



GREBE

Generating Renewable Energy
Business Enterprise



Growth strategy guidelines for SMEs in renewable energy

Reviewing of growth strategies based on new products and innovation

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The GREBE Project

What is GREBE?

GREBE (Generating Renewable Energy Business Enterprise) is a €1.77m, 3-year (2015-2018) transnational project to support the renewable energy sector. It is co-funded by the EU's Northern Periphery & Arctic (NPA) Programme. It focuses on the challenges of peripheral and arctic regions as places for doing business, and helps develop renewable energy business opportunities in areas with extreme conditions.

The project partnership includes the eight partners from six countries, Western Development Commission (Ireland), Action Renewables (Northern Ireland), Fermanagh & Omagh District Council (Northern Ireland), Environmental Research Institute (Scotland), LUKE (Finland), Karelia University of Applied Sciences (Finland), Narvik Science Park (Norway) and Innovation Iceland (Iceland).

Why is GREBE happening?

Renewable Energy entrepreneurs working in the NPA area face challenges including a lack of critical mass, dispersed settlements, poor accessibility, vulnerability to climate change effects and limited networking opportunities.

GREBE will equip SMEs and start-ups with the skills and confidence to overcome these challenges and use place based natural assets for RE to best sustainable effect. The renewable energy sector contributes to sustainable regional and rural development and has potential for growth.

What does GREBE do?

GREBE supports renewable energy start-ups and SMEs:

- To grow their business, to provide local jobs, and meet energy demands of local communities.
- By supporting diversification of the technological capacity of SMEs and start-ups so that they can exploit the natural conditions of their locations.
- By providing RE tailored, expert guidance and mentoring to give SMEs and start-ups the knowledge and expertise to grow and expand their businesses.
- By providing a platform for transnational sharing of knowledge to demonstrate the full potential of the RE sector by showcasing innovations on RE technology and strengthening accessibility to expertise and business support available locally and in other NPA regions.
- To connect with other renewable energy businesses to develop new opportunities locally, regionally and transnationally through the Virtual Energy Ideas Hub.
- By conducting research on the processes operating in the sector to improve understanding of the sector's needs and make the case for public policy to support the sector.

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GREBE reviews and analyses business growth strategies

Small and medium-size enterprises (SMEs) and micro-scale enterprises (new and established) have a key role to play in generating new employment in peripheral regions. However, from knowledge of local markets it is clear that only small numbers of SMEs are consistent in generating new employment opportunities i.e. they are successful growth enterprises. SMEs that are most successful are those that successfully deployed growth strategies to optimize their business activities.

This growth strategy guideline reviews successful business growth strategies for SMEs and micro-scale enterprises in the NPA regions and analyses how these can be adapted for application to the RE sector. Business growth strategies based on new RE and energy storage technologies are identified by a case-based approach. Successful strategies allowing for business growth in current or new domestic or international market areas are disseminated for replication across the NPA area facilitating economic growth and improved market access of new RE solutions.

This guideline report introduces firstly the contexts of business growth and main types of growth strategies. Secondly, it provides a baseline of business growth issues, preconditions of growth and support needs, basing on a transnational survey for 70 business enterprises in the NPA region. Thirdly, it provides examples of the growth strategies in renewable energy and energy storage sectors. Finally, conclusions provide more generic guidelines for the business growth strategies in the sector.

Firm growth and growth strategies

Firm growth has long fascinated people and there has been much research effort on investigating the factors affecting on it. In spite of the large amount of studies, the picture of SME growth is still partly fragmented. However, the generic characteristics are identified and are now interpreted for the development of renewable energy and energy storage sectors.

Firm growth in general refers to increase in size. In addition to increase in amount, growth also refers to increase in size or improvement in quality because of a development process. Given the process nature of firm growth, the explanatory factors may change significantly during the process. Firm growth is a multi-faceted phenomenon in nature, depending e.g. on the measures used and the period studied.

Firm growth and performance is much affected by firm strategy, which aims at achieving a fit between the firm and its environment. Strategy involves choices along a number of dimensions and can be represented by a firm's overall collection of individual business-related decisions and actions¹. Though there is a variety of definitions of the term strategy, it is conceptualized as a pattern of strategic variables, because the elements of strategy – the individual business-related decisions and actions – are interdependent and interactive². It is argued that the identification of strategy patterns permits a more complete and accurate depiction of overall strategic behavior³.

¹ Mintzberg, 1978; Miles & Snow 1978.

² Galbraith & Schendel 1983.

³ See e.g. Hambrick 1983; Robinson & Pearce 1988.

In several typologies, entrepreneurs and firms are categorized by their business goals, so growth has been a widely used dimension in many typologies. There are two broad approaches in the studies of small firm success⁴:

1. The business professionals' model: a successful firm is one that achieves its highest potential in terms of growth, market share, productivity, profitability, and return on capital invested or other measures of the performance of the firm itself.
2. The small business proprietors' model: the owner-managers' main concern is whether the firm is providing them with the benefits they want from it. These benefits are often associated with a lifestyle and an income level to maintain it. Firm success therefore means being able to reach a level of comfort rather than achieving the business's maximum potential.

Why is growth important?

From a firm's internal viewpoint, business growth is often closely associated with overall firm success and survival⁵. Growth is also suggested as the most appropriate indicator of the performance for surviving small firms⁶. Indeed, growth has been used as a simple measure of success in business⁷. Negative growth of an SME is often a sign of problems, while stagnation, i.e. a situation where growth has stopped, is usually indicative of problems that a firm will face in the future.

The growth is also an important precondition for the achievement of other financial goals of business⁸. From the point of view of an SME, growth is usually a critical precondition for its longevity⁹. It has been found that young firms that grow have twice the probability of survival as young non-growing firms¹⁰; also strong growth may reduce the firm's profitability temporarily, but eventually increase it¹¹. The firms growing successfully have first secured their profitability, and then went for the growth¹².

The growth often has instrumental value for a business enterprise. For new ventures, firm growth is needed to *ensure an adequate production volume* for profitable business. Growth can serve as an instrument for increasing *profitability by enlarging the firm's market-share*. Other similar goals include securing the *continuity of business* in the conditions of growing demand or *achieving economies of scale*. Moreover, growth may bring the firm first *mover advantage*, *new business opportunities*¹³, and a larger size enhances its *credibility in the market*. In addition, *achieving a higher net value of the firm* is regarded as a motive for firm growth.

A successful business is important not only for the firm, but is also associated with the success of the region and the well-being of people living in the area. Therefore, growth SMEs have a special importance in the economic development. Growing SMEs are often the only feasible engines of development, especially in the northern peripheral regions. They generate societal growth in terms of new jobs and revenues, and this increase the resilience of rural communities. Moreover, growing SMEs create innovations, and they form flexible production networks, for example.

⁴ Bridge et al. 1998: 140-142; see also Smith, 1967; Stanworth & Curran, 1976.

⁵ E.g. Johannisson 1993; Phillips & Kirchhoff 1989.

⁶ Brush and Vanderwerf 1992.

⁷ E.g. Storey 1994.

⁸ de Geus 1997: 53; Storey 1994; Day 1992: 128; Phillips & Kirchhoff 1989.

⁹ Storey 1994: 158.

¹⁰ Phillips and Kirchhoff 1989.

¹¹ McDougall et al. 1994; cf. MacMillan & Day 1987.

¹² Davidsson et al. 2005.

¹³ Cf. the corridor principle, Timmons 1999.

What is growing?

The selection of the level of analysis is critical for the comprehensive analyses of the business growth. Traditionally the firm growth has been studied as a firm-level phenomenon. However, an entrepreneur may prefer to set up a new firm instead of growing the extant one. Income can also be based on franchising or licensing agreements. Therefore, it is important to pay attention also to firm-external growth strategies. Moreover, in firms operating in several businesses, some of them may be growing and some others not. Therefore, growth depends on the level of analysis: firm, entrepreneur, or business.

Moreover, from the local and regional economic development perspective, for example, attending exclusively to firm-level growth and jobs may be too narrow an approach. Firms, even very small and non-growing ones, can have different strategic roles or positions in the local economic system¹⁴. Some are critical facilitators of other firms' growth or of their very emergence, and thus are important for job creation at the local level.

How to measure growth?

There is a diversity of measures for firm growth: sales turnover, employment, profits, assets, market share, and physical output. Another important aspect is the choice of absolute or relative growth. The effects of firm size on growth vary depending on whether an absolute or relative measure is applied. Absolute measures tend to ascribe higher growth to larger firms whereas smaller firms more easily reach impressive growth in percentage (i.e., relative) terms. Moreover, the results depend on the period¹⁵ - the status of being a growth firm may be rather temporary¹⁶. Moreover, growth outcomes are to some extent dependent on the growth strategy of the firm¹⁷.

It is recommended that multiple growth measures should be used for analysing the growth¹⁸. It has also been found that there is very low correlation among the most commonly used growth measures¹⁹. The most frequently used measures have been change in the firm's sales turnover²⁰ and the change in the number of employees. These measures, frequently used in the SME context, are strongly intercorrelated²¹, but not necessarily among capital-intensive large companies.

Sales turnover is considered to offer a straightforward yet reliable indicator of how well a business is doing in general. However, sales turnover growth may be attributed to various reasons: higher prices charged to customers, increase in market share or greater share of wallet, or all these together. It is also recommended²² to use sales turnover growth over increase in employee numbers or firm assets as a measure of growth. It is important to note that firms may grow in terms of sales even though there may be no change in numbers of employees or amount of assets (e.g. a firm may increase its prices while employees and assets remain the same).

¹⁴ Laukkanen 1999.

¹⁵ Delmar et al. 2003.

¹⁶ Spilling 2001.

¹⁷ Gilbert et al. 2006.

¹⁸ Venkatraman & Ramanujam 1986; Delmar & Davidsson 1998; Havnes & Senneseth 2001; O'Gorman 2001; Delmar et al. 2003; Johnsen & McMahon 2005.

¹⁹ Delmar et al. 2003.

²⁰ E.g. Weinzimmer et al. 1998: 238; Hubbard & Bromiley 1995; Hoy et al. 1992.

²¹ North & Smallbone 1993; Storey et al. 1987.

²² Weinzimmer et al. 1998.

Sales turnover is relatively easily accessible, it applies to (almost) all kinds of firms, and it is relatively insensitive to capital intensity and degree of integration. It is also the indicator favored by entrepreneurs themselves²³. Moreover, sales turnover often precedes the other growth measures, i.e., the increase in assets and employees. Therefore, the nature of the growth process itself points to sales turnover as a natural choice²⁴.

