Aalto University
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Management capabilities, business models and investment targets / An exploratory study on the future of the Finnish manufacturing industry

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Department of Management and International Business
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Master´s Thesis
Tatu Isotalo
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ABSTRACT
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MANAGEMENT CAPABILITIES, BUSINESS MODELS AND INVESTMENT TARGETS: AN EXPLORATORY STUDY ON THE FUTURE OF THE FINNISH MANUFACTURING INDUSTRY

Objectives:
This thesis studies the projected future direction and expected management capability requirements of the Finnish manufacturing industry, by examining the development and present status of the industry's business models, management capabilities and future investment targets. During recent years the Finnish manufacturing industry has undergone significant structural changes, and the transformation is only expected to accelerate. Hence, this study aims at creating an understanding of the direction that the industry is headed in, while addressing what the critical success factors would be for firms in managing their global operations networks in the future.

Methodology:
A sequential mixed methods research approach was used for the study. Data was gathered from a total of 73 companies, with a combined annual revenue of over €180 billion. The sample is a representative mix of large companies and SMEs from the chemical, forest, metal processing, mechanical engineering and electronics and electro-technical industry sectors. After conducting a preliminary industry analysis and literature review, 19 qualitative, semi-structured interviews were carried out. Based on the answers and input from the interviews, a quantitative online survey was created, with a total of 54 respondents.

Findings:
The manufacturing industry is expected to continue to expand further abroad and direct their investments increasingly outside of Finland. The transfer of operations overseas is seen to extend from manufacturing to R&D as well. The results also suggest that the importance of Finland for firms as a location is expected to decrease in the future, since the companies' operations networks are expected to become increasingly footloose. The business models, however, are assumed to remain largely based on maintaining product design in-house. Critical management capabilities for the future include the ability to optimise the company as a whole, network management and developing the interfaces between R&D, manufacturing and sales and marketing. The poor alignment of investment targets and future capabilities, however, raises concerns over the level and quality of strategic management in several firms.

Keywords:
Finnish manufacturing industry, future, management capabilities, business models, investment targets, strategic management

AALTO-YLIOPISTON KAUPPAKORKEAKOULU
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Pro gradu -tutkielma
Tatu Isotalo

JOHTAMISKYVYKKYYDET, LIIKETOIMINTAMALLIT JA INVESTOINTIKOHTEET: TUTKIMUS SUOMALAISEN VALMISTAVAN TEOLLISUUDEN TULEVAISUUDESTA

Tavoitteet:
Tutkimuksen tavoitteena on ymmärtää, mihin suuntaan suomalainen valmistava teollisuus olisi menossa ja minkä johtamiskyvykkyyksien tärkeys korostunee jatkossa teollisuudelle. Tutkimuskohteina ovat yritysten liiketoimintamallien kehitys, yritysten toiminnan kannalta kriittiset johtamiskyvykkyydet sekä tulevaisuuden investointikohteet. Viime vuosina suomalainen valmistava teollisuus on läpikäynyt murrosta ja muutoksen odotetaan jatkuvan kiihtyvällä tahdilla. Tämä tutkimus pyrkii selvittämään, millä keinoin teollisuus on sopeutumassa tähän muutokseen ja samalla selventämään, mitkä ovat menestystekijöitä yrityksille tulevaisuudessa globaalien tuotanto-operaatioiden johtamisessa.

Tutkimusmenetelmä:
Tutkimuksessa yhdistettiin kvalitatiivisia ja kvantitatiivisia tutkimusmenetelmiä. Tutkimukseen kerättiin tietoa yhteensä 73 yrityksestä, joiden yhteenlaskettu liikevaihto on yli € 180 miljardia. Otos on kuvaava ryhmä suuria ja pk-yrityksiä kemian teollisuuden, metsäteollisuuden, metallien jalostuksen, konepaja- ja metallituote- sekä elektroniikkateollisuuden toimialoilta. Alustavan kirjallisuuskatsauksen ja teollisuuden analyysin perusteella haastateltiin 19 yritystä. Haastatteluiden pohjalta rakennettiin kvantitatiivinen online-kysely, johon vastasi 54 yritystä.

Tulokset:
Valmistava teollisuus näyttäisi suuntautuvan jatkossa yhä enemmän ja kauemmas ulkomaille, samalla kohdentaen sijoituksiaan enemmän Suomen ulkopuolelle. Tuotannon siirtämisen lisäksi tutkimus- ja kehitystyötä oltaisiin nähtävästi siirtämässä seuraavaksi muualle. On odotettavissa, että Suomen merkitys yrityksille vähenee jatkossa, koska yritysten tuotantoverkostojen odotetaan kehittyvän entistä enemmän maantieteestä riippumattomaan suuntaan. Liiketoimintamalleissa ei näyttäisi olevan varsinaista muutosta – yritykset pitänevät kiinni jatkossakin tuotesuunnittelusta. Kriittiset johtamiskyvykkyydet tulevaisuutta silmälläpitäen näyttävät liittyvän yrityksen kokonaisuuden optimointiin, verkostojohtamiseen sekä tutkimus- ja kehitystyön, tuotannon sekä myynnin ja markkinoinnin rajapintojen kehittämiseen. Usean yrityksen heikko kyky kohdentaa investointejaan tulevaisuuden kyvykkyyksiin herättää huolta strategisen johtamisen laadusta.

Avainsanat:
Suomalainen valmistava teollisuus, tulevaisuus, johtamiskyvykkyydet, liiketoimintamallit, investointikohteet, strateginen johtaminen

ACKNOWLEDGEMENTS

I must admit, there is an overarching sensation combining relief over the past, present content, and eagerness concerning the future when typing these words.

This thesis has been the result of a six-month endeavour, and I sincerely welcome all the support that I have received during the process, both tangible and intangible. First and foremost, I remain in deep gratitude to Sami Laine and Aki Laiho for not only formulating such an interesting research topic, but also for their engagement, participation, guidance and enthusiasm throughout the project. My thesis supervisor played naturally an important role with her views and guidance when the road became slightly rockier, with special regard to the finalising of the document at hand. In addition, I would like to express my appreciation to Olli Nevanlinna, Kimmo Salakka, Mikko Vaara, Mika Palosuo, Kristian Isaksson and Tero Mäenpää for their participation, support and guidance.

The steering group of the study had an important position in terms of insight and reflection, for which I am very thankful. Moreover, it goes without saying that if it was not for the time and input of the interviewed company representatives and the participants of the online survey, the study would not have been possible.

On a more personal note, it goes without saying that the support and commitment that my family and friends have shown me during the process is invaluable. Nonetheless, I would like to mention Joel Karjalainen, Niko Marjomaa, Tiago Correia Machado and Sven Junghagen in particular, for their support and inspiration, together with the occasional bottle(s) of wine that we shared during the process.

The past months have been a great experience, significant learning opportunity and a time for reflection. However, it is now time to move on and look ahead.

Helsinki, November 2012

Tatu Isotalo

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1 INTRODUCTION

1.1 Background

There has been a large wave of concern and scrutiny over prospects of the Finnish economy in the recent past. For example, the country's largest newspaper, *Helsingin Sanomat*, released in 2010 a series of stories portraying the expected economic situation of the country in 2017. Today, in the evening of 2012, the discussion is still carried out in several fora, with economists, governmental institutions and companies expressing their views of what course of action should be taken. Hence, there is a genuine concern regarding the future of the Finnish industry and economy present. The recent news concerning domestic lay-offs, outsourcing and company turning points (Helsingin Sanomat 2012a, 2012b & 2012c; Leppänen, 2011; Malin, 2012; Talouselämä, 2012) have only fuelled the discussion concerning the present turmoil in the country's economy.

In order to re-vitalise the country's competitiveness, Palokangas (2012), for example, calls for the re-definition of corporate taxes, while also encouraging political decision-making and increasing the responsibility from trade unions. The studies conducted by Eloranta (2012), Alahuhta et al. (2012) and Stadigh et al. (2012), as commissioned by the ministries of Employment and Economy, Foreign Affairs, and Finance, respectively, express the concern from the government's side. The underlying and unanimous message in the publications and debates is that change is to be implemented in multiple disciplines, quickly, in order to ensure Finland's competitiveness and growth in the years to come. However, differing points of view of what the right direction would be, together with the lack of a coherent understanding of the actual situation both in the national and global economy is, make the task increasingly difficult.

The Finnish manufacturing industry plays an important role in the country's economic development and has traditionally held a strong position in Finland's export-oriented economy (Eloranta et al., 2010; Deloitte, 2011). In 2011 the value of exported goods was €56,6 billion, composing roughly 30 per cent of the country's GDP (Confederation of Finnish Industries, 2011; Statistics Finland, 2012). Needless to say, any shifts in the

country's manufacturing industry have notable repercussions in the national economy, making the topic increasingly important for examination. In essence, the industry is undergoing structural changes due to both external and internal factors (Ylä-Anttila, 2010). All of this emphasises the need for firms to identify a new and sustainable configuration in order to operate in the re-defined and evolving environment.

According to Mälkiä (2011), manufacturing in Finland is typically characterised by operational excellence, instead of pursuing competition on cost. Domestic manufacturing in the country is largely present today because of historical reasons, while having access to available talent and the proximity to key customers are also considered location factors. The trend of transferring manufacturing operations outside national borders has heavily taken place during 2000–2010 and the pace of development is only estimated to accelerate towards the future (ibid.).

The predominant reasons during the past decade that have driven the transfer of manufacturing outside Finnish borders have been related to seeking both lower operational costs and proximity to new and emerging markets (Mälkiä, 2011). Interestingly enough, Finnish investments in international manufacturing have been mainly executed as greenfield investments, or alternatively through acquisitions (ibid.). Hence, the investment decisions have not directly caused the loss of jobs in Finland – yet (Deloitte, 2011), as the investment decisions were not related to closing a domestic factory and transferring it abroad, but rather increasing production capacity outside national borders.

The trend of transferring operations abroad poses an array of challenges for the manufacturing industry to address, particularly in the long term (VTT, 2011). In essence, the transfer calls for the need for firms to re-evaluate their manufacturing strategy, and possibly, even re-define their core business. Naturally, the phenomenon of outsourcing or offshoring production is not solely applicable to Finland but Western countries in general (Palokangas, 2012), as the transition is strongly related with the opportunities that globalization offers as a whole (Koren, 2010; World Economic Forum, 2012; Eloranta et al., 2010) for all countries.

However, constant offshoring raises concerns over how countries maintain their competitiveness (Pisano & Shih, 2009). For instance, Palokangas (2012) highlights the variance in resilience of different countries managing and adapting their economies to the new order. Needless to say, it has become imperative for the Finnish manufacturing industry to re-structure itself. According to Eloranta (2012), for example, the strategies that have succeeded in the past will not create the same results to what the industry's export value was prior to the 2008 financial crisis.

Interestingly enough, the general trend of outsourcing manufacturing operations to Asia may begin shifting to a more region-specific and flexible manufacturing strategy – possibly even excluding China (Simchi-Levi et al., 2012). The driving factors for this change seem to be attributed mainly, but not exclusively, to the rising labour and logistics costs, supply chain disruptions, demand volatility and other fluctuations (Simchi-Levi et al., 2012; Boston Consulting Group, 2011; Raunio, 2012) in the region. Regardless of the portrayed regionalisation or on-shoring prospects for the global industry, however, a significant transition in the context of the Finnish manufacturing industry has already occurred – one that is expected to ripple both in the country's economy and society in the future (Deloitte, 2011).

Keeping the above preconditions in mind, this thesis will primarily aim at shedding some light over the future of the Finnish industry, from the manufacturing industry's perspective. In practise, this study primarily aims at identifying the critical management capabilities that the Finnish manufacturing industry will require in the future, in order to manage their global manufacturing operations. Secondary goals include gaining an overall understanding of the prevailing business models within the industry as well as their development, and finally seeking knowledge of what the main investment targets of the industry are likely to be.

In addition to being a current topic and a target of public and economic debate in Finland, the matter is intriguing also from the point of view of strategic management. After all, cognition and capability development are largely present within the research scope, as well as foresight, strategy formulation and implementation also playing an important role in the matter. More precisely, the alignment of the future capabilities and

the priority of investment targets will be taken under scrutiny. The foundation for the study is largely based on Mälkiä's (2011) findings concerning the role of Finnish manufacturing, as this thesis is the second phase of a larger study concerning the future of the Finnish industry.

1.2 Research problem

Globalisation has revolutionised the business environment for the manufacturing industry worldwide (Koren, 2010; World Economic Forum, 2012). In the context of the Finnish manufacturing industry, there is a constant and ever-increasing pressure towards internationalising firms' supply chain and production operations, given the high cost structure and geographical location of the country (Mälkiä, 2011). Another aspect of the challenges currently present in the Finnish manufacturing industry stem from the somewhat unclear role definition of local manufacturing sites, in contrast to the firm's global operations (Deloitte, 2011). These blurred definitions of who does what can lead to a loss of efficiency and productivity within the industry (ibid.), increasing, in turn, the complexity of the scenario itself.

Hence, the evolving landscape not only calls for a re-definition of both the structure and responsibilities of companies' supply chain and manufacturing strategies (Deloitte, 2011), but also for a closer examination to firms' core businesses as well. In order for firms to be able to meet the demands from the increasing degree of internationalisation, the company itself and, most likely its management capabilities as well, will have to evolve. However, in what areas and by what means they are to be developed, remains unclear.

The research topic is increasingly challenging due to the structural changes that the national economy has been undergoing during the past decade, with particular reference to the information and communication technology (ICT), forest and mechanical engineering industries (Ylä-Anttila, 2010; Eloranta et al., 2010). Given the past and on-going transitions in the national industry sectors, it can be left open for scrutiny how suitable and dynamic the companies' business models are in relation to industry's

evolution on a global level. So-being, the research problem of this study is largely based on exploring how and by what means the firms operating in the Finnish manufacturing industry adapt themselves to the developing business environment. As it is clear that change needs to be implemented, the industry's direction in having clear investment and development plans for their future requirements will also be examined. Given the strategic management perspective of this thesis, the identified future capability requirements and expected investment plans will be compared with each other, in order to identify how well they are aligned with each other, and thus, enabling the possibility to evaluate the overall configuration of strategy formulation and implementation.

1.3 Objectives and research questions

As previously mentioned, the study has three objectives. The research objectives are accompanied by three research questions for the study, as presented in Figure 1, below.

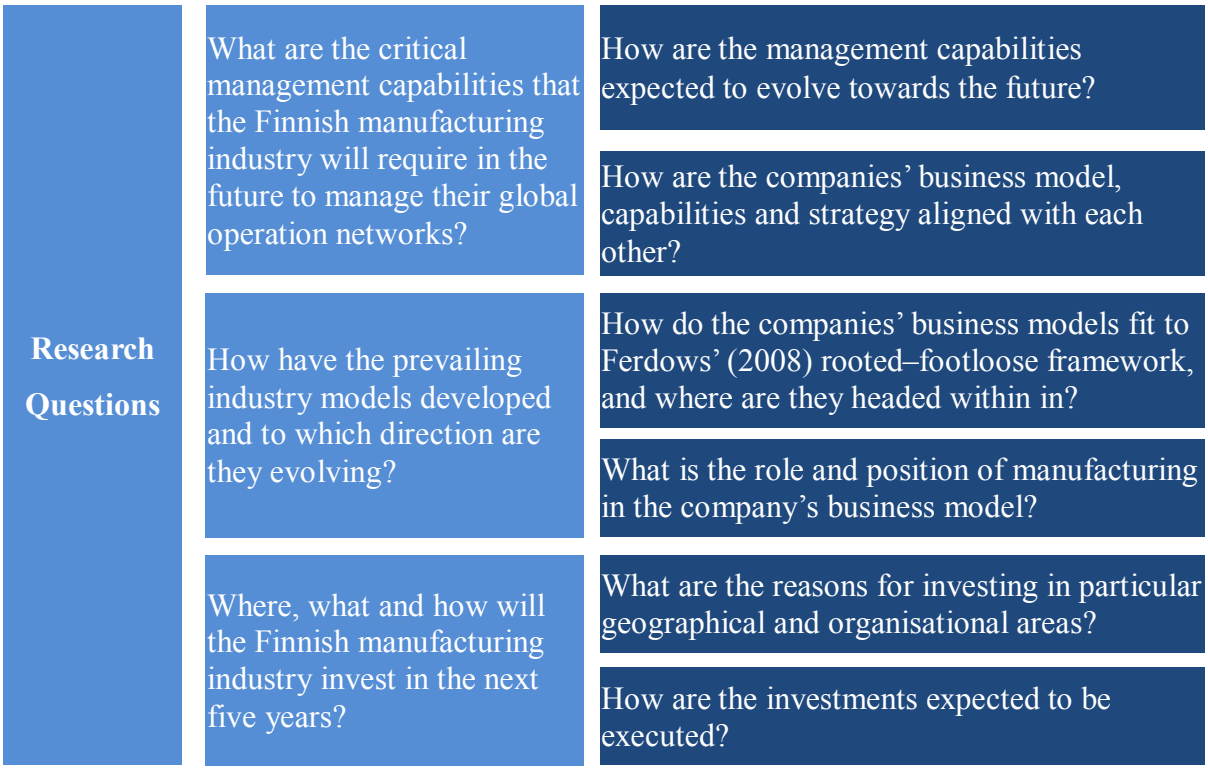
Figure 1: The study's objectives and research questions

Objectives	Identify the critical management capabilities for the Finnish manufacturing industry concerning the next five years.
	Study the prevailing business models in the industry and how they have, and are expected to evolve in five years.
	Gain knowledge of what will the industry invest in during the next five years.
Research Questions	What are the critical management capabilities that the Finnish manufacturing industry will require in the future to manage their global operations?
	How have the prevailing industry models developed and to which direction are they evolving?
	Where, what and how will the Finnish manufacturing industry invest in the next five years?

Primarily, this thesis aims at identifying the critical management capabilities that the Finnish manufacturing industry will potentially require in the future, in order to manage their global manufacturing operations, and thus, remain competitive. Secondary objectives of the study include gaining an understanding of the prevailing business models within the industry and the way they have evolved, and how they are expected to evolve in the future. Finally, this study seeks to gain knowledge on the industry's investment targets, i.e. where and what is the industry likely to be investing in during the next five years.

