additional resources from this innovation subsidy have positive spillover effects that would advance internationalisation of your company?

28. Do you have something you would like to add regarding any of the themes we have discussed?

Appendix 3 Size of the companies that received funding from the RRF-program "Innovation support for growth companies"



The data for this research was collected by the researcher themselves. The researcher got permission from the participants to collect the data and use it for this research.

Data type 1: Recordings of the interviews

Data type 2: Transcriptions of the interviews

4. Storing the data during the research process

During the research process the data will be stored in the university's network drive and university-provided Seafile Cloud Service. The university's data storage services will take care of data security and backup files automatically.

5. Documenting the data and metadata

5.1 Data documentation

For documenting the changes made to the data during the research process, the researcher uses a research journal. The journal includes dates of analysis which assists in being up to date when changes are made. In addition, the data is analysed on separate documents where the researcher will record the main points of the data, phases of analysis and significant themes.

5.2 Data arrangement and integrity

I will keep the original data files (transcription from the interviews) separate from the data I am using in the research process, so that I can always revert back to the original, if need be.

5.3 Metadata

I will save my data into an archive or a repository that will take care of the metadata for me.

6. Data after completing the research

I will store all data for 3 years. The data will be stored on a flash drive.

Appendix 6 Disclosure of the use of AI

Examples of ChatGTP prompts that were used to improve language in this thesis:

Example 1:

Prompt: Could you please give a few ways to rephrase the word "explore" in academic english, in a sentence "this chapter will explore"

ChatGTP:

Certainly! Here are several **academic English** alternatives to "**explore**" in the sentence "**this chapter will explore**", ranging from neutral to more formal:

1. **"This chapter examines..."**
2. **"This chapter analyzes..."**
3. **"This chapter investigates..."**
4. **"This chapter addresses..."**
5. **"This chapter discusses..."**
6. **"This chapter considers..."**
7. **"This chapter reviews..."**
8. **"This chapter evaluates..."**
9. **"This chapter outlines..."**
10. **"This chapter focuses on..."**

If the chapter is **theoretical**, "*examines*" or "*analyzes*" work well; if it is **descriptive**, "*discusses*" or "*outlines*" may be more appropriate.

If you'd like, tell me the chapter's purpose and I can suggest the best fit.

Example 2:

Prompt: Could you please rephrase this: "thus facilitating enterprises to engage in"

ChatGTP:

Sure! Here are a few reworded versions of your phrase:

1. **"Enabling enterprises to participate in"**

2. **"Helping enterprises engage in"**
3. **"Allowing enterprises to take part in"**
4. **"Supporting enterprises in engaging in"**
5. **"Encouraging enterprises to pursue"**
6. **"Making it easier for enterprises to engage in"**
7. **"Promoting enterprise involvement in"**
8. **"Providing enterprises with the means to engage in"**

Let me know if you need further refinements!

Example 3:

Prompt: Could you please give a few ways to rephrase this "gives a more concrete view"

ChatGTP:

Certainly! Here are several academically appropriate ways to rephrase **"gives a more concrete view"**:

1. **"Provides a more detailed perspective"**
2. **"Offers a clearer representation"**
3. **"Delivers a more tangible perspective"**
4. **"Presents a more specific depiction"**
5. **"Yields a more precise understanding"**
6. **"Contributes to a more clearly defined view"**
7. **"Offers a more explicit account"**
8. **"Provides greater clarity"**

If you share the sentence, I can help select the most natural option for your context.

Example 4:

Prompt: Could you please give me a few options on how to say "seeks to explain" in academic english?

ChatGTP:

Certainly! Here are several academically appropriate ways to rephrase **"seeks to explain"**, depending on tone and context:

1. **"Aims to explain"**
2. **"Attempts to explain"**
3. **"Intends to explain"**
4. **"Examines"**

5. **“Addresses”**
6. **“Explores”**
7. **“Seeks to elucidate”**
8. **“Aims to clarify”**
9. **“Provides an explanation of”**
10. **“Investigates”**

If you want something slightly more confident or neutral (less tentative than “*seeks*”), **“examines,”** **“investigates,”** or **“addresses”** are often preferred in academic writing.

Example 5:

Prompt: Could you please give me a few options on how to say ”goes hand in hand” in academic english?

ChatGTP:

Certainly! Here are several **academic English** alternatives to **“goes hand in hand”**, depending on the relationship you want to express:

1. **“Is closely associated with”**
2. **“Is strongly linked to”**
3. **“Is closely intertwined with”**
4. **“Coincides with”**
5. **“Is mutually reinforcing with”**
6. **“Is closely connected to”**
7. **“Is systematically related to”**
8. **“Occurs alongside”**
9. **“Is concomitant with”**
10. **“Is integrally related to”**

If you share the full sentence, I can suggest the most precise option for your context.