Sales is not, however, the perfect indicator of growth for all purposes. Sales are sensitive to inflation and currency exchange rates, while employment is not. It is not always true that sales leads the growth process. For high-technology start-ups and the start-up of new activities in established firms, it is possible that assets and employment will grow before any sales will occur. Arguments have been offered for employment as a much more direct indicator of organizational complexity than sales, and it may be preferable if the focus is on the managerial implications of growth²⁵.

From more macro-economic and job creation perspective, measuring growth in employment seems to be a natural choice²⁶. Obvious drawbacks of employment as a growth indicator are as follows: The employment is affected by labor productivity increases, machine-for-man substitution, degree of integration, and other make-or-buy decisions. A firm can grow considerably in output and assets without any growth in employment. Moreover, only few managers see growth in employees as a goal in itself.

Other growth measures have some significant shortcomings that limit their applicability outside of very special contexts²⁷. Concerning market share, defining the markets can be challenging for small firms and it does not make sense to compare market shares for firms operating in different markets. In addition, the value of assets varies with the capital intensity of industries. Concerning physical output, in within-industry studies measures such as the number of seats for restaurants can be used, but usually cannot be compared across industries.

A firm's profitability can be a useful measure of performance in the case of large companies. The measurement of performance is more complicated when studying SMEs, for several reasons. First, the central goals and objectives of an SME may be other than financial. Second, it is difficult to obtain reliable information on the factors affecting the financial performance of an SME: for example, in family businesses it is difficult to take into account the inputs of family members that are not recorded by means of the accounting system. Third, organizational form can create artificial differences, e.g. procedures for handling owner compensation can present major sources of error²⁸. Fourth, SMEs may be very reluctant to provide financial data on their performance²⁹. Fifth, it may take several years before a new business venture becomes profitable³⁰. Correspondingly, an established growing firm may be unprofitable.

How do companies grow? – Growth Strategies

Traditionally the ways of growth have been divided into organic and inorganic growth strategies. Within these two major categories, several growth options can be found. Another distinction can be made between internal and external growth³¹. However, in practice growth strategies are often used in combination³². Organic growth

²³ Barkham et al. 1996.

²⁴ Delmar 1997; Flamholtz 1986.

²⁵ Churchill & Lewis 1983; Greiner 1972.

²⁶ Schreyer 1999.

²⁷ Delmar et al. 2003.

²⁸ Dess & Robinson 1984.

²⁹ E.g. Dess & Robinson 1984.

³⁰ Biggadike 1979.

³¹ E.g. Tornikoski et al. 2011.

is based on firm's operations from its own (internally generated) resources, without resorting to borrowing or acquisition of other firms. Inorganic growth is based on firm external operations, such as mergers or takeovers, which can also provide access routes to the new markets.³³



Figure 1. Growth strategy categories of organic (firm internal) and inorganic (firm external)³⁴

Four options are identified at the product/market strategy³⁵:

1. Market penetration
2. New product development
3. New market development, and
4. Moving into new markets with new products.

Thompson³⁶ presents four growth strategies among high-growth firms as follows:

1. Organic growth
2. Acquisition
3. Strategic alliance, and
4. Joint venture

³² E.g. Simon 1996.

³³ Business Dictionary 2016.

³⁴ Modified after: Small Business Solver 2013; UNI strategic business growth 2013.

³⁵ Burns 1989: 47.

³⁶ Thompson 2001: 563–565.

In addition, Dsouza³⁷ identified three primary strategic clusters:

1. Build strategy, i.e. emphasis on vertical integration
2. Expand strategy, i.e. emphasis on resource allocation and product differentiation, and
3. Maintain strategy, i.e. emphasis on market dominance and/or efficiency

However, the major distinction, which has important implications for the firm and for society, can be made between organic growth firms and acquisition growth firms. These growth strategies constitute different challenges for the management of the firm and they may have a differential impact on firm performance³⁸. In the economy, organic growth is usually associated with genuine job creation, whereas inorganic growth, i.e. growth through acquisition, is often considered as a shift of jobs from one firm to another.



Figure 2a. Organic (firm internal) growth strategies with a pattern of interlinked subcategories.

Organic growth refers to the growth a company can achieve by increasing sales to existing customers, finding new customers, introducing new products and services, using new channels, increasing cost-efficiency, or creating new business models. New products and services are often results of research, development and innovation (RDI) activities. Most commonly new target markets or geographic expansion refers to internationalization. However, opening a new geographic site is similar to a start-up process in that a firm must

³⁷ Dsouza 1990.

³⁸ Delmar et al. 2003.

select a location, hire and train staff, establish organizational legitimacy, motivate and supervise employees, and develop a structure to accommodate future growth³⁹.



Figure 2b. Inorganic (firm external) growth strategies with a pattern of interlinked subcategories.

Inorganic growth is affected to a great extent by exogenous factors. Vertical and horizontal integration are often related to acquisitions and therefore inorganic growth strategies. Acquisitions are regarded more as a large company growth strategy, which can be either synergistic or non-synergistic⁴⁰. Forward or backward vertical integration means that the acquired firm is located at a different level of the value-addition chain, i.e. the acquired firm is a customer or supplier of the firm. In contrast, horizontal integration refers to a firm, which is at the same level of value-addition, i.e. it is a competitor. Lateral integrations refer to unrelated businesses that represent a diversification strategy. It has been found that very few firms engage in vertical integration or unrelated diversification⁴¹.

Besides becoming bigger and thus acquiring greater market power, there might be several other reasons for acquisitions. Those include acquiring synergies, industry restructuring, reduction of business risk, acquiring new knowledge and other necessary resources, overcoming barriers to entry, and entering new markets quickly⁴². Despite the fact that growth through acquisitions is more typical of larger firms than smaller ones⁴³, it is one option for the growth of an SME.

³⁹ Barringer & Greening 1998.

⁴⁰ Anslinger & Copeland 1996.

⁴¹ Levie 1997.

⁴² See Vermeulen & Barkema 2001; Empson 2000; Birkinshaw 1999; Tetenbaum 1999; Chatterjee 1992.

Growth can result of modes like portfolio and serial entrepreneurship (i.e. multiple entrepreneurship), franchising, licensing, and other network-based strategies like strategic partnerships and alliances, and joint ventures. It has been found that about half of high-growth firms had engaged in strategic alliances⁴⁴.

Setting up new firms is one often-neglected way of growing. Studies using a firm as the unit of analysis have not been able to identify growth through a portfolio of firms as one way of growing⁴⁵. However, portfolio entrepreneurship appears to be more common than suspected, and that it is characteristic of entrepreneurs who own and manage growth firms⁴⁶. Growth through portfolios of firms does not seem to be an alternative to growing a single firm, but entrepreneurs leading rapidly growing firms tend more often to start subsidiaries and independent new firms and to grow these firms⁴⁷. Small business growth through geographic expansion is a challenging growth strategy, as during the course of opening a new geographical site an entrepreneur will confront the task of managing an existing business and a start-up at the same time⁴⁸.

Multiple entrepreneurship can offer an alternative approach to understand the mechanisms of business growth at the local and regional level. It can thus be an important element in regional economic development. Little attention has been paid to multiple business ownership as a mechanism for growth⁴⁹. There is some evidence that entrepreneurs of high-growth firms are often linked to a high rate of multiple ownership⁵⁰. Multiple business creation has been found to be an important way of reaching the owner-manager's growth objective⁵¹. In addition, habitual entrepreneurship is more common in settings where opportunities for growth are restricted⁵². In this case, entrepreneurs may substitute the growth of one venture with the creation of multiple firms.

Growth patterns

Traditionally the processes of growth have been described by using organizational life cycle or stage models, covering the life span of an organization⁵³. However, organizational life cycle models have been criticized because of their extreme simplification of reality. More recently, research on firm growth has increased our understanding of different growth patterns. Previous research has suggested that the paths to growth can differ systematically by firm-level factors⁵⁴. In fact, already in the late fifties Penrose (1959) presented the view that a firm's growth pattern is related to characteristics of the firm and its environments⁵⁵. It is probable that different growth patterns have different implications for management and possibly also for the long-term performance of the firm⁵⁶. Because research on the phenomenon is still scanty in the SME context, it is important to explore SME growth patterns.

There is no a typical growth firm but many different types of growth firms. Growth firms do not grow in the same way but have different growth patterns. Growth patterns differ in pace, content and regularity.

⁴³ See e.g. Davidsson & Delmar 1998.

⁴⁴ Barringer and Greening 1998.

⁴⁵ See Scott & Rosa 1996.

⁴⁶ Pasanen 2003.

⁴⁷ Wiklund 1998: 239.

⁴⁸ Barringer & Greening 1998.

⁴⁹ Scott and Rosa 1996.

⁵⁰ Storey et al. 1987.

⁵¹ Donkels et al. 1987: 48.

⁵² Kolvereid and Bullvåg 1993: 8; Carter 1998.

⁵³ E.g. Greiner 1972; Churchill & Lewis 1983; Scott & Bruce 1987; Kazanjian 1988.

⁵⁴ Fisher & Reuber 2003; Delmar & Davidsson 1998.

⁵⁵ See Delmar et al. 2003; also Stinchcombe 1965.

⁵⁶ Delmar et al. 2003.

However, when different aspects of growth are combined systematically, a finite number of empirically distinct and conceptually meaningful growth patterns can be identified. “*How firms grow*” is systematically related to characteristics of the firms and their environments: such as their age, size, and industry affiliation. There appears to be some type of order how a firm grows, and therefore, a potential for gaining a deeper understanding of the growth pattern.⁵⁷

As there are different types of high-growth firms, showing markedly different growth patterns and background characteristics, the forms of growth may have different determinants and effects.⁵⁸ For example, firms’ marketing and financial capabilities have been found to have a positive association with market expansion and innovation⁵⁹.

However, it has been found that controlling for location and performance, the high-growth small firms experience similar management challenges regardless of the specific firm size, revenue level, or industry⁶⁰. The results challenge the “received wisdom” that suggests the managerial challenges faced by small firms during their business growth and development always vary.

Firms that grow organically will show a smoother growth pattern over time compared to firms that grow mainly through acquisitions⁶¹. The organic growth should be more associated with smaller firms, younger firms, and emerging industries whereas acquisition growth is more likely in older and larger firms, and in mature industries⁶². Some support for such relationships is found in a few empirical studies⁶³.

What are the factors positively affecting growth?