The fundamental idea was to have one specific research question addressing each research objective. However, each of the research questions is composed by a set of more specific questions, illustrated in Figure 2, below. The idea behind the decomposition of the main research questions is to seek more specific knowledge concerning the topic, and thus, hopefully gain a deeper insight in certain fields – e.g. how the firms operating in the Finnish manufacturing industry position themselves in Ferdows' (2008) rooted-footloose production network framework. The framework illustrates the nature of a firm's production network, of either staying rooted in one place and developing its current manufacturing capabilities or being footloose and constantly seeking the most feasible production locations. The framework is presented with further detail in chapter 2.4.1.

Figure 2: A decomposition of the research questions



1.4 Research scope

The scope of the study is defined and limited to the companies operating in the manufacturing industry, in five sectors. For purposes of clarity, the sectors listed below are accompanied by their corresponding standard industry codes (SICs), as defined by Statistics Finland (2011):

i) forest industry, including furniture manufacturing (16-17, 31);
ii) chemical industry (19-23);
iii) metal processing industry (24-25);
iv) electronics & electro-technical industry (26-27);
v) mechanical engineering (28-30).

In total, the value of sold Finnish manufactured industrial goods was €81,3 billion in 2010, of which the five selected industry sectors accounted for 82,6%. The industry

classes that were ruled out of the scope of this study were mining (1,5%), food, drinks and tobacco (9,8%), textile, clothing and leather goods (0,8%). (ibid.)

The rationale for ruling out the aforementioned sectors was firstly due to the strong local market and target group that the industry sectors serve, decreasing the relevance of international manufacturing operations for them (Mälkiä, 2011). This is particularly the case with food, drinks and tobacco. Secondly, in mining, the notion of manufacturing is practically inapplicable, as the industry is more of an extractive nature. Thirdly, the value that the textile, clothing and leather industry class represents of the total trade was considered too small to include in the scope. Hence, it was decided that by examining the selected five industry sectors, the results and views would be sufficiently applicable and generalizable to represent the Finnish manufacturing industry, as a whole.

In terms of the qualified company size for the study, the definitions established by the European Commission (2009) were applied, where the lower limit for a defined medium-sized company is € 10 million in turnover. Conversely, a company with a greater turnover than € 50 million is considered large (ibid.). Similarly to the previous study (Mälkiä, 2011), this thesis is also defines Finnish manufacturing as companies that presently have or have had manufacturing operations in the country during the 21st century, irrelevant of the firm's country of origin. However, for data analysis purposes, it was agreed to define a large company to have a revenue of ≥500 million Euros (MEUR), while small and medium enterprises (SMEs) to have a revenue of <500 MEUR.

It ought to be kept in mind that the intention of this study is to examine what firms are doing in order to remain competitive in the re-defined business environment. Hence, although it is to be acknowledged that government regulations, tax policies and political decisions affect the preconditions for doing business, the scope of this study extends beyond those. Since the business environment is regulated and controlled, it also means that the operating conditions are similar for all within the respective industry sector in the corresponding country – in this case, the manufacturing industry in Finland. Also, when excluding such factors from the research scope, it poses a greater focus on the

companies themselves and their actions, making the research itself more valuable for all parties.

1.5 Structure of the study

The structure of this study is such that the chapter to follow will present a literature review on the:

i) resource-based view of the firm;
ii) field of capabilities and dynamic capabilities
iii) concept of management capabilities;
iv) key frameworks in manufacturing strategy.

The aim of the respective chapter is to provide the reader with a sufficient understanding of the fundamental theories and concepts in question, before further elaborating on the research methodology, in chapter three. The empirical part of the study is composed of 19 qualitative interviews with companies from the five industry sectors, complemented with data acquired through a quantitative online survey.

Hence, chapter four will illustrate the results of the conducted empirical components, i.e. what the results of the study suggest. The results will be presented first as industry averages, after which the differences between large companies and SMEs will be illustrated. In addition, the results from each industry sector will be isolated, in order to gain a more coherent understanding of the sector-specific trends and characteristics.

Finally, before listing the references and appendices, chapter five will conduct an analysis and discussion on the findings of the study, with chapter six drawing a set of conclusions on the studied matter, highlighting the key findings and presenting possibilities for further and future research.

2 LITERATURE REVIEW

As previously mentioned, the purpose of this chapter is to provide the reader with a sufficient understanding of the key academic theories and concepts concerning the research topic. The review itself is divided into four sections. The first section presents the resource-based view of the firm, as the view is seen as the foundation on which the theme of capabilities and dynamic ones in particular, are built upon (Teece, 2007; Kuuluvainen, 2011). The two sections that follow present the field of dynamic capabilities and management capabilities. Despite the strong interconnectedness of the two topics under the concept of capabilities, the author's intention is to present the two matters separately.

Finally, given the context of this thesis, it is crucial to also share an understanding of the fundamentals of manufacturing strategy (Hayes & Pisano, 1994), in order to be able to evaluate the conditions and business environment of the research scope in question in a more elaborate manner. Hence, the fourth section illustrates a selection of the relevant paradigms in manufacturing strategy that serve the purpose of better understanding the scope of the study.

2.1 Resource-based view of the firm

The underlying, seminal ideas of the resource-based view (RBV) of the firm can be considered to date back to 1959, when Edith Penrose's *The Theory of the Growth of the Firm* was published (Rugman & Verbeke, 2002). However, according to Wang & Ahmed (2007), it was not until Wernerfelt (1984) that the actual theory was made known, and eventually, made popular by Barney (1991). Nonetheless, the main thoughts that Penrose (1959, in Pitelis 2009) presented and that have guided the RBV are that:

i) firms are bundles of resources;
ii) combining resources with other resources makes the use of resources and innovation effective;
iii) managerial resources are of essence and firm-specific;

iv) firms are defined in terms of resources.

There are those who claim that Penrose's direct or intended contributions may have merely been largely misinterpreted from the beginning (Rugman & Verbeke, 2002), while there are also those who remain certain that her work "has been instrumental to the on-going development of the modern resource-based view of strategic management" (Kor & Mahoney, 2004:191). Then again, some question the usefulness of the RBV in strategic management as a whole (Priem & Butler, 2001), while others are strong supporters of it (Barney, 2001a). Nevertheless, Wernerfelt (1995) points out that over the years the research stream has been built and complemented by numerous academics, with the RBV positioning itself as one of the leading paradigms in the field of strategy research in the 1990's (Lockett, 2005).

In essence, the RBV portrays an alternate way of examining firms, in terms of their resources, as opposed to their products (Wernerfelt, 1984). Alternatively, one may say that "the RBV takes an 'inside-out' or firm specific perspective on why organisations succeed or fail" (Dicksen, 1996 in Srivastava, Fahey & Christensen, 2001:778). Interestingly enough, although Barney (1991) broadly defined capabilities as resources as well, it was not only until later in the research (Helfat & Peteraf, 2003) when the concept of capabilities was included to complement the prevailing definition of resources, or to be fully taken into consideration under the RBV (Henderson & Cockburn, 1994).

For the ease of discussion, the term *resources* is defined as the tangible and intangible assets and skills that a firm holds, controls or has access to on a semi-permanent basis (Caves, 1980; Helfat & Peteraf, 2003). Even when there are multiple fields under the resource-based concept today, each topic shares a common assumption. The overall assumption according to Barney (2001b:649) is that "resources and capabilities can be heterogeneously distributed across competing firms, that these differences can be long lasting, and they can help explain why some firms consistently outperform other firms." However, Helfat & Peteraf (2003) point out that it ought to be taken into account that neither resources nor capabilities are static, as they can be expected to evolve, perhaps even significantly over time.

Although the RBV is well-rooted in the field of competitive advantage (Barney, 1991; Peteraf, 1993), and particularly, when used as a perspective in evaluating sustainable competitive advantage (Oliver, 1997), the view has been linked and combined to other research fields as well. These include, but are not limited to, strategic management (Barney, 2001a; Mahoney & Pandian, 1992), marketing (Srivastava, Fahey & Christensen, 2001) and manufacturing strategy (Schroeder, Bates & Junttila, 2002), among others. Hence, even a half a century after Penrose's work, the theme remains a current and interesting topic of discussion, with an increasing amount of fields to be studied and under the RBV, e.g. human resource management (Lockett, 2005) as well.

The position of resources under competitive advantage was raised by Wernerfelt (1984), when stating that resources are able to act as position barriers. Said barriers can be seen as an analogy or contrast to entry barriers in competition (Porter, 1979), yet the interrelatedness of both resources and products is to be taken into consideration in such case. Thus, the complete and full separation of the RBV from the product-based view is somewhat complex, if not, even impossible. Wernerfelt's (1984) notion of resources being able to create barriers, as well as the central position that resources have in corporate strategy (Wernerfelt, 1989) highlight the relation between the RBV and competitive advantage – laying the foundation for Barney (1991) and Peteraf (1993) to examine the correlation between a firm's resources and competitive advantage in greater detail.

According to Barney (1991) not only are resources between firms heterogeneous, but in order for them to enable a sustained competitive advantage they must be valuable, rare, imperfectly imitable and non-substitutable, (VRIN). Peteraf (1993), on the other hand, highlights that the RBV has deepened the understanding of how resources are combined and applied, together with what makes competitive advantage sustainable. She also claims that competitive advantage would be based on four cornerstones:

i) heterogeneity of resources;
ii) ex post limits to competition;
iii) imperfect mobility;
iv) ex ante limits to competition.

In this case, Peteraf (1993) refers to the concept of heterogeneity as companies being able to compete with different capabilities and breakeven, as a minimum. If a company has superior resources, it can be expected that it will earn rents, while those with marginal resources can be expected, at most, to breakeven. The notion of ex post limits to competition refers to having factors that limit the competition in terms of the recently-acquired rents through a superior position. In practise, this is where the imperfect imitability and non-substitutability attributes of VRIN resources (Barney, 1991) come into play.

Whenever resources cannot be traded, they are considered perfectly immobile (Peteraf, 1993). Another way of seeing imperfect mobility of resources is when they are more valuable to the present firm than some other one, i.e. highlighting the concept of resources being firm-specific. Imperfectly mobile resources, on the other hand, are less likely to be imitable, Peteraf (1993) explains, due to which they would play a central role in sustainable competitive advantage. Finally, the notion of ex ante limits to competition refers to having a limited competition for a superior resource position. Out of the four corner stones, however, the most basic condition would be the heterogeneity of resources, being referred to as the "sine-qua-non of competitive advantage." (Peteraf, 1993:185)

Even though a firm would have an extensive supply of VRIN-defined resources, the role and position of managers cannot be ignored. In addition to determining the corporate strategy of the firm (Caves, 1980), managers have a central role in analysing the company's performance towards sustained competitive advantage (Barney, 1991). The managers and their skills can also be held responsible for the differences in company performance (Kunc & Morecroft, 2010). Similarly, Oliver (1997) alludes to the importance of managerial choice when selecting resources, as a stepping stone towards sustainable competitive advantage – while simultaneously underlining the importance of the social context, e.g. firm traditions, in the resource-selection process. Fahy (1999) correspondingly claims that advantage in international business is built on the role of resources, accompanied by economic and management traditions. So-being, it can be considered that it is not sufficient for a firm to merely have a pool of resources, regardless of how VRIN they may be, if their management and selection are not

carefully planned – naturally, not forgetting to take into account the actions of rivals (Kunc & Morecroft, 2010) as well.

2.2 Operational and dynamic capabilities

As noted by Wang & Ahmed (2007), the dynamic capabilities theory combines multiple fields of prior research. The combined fields include organisational routine, core competences, architectural routine and combinative capability, among others, yet a more comprehensive understanding of dynamic capabilities is sought (ibid.). The search for a more elaborate understanding can be considered reasonable, given that the field of dynamic capability theory is anything but simple and concise. For this reason, Barreto (2010) calls for consolidation and capitalisation on previous research in a more structured way.

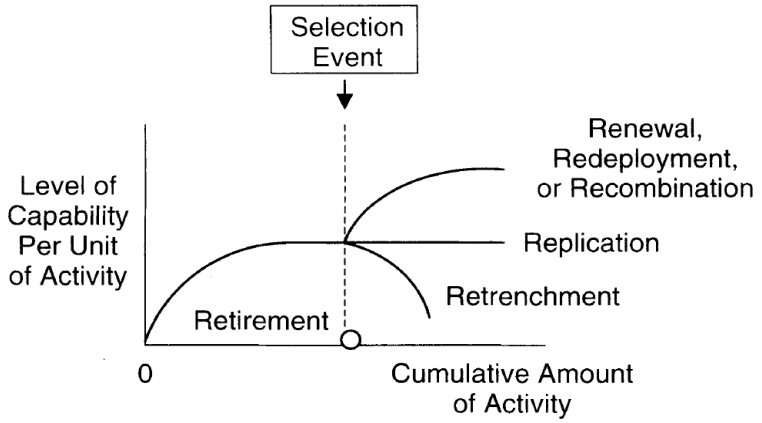
Nonetheless, dynamic capabilities are often seen as a relevant extension of the RBV (Kuuluvainen, 2011), since they have a central role in the development of a firms resources, particularly VRIN ones (Eisenhardt & Martin, 2000). Teece & Pisano (1994) introduce the dynamic capabilities view as a continuum to Schumpeter's work, particularly to be considered under the field of competitive advantage (Teece, Pisano & Shuen, 1997). Nonetheless, as Barreto (2010) notes, over the years the concept of dynamic capabilities has expanded outside from the field of strategic management, e.g. knowledge management (Cepeda & Vera, 2007) or technology management (Cetindamar, Phaal & Probert, 2009) as well.

Prior to going into the topic of dynamic capabilities with greater detail, the concept of capabilities will be clarified. Day (1994:38) defines capabilities as "complex bundles of skills and collective learning, exercised through organisational processes, that ensure superior coordination of functional activities." So-being, capabilities ought to be considered as organisation-specific processes that enable the firm to function. Similarly, Helfat & Peteraf (2003:999) formulate a definition of the matter at an organisational level: "an organisational capability refers to the ability of an organisation to perform a coordinated set of tasks, utilizing organisational resources, for the purpose of achieving a particular end result". For the purpose of drawing a distinction and a clear definition in

terminology, it should be emphasised that unless the activity is practised as a *routine*, it remains an activity and not a capability (Helfat & Peteraf, 2003; Degravel, 2011).

With an aim of providing a more elaborate understanding of the cyclical nature and development of capabilities, Helfat & Peteraf (2003) suggest a model on capability lifecycles, presented in Figure 3, below. The model not only exemplifies the notion of capability lifecycles, but also accentuates the role and position to their strategic management, i.e. the selection process of which capabilities to develop further. The underlying message is that with existing capabilities facing external conditions and development needs, a choice has to be made with six identified alternative courses of action. The options are to i) retire; ii) retrench; iii) replicate; iv) recombine; v) redeploy; and vi) renew the capability.

Figure 3: Branches of the capability lifecycle



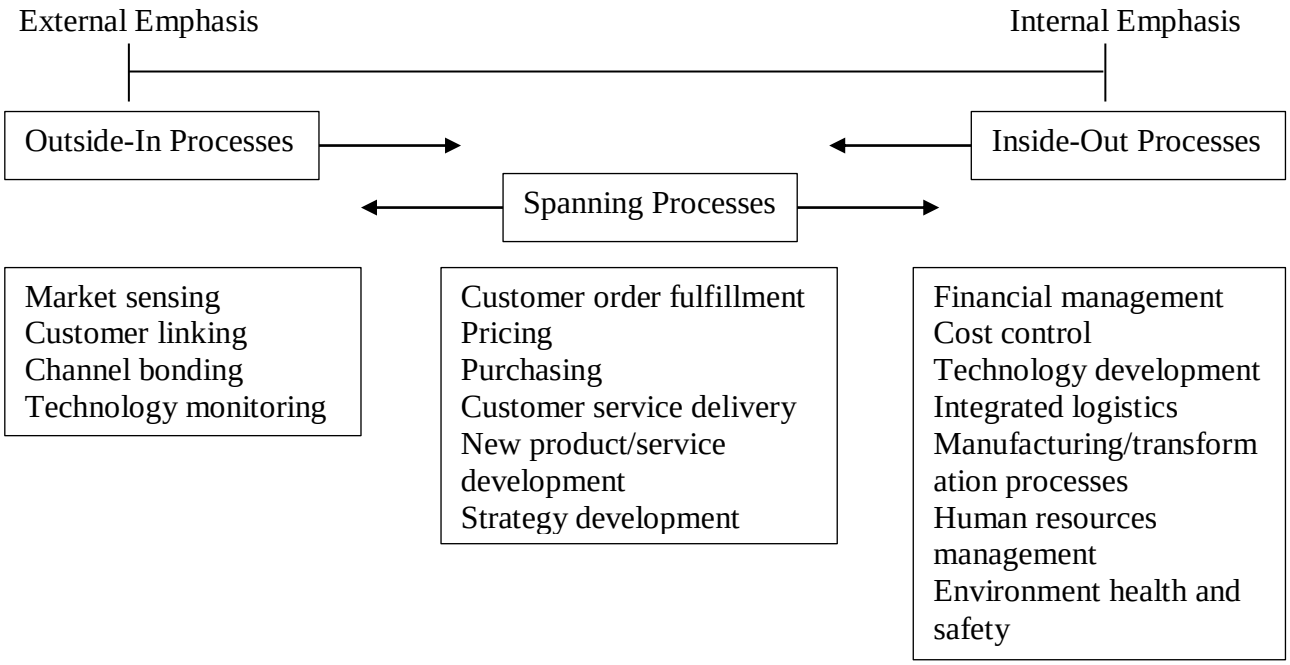
Source: Helfat & Peteraf (2003)

In Helfat & Peteraf's (2003:1005) model there are, in practise, two branches: one being more terminal by nature, i.e. it threatens to "make a capability obsolete", while the other provides further development and growth possibilities for the capabilities. The authors present that among the most extreme situations when a capability is retired is due to a change in regulation, for which all production and related knowhow concerning the matter are ended, e.g. DDT. In contrast, the reduced utilisation of the capability is depicted with the term retrenchment, referring to the decrease in the use of the capability, leading to its degrading.