To date, a number of studies have dealt with firm growth, indicating that a huge number of factors seem to be associated with firm growth⁶⁴. There is substantial heterogeneity in a number of factors associated with firm growth⁶⁵. However, there is no comprehensive theory to explain which firms will grow or how they grow. Indeed, there is still not much of a common body of well-founded knowledge about the causes, effects or processes of growth⁶⁶.

Although several determinants of firm growth have been suggested, researchers have been unable to achieve a consensus regarding the factors leading to firm growth⁶⁷. Moreover, the findings of previous studies of such factors have been contradictory to some extent. In fact, no particularly strong explanatory factors have been identified⁶⁸. Attempts to build models for predicting the future growth of a firm, i.e. “picking winners,” have not been particularly successful. Therefore, it has been argued that still only little is known about SME growth⁶⁹.

⁵⁷ Ibid.; Brush, Ceru & Blackburn 2009.

⁵⁸ Delmar et al. 2003.

⁵⁹ Barbero, Casillas & Feldman 2011.

⁶⁰ Chan et al. 2006.

⁶¹ Penrose 1959.

⁶² Ibid.

⁶³ Levie 1997; Wiklund & Davidsson 1999.

⁶⁴ E.g. Dobbs & Hamilton 2007; O’Regan et al. 2006; Delmar et al. 2003; Davidsson et al. 2002; Wiklund 1998.

⁶⁵ Delmar et al. 2003.

⁶⁶ Davidsson & Wiklund 2000.

⁶⁷ Weinzimmer 2000.

⁶⁸ Gibb & Davies 1990; Gibb 1997; Pistrui et al. 1997; Poutziouris et al. 1999.

⁶⁹ Wiklund et al. 2009; Leitch, Hill & Neergaard 2010; Wright & Stigliani 2012.

Several classifications of factors affecting firm growth and various explanatory approaches have been presented. The general preconditions for growth have been suggested to be:

1. Entrepreneur's growth orientation
2. Adequate firm resources for growth, and
3. The existence of the market opportunity for growth

Factors explaining the growth have been grouped into four main types of approach:⁷⁰

1. Personality-dominated approaches, which explore the impact of personality and capability on growth, including the entrepreneur's personal goals and strategic business aspirations⁷¹
2. Firm development approaches, which seek to characterize the growth pattern of the firm across stages of development and the influence of factors affecting growth process⁷²
3. Business management approaches, which pay attention to the importance of business skills and the role of functional management, planning, control and formal strategic orientation in terms of shaping the growth and performance of the firm in the marketplace⁷³, and
4. Sectoral and broader market-led approaches which focus largely on the identification of growth constraints and opportunities relating to small firm growth in the context of regional development or the development of specific industrial sectors such as high-technology small firms⁷⁴

There are three key influences on the growth rate of a small independent firm⁷⁵:

1. The background and access to resources of the entrepreneur(s)
2. The firm itself
3. The strategic decisions taken by the firm once it is trading

The most important factors associated with an entrepreneur are motivation, education, management experience, and the firm having more than a single owner. Concerning firm, its age and size, sectoral affiliation, legal form, and location affect the growth. The growth of the smallest and youngest firms is the most rapid. The most important strategic factors are shared ownership, technological sophistication, an ability to identify market niches and introduce new products, and an ability to build an efficient management team. These three components need to be combined appropriately for achieving the growth⁷⁶.

There are four identified categories of small business growth factors, namely, management strategies; characteristics of the entrepreneur; environmental/industry specific factors; and the characteristics of the firm⁷⁷. Concerning *management strategies*, the most important factors associated with growth are growth objective, employee recruitment and development, product market development, financial resources, internationalization and business collaboration, and flexibility. The most important factors associated with the *characteristics of the entrepreneur* are motivation, education, experience, and size of the founding team. *Environmental/industry specific factors* refer to firm-external forces constraining the growth and providing opportunities for growth. It is claimed that the choice of environment is more critical to growth than strategic

⁷⁰ Gibb & Davies 1990: 16-17; Gibb 1997: 2-3; Pistrui et al. 1997; Poutziouris et al. 1999.

⁷¹ E.g. Chell & Haworth 1991; 1992.

⁷² E.g. Scott & Bruce 1987.

⁷³ E.g. Bamberger 1989; 1983.

⁷⁴ E.g. Smallbone et al. 1999.

⁷⁵ Storey 1994: 158.

⁷⁶ Ibid.

⁷⁷ Smallbone & Wyr 2000.

choices concerning behaviour within that environment⁷⁸. Concerning the *characteristics of the firm*, age and size are the main factors explaining firm growth.

It is suggested that approaches to the study of small business growth can be divided into six broad groups: stochastic; descriptive; evolutionary; resource-based; learning; and deterministic⁷⁹. Stochastic models of firm growth suggest that there are a large number of factors affecting growth and thus explaining the absence of any dominant theory⁸⁰. Descriptive approach refers to stage of development models, which not attempt to explain what causes a firm growth, but rather they are concerned with how a small business adapts internally in order to continue its growth. In the evolutionary models, the growth of a firm over a period is contingent on the interaction of a number of internal and external forces, and therefore the nature and timing of a firm's growth will be a resultant of its own unique circumstances. In the resource-based approach, growth depends on the managerial resources available, especially on the strategic capability of small firm founders to identify opportunities for growth. Concerning the learning approach, the growth path of each firm will mirror to some extent the dynamics of learning within the business. In the deterministic approach, the objective is to identify a stable set of explanatory variables, relating to the people, the firm, and its industry environment, that can explain a major proportion of the observed variation in business growth rates.

Strategy is claimed to be the most important determinant of firm growth⁸¹. It has been found that some business strategies and growth outcomes are interlinked. It is also found that high growth firms compete largely based on price⁸². It was concluded that high growth firms place a greater emphasis on external drivers such as strategic orientation, their operating environment and the use of e-commerce compared with firms having static or declining sales⁸³. However, the findings regarding the relationship of business strategy and firm growth have been contradictory⁸⁴. It is worth noting that a firm may lose its original competitive advantage because of high-growth, e.g. when a small firm grows into medium-sized firm. Managing growth is a major strategic issue for a growing firm⁸⁵.

In addition to the importance of favorable firm-internal conditions, the strategies should be in harmony with the environmental conditions. Different growth environments may require different business strategies for SMEs. For instance, for small manufacturing firms, different growth environments have required distinctly different strategies⁸⁶. Interestingly, this was contrary to the findings concerning large companies. It was concluded that strategic flexibility is a critical requirement for small firms⁸⁷.

Strategic orientations, such as market orientation⁸⁸, entrepreneurial orientation⁸⁹, learning orientation⁹⁰, and brand orientation⁹¹ have been used in explaining business performance. Strategic orientations represent the broad strategic choices firms make⁹². In the SME context, the entrepreneurial orientation is claimed to have an effect on business growth⁹³. Moreover, the growing SMEs are found to be more market oriented and brand

⁷⁸ Hawawini et al. 2002; O'Gorman 2001.

⁷⁹ Dobbs & Hamilton 2007.

⁸⁰ McMahon 1998.

⁸¹ Weinzimmer 2000.

⁸² O'Regan et al. 2006.

⁸³ Ibid.

⁸⁴ See e.g. Gilbert et al. 2006.

⁸⁵ See e.g. Arbaugh & Camp 2000.

⁸⁶ Chaganti 1987.

⁸⁷ Ibid.

⁸⁸ E.g. Narver & Slater 1990; Jaworski & Kohli, 1993.

⁸⁹ E.g. Li et al. 2008.

⁹⁰ E.g. Baker and Sinkula, 1999.

⁹¹ E.g. Baumgarth, 2010; Wong & Merrilees 2008.

⁹² Gatignon & Xuereb 1997.

⁹³ Wiklund et al. 2009.

oriented than stable or declining SMEs⁹⁴. Most recently, in a multigroup analysis it was examined how different strategic orientations simultaneously affect business growth in the SME context⁹⁵. The entrepreneurial orientation, market orientation and brand orientation had a positive effect on business growth in SMEs through brand and market performance⁹⁶.

Growth motivation: In SMEs, growth objectives are often bound up with the owner-manager's personal goals⁹⁷, and so it is important that they support each other. Much has been written about the importance of the entrepreneur's growth motivation⁹⁸. The close connection between an owner-manager and the firm is the dominant characteristic of small firms⁹⁹. Instead of profit maximization or growth, a firm's primary goal may be the entrepreneur's independence or self-realization¹⁰⁰. Moreover, there may be no adequate resources for growth, or the expected increase in business risks may limit a firm's growth willingness. However, aversion to growth has been said to be the principal reason why most SMEs stagnate and decline¹⁰¹.

An entrepreneurial team is often characterized as two or more individuals with equity interest jointly launching and actively participating in a business¹⁰². Moreover, in the definitions of an entrepreneurial team, the team members' key role in the strategic decision making of the firm¹⁰³, and the team members' active participation in the development of the enterprise¹⁰⁴ are emphasized.

Research has revealed the importance of entrepreneurial teams for firm performance and growth¹⁰⁵. Several empirical studies have revealed that firms founded and managed by teams are on average more successful than firms founded and managed by single persons are¹⁰⁶. Firms that have a diverse range of management skills and competencies, i.e. a large number of management functions covered by individuals in the team, have a significantly greater propensity to survive¹⁰⁷. Moreover, the importance for the growth rate of a small independent firm of shared ownership and an ability to build an efficient management team has been highlighted¹⁰⁸.

Determinants of small business growth based on the summary of 34 studies carried out in 1995–2005, are as follows¹⁰⁹.

- entrepreneurial motivation and commitment to growth
- owner/manager education
- industry experience of founder
- age of owner/manager
- founder's human capital
- founding team/management team

⁹⁴ Reijonen et al. 2012.

⁹⁵ Laukkanen et al. 2013.

⁹⁶ Ibid.

⁹⁷ E.g. Jennings & Beaver 1997.

⁹⁸ E.g. Perren 2000; Davidsson 1991; Miner 1990.

⁹⁹ Vesalainen 1995: 18.

¹⁰⁰ See e.g. Foley & Green 1989.

¹⁰¹ Clark et al. 2001.

¹⁰² Kamm et al. 1990; Watson et al. 1995.

¹⁰³ Ucbasaran et al. 2003.

¹⁰⁴ Cooney 2005.

¹⁰⁵ See e.g. Birley & Stockley 2000; Cooper & Daily 1997; Weinzimmer 1997; Eisenhardt & Schoonhoven 1990; Vyakarnam & Handelberg 2005.