The second branch shares a more growth-oriented path for the firm's capabilities. Instead of retiring or retrenching the capability, an option is to renew it, through more or less elaborate modifications, for instance. In case the capability was retired, in certain situations it can be replicated to some other location or use where it can be of use. Helfat & Peteraf (2003) exemplify this matter with transferring a capability to a place with different government regulations. Along the lines of replication, which is limited to adopting the capability in a different geographical location, redeployment can be carried out in a different – yet closely related – market for the product or service in question. Finally, as opposed to replicating or redeploying the capability, a firm may recombine the capability with others, in order to create a new set of capabilities. However, it ought to be understood that the recombination of capabilities requires the devoted development of the new capabilities, as well as a new course in the capability lifecycle. (Helfat & Peteraf, 2003)

Teece & Pisano (1994) take on the concept of capabilities by highlighting the role of strategic management in orchestrating skills, resources and competences in a changing environment. Hence, it would not be the ability of the organisation in itself that would constitute a capability, but rather the way of combining and allocating resources (Schreyögg & Klesch-Eberl, 2007), skills and competences, with the aim of creating competitive advantage. Alternatively, as Loasby (1998:144) describes, "They [capabilities] are in large measure a by-product of past activities, but what matters at any point in time is the range of future activities which they make possible". With the intention of making the notion of capabilities more understandable, Day (1994) offers a framework for classifying them (see Figure 4, below), according to their point of emphasis. It is worth noting that the sensing capability that is defined under Outside-In Processes (ibid.) is later defined as a microfoundation for dynamic capabilities (Teece, 2007).

Figure 4: A method to classify capabilities



Source: Day (1994)

An important distinction under the concept of capabilities is the separation between operational and dynamic capabilities (Helfat & Peteraf, 2003). Operational capabilities, also referred to as zero-level (Winter, 2003), first order (Collis, 1994) or substantive (Zahra, Sapienza & Davidsson, 2006) capabilities are the activities through which an organisation earns a living, e.g. manufacturing (Winter, 2003; Helfat & Peteraf, 2003). Dynamic, or second order capabilities (Collis, 1994), on the other hand, are the ones that change or re-configure operational ones (Teece, Pisano & Shuen, 1997), of which product development (Helfat & Peteraf, 2003; Winter, 2003) can be taken as an example.

With an aim of describing the nature of dynamic capabilities, Teece (2007) illustrates that enterprises with strong dynamic capabilities would be exceptionally entrepreneurial, i.e. in addition to merely adapting to the business environment, such enterprises would shape it as well. Given the perspectives presented above, dynamic capabilities would seem to play a genuinely important role in the firm's development, both concerning the internal as well as external environments.

Despite the criticism towards the importance and role of capabilities in sustaining competitive advantage (Collis, 1994), or Drnevich & Kriaciunas (2011) calling for additional testing and examination of capabilities in performance, one may state that operational capabilities enable the organisation to operate (Winter, 2003). Dynamic capabilities, on the other hand – when properly managed – enable the firm to adapt to the changing environment in order to succeed in the future as well. In this particular matter, the key word is future. Dynamic capabilities are heavily built on developing the best possible resource base for the forthcoming, whereas operational capabilities focus on performing and competing in the status quo (Ambrosini & Bowman, 2009a).

Given that the firm's operating environment is under constant change and evolution, the organisation needs to develop its dynamic capabilities in order to update or reconfigure their operational capabilities (Sfirtsis & Moenaert, 2010). Without the evolving nature of dynamic capabilities, the operational ones would remain static as well. Because of the changes occurring in the business environment, this would, perhaps, result in the detriment of the firm. (Ambrosini & Bowman, 2009a)

In the recent past, dynamic capabilities have been the target of multiple definitions (see Table 1, below). However, according to Ambrosini & Bowman (2009a), the more contemporary definitions of dynamic capabilities do not differ notably from Teece, Pisano & Shuen's (1997:516) original definition of dynamic capabilities of "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Moreover, by drawing a comparison to Dierickx & Cool's (1989) view of the development of strategic assets, it ought to be emphasised that dynamic capabilities constitute a long-term process and should always be considered and evaluated in such way (Teece & Pisano, 1994; Wang & Ahmed, 2007).

Table 1: Summary of the main definitions of dynamic capabilities

Study	Definition
Teece & Pisano (1994)	The subset of competences and capabilities that allow the firm to create new products and processes and respond to changing market circumstances
Teece, Pisano & Shuen (1997)	The firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments
Eisenhardt & Martin (2000)	The firm's processes that use resources–specifically the processes to integrate, reconfigure, gain, and release resources–to match and even create market change; dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die
Teece (2000)	The ability to sense and then seize opportunities quickly and proficiently
Winter (2003)	Those (capabilities) that operate to extend, modify, or create ordinary capabilities
Zahra, Sapienza & Davidsson (2006)	The abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision maker(s)
Teece (2007)	Dynamic capabilities can be disaggregated into the capacity (a) to sense and shape opportunities and threats, (b) to seize opportunities, and (c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets

Source: adapted from Barreto (2009)

The topic of dynamic capabilities has attracted a lot of attention, while remaining to be of interest among scholars (Easterby-Smith, Lyles & Peteraf, 2009). In accordance with Schreyögg & Kliesch-Eberl, (2007) and Ambrosini & Bowman (2009a), it can be stated that the nature of dynamic capabilities is patterned, constructed and coordinated, as opposed to being based on spontaneous, ad hoc problem-solving practices. On the other hand, Eisenhardt & Martin (2000) claim that dynamic capabilities alone do not constitute as competitive advantage, since the value of said capabilities lay in the resource configuration that they create.

Building on the above, Teece (2007) divides the concept of dynamic capabilities into three capacities, named the microfoundations for sustained enterprise performance, those being:

i) sensing and shaping opportunities and threats;
ii) seizing opportunities;
iii) reconfiguring.

Sensing in this context (Teece, 2007) is largely attributed to identifying opportunities and eventually shaping them through active scanning and monitoring the current and future prospects of the market, technological environment as well as the competitors' moves. Seizing, on the other hand, accounts more towards addressing the identified opportunity or threat. In practise, this would require maintaining and improving certain areas or processes, and eventually, increasing the investments in it. The eventual success of the investment decision will be decided and evaluated later, depending on the customer reaction, overall timing and competitor moves (Teece, 2007).

Similarly, Sfirtsis & Moenaert (2010) juxtapose organisational ambidexterity (O'Reilly & Tushman, 2004) as a high-order dynamic capability, since the view calls for optimising exploration and exploitation (Wernerfelt, 1984), i.e. sensing and seizing. Hence, although Teece (2007) separates the capacities between sensing and seizing, the interrelatedness should be taken into consideration. Finally, depending on the success or failure of the seized opportunity, profitable growth will result to the increase in the organisation's resources to be invested. So-being, a key factor in achieving and maintaining profitable growth is the ability for an organisation to reconfigure and possibly restructure its assets and organisational structures. In doing this, not only the growth of the firm is to be considered, but the changes in its external environment are to be taken into account as well. In particular, it is the reconfiguration capacity of the organisation that can truly make a difference, as it includes the skill of also correcting a chosen path that may be, in fact, misleading for the company. (Teece, 2007)

Touching upon the microfoundations of dynamic capabilities illustrated above, Laamanen & Wallin (2009) elaborate on the role and importance of management's

foresight to decide in which capability area they are to focus next, i.e. overall company performance. They present three levels where capabilities are developed, those being:

i) the operational level;
ii) the firm level;
iii) iii) the enterprise level.

The first-tier of capability development is largely based on individual cognition, while at the firm level, the firm's portfolio of capabilities is dependent on the amount of attention that is shifted and allocated to the respective area. Finally, the enterprise level encompasses its capability constellation, which is dependent on the management's foresight, especially in terms of focus. The authors stress that at the enterprise level, the development of capabilities cannot solely focus on individuals, as the process will possibly require structural changes as well. (Laamanen & Wallin, 2009)

Taking into consideration both Teece's (2007) work and Laamanen & Wallin's (2009) findings, Jantunen, Ellonen & Johansson (2012) point out that firms in the same industry have both commonalities as well as personal differences in their set of dynamic capabilities. Namely, the similarities would be present in sensing, while the seizing and reconfiguring (Teece, 2007) is what would differentiate companies from each other. Furthermore, Jantunen, Ellonen & Johansson (2012) claim that it is not only the external factors that drive the development of dynamic capabilities, but also internal factors, such as the firm's history and strategic choices play a role. This matter, in turn, would be in line with Laamanen & Wallin's (2009) notion of the management's importance in steering the company's performance and capabilities.

As noted earlier, VRIN resources are the ones that enable firms to generate rents (Barney, 1991), and upon their adequate allocation and management, they may lead to competitive advantage (Eisenhardt & Martin, 2000). In line with Collis' (1994) proposal of different levels of dynamic capabilities, Ambrosini & Bowman (2009b) suggest that there are three levels of dynamic capabilities that function in improving and augmenting the firm's resource base.

The three presented levels of dynamic capabilities are:

i) incremental;
ii) renewing;
iii) regenerative dynamic capabilities. (ibid.)

Similar to continuous improvement, the first presented level of dynamic capabilities describes those that increase the firm's resource base. Hence, Ambrosini & Bowman (2009b), in accordance with Eisenhardt & Martin (2000), draw a distinction to Teece, Pisano & Shuen's (1997) view that dynamic capabilities would only occur in environments of rapid change. Instead, the dynamic capabilities in Ambrosini & Bowman's (2009b) incremental level also appear in more stable markets – according to Eisenhardt & Martin (2000), dynamic capabilities are more of an iterative and simple nature in such environments.

The second level of dynamic capabilities, as presented by Ambrosini & Bowman (2009b), draws a comparison to Winter's (2003) definition of first order capabilities, since they share and represent renewing characteristics. As opposed to the first level's incremental nature, the dynamic capabilities in this second level tend to be more common in changing environments, ensuring rent by modifying and refreshing the existing resource base. Thirdly, when the present dynamic capabilities turn out to be insufficient to have a significant effect on the firm's resource base, the dynamic capabilities themselves are to be renewed. Hence, firms would have a set of dynamic capabilities to evolve from current ones, allowing "the firm to move away from previous change practices, towards new dynamic capabilities" (Ambrosini & Bowman, 2009b:18). Needless to say, that this level of dynamic capabilities tends to be more common in firms operating in environments of rapid cycles, e.g. in information technology (ibid.).

Taking the above into account, when examining dynamic capabilities, one should take into consideration both their microfoundations (Teece, 2007) and the levels in which they function (Ambrosini & Bowman, 2009b). Moreover, one should not forget that there may be great company-specific differences (Jantunen, Ellonen & Johansson, 2012) in the performance of dynamic capabilities, while simultaneously keeping in mind the

levels where capabilities are developed (Laamanen & Wallin, 2009). Finally, the notion of capability lifecycles (Helfat & Peteraf, 2003) should be taken into account as well, since while operational capabilities maintain the business functioning, it is the dynamic capabilities that adjust the processes to the changed business environment.

It can be understood from the above why the theory of dynamic capabilities is a field that has grabbed the attention of many scholars (Barreto, 2009), particularly within the areas of strategic management and competitive advantage. The topic has become increasingly interesting due to the various nuances and levels that can be built on the platform-type of theory (Leiblein, 2011). Although on the one hand, the distinction of types and levels of dynamic capabilities structures the discussion, on the other, it opens further possibilities to explore adopt within the scope of the theory. With an aim of summarising the dimension of the topic of dynamic capabilities, in accordance with how Easterby-Smith, Lyles & Peteraf (2009:S6-S7) phrase the matter:

> *"dynamic capabilities can take a variety of forms and involve different functions, such as marketing, product development or process development, but the overriding common characteristics are that they are higher level capabilities which provide opportunities for knowledge gathering and sharing, continual updating of the operational processes, interaction with the environment, and decision-making evaluations."*

2.3 Management capabilities

Even though the focal point of this study is on *management capabilities*, the majority of the literature covered in this section is framed under *managerial capabilities*. In practise, it is the difference between individual and organisational management capabilities that can be the target of debate here. However, since an organisation is built by and around or upon individuals, it was deemed possible to present the notion at a managerial, i.e. individual level, and eventually expand it to a management, or organisational level. The rationale behind such approach is based on the scarcity of literature under the defined concept of management capabilities, as often the literature under said keywords is linked to capabilities in a specific field with the word

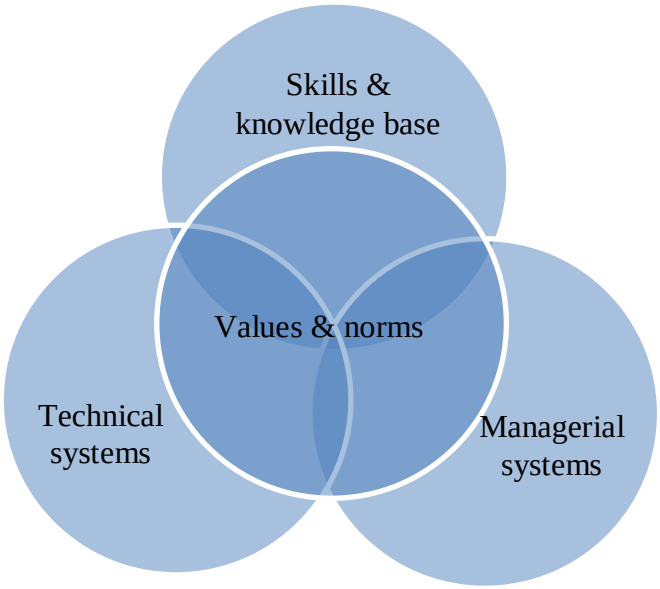
management in it, such as knowledge, human resources or supply chain management. In addition, as the scope of this thesis is heavily skewed towards operations, a section will be devoted to introduce the specifics of supply chain management and illustrate some of the capabilities that are necessary to manage said function.

The role of the organisation as an enabler for management capabilities cannot be ignored. After all, management is often executed through a set of defined structures, e.g. the existing organisational structures or the present infrastructure (Gold, Malhotra & Segars, 2001). The mentioned structures, in turn, both enable and ease carrying out the required managerial duties. Wasserman, Pagell & Bechtel (1999:23) argue that superior firm performance is attributed to organisational capabilities, while defining capabilities as "the result of managerial skill applied strategically to a firm's processes and resources in a variety of value chain areas going beyond just operations and technology". Given this view, the correlation between managerial capabilities as the elements building the organisation's management capabilities would seem positive.

In contrast, Adner & Helfat (2003:1020) present the notion of dynamic managerial capabilities, defining them as "the capabilities with which managers build, integrate, and reconfigure organisational resources and competences." In addition, they note that because of the differing resource and capability base between organisations, it may lead to differences in managerial decisions. So-being, although each manager has a role in shaping and reconfiguring the organisation, the existing platform, i.e. organisation and its resource base, is unique, leading by de facto to varying results.

When a capability differentiates a company strategically, it is considered a core capability (Leonard-Barton, 1992). Figure 5, below represents how the concept of core capabilities is divided into four different dimensions (ibid.). What ought to be pointed out is the interrelatedness between the four fields, while particularly taking note of the position of managerial systems in the model. Moreover, the division provides an interesting organisational platform on which to further evaluate capabilities, particularly within the field of management capabilities.

Figure 5: Four dimensions of core capabilities



Source: Leonard-Barton (1992)

Taking into consideration the set of unique resources and capabilities that a firm may have, Penrose (1959, in Barbero, Casillas & Feldman, 2011) highlighted the role of managerial capabilities as the most important one. This is based on the view that executive talent would be the largest impediment for growth, as it is the only resource that cannot be acquired in the short term (ibid.). Similarly, while also touching upon the function and role of agency theory, Castanias & Helfat (1991) bring about three levels of managerial skills and capabilities:

i) generic;
ii) industry-related;
iii) firm-specific.

The underlying message of the three levels is to highlight the heterogeneity and variance in the managerial capabilities between organisations. Castanias & Helfat's (1991) framework builds on the resource-based view, in this context with managerial skills and capabilities being the resources that are distributed heterogeneously between firms (Barney, 1991), and thus, explicating differences in performance. Castanias &

Helfat (1991) also highlight the framework for possible use when examining the correlations and possible variance in performance when the manager changes industry or firm, since the capability pool changes simultaneously. For instance, as Stamp (1981) notes, a capability is not a mere attribute of a person, but more of a characteristic on how the person patterns and orders their accumulated experiences in order to make sense and operate in their respective world.

Conversely, Barney (1991) highlights the position of managers in understanding and describing the economic performance of the firm as a critical factor for competitive advantage. Similarly, Mahoney & Pandian (1992) further emphasise the management's role in identifying how to best exploit the firm-specific resources. On the other hand, Graves & Thomas (2006) underline the role of managerial capabilities to configure and leverage the firm's resources concerning internationalisation and expansion abroad – a matter that is of significance considering this study.

Equally, Stamp (1981) scrutinises the accentuated role of analytical skills in evaluating managerial competence, as it may create a false evaluation of the person's decision-making skills. Although managers, having an important role in building and supporting competitive advantage for a firm through understanding different metrics and indicators, an equally important skill for them to have would be actual decision-making and resource allocation (ibid.). Lado & Wilson (1994:703), drawing on Westley & Mintzberg's work present that managerial competences include "the unique capabilities of the organisation's strategic leaders to articulate a strategic vision, communicate the vision throughout the organisation, and empower organisational members to realize that vision (Westley & Mintzberg, 1989)." In addition, according to Lado & Wilson (1994), managerial competences would also include the ability to create a beneficial relationship between the firm and its environment.

On a more operational level, Nilniyom & Ussahawanitchakit (2009) define managerial capability as the set of capabilities through which managers build, integrate and reconfigure organisational resources and competences. Similarly, Graves & Thomas (2006:208) share their definition of managerial capabilities as "the management capacity, management expertise and management processes available to the firm for

evaluating, shedding, adding, bundling, and leveraging its resources to achieve a competitive advantage." However, Acosta Molina, Barrios del Pino & Correa Rodriguez (2004) illustrate that the role of managers, despite everything, is based on acquiring, developing and deploying the resources that are present in the organisation, as well as delivering value to stakeholders through the creation of products. Hence, based on the statements above, although managerial capabilities would have a strong foundation in resource governance, strategy formulation and its deployment, their ultimate function would, nonetheless, remain delivering value to stakeholders.