¹⁰⁶ Lechler 2001; Rosa & Scott 1999; Vyakarnam et al. 1999.

¹⁰⁷ Westhead et al. 1995.

¹⁰⁸ Storey 1994: 158.

¹⁰⁹ Dobbs & Hamilton 2007.

- firm age
- firm size
- number of technical staff
- legal form
- mission statement
- information management
- marketing methods
- customer knowledge and closeness to customer
- differentiation
- active learning orientation, research & development, and innovation
- availability of external finance and internal finance
- strategic planning and management, business strategies, and use of business plan
- leadership styles
- management systems
- market growth, product/market development
- location
- foreign subsidiaries
- networks
- patenting
- industry sector, industry structure
- institutional/environmental determinants, favorable environment
- economic fluctuations

Several differences between growth and non-growth small firms were found in a recent multiple case study¹¹⁰. It revealed that the owner-managers of growth firms had growth ambitions and positive and opportunistic worldview, whereas the owner-managers in non-growth firms were characterized as 'lifestylers', internally oriented and they had negative and deterministic worldview. Growth firms were more adaptable, proactive and innovative, whereas non-growth firms were more traditional, less adaptable and they had low levels of innovation and technological sophistication. Learning in growth firms were based on extensive professional networks, experimental learning, and strong staff training and development. All portfolio entrepreneurs were the owner-managers of the growth firms. Non-growth firms had less professional networks, little training and development of staff, and they were less open to learning.

How do rapid-growth firms differ from slow-growth firms?

SMEs differ from each other in their pace of growth. High-growth, rapid-growth, or fast-growth firms have gained a special attention in comparison with slow-growth firms. However, number of definitions have been used to identify these firms, and therefore the results are not comparable with each other. The most recent research has investigated the future performance of rapid-growth firms¹¹¹, indicating that the period of high-growth is short, very rarely exceeding three years¹¹².

It has been found that rapid-growth firms differ from their slow-growth counterparts on a number of important dimensions (Figure 3). The founders of rapid-growth firms are better educated, have a more compelling entrepreneurial story (or motivation to be an entrepreneur), and have a higher incidence of prior

¹¹⁰ Hansen & Hamilton 2011.

¹¹¹ E.g. Senderovitz, Klyver & Steffens 2016.

¹¹² E.g. Parker, Storey & Witteloostuijn 2010.

industry experience compared to founders of slow-growth firms. Rapid-growth firms have a stronger commitment to growth, are more involved in inter-organizational relationships, and utilize a growth-oriented mission statement largely than slow-growth firms. Rapid-growth firms add more unique value and have a deeper level of customer knowledge than slow-growth firms have. Moreover, rapid-growth firms emphasize training, employee development, financial incentives, and stock options largely than their slow-growth counterparts.

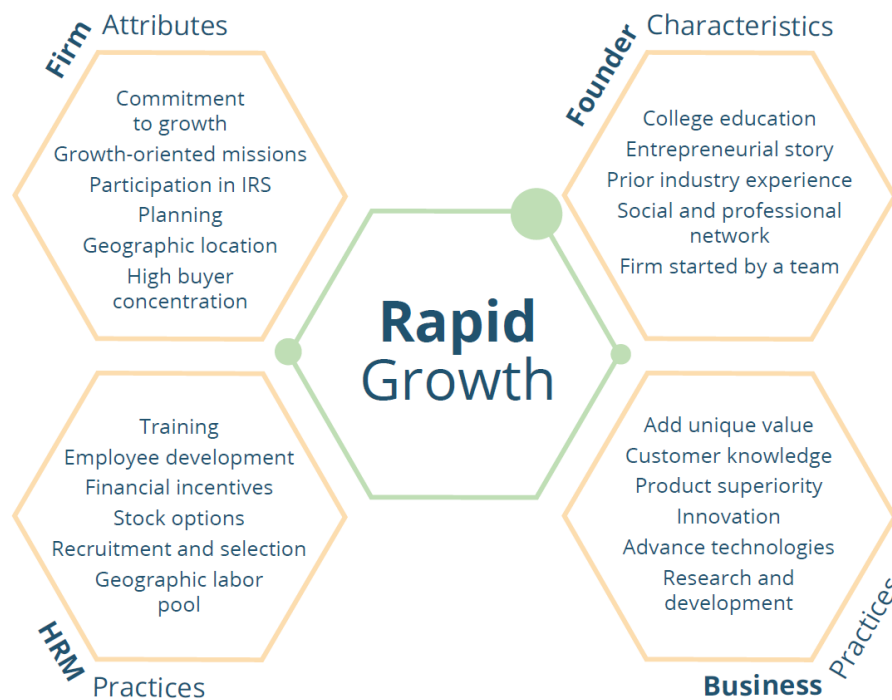


Figure 3. Key attributes that differentiate rapid-growth firms from slow-growth firms¹¹³.

What are the factors negatively affecting growth?

Growth can happen only if there are no growth barriers. Such barriers can be related to firm-internal and firm-external factors¹¹⁴. Sectoral and broader market-led approaches have focused largely on the identification of growth constraints and opportunities. In the literature, the most commonly reported factors adversely affecting the small firm growth are lack of financing, lack of management skills, market challenges, and institutional regulation¹¹⁵. However, obstacles to growth may vary e.g. from country to country and region to region depending on the business environment. Moreover, it has been found, for instance, that economic fluctuations strongly affect the growth probability of small firms¹¹⁶.

Financial barriers seem to be the most common barrier to small firm growth¹¹⁷. The firm-internal factors affecting unwillingness to grow include the entrepreneur's fear of losing her or his autonomy, difficulties in

¹¹³ Modified from Barringer et al. 2005.

¹¹⁴ See e.g. Barber et al. 1989; Smallbone & North 1999; Vaessen & Keeble 1995; Jones-Evans 1996; Vesper 1990: 174-175; Hay & Kamshad 1994.

¹¹⁵ E.g. Gill & Biger 2012.

¹¹⁶ Kangasharju 2000.

¹¹⁷ E.g. Gill & Biger 2012.

fitting together personal and the firm's goals, and weak managerial or marketing skills¹¹⁸. Market challenges like stiff competition may hinder firm growth. For firm growth, it seems that aiming at growing market niches is more important than taking market shares from competitors¹¹⁹. However, we also have evidence on high-growth SMEs in the context of declining industries¹²⁰. It is also reported about institutional growth barriers and constraints caused by regulation of certain sectors of the economy, taxation, wage-setting institutions, and labor market legislation¹²¹.

The growth barriers characteristic of small firms in peripheral locations have been identified in earlier research¹²². For example, venture capital availability is more limited, as are opportunities for small firm expansion based upon local and regional markets. Peripheral economies dominated by large firms may not provide an ideal source of labour for small firms. The supply of managerial and organizational skills is restricted, firms are more vertically integrated, and the lack of specialization reduces competitiveness and the rate of growth of local firms. The lower rates of innovation may also cause technical impediments.

In the study carried out by the Cambridge Small Business Research Centre¹²³, the most common growth barriers were related to factors on the macro level. The most important growth barriers were related to difficulties in obtaining finance and the price of money, the level of and decrease in demand¹²⁴, and tightening competition¹²⁵. Other growth barriers were caused by restrictions determined by authorities, problems in obtaining a skilled workforce, and the small number or lack of potential cooperation collaborates in the area. It has been also found that the lack of science base, lack of mechanisms for technology transfer, lack of density of networks, and lack of entrepreneurial climate are negatively affecting business growth¹²⁶.

In the study of the socio-economic impacts of low population density, peripherality and cold climate in the northern regions of Sweden and in northern and eastern regions of Finland, several factors potentially restricting firm growth were reported¹²⁷. Firms operating in sparsely populated areas and locating far away from their main market areas are often suffering from costs to compensate for the lack of modern logistics systems, additional costs for the lack of business networks and the lack of innovative milieus, extra costs for diseconomies of scale and for the lack of the critical mass, and extra costs for the lack of specialised business-related service sectors (such as banking, lawyers, tax advisers, translation services).

¹¹⁸ See also MacNabb 1995; Perren 2000.

¹¹⁹ Wiklund 1998.

¹²⁰ Bamiatzi & Kirchmaier 2014.

¹²¹ Davidsson and Henrekson 2002.

¹²² Birley and Westhead 1990, 538.

¹²³ Cambridge Small Business Research Centre 1992.

¹²⁴ Also Perren 2000.

¹²⁵ Also Hay & Kamshad 1994.

¹²⁶ E.g. Carlsson 2002.

¹²⁷ Gløersen, Dubois, Copus & Schürmann 2005.

Baseline: a business growth survey for renewable energy and energy storage businesses

The GREBE project launched a survey between April and September 2016 to gather information and have better understanding of the relevance of Business Growth Strategies especially in the field of renewable energy, energy storage and related business sectors. The information gathered transnationally from 6 countries and 70 business enterprises establishes a baseline for interpreting growth issues in northern peripheral context of this specific sector. The survey had three language versions: English (covering Ireland, N-Ireland, Scotland and Iceland), Finnish and Norwegian. We asked Managing Directors/CEOs to consider the relevance of several factors for their business growth and let us know if there were any current or emerging support needs related to them. This section presents the baseline information of the enterprises attending the survey, as well as information on how relevant entrepreneurs saw different preconditions for their business growth. The open answers, as well as information gathered directly from companies and other sources, are used in interpreting the business growth theory in renewable energy (RE) and energy storage sectors, and at the end, in establishing the growth strategy guidelines.

Survey respondents

The survey respondents (n. 70) represented mainly micro- and small-scale enterprises in renewable energy and energy storage sectors in GREBE project areas (Figure 4). The survey response rate was approximately 18 %; however, delivery in Norway did not result replies as expected. The sample is indicative for the sector, as there is some regional imbalance, and total number of the replies remains rather low. The pattern of replies (e.g. concerning the preconditions for growth) remained the same through the survey period, which indicates for results being consistent for despite 5 months survey period. Therefore, we assume that growth strategy issues are not very sensitive in terms of period of replies, but are more generic, related to entrepreneur characteristics, and strategic orientations of the firm, for instance.

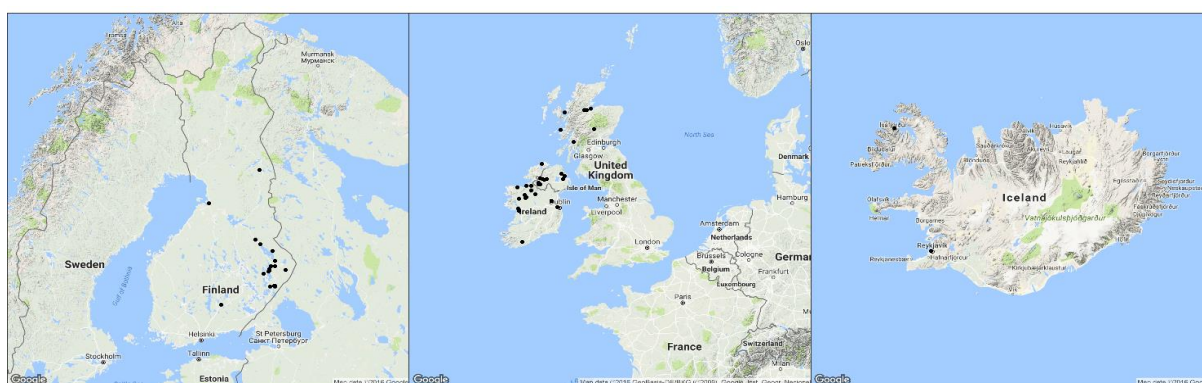


Figure 4. Locations of the respondents in Finland (26), N-Ireland (10), Ireland (16), Scotland (9), Iceland (8) and Norway (1).

The business enterprises attending were mostly micro- and small-scale, as the GREBE target groups (Figure 5). However, the survey received also some attention among medium- and large-scale enterprises, as some entrepreneurs were involved in them. However, this provided some examples of inorganic strategies more typical in large enterprises. The business sectors included a variety of energy-related subsectors, including renewable energy production, energy efficiency, energy services, technology manufacturing and others (such as real estate management, consultation, ICT, Biotech, community enterprises, forest management and design

services) (Figure 6). In some enterprises, especially in category “others”, energy was additional business activity supporting the main business.

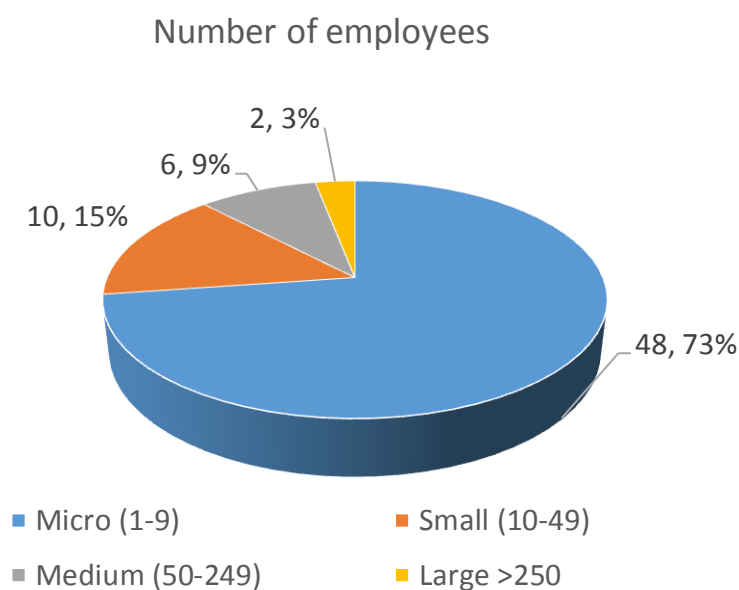


Figure 5. Number of employees in enterprises attending the survey.

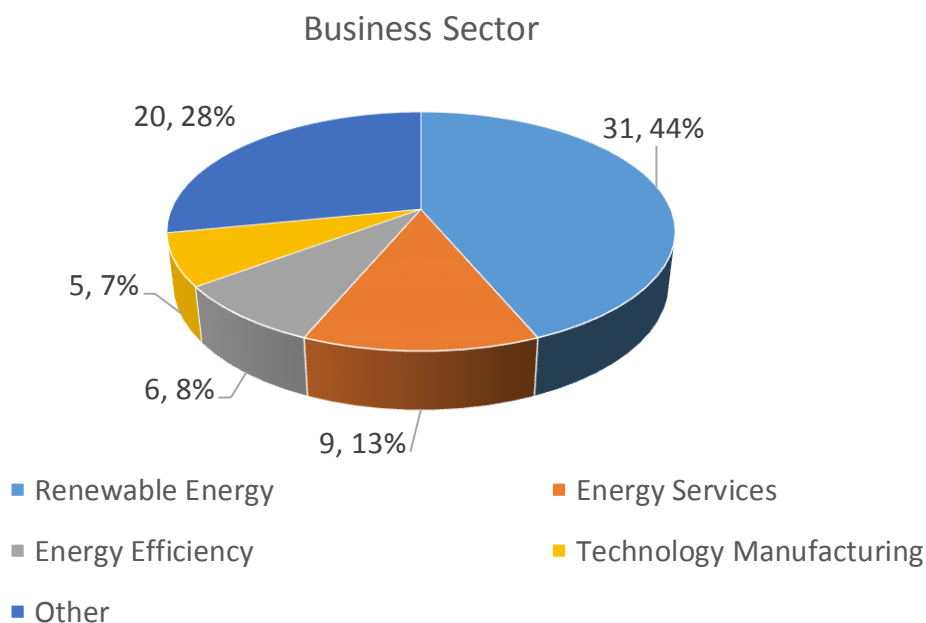


Figure 6. Business sectors of enterprises attending the survey.

Background data of the survey is presented in Table 1. The median business establishment year was 2007, but this had variation per country. In Scotland, median (Q2 in Table 1) was 1999 and in Finland 2002, indicating for more mature sector compared to Ireland (2007), Northern Ireland (2010), and Iceland (2009). In Scotland, firms were mostly community enterprises that might explain the difference to the rest of the U.K.

Respondents were mostly male and average birth year was 1969. Business turnover median was 0.354 million euros, average was up to 4.9 million euros due to couple large enterprises attending the survey.

Table 1. Background variables.

	Average	Q1 25th percentile	Q2 50th percentile	Q3 75th percentile
The year business established	1998	1994	2007	2012
Firm age	18	4	9	22
Respondent gender (Male/Female)	M:84,3% F:15,7%			
Respondent birth year	1969	1961	1968	1977
Turnover (million euro)	4.932	0.088	0.354	1.500

The data indicates that entrepreneurial teams are common in the sector, as over half of the companies had several owners, and many entrepreneurs were involved in other enterprises (Table 2). Entrepreneurs had varying background experiences: some had earlier experience as entrepreneur, some had been working in other enterprises in sector, and some had recently started as entrepreneurs.

Table 2. Ownerships and management of the enterprises attending the survey.

Ownerships & management	
Several owners	51,4 %
Involvement in other enterprises	34,3%

Actual growth and growth orientation

The business enterprises attending have experienced growth during the last three years (Table 3). The growth took place mostly as increase of the sales volume and number of employees. The growth pattern had some country-specific differences: in Finland employment increased less and sales volume increased more than in U.K.

Table 3. Actual growth during the last three years in terms of four growth measures

Actual growth (n. 49)	
Number of employees	59,2%
Sales volume (number of products/services sold)	77,6%
Market share	46,9%
Profits	36,7%

The companies attending the survey were growth oriented (Figure 7). This can result of both survey delivery methods as it was directly recommended for GREBE project target groups, as well as sector specific factor. Companies not aiming for growth included community enterprises, companies still involved in technology development stage, and self-employed consultants/service providers. The growth-oriented companies responded also to the questions concerning different preconditions for their business growth.

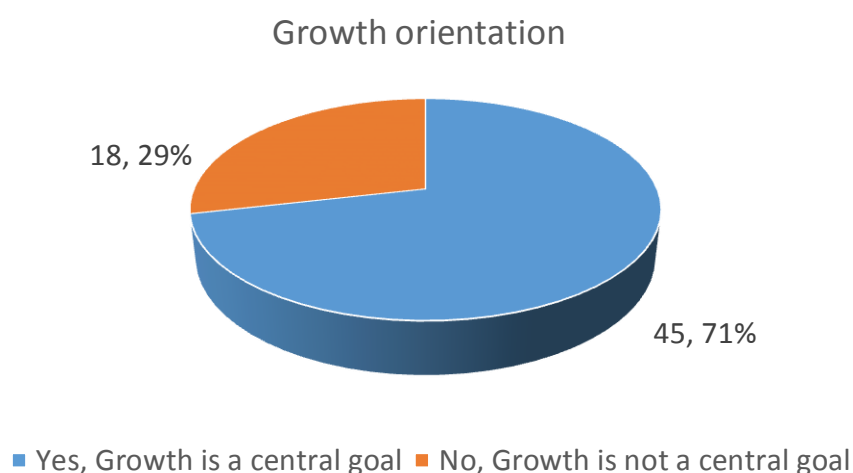


Figure 7. Growth orientation

Preconditions for the business growth

The respondents from growth-oriented firms were requested to consider the significance of several preconditions for the growth of their business enterprise. The main themes included:

1. Management and growth orientation
2. Financial resources
3. Personnel
4. Markets
5. Market knowledge
6. Co-operation partners
7. Production processes
8. Technologies

9. Product development
10. Service development
11. Sales and distribution channels
12. Location and climate
13. Other preconditions

The survey provided 3-5 statements in each main theme and respondents expressed if they agreed or disagreed with them, or if the statement was not relevant for them (Figure 8). The highest values were given in themes “management and growth orientation”, “technologies”, “market knowledge” and “production processes”. Lowest values were in “other preconditions” (including also some inorganic strategy related statements), “financial resources” and “location and climate”. The results indicate that financial resources and location are causing limitations for the business growth; social media and online trade are issues dividing the respondents: about 23% of business enterprises considered them as very important precondition even if the average remained low. Statements based on organic growth strategies (firm-internal growth) resulted higher values than those based on inorganic strategies (firm external) or so called acquisition-growth.