Then again, Hamel (2011) questions the usefulness of managers and of the concept of management as a whole, given the prevailing hierarchies and top-heavy management models, leading to a notable loss of efficiency. As an alternative, a self-managing and empowering organisation with no superiors is presented with a case example. Perhaps this structure and approach will be considered a management capability in the future?

From an inter-firm relationships point of view, Lorenzoni & Lipparini (1999) raise the concept of integrating knowledge from within and outside a firm as an organisational capacity – with managers playing a central role at it. This notion is derived from the position of the firm's interrelatedness and networks with other companies, for e.g. a supplier network and its specialisation. Furthermore, Svahn & Westerlund (2007) attest to the role and position of networks, or nets in today's supply activities, while illustrating some of the identified key managerial capabilities within the concept of supply nets. Their four key areas what comes to managing supply nets are presented below, in Table 2. For an alternative approach to supply chain management capabilities, see Tracey, Lim & Vonderembse (2005) or Beske (2012) for a connection to sustainability when managing the supply chain.

Table 2: Capabilities in supply net management

Mode of management			
Influencing	**Controlling & monitoring**	**Coordinating**	**Integrating**
Required capabilities			
Communication	Tight monitoring of value activities	Time- and project management	Integration of multiple actors
Visioning capability	Tight control of production and delivery routines	Net mobilization	Rapid adjustment to dynamic environment
Crossing communities of practice	Knowledge codification	Exploitation learning	Building multiple roles
Adapting to heterogeneous needs	Product- and process improvement	Operations management	Joint knowledge creation
			Business innovation capability

Source: Svahn & Westerlund (2007)

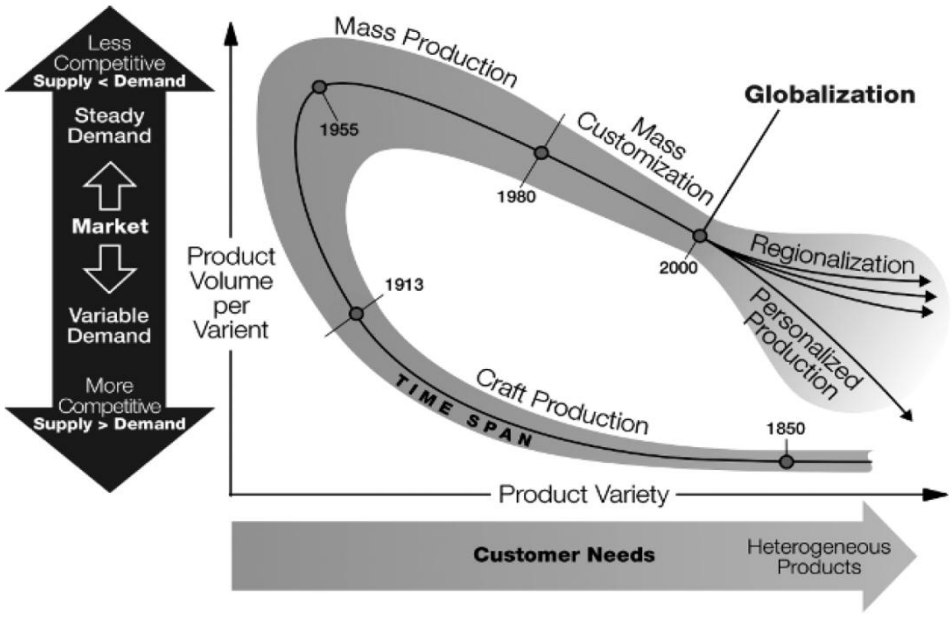
In a similar tone to Svahn & Westerlund's (2007) findings, Novicevic, Buckley & Harvey (2000:34) present the transition from the "Traditional hierarchical manager" to the "Emerging supply network manager". They simultaneously lay the foundation for understanding the required capability set of managing supply networks in the future. In practise, the shift is seen to occur from the traditional, hierarchical and administrative function to the emerging role of a manager, i.e. being more of a coach with an entrepreneurial spirit, while integrating action and cognition to each other. Needless to say, that the capability requirements for such individuals would affect all configurations on Castanias & Helfat's (1991) levels of managerial skills and capabilities.

2.4 Manufacturing strategy

The last section of this literature review will focus on the theories of manufacturing strategy. Not to mention the relevance of understanding the topic in terms of the thesis itself, the field of manufacturing strategy can also be linked to the RBV (Colotla, Shi & Gregory, 2003) as well as to both dynamic and operational capabilities (Ferdows & DeMeyer, 1990; Shi 2003;). More importantly, however, one of the key frameworks for this study, Ferdows' (2008) rooted-footloose operations network model will be presented in section 1.4.1.

In simplest terms, a manufacturing enterprise has three main functions, i.e. to design, make and sell products (Koren, 2010). In order for the firm to be competitive, the designed products need to be innovative and customisable, while maintaining a manufacturing capacity that can be easily reconfigured. Finally, the organisation also requires a responsive business model in sales, in order to succeed. Koren (2010) also describes the trends and factors that have affected the evolution and development of manufacturing paradigms, together with possible future directions in the field, presented to follow, in Figure 6.

Figure 6: The drivers of new manufacturing paradigms are market and society needs



Source: Koren (2010)

Skinner (1969) raised the concern for the position of manufacturing as a factor in corporate strategy, since its role in a firm's competitiveness tends to be often overlooked. Skinner's concern is based on the distance between manufacturing and managers, leading to a hindered understanding of the potential for the organisation that its manufacturing capabilities entail. Simultaneously, Skinner (1969) presents five categories of trade-off decisions that are to be resolved in terms of manufacturing, illustrated in Table 3, below. The fundamental idea is that you cannot have both of the alternatives, and thus, have to choose between the presented alternatives.

Table 3: Skinner's trade-off decisions in manufacturing

Decision area	Decision	Alternatives
Plant and Equipment	Span of process	Make or buy
	Plant size	One big plant or several smaller ones
	Plant location	Locate near markets or near materials
	Investment decisions	Invest mainly in buildings or equipment or inventories or research
	Choice of equipment	General-purpose or special-purpose equipment
	Kind of tooling	Temporary, minimum tooling or "production tooling"
Production Planning and Control	Frequency of inventory taking	Few or many breaks in production buffer stocks
	Inventory size	High inventory or low inventory
	Degree of inventory control	Control in great detail or in lesser detail
	What to control	Controls designed to minimize machine downtime or labor cost or time in process, or to maximize output of particular products or material usage
	Quality control	High reliability and quality or low costs
	Use of standards	Formal or informal or none at all
Labor and Staffing	Job specialization	Highly specialized or not highly specialized
	Supervision	Technically trained first-line supervisors or nontechnically trained supervisors
	Wage system	Many job grades or few job grades; incentive wages or hourly wages
	Supervision	Close supervision or loose supervision
	Industrial engineers	Many or few such men

Product Design / Engineering	Size of product line	Many customer specials or few specials or none at all
	Design stability	Frozen design or many engineering change orders
	Technological risk	Use of new processes unproved by competitors or follow-the-leader policy
	Engineering	Complete package design or design-as-you-go approach
	Use of manufacturing engineering	Few or many manufacturing engineers
Organizational and Management	Kind of organization	Functional or product focus or geographical or other
	Executive use of time	High involvement in investment or production planning or cost control or quality control or other acivities
	Degree of risk assumed	Decisions based on much or little information
	Use of staff	Large or small staff group
	Executive style	Much or little involvement in detail; authoritarian or nondirective style; much or little contact with organization

Source: Skinner (1969:141)

With reference to Skinner's (1969) definition of generic capabilities in manufacturing, i.e. cost efficiency, quality, dependability and flexibility, Ferdows & DeMeyer (1990) question the necessity of having to trade-off said capabilities between each other in manufacturing. Instead, the approach would develop from that of trade-offs to that of a more cumulative one. In essence, the suggested view would alter the way in which capabilities are built, i.e. rather built on top of each other than replacing one another.

Simultaneously, Drucker (1990) asks for a re-evaluation of the concept of production – with special regard to the roles of distribution and service in the production chain, which seemed to be forgotten by western manufacturers at the time. A few years later, Ferdows & Skinner (1993) present that the attitude towards and position of manufacturing and manufacturing management has changed significantly, as the view had evolved from a cost-creator to a strategic resource. In part, one of the drivers for the change was considered the external environment, with technological developments having a central role.

Given the new production ecosystem, Ferdows & Skinner (1993) raise four concepts which are to be re-considered in order to succeed in the future, claiming that unless they are well-established and managed accordingly, the firm will not succeed in manufacturing in the evolved paradigm:

i) internal control of operations;
ii) manufacturing investment decision;
iii) manufacturing strategy;
iv) manufacturing management skills.

Considering the evolution of manufacturing since Skinner's (1969) work, Voss (1995) identifies three predominant paradigms under manufacturing strategy, illustrated below in Table 4. In broad terms, touching upon Porter's (1980) work in strategy, competing in manufacturing is based on cost, quality, dependability and flexibility (Wheelwright, 1984; DuBois, Toyne & Oliff, 1993). However, Hayes & Pisano (1994:86) urge manufacturing companies to adopt a more long-term oriented strategy, i.e. one that does not "confine itself to guiding short-term choices between conflicting priorities like cost, quality, and flexibility", since constant manoeuvring hinders the creation of differentiating operating capabilities, and thus, competitive advantage.

Despite Miller & Roth's (1994) taxonomy of manufacturing strategies, and although Ward, Bickford & Leong (1996) present four basic strategic configurations to compete with in manufacturing, Voss' (1995) mapping of the three prevailing manufacturing strategies will only be presented in more detail. This is due to Miller & Roth (1994) illustrating more the nature of companies instead of their actual manufacturing strategies, while Voss' (1995) categorisation offers a more concise platform to examine – not to mention simultaneously covering also what Ward, Bickford & Leong's (1996) suggest. The three manufacturing strategies that Voss (1995) identified are:

i) competing through manufacturing;
ii) strategic choices in manufacturing;
iii) best practise.

The first identified manufacturing strategy by Voss (1995) is strongly based on the firm's capabilities in manufacturing, as competing in itself would occur through aligning them with the firm's corporate and marketing strategies (cf. St. John & Hall, 1991; Hausman, Montgomery & Roth, 2002), as well as the market's demands. The second strategy is namely the need for matching internal strategic decisions with the external environment. In practise, the approach is based on matching the product with the customer. Thirdly, the final manufacturing strategy that firms can pursue is by adopting best practices and continuously developing them in all areas within the company. Eventually, this approach is seen to lead to world class manufacturing and increased competitiveness. (Voss, 1995)

Table 4: Three paradigms of manufacturing strategy

	Competing through manufacturing	Strategic choices in manufacturing	Best practices
Key concepts	Order winners	Contingency approaches	World-class manufacturing
	Key success factors	Internal and external consistency	Benchmarking
	Capability	Choice of progress	Process re-engineering
	Generic manufacturing strategies	Process and infrastructure	TQM
	Shared vision	Focus	Learning from Japanese
			Continuous improvement
Process			
Measurement			

Source: Voss (1995)

According to Voss (2005), during the 1990s the dominant view was that competition was pursued through the factory. With the rise of outsourcing and offshoring, however, the view was eventually deemed too narrow and obsolete over time (ibid.). Considering the development of the manufacturing ecosystem, Ferdows (1997) points out that the benefits of manufacturing abroad are not fully exploited if foreign production facilities are only built because of tariff or trade concession advantages. The main reasons for

manufacturing abroad are presented namely as tariff and trade concessions, cheap labour, capital subsidies or reduced logistics costs.

In order to achieve the best results from the trend of international manufacturing, Ferdows (1997) suggests a division of six different roles for foreign factories:

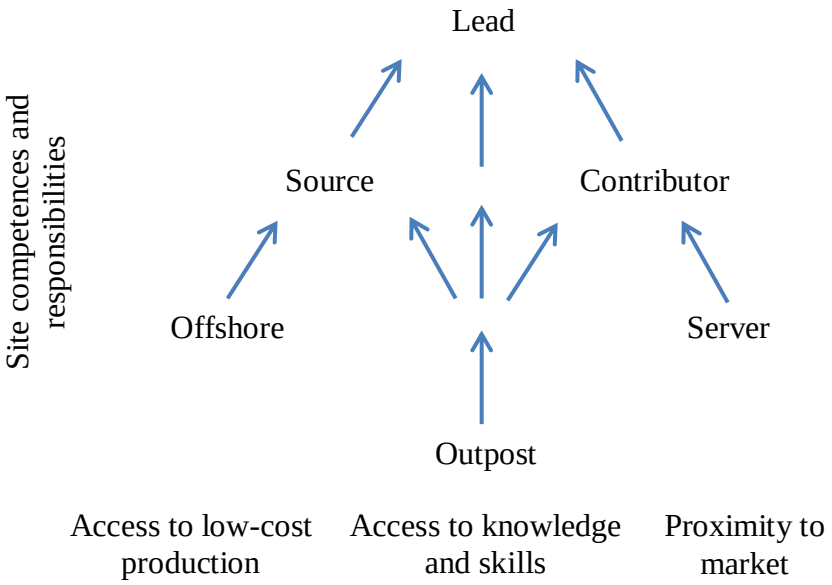
i) offshore factory;
ii) source factory;
iii) server factory;
iv) contributor factory;
v) outpost factory;
vi) lead factory.

The strategic role of the six different factory types is exemplified in Figure 7, below. According to the division of roles for foreign factories, as presented by Ferdows (1997), the lowest threshold for international manufacturing is through an offshore factory. Typically they are established to produce at low cost, with a defined output, with very little additional investment or development taking place. A source factory, on the other hand, operates with a similar basic concept as an offshore factory in terms of low cost, yet with greater strategic importance. In addition, its managers have a greater authority in terms of selecting suppliers, outbound logistics and customisation. The purpose of server factories is typically to serve a specific region or area, while simultaneously having a position in overcoming tariff barriers or reducing logistics costs, for instance. Despite having more authority over products and production methods than an offshore plant, its autonomy is quite limited. Similarly to the position of a server factory, a contributor factory's position is also that of serving a regional or national market. However, its role also includes product and process engineering, as well as having a say in the selecting the key suppliers for the company. (Ferdows, 1997)

In essence, Ferdows' (1997) concept of a contributor factory may compete with the company's home plants to be the testing site for future developments. Moreover, an outpost factory has two roles. On the one hand it is established to collect information concerning developments within the entire supply chain, as well as customer

preferences. On the other, it naturally has a production function as well – typically similar to that of a server or offshore factory. Finally, a lead factory develops company-wide processes, technologies and products. The site builds on local knowledge and skills, in order to further develop the product portfolio of the entire company. The management of lead factories has a significant position in choosing the company's suppliers, as well as the factory initiating innovations on a frequent basis. When properly managed, combining and defining the roles of different factories complements the view of having a global factory. Simultaneously, the set-up supports the company's manufacturing capacity in becoming a source of competitive advantage for the firm. (Ferdows, 1997)

Figure 7: Primary strategic reasons for factory types



Source: Ferdows (1997)

Building on the above, as well as on Shi & Gregory's (1998) views of firms needing to focus on their international manufacturing networks, Colotla, Shi & Gregory (2003) combine the interdependence of factories with network capabilities. In practise, they combine the RBV and the theory of capabilities to the context of manufacturing, as an approach to support the requested re-definition of operating manufacturing networks. Moreover, elaborating on Shi's (2003) suggestion of having four building blocks to

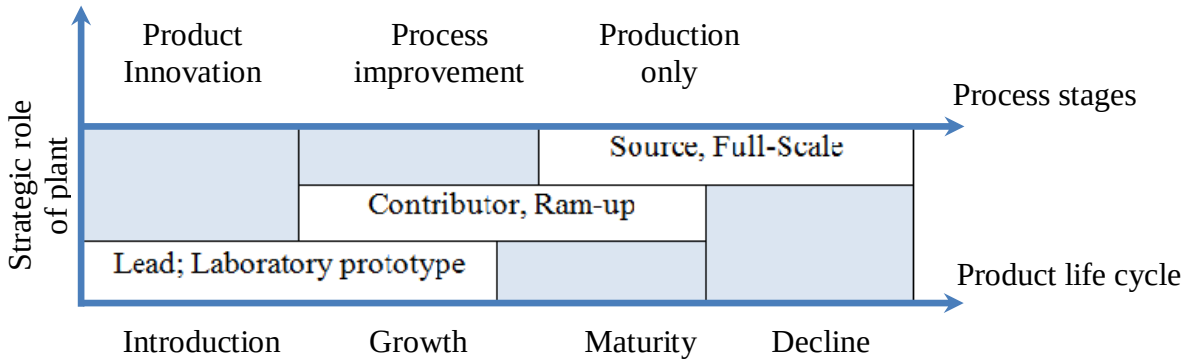
build the manufacturing system of the future, Shi, Fleet & Gregory (2005) take the discussion of having a global production network a step further and highlight the possibility of collaborative manufacturing between companies in a value creation network. In addition, gaining supply network advantages when combining geographically spread manufacturing facilities (Shi, Fleet & Gregory, 2005) is also raised as a possibility considering future set-ups.

The present, international nature of manufacturing sites bring both challenges and opportunities in numerous fields, those including coordinating and configuring the manufacturing network (Rudberg & West, 2008; Waehrens, Riis & Johansen, 2011), logistics (Cooper, 1993) and knowledge transfer (Lipparini & Frantocchi, 1999), among others. So-being, having a manufacturing footprint strategy has, and is expected to continue, to become increasingly important (Christodoulou, Fleet & Hanson, 2007; Simchi-Levi et al., 2012). This view can be attributed to developments in numerous fields in logistics, ICT and supply chains, together with the rise of low-cost nations in the competition (Cheng, Farooq & Johansen, 2011). The re-defined operating environment has led to the fact that simply being lean is insufficient to being competitive at a global scale anymore (Christodoulou, Fleet & Hanson, 2007; Ferdows & Thurnheer, 2011).

Hence, the key business process, according to Christodoulou, Fleet & Hanson (2007) is becoming the configuration and location of manufacturing plants. In practise, the key factors to consider include what the manufacturing locations are and how they should interact, their strategic parts and process as well as coordinating and monitoring their transition. Contrary to previous or the lack of manufacturing network configurations (Cheng, Farooq & Johansen, 2011), Lamarre, Pergler & Vainberg (2009:1) claim that because of all the turmoil that the recent financial crisis has caused, "redesigning the manufacturing footprint can be the biggest and most important transformation a manufacturer can undertake." In essence, Cheng, Farooq & Johansen (2011) allude that in order for firms to remain competitive in today's business environment, they have to re-think their manufacturing footprint. Building on Ferdows (1997), Figure 8, below, describes the relationship between the product/process and the strategic role of the

manufacturing plant, also working as a basis for better understanding the concept of the manufacturing footprint.

Figure 8: Relationship between product/process and strategic role of plant



Source: Cheng, Farooq & Johansen, (2011)

However, given the recent and on-going developments in the global economy, including the volatility of oil prices, rising labour costs in emerging economies and demand shifts (Simchi-Levi et al., 2012; Raunio, 2012), the notion of backshoring (Kinkel & Maloca, 2009; Deloitte, 2009) has become increasingly relevant. The concept refers to the re-allocation of previously offshored operations, such as manufacturing or R&D for instance, back to the home country (ibid.).

Touching upon the topic, Pisano & Shih (2009) and Handley (2012) raise the concern over the effects of continuous offshoring. In essence, the past decades of "destructive outsourcing" (Pisano & Shih, 2009:1) that has been practised in the US, has left the American industry without the capabilities and position to come up with the technological advances for the future – unless both the government and firms take action, promptly. Similar concerns are raised by the Boston Consulting Group (2009), which emphasises the need for innovative approaches in the manufacturing industry, in order for the US to regain its competitiveness. From a more academic perspective, Handley (2012) is alarmed by the loss and disposal of capabilities when outsourcing decisions are executed. Despite a past decade of global outsourcing and offshoring, however, it yet remains to be seen if a global wave of backshoring will emerge or not.

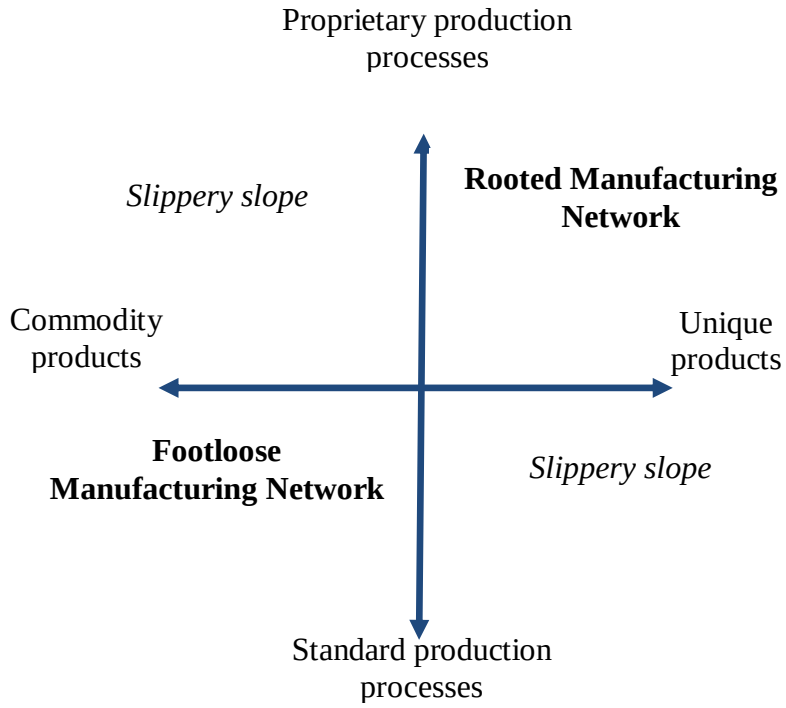
2.4.1 Ferdows' (2008) Rooted – Footloose framework

According to Ferdows (2008), manufacturing has been shifting towards the question of where to produce certain production tasks, as opposed to deciding on where to produce a certain product. Given that the evolution and rationale behind choosing the respective production network for companies is highly industry-, sector- and company-specific, Ferdows (2008) suggests a framework (see Figure 9, below), with an aim of clarifying the strategic options in developing said production networks.

The framework is based on differences in the nature of the production networks of companies, with two extremes termed "rooted" and "footloose". The respective types of production networks are positioned according to the exclusivity of their production systems, as well as the uniqueness of the product itself. A rooted production network is characterised by distinctive capabilities of the company's own manufacturing sites. The production processes are often deeply embedded in the firm through tacit know-how, which, in turn, is difficult to transfer between manufacturing locations. The rooted approach bases its competiveness on unique products and proprietary production processes – which, simultaneously, require strong commitment and investment from their suppliers as well. Hence, stability, commitment and a strong investment practise in existing capabilities and locations are representative of said manufacturing networks. (Ferdows, 2008)

In turn, the footloose production network, as suggested by Ferdows (2008), has a more explicit approach towards knowledge in its production processes, enabling an easier transfer between manufacturing locations. The underlying notion is that the footloose approach does not see proprietary manufacturing capabilities as a source of competitive advantage. Instead, it relies on the manufacturing capabilities of others. Through such way, capital can be freed for investing in other activities, such as design or marketing, for example. In essence, the term is created by the nature of production being moved to different locations according to the ease of manufacturing – referring to labour cost, availability of raw material and proximity to markets, among other factors. (Ferdows, 2008)

Figure 9: The basics of the rooted – footloose framework



Source: Ferdows (2008)

A company can well adopt both approaches in their production network, since the views in the framework are not mutually exclusive. Zara, for instance (Ferdows, 2008) has been able to allocate a part of its production, for e.g. simple and more predictable garments such as men's shirts, under the footloose quadrant, while maintaining other less predictable, time-sensitive and complicated garments, such as women's suits in seasonal colours, under a more rooted network (ibid.). In essence, the footloose approach enables the company to differentiate on cost (Porter, 1980), while the rooted view enables differentiation in other fields. However, the division of what to produce as rooted and what to manufacture as footloose ought to be clearly defined and planned ahead (Ferdows, 2008).

In case the company has a unique product, yet the production processes are relatively standard, the company would be dependent on patent protection and secrecy from its suppliers. In such case, Ferdows (2008) defines the company to be in a slippery position, taking Sony as an example. Simultaneously, in case the company has more of a proprietary production process, yet with an inclination towards a commoditised

product, the company, with Ferdows (2008) taking Lego as an example, would also be considered being in a slippery position when it began outsourcing its production to Flextronics. In such situation, when possessing a highly proprietary production process, the transfer requires significant investments in order to become a worthwhile shift. (Ferdows, 2008)

Correspondingly, there are a number of factors that would make footloose production an attractive option, those including outsourcing production to contract manufacturers and moving operations to a location where the taxes and wages are lower, together with more attractive subsidies or a larger raw material pool (Ferdows, 2008). However, the footloose orientation also shares four main hidden costs:

i) loss of expertise;
ii) harming the morale;
iii) product commoditisation;
iv) helping competitors.

The loss of expertise is mainly attributed to the difficulty in shifting tacit knowledge between manufacturing locations, as opposed to having a vast pool of explicit knowledge to transfer. Moreover, when a decision of moving production to a new location is communicated to the current location, it goes without saying that it is very likely to have a negative impact on the personnel's productivity. Upon making a transferring decision, most likely to contract manufacturers, the risk that the product will become increasingly commoditised is self-evident – simultaneously leading to decreased profit margins for the outsourcing company, resulting in cost-cutting elsewhere. Finally, having set up a manufacturing site, in case the decision to close it down is taken, it leaves a ready-made facility with pre-established processes for competitors to approach. So-being, the notion of being footloose has to be carefully considered and coordinated with a long-term view, as making swift, ad hoc decisions may end up hindering overall company performance. (Ferdows, 2008)

Nonetheless, it ought to be taken into consideration that the presented framework is not definite, as often firms combine attributes of both orientations. So-being, a firm's

production network should be carefully studied within its own, specific context composed not only of industry-specific attributes, but company-specific and maturity-level related factors as well.

In this study, the framework will be used to map the current location and prospective direction that the firms in the scope of the study will be moving towards, at a general level. In addition to its present structure, Ferdows' (2008) framework can also be used as a platform to elaborate and build upon with other criteria, such as incorporating local or global factors in the matrix as well (Laiho, 2012).

3 METHODOLOGY

Having covered the most relevant theories and frameworks concerning the study, this chapter will present the structure of how the research for the study was carried out. To follow, an overall presentation of the data gathering will be described, followed by dedicated sections to elaborate both on the qualitative and quantitative phases of the process.

3.1 Research design

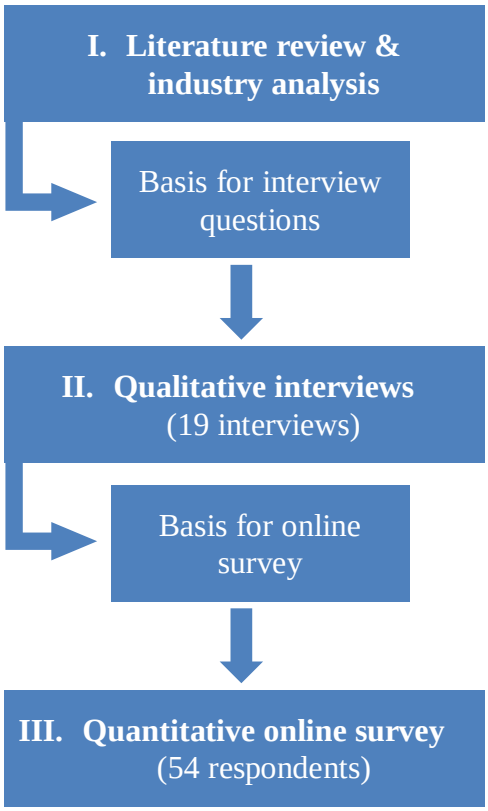
The structure of the study itself can be divided into three main phases:

i) a preliminary literature review and industry analysis;
ii) qualitative company interviews;
iii) a quantitative online survey.

This chapter will focus on describing the two latter stages of the research, as the previous chapter presented the outcome of the literature review. During the first phase the use of secondary data was accentuated, being composed of predominantly academic articles, industry analyses as well as past studies related to the research topic. Phases two and three represent a stronger gathering of primary data, including company interviews and with top and senior level management as well as a quantitative research questionnaire.

Even though the process is presented as a three-step model, the role of the first phase, i.e. the literature and industry review, is not to be considered a single and isolated phase, as such, but rather a more iterative and on-going process that was carried on during the two latter stages as well. Having a three-step approach to the research also reserved the possibility for complementing the theoretical basis of the study itself at later stages. The data collection process for the study is presented in Figure 10, below.

Figure 10: Data collection process



The first step for carrying out the research was to conduct a brief, yet comprehensive literature review on the topics at hand. The purpose of this phase was to gain a preliminary understanding of the prevailing theories and concepts in the field itself, as well as enabling the selection of adequate frameworks from the relevant research fields, since the interview questions were built based on the literature and industry reviews, carried out during the first stage. The four identified areas that were to be studied in the interviews with greater detail were agreed to be:

i) the companies' business models and their development;
ii) the firms' capabilities, management capabilities and their development plans, incl. investment targets;
iii) the interfaces in the supply chain, with special regard to the interfaces of R&D with manufacturing and manufacturing with sales;
iv) how the firms' capabilities are aligned with the changing business environment, strategy and business model.

Having created the guide for the interviews (see appendix 1), the second phase was to conduct the qualitative company interviews. A total of 19 company interviews were performed between June and September 2012. The rationale behind this phase was to obtain an understanding of interpretive nature of the critical capabilities and management capabilities that are currently prevailing in the Finnish manufacturing industry. Through the interviews it was sought to grasp an idea of the present business models that companies are operating under, together with the way said business models have evolved. It was also set among the interviews' objectives to gain consciousness concerning the future development directions of the identified capabilities and management capabilities, while also seeking an understanding of the investment targets that companies operating in the Finnish manufacturing industry are planning.

Since the purpose of the company interviews was to act as the basis and backbone for the online survey, the survey was structured according to the three key topics identified in the interview stage. The three key themes that were highlighted in the interviews were:

i) the companies' business models and their development;
ii) capabilities and future capability requirements;
iii) future investment targets.

As the third and final phase of the research, an online survey (see appendix 2) was formulated based on the gathered data from the company interviews. The survey was sent to a compiled company database at the beginning of August 2012, covering 430 firms operating in the Finnish manufacturing industry. The aim of the survey was to provide a more elaborate and in-depth understanding of the prevailing conditions and future directions of the industry, while, in turn, extending the reach and validity of the study as a whole.

The mixed methods research design (Johnson & Onwuegbuzie, 2004) was chosen as the research approach for this study due to its complementary nature (Vidich & Shapiro, 1955; Bryman, 1984; Onwuegbuzie & Leech, 2005), of combining both quantitative and qualitative data. Specifically within the scope of this study, the two-fold research method was agreed to help clarify and better understand (Bryman, 2007; Bryman &

Bell, 2007) the topic as a whole, together with the relationships within it. Greene, Caracelli & Graham's (1989) justifications for combining qualitative and quantitative research were also considered applicable for this study – particularly within the spheres of complementarity, expansion and development. These matters also validate the choice of the research design. More precisely, the chosen approach is a sequential, mixed methods approach, as the qualitative part is first analysed and then used as the foundation for the quantitative section.

3.2 Qualitative company interviews

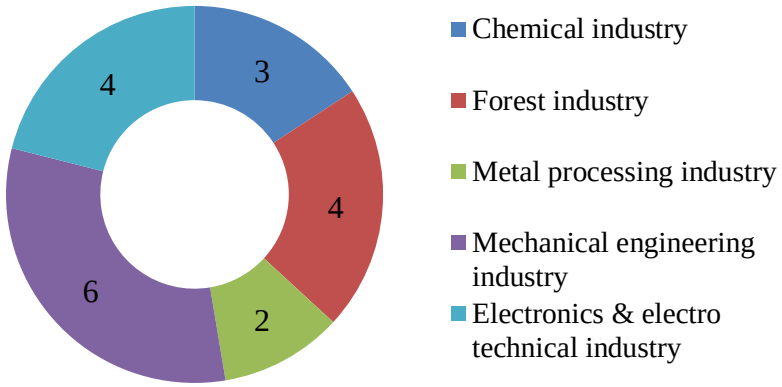
3.2.1 Selection of interviewed companies

The selection of the interviewed companies was largely based on the previous year's study's profiles and participants (Mälkiä, 2011), with a few alterations to the prior sample due to declines and conflicting schedules. However, the total spectrum of the 19 companies interviewed is a balanced mix of large companies and SMEs, from the defined five sectors within the manufacturing industry, with Figure 11, below, illustrating the division of the interviewed companies by sector:

i) chemistry;
ii) forestry;
iii) metal processing;
iv) mechanical engineering,
v) electronics & electro-technical.

In addition, the companies display a great variation in their structure and degree of internationalisation, ranging from large multinational companies that have global operations to smaller companies that operate in a relatively local or regional scale. Having a sample with representatives from multiple fields, backgrounds, ownership structures and set-ups was critical for the validity of the study already at this stage, as there can be notable differences in the development plans for companies from different sectors and sizes, concerning all of the examined themes.

Figure 11: Division of interviewed companies by industry sector



The 19 interviews were carried out during June – September 2012, as presented below in Table 5. Out of the nineteen interviews, 63% were conducted face-to-face. In 58% there was only one interviewer, while in the remaining there were two or more interviewers. One interview was conducted in English, while all others in Finnish. The reason for conducting one interview in English was because one respondent was not a native Finn, and despite the interviewee's fluency in the language, it was mutually agreed that conducting the interview in English would be the fairest for all parties. Nonetheless, the online survey was compiled after completing 18 of the 19 interviews, as it was agreed that with all but one of the scheduled interviews conducted, the relevant themes would have risen.

Table 5: Schedule and course of conducting interviews

Inter-view	Date	Time	Type	Location	Duration	Inter-viewers
1	7.6	10.00	Face-to-face	Company HQ	1h 04 min	2
2	11.6	10.00	Telephone	Deloitte HQ	36 min	1
3	14.6	14.00	Face-to-face	Company HQ	52 min	2
4	15.6	16.00	Face-to-face	Deloitte HQ	1h 06 min	2
5	18.6	10.00	Telephone	Deloitte HQ	1h 03 min	3
6	19.6	13.00	Face-to-face	Deloitte HQ	50 min	2
7	20.6	11.00	Face-to-face	Company HQ	57 min	1
8	21.6	09.00	Face-to-face	Company HQ	1h 13 min	2
9	21.6	15.00	Telephone	Deloitte HQ	34 min	1
10	25.6	16.00	Face-to-face	Company HQ	58 min	1
11	26.6	10.00	Face-to-face	Company HQ	54 min	1
12	26.6	14.00	Face-to-face	Company HQ	49 min	1
13	27.6	10.00	Telephone	Deloitte HQ	36 min	1
14	28.6	10.30	Face-to-face	Company HQ	40 min	2
15	24.7	10.00	Telephone	Deloitte HQ	44 min	1
16	6.8	12.00	Telephone	Deloitte HQ	31 min	1
17	6.8	15.00	Face-to-face	Company HQ	58 min	2
18	7.8	10.00	Telephone	Deloitte HQ	57 min	1
19	17.9	15.00	Face-to-face	Company HQ	35 min	2

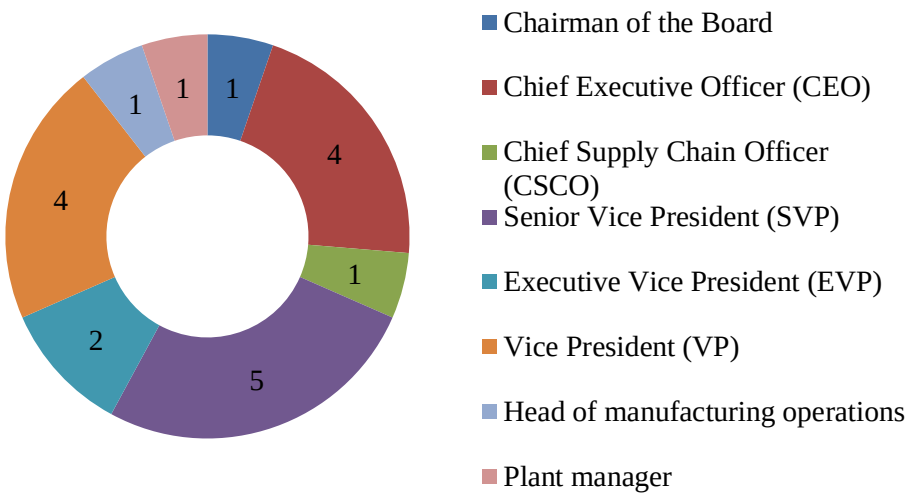
3.2.2 Interview themes

The interviews were based on a semi-structured set of questions (see Appendix 1) that was sent to the respondents in advance. The positions of the interviewees are presented in Figure 12, below. The interview questions had four main themes, as followed:

i) Background of the company: business model and its development, footprint and position of manufacturing in business model;
ii) The company's capabilities and management capabilities and future capability needs and investment targets;
iii) The interfaces in the company's supply chain, their synergies and coordination;
iv) The alignment of the company's capabilities to the business environment, business model and strategy.