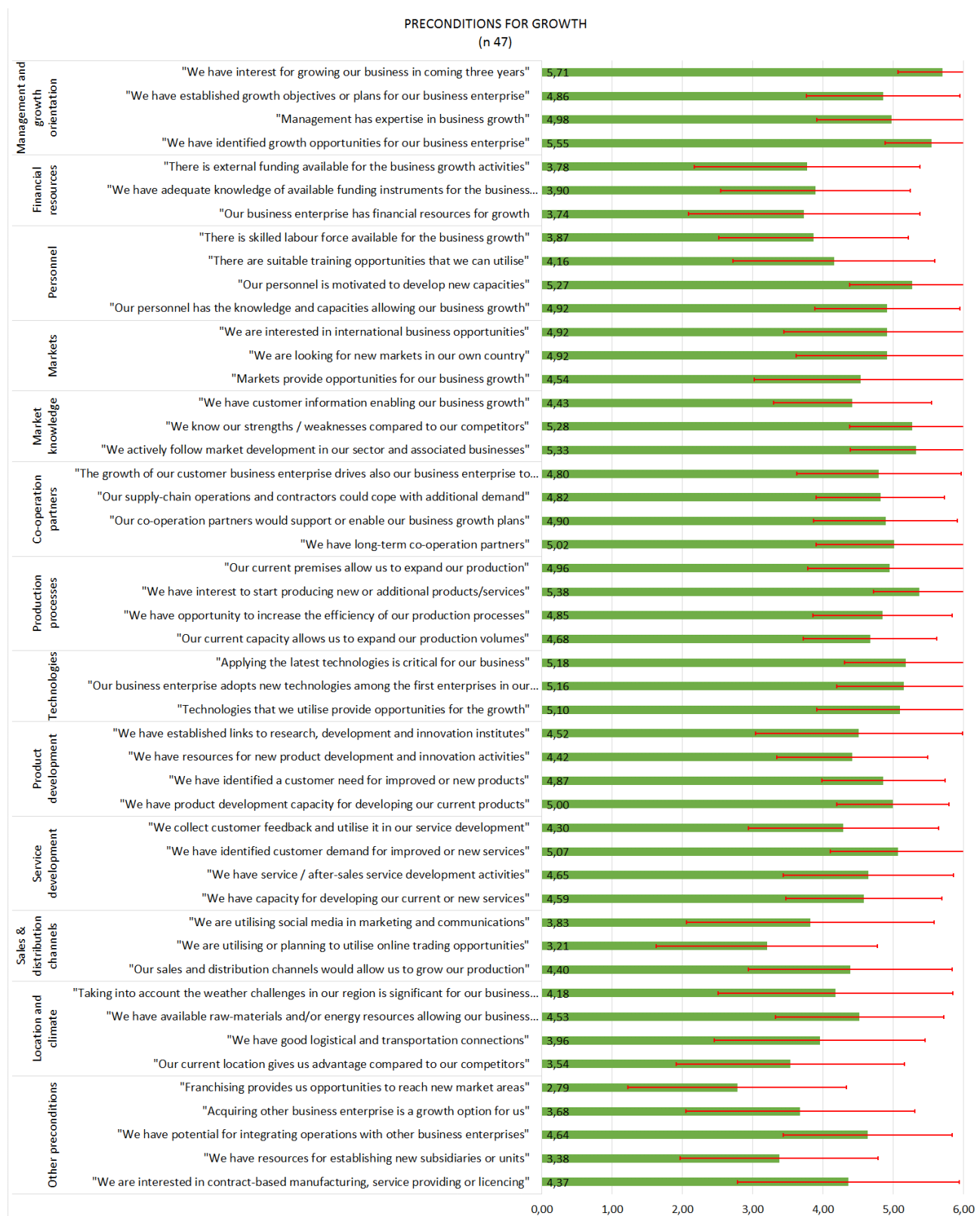


Figure 8. Preconditions for the business growth. The graph presents average and standard deviation values.

Identified business support needs

The results concerning the business support needs are presented in Figure 9. The highest support needs were in reaching new markets, finding resources for growth, developing the business strategy and finding partners and cooperation with other enterprises. Entrepreneurs had typically several support needs each. Open answers included support needs for internationalization: either exporting own products or sourcing international suppliers. In addition, support was needed for improving the quality, and obtaining suitable funding for the business growth.

One respondent stated it as follows: *“somebody to come and see what we do and offer us information on what is available in supports and grants”*.



Figure 9. Identified business support needs.

The business support needs identified will be utilised in developing the GREBE project service, Entrepreneurship Enabler Scheme, offering tailored mentoring for business enterprises in renewable energy and energy storage sectors.

Organic growth strategies in renewable energy and energy storage

New types of business models

The energy business model include 1) the business architecture for product/service flows (i.e., establishing the renewable energy system, and defining ownership and responsibilities between all stakeholders involved), and 2) establishing the earning logics (i.e., strategies for generating and maintaining profitable and sustainable business operations¹²⁸).

The business often involves many interlinked stakeholders and the utilization of *place-based opportunities* (e.g., available energy resources, integration with other industries or available partnerships).

For instance, in the district heating, the ownership practices of the energy plants tend to vary between the public and private, which affects risk sharing. The basic models of ownership have been categorized as ownership by the customer (i.e., procurer), by the entrepreneur/enterprise (i.e., supplier), or as shared ownership¹²⁹. The investor and the initial owner can also be temporary, such as in ESCo (Energy Saving Concept), and the customer receives the investment after the payback.

Examples of new types of business models in GREBE growth strategy survey included:

- ICT services for the RE industry, such as Protacon solution (The Once System) for management and reporting of energy production and fuel deliveries. Information produced in the fuel supply chain enables better calculation of fuel efficiency rates, as well as comparison of costs.¹³⁰
- Market solutions for supplying renewable energy, such as Farm Power by Oulun Energia Ltd. providing local energy from Finnish small-scale producers. Farm Power electricity is generated using micro and small scale generating plants used principally for generating electricity for the producers' own needs. When generation capacity exceeds the producer's own demand, electricity is sold to the grid.
- Solutions for resource estimation and trading, e.g. Norwegian start-up, Aquiloz¹³¹, providing Wind Power Prediction & Trading Information system for wind park owners and grid operators.
- Social enterprises (SE), operating especially in the community RE sector in Scotland. SE can serve a social purpose and invest in its own operation, but it can also operate as a funding provider for other selected purposes, such as development of community renewables, community development, and providing loans for other business development located in the community. The innovativeness of the model is in potential socio-economic benefits and re-investment strategies.

Management and quality assurance

Improving the management and quality assurance is identified as a sub strategy, including activities of gradually improving the business processes and thus obtaining good reputation.

The quality assurance included following activities:

- Increasing reputation and profile through service quality
- Validating quality through ISO 14001 certification

¹²⁸ Okkonen & Suhonen 2010

¹²⁹ Ibid.

¹³⁰ Protacon 2016.

¹³¹ Aquiloz 2016.

- Business process auditing
- Qualifications of personnel
- Lean approach and efficiency in process management
- Obtaining industry award

Some entrepreneurs expressed also importance of active stakeholder cooperation and policy informing activities to reduce or remove market barriers.

Product and service innovations

Product and service innovations included:

- *New renewable energy, energy storage and infrastructure solutions*, such as
 - combined heat and power production plant in small-scale
 - mobile anaerobic digestion (AD) solution
 - hybrid energy solution (bio-solar)
 - new type of vanadium-redox flow battery
 - small-scale vertical-axis wind power solutions
 - electric vehicle charging
 - energy efficient / healthy building structures
 - manufacturing of recycling equipment (refuse derived fuel RDF machine construction)
 - Feeders, augers, components
 - Forest / bioenergy machinery
- *Product modulation*, i.e. by designing the production, the same structures can be utilised in several products and thus gain efficiency and material savings. This is applicable in manufacturing industries.
- *Industrial design* of existing products to make them more user-friendly and attractive; *design and brand-building* for companies in RE sector
- *Digital services* for monitoring and controlling energy systems

As the list above demonstrates, the RE and energy storage sector is heterogeneous and offers a great variety of new product and service development opportunities. In many cases, the technology readiness level was below nine, i.e. technology being in development stage, raising the importance of designing longer-term market-access strategy. Niche market opportunities can also be identified: in wind power these include solutions for exceptionally high or low winds, and for different market segments (households, public estates, industry)¹³², and foundations and sub structures for towers¹³³.

Existing Customers

Growth strategy basing on the existing customers, (and market areas), included activities as follows:

- *Increasing the scale* of operations:
 - establishing new RE generation sites / production unites
 - gradual increase of production (e.g. wood fuels) by increasing the stock levels
 - ensuring the access to the resource

¹³² Icewind 2016.

¹³³ OWEC Tower AS 2016.

- expanding the production facilities
- expanding the delivery networks (e.g. DH networks, sales networks)
- increasing the number of service / installation cases
- increasing sales of current products / services, e.g. through active branding and marketing, and efficiency of service delivery
- *Growing along the partners or main customers*
 - The firm growth is closely interlinked to main customer, and thus determined according its needs and demand (wood industry)

New customers and market segments

Organic growth strategies include growth based on new customers, market segments, target markets and geographic sites.

In GREBE growth strategy survey, we identified diverse combinations of business activities, as follows:

- Forest management, consultancy, biomass harvesting and supply and wind power production
- Warehousing and manufacturing of timber products, firewood
- Firewood production and smoking (BBQ) chips production
- Logistical services and material processing machinery
- Forest management machinery, harvesting machinery with different sub technologies
- Expertise services in bioenergy, waste water treatment, recycling, solar PV, energy storage
- Assembly, services and maintenance for electricity, antennas and telecommunication networks
- Supplying and installing energy efficient products; heat pumps, PV, energy efficient controls
- Waste treatment, biogas production, heat and power, recycled fertilizers

Diversification by offering new products and services in closely associated business sectors seems to be a growth option for enterprises in renewable energy. Often energy is additional business activity supporting the main business. In some cases, there were also tailored-solutions of heating, cooling, and energy efficiency for different market segments: small private customers, public sector and the industry.

Renewable energy provides opportunities for multiple products and services, as the example of Swedish Glommers Miljöenergi¹³⁴ indicates. The small-size enterprise, located in Glommersträsk, has business activities in wood pellet and reed canary grass briquette production and selling to domestic fuel and animal bedding markets, heat entrepreneurship based on biomass fuels, re-selling of biomass burners Janfire and EcoTec, research and development facilities and projects nationally and internationally, and rental of apartments.

¹³⁴ Glommers Miljöenergi 2016.



Figure 10. Reed canary Grass briquetting at Glommers Miljöenergi¹³⁵.

Renewable energy system can also support the growth through other business activities. In Scotland, the energy systems at Scroggie farm include Wind, Hydro (on and off grid), Solar PV, Solar Gain, Solar Thermal, Biomass, and an Electric Car. The demonstrated low carbon management through improved resource efficiency provides opportunities also for a new whisky product, GlenWyvis, branding for niche markets.¹³⁶



Figure 11. The energy system of Scroggie farm includes 11 kW wind power plant and an electric car, among other RE technologies.¹³⁷

¹³⁵ Karelia UAS 2011.