The aim of the first theme was to map the companies' business models according to Weill et al.'s (2005) business model archetypes[1], as well as offer the interviewee a chance to elaborate on the past development and key factors affecting the business model's evolution in the firm. In addition, it was sought to be able to classify the company's manufacturing model according to Ferdows' (2008) framework of a company having a rooted and footloose manufacturing strategy, as well as gaining an understanding of the position of manufacturing itself within the company's business model. Simultaneously, the first theme allowed the interviewee to describe the company's manufacturing strategy, aiding the understanding of the company's establishment and position in its operations network.

Figure 12: Positions of interviewees



The second theme aimed at identifying the companies' capabilities and management capabilities in terms of manufacturing and managing their supply network. For the ease of discussion, a brief definition of capabilities (Teece, Pisano & Shuen, 1997; Winter, 2003) was provided with the interview questions. In addition, the topic aimed at understanding the development of said capabilities, with focal regard to the influence of internationalisation to their growth and development. More precisely, the aim was to

[1] Weill et al. (2005) present four basic and sixteen detailed business model archetypes. For the scope of the study the most relevant are the Creator and Distributor business models, depending on whether the company only manufactures (Distributor) or also designs (Creator) the end product. The sellers of the right to use (Landlord) or matchmakers (Broker) are also possible business models, yet they are assumed to be less likely to come up in the research scope.

construct a timeline from the past, present and future in terms of the companies' capabilities. In such way, the companies would be able to visualise and evaluate their capability developments and assess the drivers behind such developments. Similarly, the theme also touched upon the future requirements of the company, mainly concerning management capabilities, with an aim of exploring the future business environment of the company and the way the firm is investing to meet its future challenges.

To follow, the third theme of the interviews examined the interfaces between the different phases of the supply chain. In particular, the interfaces between R&D and manufacturing, as well as between manufacturing and marketing were taken under scrutiny. In practice, the questions were directed to identify how, if in any way, the management and coordination between the different phases in the supply chain was arranged. This topic supported the first theme of understanding the role of manufacturing in the company's operations, while also enabling the evaluation whether the supply chain is managed as a whole, as opposed to being treated as independent phases.

Finally, the fourth theme was based on examining the way the company's capabilities, business model and strategy are aligned. In practice, the questions were constructed to gain an understanding of the way in which the firms develop their capabilities. Are they developed in a more of an ad hoc way or through structured, goal-oriented development plans? Simultaneously, the structure of the organisation, in terms of decision-making and alignment of the strategy to the business model, were discussed.

The four themes composing the interviews provided insights to the structures and business models of the companies operating in the manufacturing industry, while also shedding light on the array of capabilities and management capabilities that the firms operate with. In addition, the relationship and dependence between the company's business model, strategy and capability development plans was illustrated.

The idea for having the four themes present in the interviews was to examine the suitable foundation for the online survey. It was assumed that there would be 2-3 main themes that would be of most interest for the interviewees, which would then be taken

into further examination in the quantitative phase of the study. After all, the aim of the third phase of the methodology was to pursue a deeper understanding of the actual topic at hand, with the ultimate goal of gaining a more valid and more comprehensive basis for answering the research questions.

3.2.3 Interview data analysis

As mentioned earlier, the fundamental purpose of carrying out the company interviews was to be able to identify some of the key elements within the research area, in order to create and carry out a quantitative survey with a larger sample in the scope of the study. For this purpose, the interviews were recorded and transcribed, after which they were collectively coded using Microsoft Excel, as proposed by Meyer & Avery (2009). The contents of the interviews were categorised in the coding process under the corresponding industry classes and interview themes (see chapter 3.3.2), in order to comprehend the different nuances of the respective sectors.

From the interviews, six themes rose. The synthesis composed of these six topics is by no means to be treated as the results of the interview round (Mikkonen, 2010), but more of an acknowledgment and a guiding tone for the remainder of the study. Table 6, below, will indicate which topics rose in which industry sectors.

Firstly, it became apparent that SMEs seemed to be more alarmed by the current and on-going transformation of the industry, compared to larger firms. While it was widely acknowledged that structural change has occurred and is present in the industry, it was seen that the larger firms are better established to face the future than the smaller companies – while having varying degrees of consciousness as well. As the CEO of a medium-sized company phrased the matter: *"Some of the companies are well aware and very conscious of the situation, and then there are those who are asleep and still believe that oh, yes, the good old days will come back as they were, once again."*

Similarly, the VP of production of a different medium-sized company expressed that:

> *"I've touched upon this, when I talked about the structural change of the market, and these are value-based decisions of what we do, for whom, and how. It's no use looking in the rear-view mirror; things won't work with the old template."*

Moreover, the concept of having a clear direction for change raised some degree of concern, namely posing the question how orderly and structure are the firms' development plans. In essence, the balance between forced, external change and change stemming from within the company was a topic of interest. In other words, the question is, how voluntary is change in the given context?

The second finding became of interest, since it was not directly asked for during the interviews. It came up naturally during the course of the talks in each interview. It became clear that cost-optimising and developing the company's network in terms of agility, referring both to the firm's supply network as well as its position in the network of the company, if applicable, is a priority. Some companies claimed their network's agility to be a competitive advantage for them, while others remain completely focused on cost-optimising their network for better performance. A SVP from a large company, while discussing sourcing and the availability of raw materials explicitly stated that: *"our profitability is largely in the hands of our [supply] network, and how well we can manage it."*

Thirdly, not only the international experience of the employees was accentuated, but their readiness and international competence were emphasised as well. The unanimous message was that since the markets are global these days, you also need the understanding and skills to work with other manners and ways of doing things. Some companies had adopted international graduate trainee programs, while one company illustrated that the requirements for advancing to a managerial position in the company include not only having lived in at least two foreign countries, but also having worked at least in two different functions as well. An EVP from a large company presented their philosophy: *"Internationality and cross-functional teams have to operate in a process-environment. There has to be this… you have to achieve a non-parochial, more metropolitan thinking. Not a metropolis but more international."*

Fourthly, touching upon sales management, the concept of managing and developing the product portfolio was raised. In essence, the balance between customer-oriented yet maintaining some limits to what is produced was sought. Furthermore, as some industries, e.g. ICT, tend to be rapidly-evolving, the dismissal of so-called legacy products was mentioned as a future challenge. In more of the engineering sector, the need for de-engineering and adapting their business model to emerging markets was highlighted. For others, the notion of responding swiftly to customer demands, i.e. emphasising agility and the postponed or late customisation of variants was emphasised. On the other hand, the forecasting of sales was described as critical for performance in one interview. The chief supply chain officer of a large company illustrated that:

> *"Anything that you have designed can be sold globally with Western technology. That is the problem – it doesn't work with emerging countries. You need to find a middle segment or a low segment and that is not in our portfolio today."*

Slightly touching upon the previous finding, the concept of foresight was emphasised in multiple occasions. Not only was it present in relation to marketing but also in technology, production methods sourcing and also within R&D, in terms of bio-based resources. This way, it was sought that it would be possible to minimise the possible damage and risk arising from the eventual change – a form of risk management, so to say. In relation to the first finding, i.e. the notion of forced vs. voluntary change, this finding does present a relatively strong inclination towards the future and making use of the possibilities that it entails. As the CEO of a division of a large company described the situation: *"How high is high changes constantly. Although it is a cliché, they really do change year after year. You have to be better in order to pull through"*

Finally, the sixth finding refers to the role and function of sustainability and company values as a management capability. One company saw it as a common and mutual basis for the entire organisation, while another described it as the precondition on which all business activities are carried out. The concept of sustainability was also raised a key differentiator on a global scale. The SVP of business development of a business unit in a large company raised sustainability also to a characteristic at the industry level:

"Yes, the company will continue having it [sustainability] as a belief. Only that it is extremely hard to measure. In our clientele we have quite a few who will not, under any circumstance, accept e.g. [competitor's name] products. It's actually so that back in the days you thought that ethical investing would be so big that it would motivate companies to get on board, but in our client portfolio, more and more clients will not accept unsustainable products in our field."

As mentioned before, it ought to be kept in mind that the six findings presented above are not to be considered as the results from the interview rounds (Mikkonen, 2010. Rather, their purpose is to illustrate the way how the themes rising from the qualitative section guided the construction of the quantitative survey. Table 6, to follow, presents the representation of said findings in each industry sector, accompanied by whether the finding was raised by an SME or large company.

Table 6: Distribution of interview findings by industry sector

Finding	Industry sectors where present
Smaller firms more concerned over future, approach towards driving change varies	Metal processing (SME); Metal mechanical (large & SME); Electronics (Large)
Network management and development is critical	Chemical (large); Metal mechanical (large); Forest (large); Electronics (large, SME)
Emphasis on the international experience and competence of employees	Chemical (SME); Metal processing (large, SME); Metal mechanical (large); Forest (large)
Managing and developing product portfolio	Metal mechanical (large); Metal processing (large); Electronics (large, SME)
Foresight along all fields of supply chain, not just marketing	Chemical (large & SME); Metal processing (large); Electronics (large & SME); Forest (large); Metal mechanical (small)
Role and position of sustainability and values	Forest (large); Metal mechanical (large); Chemical (SME)

3.3 Quantitative online survey

Conducting a quantitative online survey was the third and final phase in the research methodology. This sub chapter will elaborate on the contents, structure, recipients and

actual execution of the survey. Finally, the method of analysing the data will be illustrated, whereas the actual results of the questionnaire will be covered in the following chapter, in section 4.2.

3.3.1 Contents of the survey

As mentioned previously, the qualitative interviews served as the foundation for the quantitative survey. The questionnaire, in English, was built on the topics that raised most interest in the conducted interviews, acting simultaneously as a defining or limiting method for the contents of the questionnaire itself. The aim of the survey with its twenty questions was to gather a larger sample of respondents to present their corresponding views to their respective industry sector, company and business model. As the purpose of the survey was to be a descriptive one, a seven-point scale was chosen to be used when applicable. Inspired by Miller (1994), and in accordance with Cox (1980), Preston & Coleman (2000) and Rose (2012), it was agreed that by using a 7-point scale, the validity, together with the nuances and differences within the industries would be highlighted better than with a 5-point scale.

The contents of the online survey (see Appendix 2) can be classified into three sections. The first section gathered the background information of the respondent, seeking also to identify the company's ownership, structure and legal domicile, together with the relevant financial data, primary customers and number of employees in Finland and abroad. The industry sector was also classified at this stage, while presenting the present and expected importance of geographical regions for the company's operations as well. The world was divided into 13 sections, isolating the BRIC countries (Brazil, Russia, India and China), Finland and the Baltic countries from their corresponding continents. There was also made a distinction between Asia, the Middle East and Asia Pacific, Eastern Europe and Northern & Western Europe. In addition, North America was defined to include Mexico as well – leaving Latin America, excluding Brazil, and Africa as two continents. Finally, the ownership of manufacturing sites both in Finland and abroad was sought, as the composition of the firm's manufacturing footprint was believed to play a critical role in the orientation of the company.

The second section of the survey was built around the topic of the firms' business models and their development. To begin with, the business model archetypes of the firm, as classified by Weill et al. (2005), together with the company's orientation concerning its production network (Ferdows, 2008) were inquired about. The rationale for choosing these two frameworks as the theoretical foundation for the survey was largely based on the clear definitions and generalizability of Weill et al.'s (2005) classifications of business models. On the other hand, Ferdows' (2008) rooted-footloose framework not only was at a focal point in Mälkiä's (2011) study on the Finnish manufacturing industry, but it also provides interesting insights and comparison possibilities on the nature of the company's operations network.

Before concluding the second section of the survey, the current structures of the firms were queried, followed by the ways in which the business model has developed and the methods through which the company's capabilities are aligned with the changing business environment – not forgetting to touch upon the management capabilities with which companies currently operate.

The third and final section of the survey was built exclusively around the future capabilities that are viewed as being needed, as well as the future investment targets. Considering future capabilities, their perceived importance was asked on a scale from one to seven, touching upon a set of topics that arose from the interviews, with capabilities related to supply chains, manufacturing processes, sales management and optimising, among others. Under the theme of investment targets a comparison was built, i.e. seeking to compare the importance of a pre-defined set of investment targets, as discovered in the interviews, both over the past five years and for the next five years to follow. Despite the strong focus on supply chains and their management, themes based on sustainability, human resources and company structures were present as well. Although there were three carrying themes for the online survey, each topic consisted of a number of items that had come up in the interviews. Figure 13, below, exemplifies how the presented topics in the online survey are structured.

It was agreed that, given the schedule and nature of the study, the three fields would provide the best possible and most feasible data to answer the research questions. After

all, the survey is heavily skewed towards understanding the future directions and necessities of the Finnish manufacturing industry, together with its investment plans. In addition, the development of the prevailing business models and the position of the relevant management capabilities were also structured in the survey.

Figure 13: Structure of topics present in the survey

Business models and their development	Directions and means of developing	Developments in manufacturing and R&D	Geographical presence, location of markets
	Geographical importance, change of focal point	Decision-making and organisational structure	Sharing of information, know-how & technology
	Rooted-footloose orientation	Focus and orientation (market, product…)	Support functions (HR, IT)
Capabilities concerning the future	Alignment of capabilities to business model	Optimisation of production network	Developing sales management
	Consistency and orderliness of development plans	Future capabilities in supply chain	Foresight in marketing
	Network-optimised vs. business unit-optimised	Capabilities in production network	Employees' international competence & exp
Most important investment targets	Customer relationships and their management	Increase / development of production capacity	Sustainability and values
	Re-design of production network	Interfaces of sales, R&D and manufacturing	Development of business units and service centres
	Identification of new raw materials	Product portfolio management, developing sales	Training and development of employees

3.3.2 Conducting the survey

The survey was sent in the middle of August 2012 to a database composed of representatives of 430 companies operating in the Finnish manufacturing industry. The primary target of the respondents was the managing director, the head of operations or the head of production of the firm. Concerning the profile of the respondents, it was considered that the company does not need to have a Finnish legal domicile to take part in the study, as long as the firm has operations within its supply chain in the country. The survey was made online using Webropol, with a given response time of three weeks.

The response rate ended up being 54/430, i.e. 12,56%. The number of responses could have been higher, yet it does enable the analysis for an indicative suggestion to which direction the industry, as a whole, would be headed towards. It ought to be taken into account that the results cannot be taken as an absolute truth concerning the developments of the industry, as such, but they do provide, nonetheless, a certain degree of understanding and guidance concerning the industry prospects.

3.3.3 Survey data analysis

The survey was concluded on the 5th of September at 18.00hrs, after which no more answers were accepted. The data were exported from Webropol to an MS Excel file and analysed using Microsoft Excel. In addition to examining the manufacturing industry as a whole, the initial idea was to have each of the identified sectors was isolated, in order to be able to better understand what characteristics each individual industry sector shares. However, given the sample size of 54, due to their somewhat similar characteristics, the metal processing industry sector was combined with the mechanical engineering industry sector, in order to have a larger representation per industry sector. Nonetheless, the separation of sectors enables the comparison of the prevailing business models and the possible association of factors among them. The results of the survey analysis are presented in the chapter to follow, under section 4.2.

3.4 Limitations

The limitations of the study are largely based on the number and structure of both the interviews and the questionnaire. For the qualitative phase, as there was only one person from the organisation expressing his/her views, the answers may have been biased.

Although the most suitable respondents were sought for the interviews, it can be left open for discussion whether all interviewees had the most adequate and comprehensive view and background of the company's situation, as a whole or concerning the firm's future prospects. Moreover, whether 18 interviews pose a sufficient of a basis to build a questionnaire concerning the future of the Finnish industry can also be left for scrutiny.

Concerning the quantitative phase of the study, the relatively low response rate already poses restrictions on the generalizability of the results. Also, it is worth acknowledging that the sample distribution may not fully match the population, for which it may create a bias for the overall results. However, this matter was mitigated by isolating each sector within the respondents – while considering the limited respondents within some of the industry sectors.

Even though the respondent firms can be considered to be representative of the manufacturing industry in terms of revenue, the validity and generalizability of the results are to be considered in further detail. Moreover, although the link to the survey was sent to a pre-defined list of industry professionals, there is no certainty that the intended respondent was the one who actually answered the survey.

Furthermore, the scope of the research topic required to consolidate, limit and simplify the questions in the survey in order for it to be more respondent-friendly and thus, gather responses. Hence, the questions composing the survey had to be kept at a more general level than initially intended, limiting the real, possible depth of the survey.

In addition, a possible matter that limited the responses of the survey was the fact that the online survey was conducted in English – after all, most of the respondents to the survey were Finnish by nationality. It can be left open for discussion whether having an online survey conducted in Finnish would gain a larger group of respondents, as possible terminology or concepts may, perhaps, be perceived in a more familiar way.

However, given that the research scope is fundamentally built on international business, English comprehension was assumed to be a given characteristic of the respondents.

4 RESULTS

This chapter will present the results of the quantitative online survey. First the results will be presented at an industry level, followed by presenting the distinction between large companies and SMEs. Each industry sector will then be examined separately.