¹³⁶ The Flying Farmer 2016.

¹³⁷ GREBE Project 2016a.

An export-oriented strategy is described by a Finnish company, Pentin Paja Ltd. Pentinpaja produces forest machinery for both domestic and international markets. Products include felling heads, energy wood heads, stroke harvesters, and up rooters for versatile wood harvesting and young forest management. Finding new market areas through internationalization has been a growth strategy and products have been exported to over 30 countries. The Naarva product family offers equipment for base machines of all machine manufacturers: tractors, forestry machines, excavators and trucks. Therefore, Naarva products are used for various purposes, including energy wood harvesting, first thinning, removal of problem trees, cleaning of seedling stands, as well as for clearing of road shoulders and field edges. The example indicates the potential of exports also for a small-size enterprise. However, this strategy requires standardized products, creation of re-selling networks through long-term collaboration, as well as market knowledge.

The international cooperation was used also “vice-versa”: some companies found collaboration with international manufacturers and were re-sellers of the energy technologies for the domestic or local market. Strategies included both selling of own products to the international markets, as well as re-selling of other companies’ products to the domestic market. Product varieties were large, varying from burners and boilers, to chimneys, silos, augers to the small additional devices.

Synergies and integrations with other industries

Synergies and integrations, in growth strategy context, includes clustering where companies look for synergies through cooperation and allies. In Norway, Innovation Norway and sectoral renewable energy companies have established clusters with involvement of research institutions and local government agencies. “All together, 11 Centres for Environment-friendly Energy Research conduct focused and long-term research at a high international level, with the aims of solving specific environmental challenges. Strong regional cluster programs (ARENA and NCE – Norwegian Centres of Expertise) have been established, involving businesses, universities and the public. *Clusters* have been established for wind, smart grid and smart energy markets, clean water and maritime cleantech”¹³⁸. In Northern Sweden, Biofuel Region¹³⁹, is a coordinated cluster of public sector, the business community and research and development actors. Clusters can provide alliances and partnerships, but also enable firm-internal development processes as there is coordinated support present for instance in technology development or funding.

Local level cooperation includes informal networks between the entrepreneurs in the same or associated sectors. There are often long-term cooperation relationships, peering support, and higher level of trust than in regional, national or international levels¹⁴⁰, indicating also the invention potential. For instance in Pielinen Karelia, a network of metal industry SMEs has been successful in developing products and services for the mining and energy production, among others.

In industrial areas or *eco-industrial parks*, larger companies in the cluster can also serve as anchor tenants, i.e. provide support for and synergies for micro-scale and small enterprises¹⁴¹. This type of anchor-tenants were identified in Iceland, where geothermal industry technologies and by-product flows enable the development of spin-off enterprises in micro-binary generators utilising lower heat waters for combined heat and power. In addition, the industry provides significant waste and by-product resources that are utilised in other sectors. Iceland Resource Park¹⁴² includes a cluster based on geothermal, including economic activities of tourism destinations (Blue Lagoon), farming warm-water flat fish, traditional and health-related tourism, natural treatments for skin disorders, algae farming, eco-friendly cosmetics with active substances from the area, methanol from geothermal gas, hot and cold groundwater, steam, geothermal fluids, warm clean

¹³⁸ Innovation Norway 2016.

¹³⁹ Biofuel Region 2016.

¹⁴⁰ Sterr & Ott 2004.

¹⁴¹ Graedel & Allenby 2010.

¹⁴² Resource Park 2016a.

seawater, etc. Companies at the Resource Park are located in the neighbourhood of the geothermal plants and for symbioses providing opportunities for scientific research, inventions and the development of new products and services. There is also evidence of significant local socio-economic benefits, as it employs about 500 employees, has balanced the labour market fluctuations, and has significant growth expectations¹⁴³.

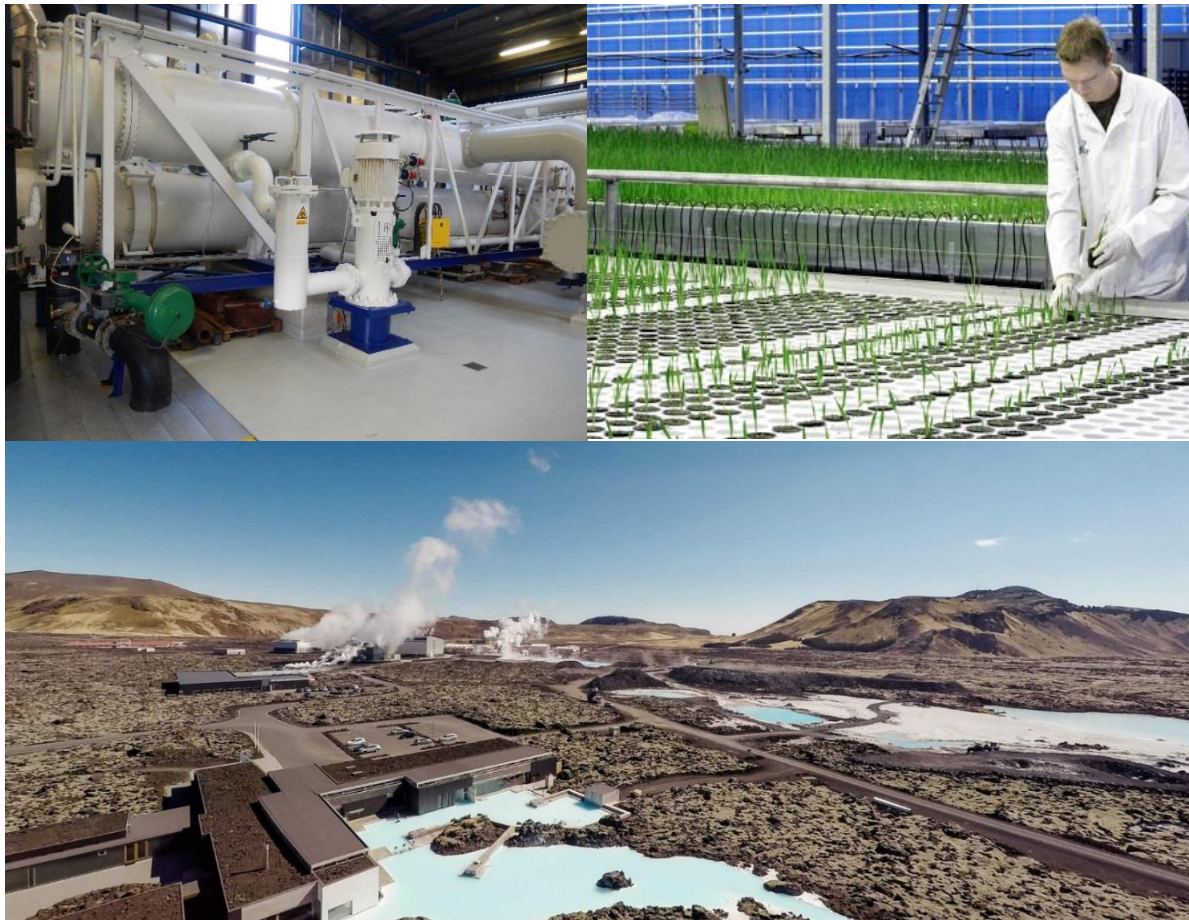


Figure 13. Iceland Resource Park is an industrial ecosystem offering synergies and opportunities for small business growth and new product developments.¹⁴⁴

Industrial symbioses are also present in other renewable energy industries, for instance forest-based bioenergy and biofuel production is often integrated with the forest industry, energy being a by-product. Industrial symbioses of Forssa¹⁴⁵, Finland, include food, enzyme, bioethanol, biogas, fertilisers, and construction and energy sectors, interlinked in a novel manner. Small and medium sized enterprises can utilise material flows and excess energy of the system, or provide services for larger enterprises.

Renewable energy and energy storage businesses can be interlinked or result as *spin-offs of other industrial sectors*. In Iceland, for instance, aluminium industry spin-off, Gerosion Ltd.¹⁴⁶, provides expertise and solutions for prevention of corrosion challenges in geothermal energy. In the forest-based bioenergy, pellet production industry is mostly based on the by-product flows of mechanical wood industry, and pyrolysis-oil production units can be integrated with combined heat and power of forest industry or power plants. Therefore, their growth is much dependent and even determined by the development of industries they are interlinked.

¹⁴³ Resource Park 2016b.

¹⁴⁴ Innovation Centre Iceland 2016; GREBE Project 2016a.

¹⁴⁵ Bright Green Project 2016.

¹⁴⁶ Gerosion 2016.

Strategic locations

A location strategy (in relation to firm's short-term and long-term goals) typically involves the following factors¹⁴⁷:

- Community, site and facilities
- Market access (including trade opportunities)
- Labor and resource availabilities (including also energy resources and supplies)
- Operating costs/ feasibilities associated with different locations
- Logistics, transportations, costs for the manufacturing and warehousing facilities
- Policies (political risks), regulation and incentives

Strategic location is case specific and requires careful consideration of several factors. Energy resources are often local (e.g. wind, biomass, geothermal, tidal), and transferring options limited (e.g. heat or power from isolated communities). In northern peripheral regions, transportation and logistics case often challenges, and policies and support mechanisms vary.¹⁴⁸ On the other hand, the region provides significant energy resources, and opportunities to operate in local niche markets. In addition, opportunities for developing technologies for specific conditions are evident (e.g. arctic conditions, high/low winds, available wave and tidal, isolated communities).

As an example of strategic location, a forest-biomass harvesting enterprise operating in North Karelia, Finland, has invested in new terminal site through a co-owned bioenergy enterprise. In addition, the company invested in new hall with facilities to provide service for timber trucks, harvesters and forwarders¹⁴⁹. Their location is strategic, as there is forthcoming investment in rail terminal, and planned industrial investment in biochar producing factory. These will likely result in significant transit traffic and demand for their new services. The strategy includes thus new market segments, strategic location, as well as business model involving several business activities (harvesting/forwarding, biomass fuel, heat production and machine maintenance).

¹⁴⁷ Reference for Business 2016.

¹⁴⁸ See e.g. GREBE 2016b.

¹⁴⁹ Karjalainen 2016.

Inorganic growth strategies

Inorganic growth strategies refer to the firm-external growth, such as acquisition of other companies, licensing or contracting for producing products for other enterprises and establishment of several enterprises (portfolio) and setting up networks between them. These strategies are more typical in medium- and large-scale. In renewable energy and energy storage, some examples were identified within this study.

Takeover or acquisition

Takeover or acquisition of other companies was present in the wood fuel industry, boiler manufacturing and biomass-based district heating. Larger energy companies can utilise horizontal integration and take over smaller fuel or heat producers that are their competitors (i.e. at the same level of value-addition), and thus reach greater market power. In biomass-based energy production, vertical integration means controlling the value network, from forest to the energy production and services. For instance, relying on the wood fuel supply requires increase in volumes and economies of scale, as vertical integration can provide opportunities of controlling fuel quality, but also receiving economic profits of added-value (as energy services), or diversification benefits (e.g. through boiler assemblies). Vertical integration and cooperation with other enterprises is often essential for securing the business profitability.



Figure 12. Forest biomass systems offer opportunities for vertical integration, i.e. controlling the whole value chain from fuel production to the energy services.¹⁵⁰

Motives for acquisition growth can also be need of synergies, restructuring, risk reduction, acquiring new knowledge and other necessary resources, overcoming barriers to entry, and entering new markets more quickly.

Joint ventures / strategic alliances

Joint ventures are used typically by larger energy companies to access new market areas via regional partner companies, or accessing technical expertise via ownership of the specific technology providing companies. Joint ventures have been used in Finland for establishment of wind power parks: partners of energy companies have had investment resources and objectives of carbon neutrality¹⁵¹, and access to the land resource¹⁵². In

¹⁵⁰ Karelina UAS 2014.

¹⁵¹ ST1 2016.

addition, joint ventures with foreign partners have been used in approaching new export markets for biochar, for instance¹⁵³.

Portfolio entrepreneurship

Portfolio entrepreneurship mean entrepreneurs involvement in several businesses, setting up net businesses and establishing networks between them. In the GREBE business growth survey, there were some portfolio entrepreneurs involved in larger number of businesses. About 33% were involved in other businesses and the number of businesses was 1-3, which in our experience is typical for growth enterprises. The businesses were other RE enterprises, or associated businesses, such as farming, forestry, real estates, and tourism. Therefore, portfolio entrepreneurship was not typical strategy for micro- and small-scale enterprises in this particular sector.

External conditions

Strategy development requires both knowledge of firm-internal issues and awareness of external growth conditions. The growth opportunities are often interlinked with the external conditions, i.e. changes in the firm's operational environments. Policy changes and economic support mechanisms can result to significant new market opportunities, and vice versa, their withdrawal results often in market decline. Market fluctuations, such as availability and price-levels of resources, competition from neighbouring markets (such as Russian biofuel trade and its impact on Finnish biofuel market), and development in other economic sectors, are often difficult to predict. In addition, technology development can provide new opportunities, or cause challenges for those being replaced (e.g. decentralised solutions causing challenges for centralised solutions).

¹⁵² Otsotuuli 2014.

¹⁵³ Tekniikka & Talous 2009.

Conclusion: guidelines for the business growth

Awareness of the business strategy

Business strategy has a key role in achieving the goals of the firm, and thus long-term performance, in particular, is much affected by the firm's strategy. In practice, however, the smaller the firm, the more likely it is that the entrepreneur has no time and skills enough for strategic planning. Moreover, often the effects of business strategies on firm performance appear in the longer run, and strategic issues are usually never as acute as operational issues.

Firm success is closely related to firm growth. Besides a business strategy, a growth-oriented firm needs a growth strategy. It is an important strategic decision for a firm whether or not to grow, and how to grow. Moreover, growth needs to advance a firm's strategy. As we know, without having a goal it is difficult to score. There are several ways to achieve the growth, following organic or inorganic growth strategies. Given the multifaceted nature of firm growth, several types of growth firms can be identified and learn from them.

Understanding both the benefits and challenges of the firm growth

Firm growth is important for firm survival and for the achievement of other goals of business. Growing firms are often regarded as the most successful firms. Growth symbolizes the vitality of the business and refers to the firm's ability to exploit the market opportunities. Growth can bring several benefits for the firm. Ensuring an adequate production volume for profitable business is important for new firms. By enlarging the firm's market-share growth can increase the firm's profitability. Growth also secure the continuity of business in the conditions of growing demand and it makes possible for the firm to achieve economies of scale. Growth can provide the firm first mover advantage or bring available new business opportunities. The firm's credibility in the market increases as a consequence of the growth. The growth of the firm leads to a higher net value of the firm and is therefore beneficial for firm owners in the case of ownership transfers, in particular.

However, there are also several challenges related to firm growth. The growth of the firm will take place only if the entrepreneur is motivated for firm growth, there are adequate resources for firm growth, and there is a market opportunity for growth. The entrepreneur should accept the risks related to firm growth. The firm should also have adequate finance for the growth. As managing growth is a major strategic issue for a growing firm, the firm should have adequate skills for managing growth. Moreover, obtaining a skilled workforce is a major challenge for many firms. Sometimes finding cooperation collaborates in the area enabling firm growth can be challenging. Recognizing the market opportunities can be challenging as the environment of the firm may change rapidly and in unpredictable way. On the other hand, changes in firm environment may provide new business opportunities for the firm. Institutional regulations may also cause challenges for firm growth. Moreover, for smaller firms and firms located in peripheral locations it can be more difficult to overcome these challenges. For a growing firm it is important to take care of the firm's competitive advantage during the growth period, e.g. when a small firm grows into medium-sized firm.

Identifying business growth potential and preconditions

For leveraging the business potential, it is important to recognize the growth opportunities available for the firm and be aware of different growth strategies. The value of the firm is largely determined by its growth potential. There are many ways to grow, and the growth can appear e.g. as a growth in sales turnover, employment, profits, assets, market share or physical output. However, the growth of the firm should not be an imperative, as growth is not always a necessary element of firm success.

To date, a huge number of factors potentially affecting firm growth seem to be associated with firm growth. There are factors related to the entrepreneur, the firm and its business strategy, and the environment of the firm. Regarding to the entrepreneur, key factors associated with firm growth seems to be growth motivation, education, experience, networks and team entrepreneurship. Firm resources, entrepreneurial orientation and proactiveness, strategy, planning, growth-orientation and commitment to growth, market-orientation and customer knowledge, RDI-orientation, and networks are positively affecting firm growth. Related to the existence of a market opportunity, favorable conditions such as an environment characterized by growing demand or central location may have an important impact on firm growth. However, the entrepreneur's interpretations and limited ability to see new business opportunities and the boundaries set by him/her may limit firm development more than the boundaries set by the external environment.

Defining growth strategies for the specific type of RE and/or energy storage business

Growth strategies are often applicable in different business sectors and types of businesses. In addition, several strategies can be used simultaneously. As generic growth strategies, improving the management, quality assurance of business operations, marketing and brand development, were present. In addition, other growth strategies discussed below can all have applications across the sector.

In *renewable energy production*, the economics of scale can be based e.g. on gradual increase of production volumes, establishment of new production units, growing along the main customers, or acquisitions. Acquisitions can include other companies/production units at the same level of value-addition (horizontal integration) or those located at a different level of the value-addition chain (vertical integration). Vertical integrations can provide benefits of controlling the whole energy supply chains, and thus receiving added value of energy (from resource into services). For renewable energy production, strategic locations are significant, both in terms of access to the resource, and in terms of accessing markets (either transmission or end-users). Finding synergies, through clustering or industrial symbioses, can also provide scale-benefits but also access to resources, information and collaboration networks. Joint ventures or strategic alliances can also be applicable strategies for accessing technical expertise, energy resources (through landowners) or investment funds.

Energy technology manufacturing often includes acquisitions, so both horizontal and vertical integrations are applicable. Technology manufacturing includes growth strategies of product and service innovations, such as development of new solutions for energy production, storage and efficiency (including different markets/segments), product modulation, industrial design activities and the efficiency of production processes. Energy technology sector benefits strategies for reaching new customers and accessing new markets. This includes also expanding the sales and export channels through new partners and networks, and can result into new exports or license-based manufacturing / re-selling. Joint ventures or strategic alliances can also be applicable growth strategies, especially for large enterprises accessing new markets through international collaborator.

Energy services are also benefitting of the scale-economies through increasing the number of service cases (and service efficiency). ESCo (Energy Saving Concept) and EPC (Energy Performance Contracting) actors can benefit of new business models with elements of 'creative financing' and risk sharing, i.e. funding or co-funding energy upgrades from energy cost reductions. In addition, new business models, including novel ICT solutions for digital services, is a strategy option. Those business models are designed e.g. for controlling and managing RE production systems, energy storage or supplying RE to market.

Renewable energy and energy storage sector is heterogeneous and linked to many other sectors, e.g. forestry, mechanical wood industry, real estate services, logistics, telecommunications and farming. Therefore, sector related diversification could be a significant growth strategy providing additional business opportunities and

income. Diversification benefits can be reached also through portfolio entrepreneurship including involvement in number of businesses, setting up new firms and networks between them.

Identifying the key support needs

Renewable energy and energy storage businesses have often various support needs. They can also be both generic (e.g. accessing finances) and sector specific (e.g. technology development). As there might be various needs, identifying the key support needs requires prioritizing. There are no criteria for prioritizing, but it is a subjective decision. Following aspects could be considered:

- Contribution of the support for the expressed need(s)
- Aligning with the defined or applicable growth strategy/strategies
- Effectiveness and expected impact that can be reached with the support

Accessing tailored and long-term support

The business supports are specific for the renewable energy in some countries (e.g. in Iceland, Northern Ireland, Scotland) and generic in others (Finland, Ireland, Norway).¹⁵⁴ Generic supports have defined subcategories and/or target groups, such as international activities or growth enterprises. The support systems are often complex and temporary, which raises the importance of supporting advisory. In accessing the support, following things could be considered:

- Are there defined contents for the business growth issues and available references of the support activities
- Availability of the person contact and flexibility according the specific growth issues (e.g. mentoring programs)
- Availability of the long-term support if needed (e.g. through other programs)

The GREBE project pilots and established transnational service, *Entrepreneurship Enabler Scheme*, for small businesses in renewable energy and energy storage. The service will have specific perspective in business growth, and provide coordinated support in the sector.

¹⁵⁴ GREBE Project 2016c.

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About GREBE

GREBE is a €1.77m, 3-year (2015–2018) transnational project to support the renewable energy sector. It is co-funded by the EU's Northern Periphery & Arctic (NPA) Programme. It will focus on the challenges of peripheral and arctic regions as places for doing business, and help develop renewable energy business opportunities provided by extreme conditions.