Given the sample of respondents, two important considerations are in place. Firstly, as previously mentioned, the metal processing and mechanical engineering industry sectors will be combined and analysed as one. Secondly, although taking into considerations the definitions of European Commission (2009) on company sizes, it was agreed that the definition of a *large* company will be slightly modified. As a basis for the analysis, it was agreed that large companies are those that reported a revenue of over 500 MEUR in 2011. It was considered that a company with such revenue has a certain position in the global markets, while also serving as a certain degree of benchmark for SMEs. In addition, the separation between large companies and SMEs at a revenue of 500 MEUR, as opposed to the European Commission's (2009) guidelines[2] draws a better distinction regarding the respondents and limiting the number of "large" companies – enabling a more thorough comparison between large companies and SMEs. The structure of results will follow that of the questionnaire, in order to maintain coherence throughout the chapter.

4.1 Respondent profiles

Figures 14, 15 and 16, below, illustrate the respondent profiles in terms of their position in the company, the represented industry sector and ownership structure of the company. The single largest group of respondents was composed of managing directors. What ought to be noted concerning the industry structure of the survey respondents is the strong presence of the mechanical engineering industry, composing roughly 40% of the survey respondents.

[2] The European Commission (2009) defines a large company as one that has a headcount of more than 250 people; turnover greater than 50 MEUR or a balance sheet greater than 43 MEUR.

Figure 14: Respondents' positions

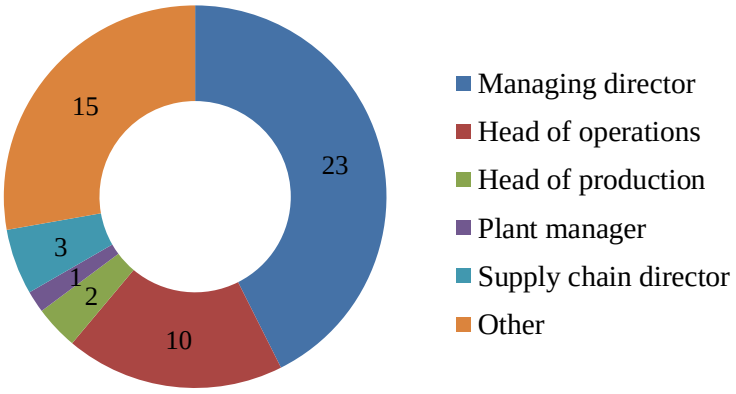
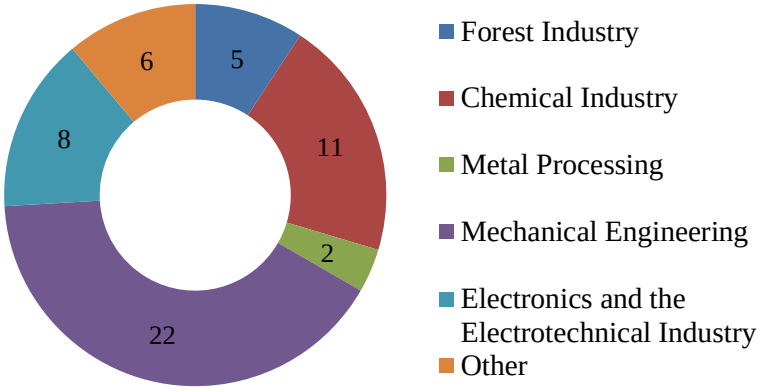
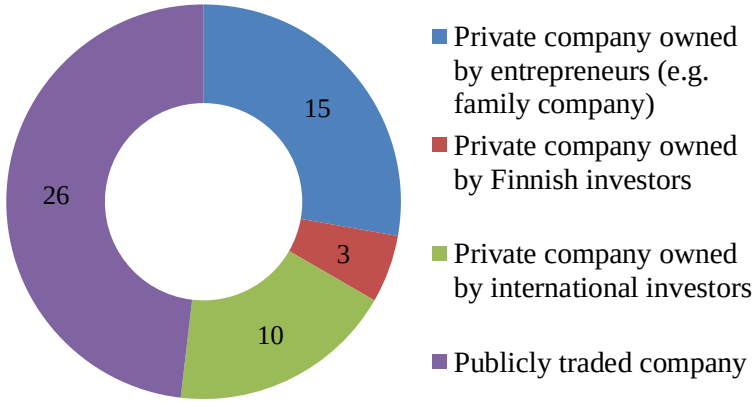


Figure 15: Respondents' industry sectors



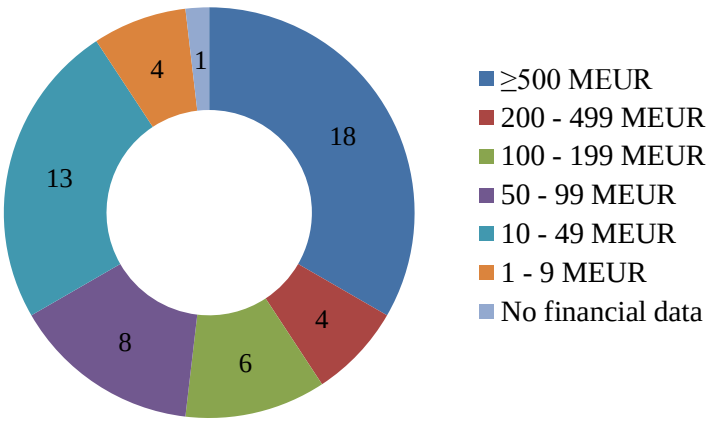
Almost 50% of the respondents are publicly traded companies. The second largest single group is private companies owned by entrepreneurs, such as family companies, for instance. Out of the 54 respondents, however, 41 companies have their corporate headquarters in Finland. Other countries where the corporate headquarters are located include Germany (2); USA (2); Switzerland (2); and Sweden (2) – together with single headquarters located in Austria, Belgium, the Netherlands, the UK and Japan.

Figure 16: Respondents' ownership structure



As previously mentioned, a decision was made to handle large companies and SMEs separately, defining the limit of 500 million euros in revenue as the dividing factor. Given this decision, the composition of the respondent profiles is that 18 companies are considered large, while 36 companies are considered SMEs, having reported an annual revenue of less than 500 million euros in 2011. Figure 17, below, presents the sample of company sizes in further detail.

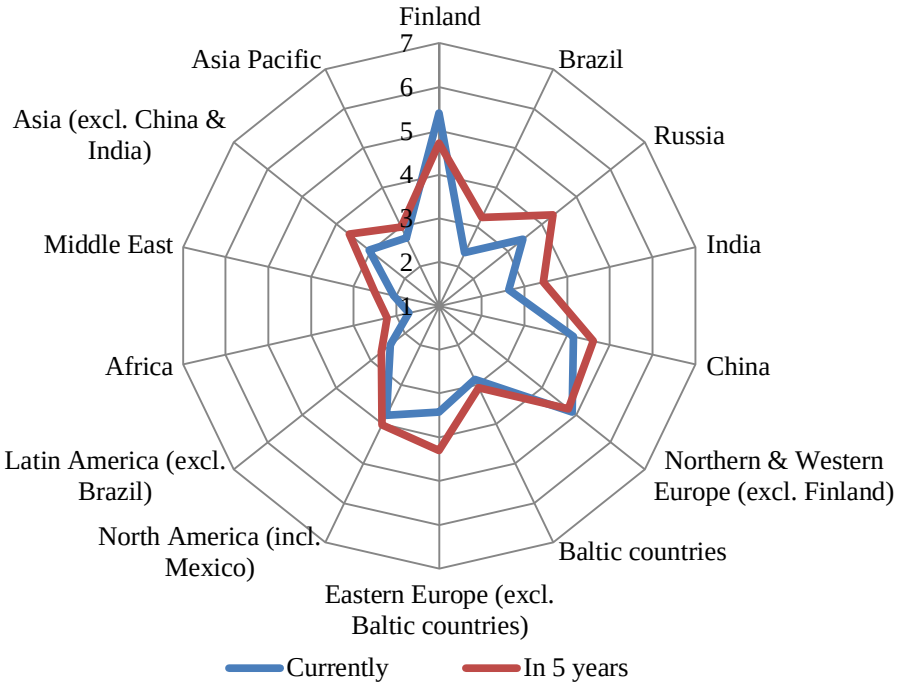
Figure 17: Respondents by revenue



4.2 Industry as a whole

In terms of the geographical orientation, there are no great surprises when examining the industry as a whole. On a general level it can be understood that the importance of Finland for firms' operations will decrease in the next five years, while growth markets, namely Brazil, Russia, India and China (BRIC) remain the targets for international expansion. What can be taken as a slight surprise can be viewed the modest development of operations aimed at Africa and the Middle East. Other than that, the position of Eastern Europe can be assumed to grow in the upcoming years. Figure 18, below, illustrates the expected change of geographical importance for firms' operations currently, and in a period of five years.

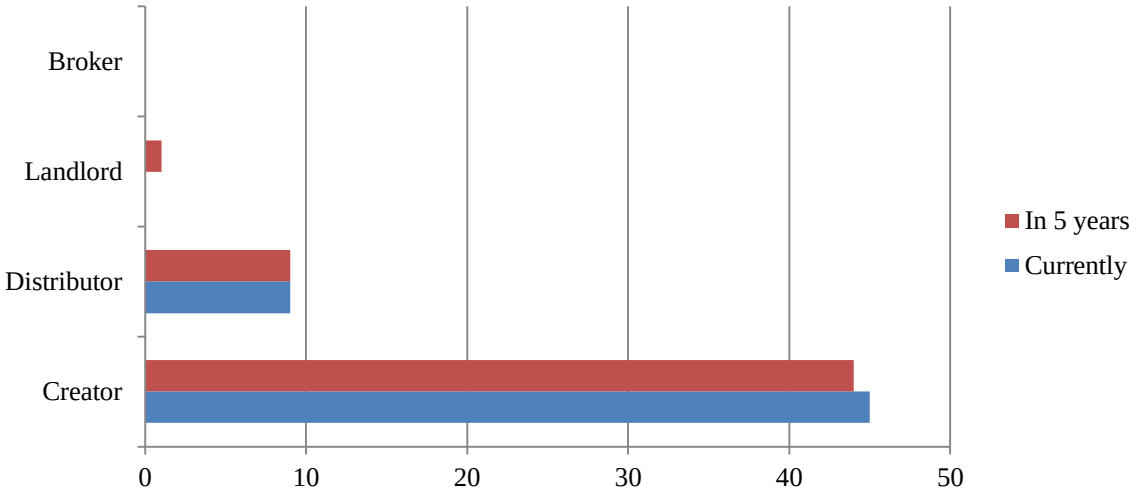
Figure 18: The geographical importance for the industry's operations



The respondents seem to have a clear position of their business models, with only one change expected to occur in the next five years. Figure 19, below, classifies the respondents according to their business model archetype, as described by Weill et al. (2005). It ought to be understood that in the questionnaire the concept of a firm designing its products was highlighted, granting the option for the respondent to choose

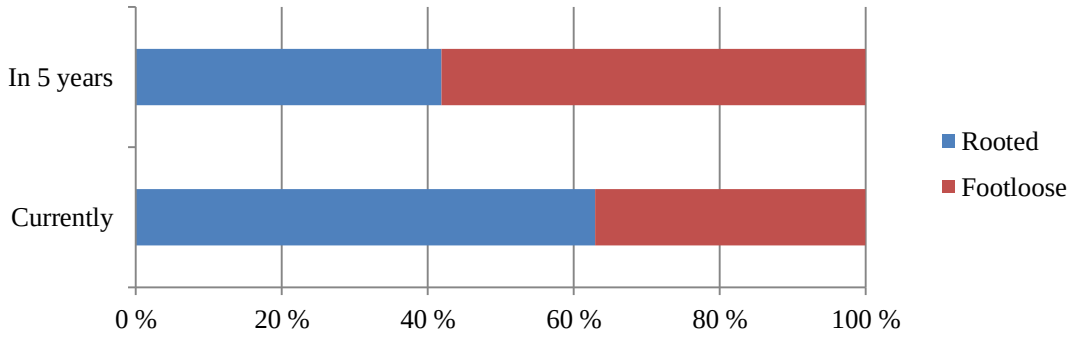
between designing and manufacturing the product and designing the product yet outsourcing its manufacturing. However, both options fall under the definition of a *Creator*.

Figure 19: Business model classifications of respondents



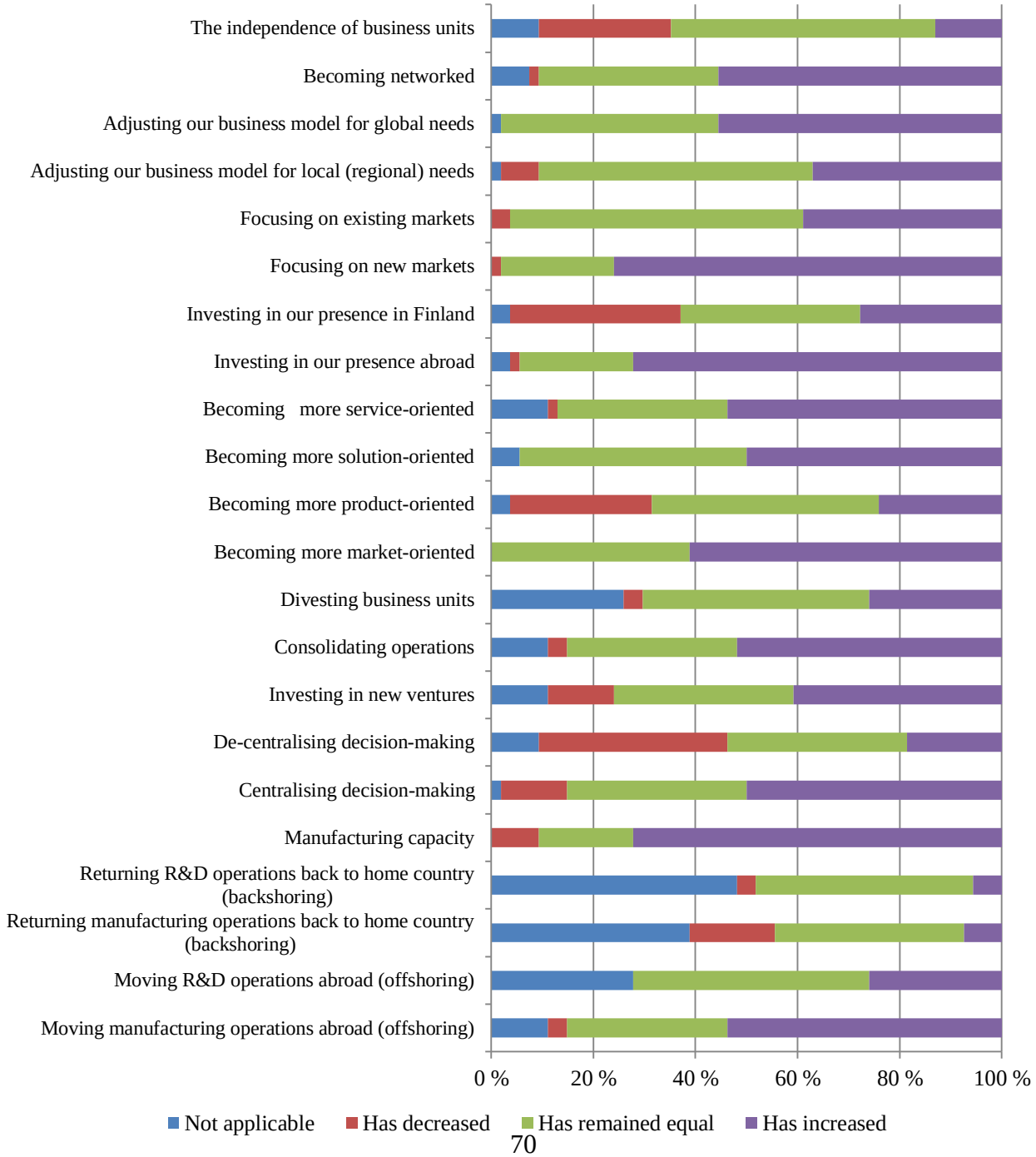
When asked to choose between the rooted and footloose orientation (Ferdows, 2008), however, the results proved to be more of a surprise. Although currently the predominant production network is skewed towards being rooted, in five years a shift is portrayed to occur towards the footloose orientation. Figure 20, below, describes the portrayed shift.

Figure 20: The respondents' production network orientation currently and in five years



Nonetheless, the past and expected future development of the companies' business models provides interesting insights. Figure 21, below illustrate the way how the firms' business models have developed over the past five years. Figure 22, to follow, represents the expectations how the business models will develop five years in the future.

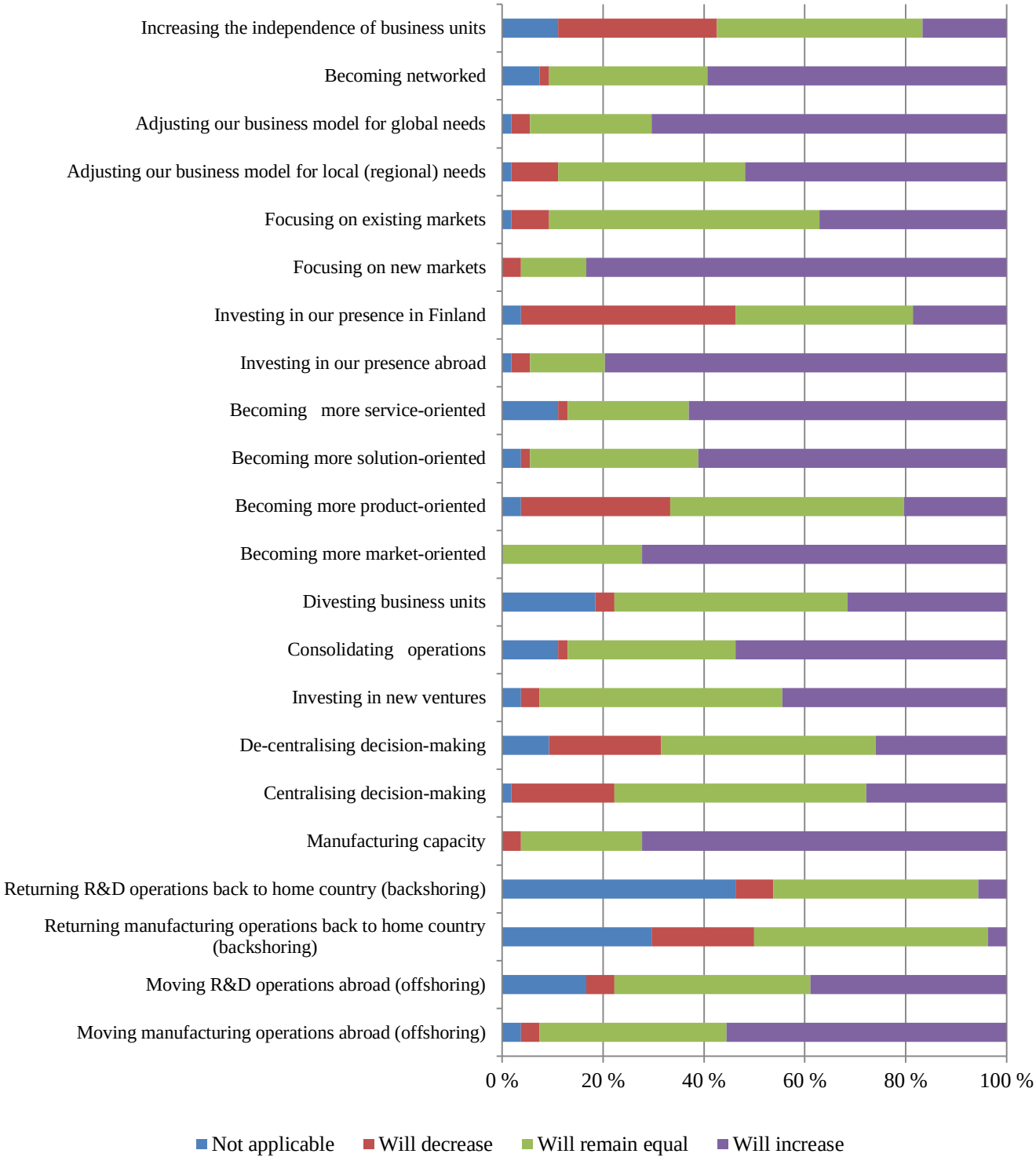
Figure 21: Past development of company business models



As can be seen from Figure 21, above, the past five years have been marked by offshoring, increasing manufacturing capacity, focusing on new markets and expanding abroad. These are all well in line with Mälkiä's (2011) findings concerning the environment of the Finnish manufacturing industry. What can be considered somewhat of an interesting result is the strong decrease in de-centralising decision-making in the past.

Figure 22, below, suggests that companies would seem to continue decreasing their investments in Finland at an accelerated pace. Simultaneously, the tendency of becoming less product and more solution-oriented is expected to grow. Conversely, what also stands out that although both manufacturing and manufacturing and R&D operations have been offshored in the past as well, their pace of offshoring is set only to accelerate towards the future.

Figure 22: Expected business model development in 5 years



The following Figure 23, below, shows how well the respondents identified themselves with the statements below, i.e. how applicable they were to their organisation. What is interesting is that the highest of the sample means was given to having an understanding of what role the supply chain has in the company's value chain, yet the view of having a clear road map on how to develop it was not as strong.

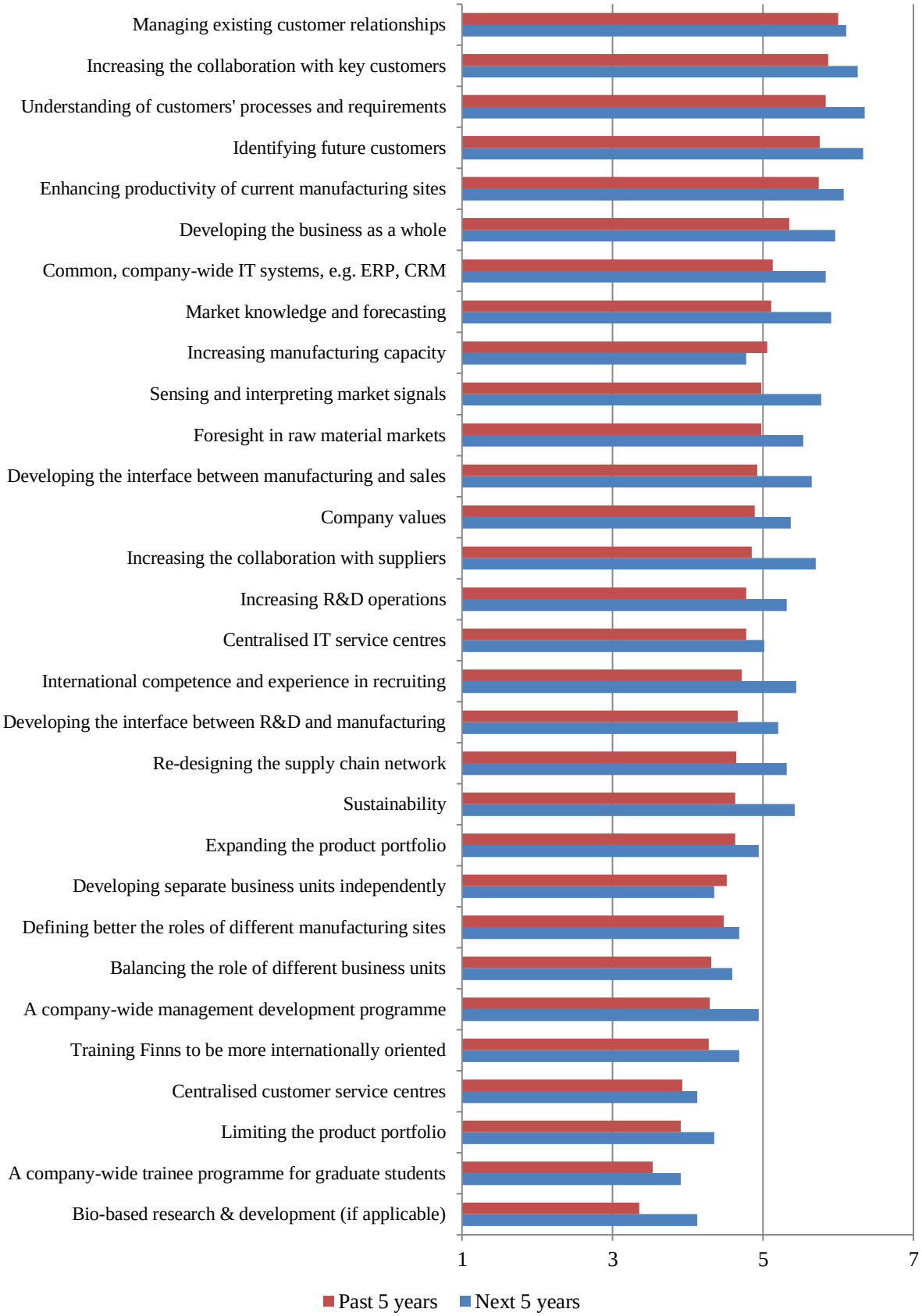
Figure 23: Applicability of selected statements to companies

Concerning the relevance of future capabilities, as presented in Figure 24, below, the results are interesting. It is pleasing to find out that companies consider numerous capabilities as important. Simultaneously, there seems to be an orientation towards developing the interfaces of the supply chain and having a better understanding of the market, together with optimising the company as a whole.

Figure 24: Importance of capabilities in five years

Finally, when examining the past and future investment targets in Figure 25, below, what stands out is the strong customer orientation that companies are seen to have considering the five years to come. Other points of interest are the alignment of the forward-looking in terms of market forecasting, together with increasing the collaboration with suppliers and developing the interfaces between R&D, manufacturing and sales.

Figure 25: The importance of past and future investment targets

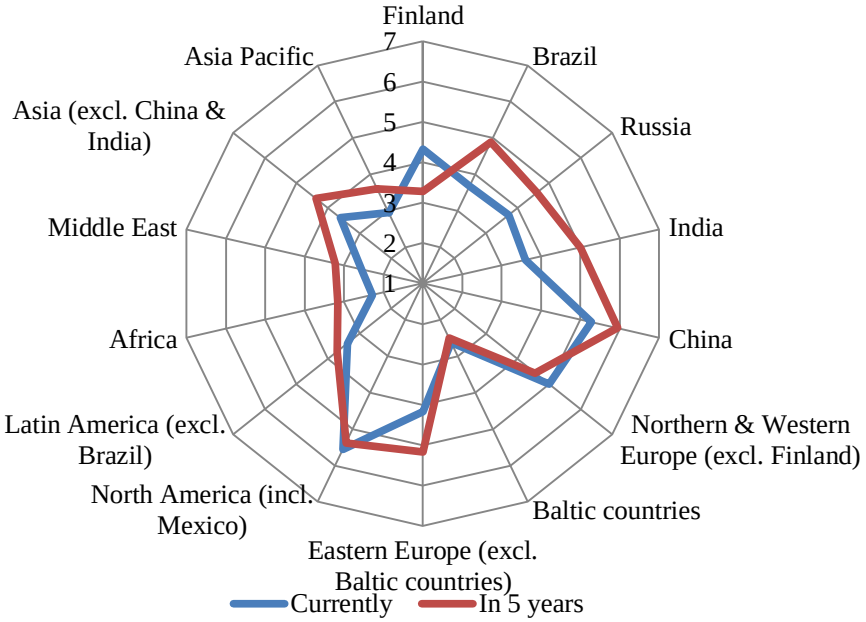


4.2.1 Large companies & SMEs

As far as possible and reasonable, the results from the large companies and SMEs will presented in combination, yet, when relevant, a distinction will be made. In practise, this will result in some Figures to be broken down and presented separately, to make the presentation easier. When possible, however, the data sets will be combined to one.

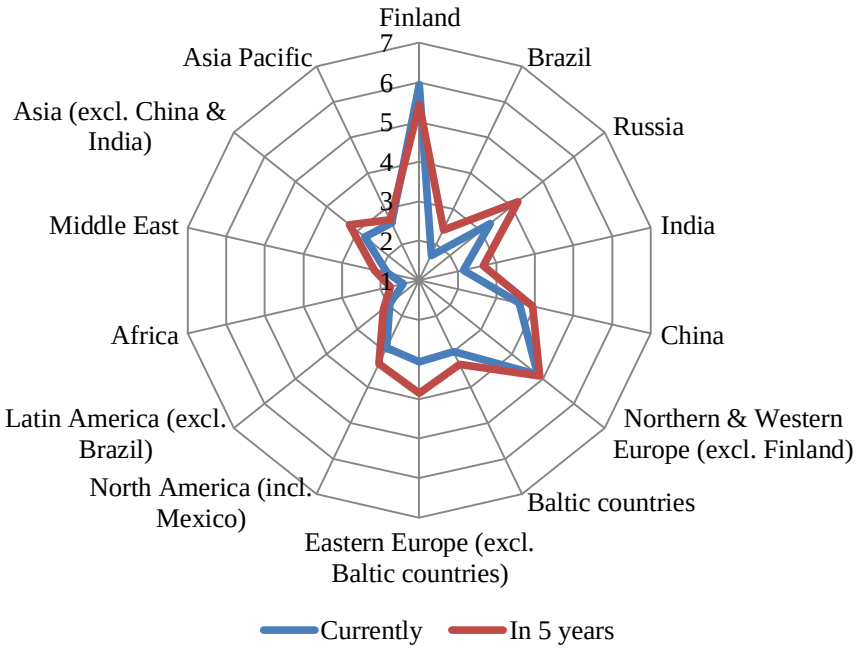
Firstly, it is worth noting the differences in the shift of geographical orientation. While the large companies are relatively well established abroad, Finland's importance is expected to decrease further in the next five years concerning their operations. Further expansion abroad can be expected, as presented in Figure 26, below.

Figure 26: The geographical importance for large companies' operations



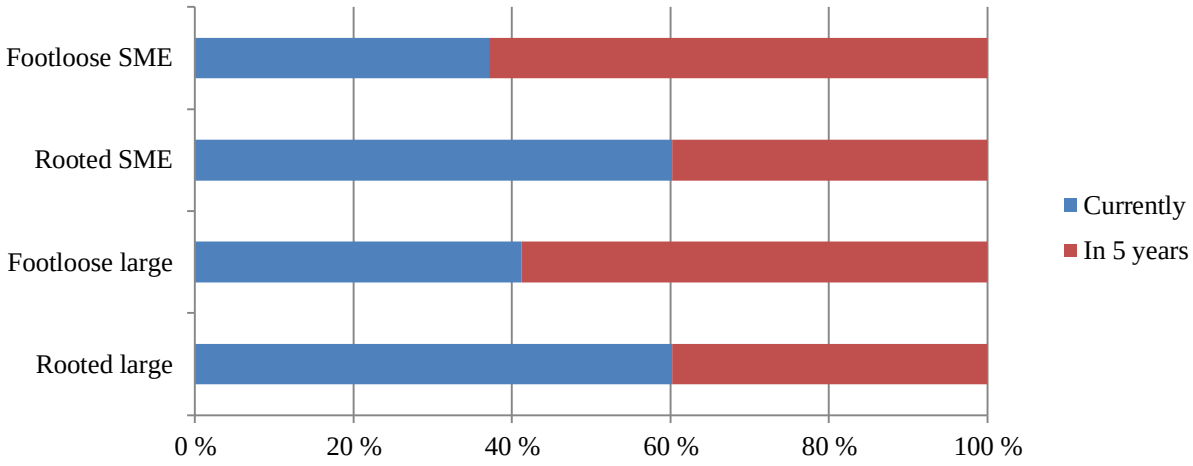
For SMEs, on the other hand, the importance and position of Finland for their operations is accentuated. While large companies are directed towards foreign markets further out, SMEs would, perhaps unsurprisingly, seem to expand more in the markets nearby in the future. Figure 27, below, illustrates the geographical importance and portrayed shift for SMEs concerning their operations.

Figure 27: The geographical importance for SMEs' operations



Concerning the business model archetypes, there are no main differences. Similarly, there are no main differences concerning the current and future orientation of the companies in terms of their production network. As can be seen from Figure 28, below, the predominant orientation currently is more of a rooted one, while the shift towards being increasingly footloose is apparent.

Figure 28: Rooted – Footloose orientation of large companies and SMEs



Concerning the past development of the companies' business models, the main difference is the heavier decrease of investments in Finland from the large companies' side. Although at a general level, both company categories have increased or decreased their positions in the same factors, the large companies have done so more distinctively – i.e. having a more distinctive increase or decrease. However, differences remain present as well, namely touching upon the degree of offshoring R&D operations, the independence of business units and backshoring R&D operations. In the two former, the larger companies have been the more predominant one, whereas in the latter, surprisingly, SMEs have pursued R&D backshoring slightly more. As a contrast, Figures 29 and 30, to follow, illustrate the future business developments of the company types.

Figure 29: Future business model developments, large companies

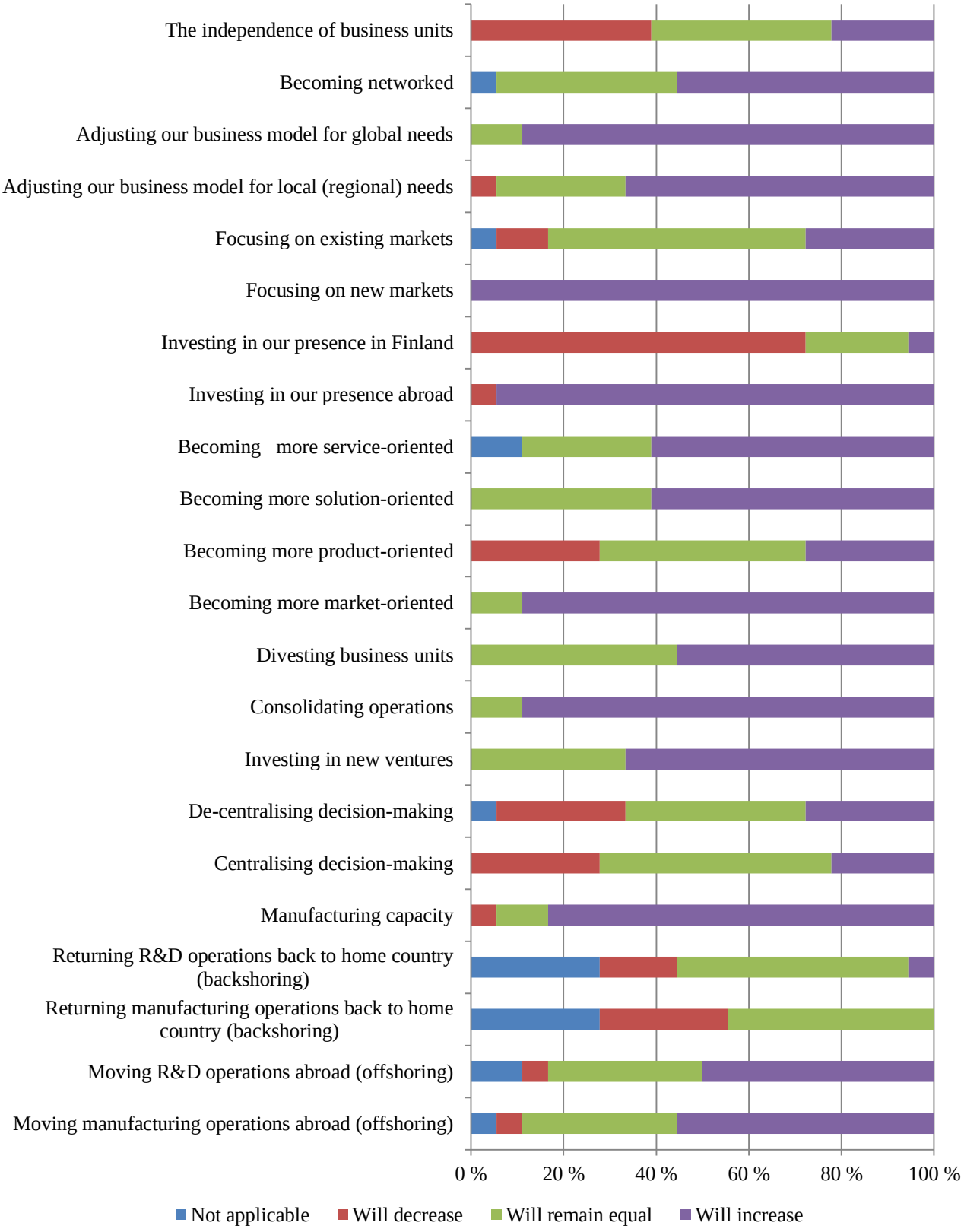
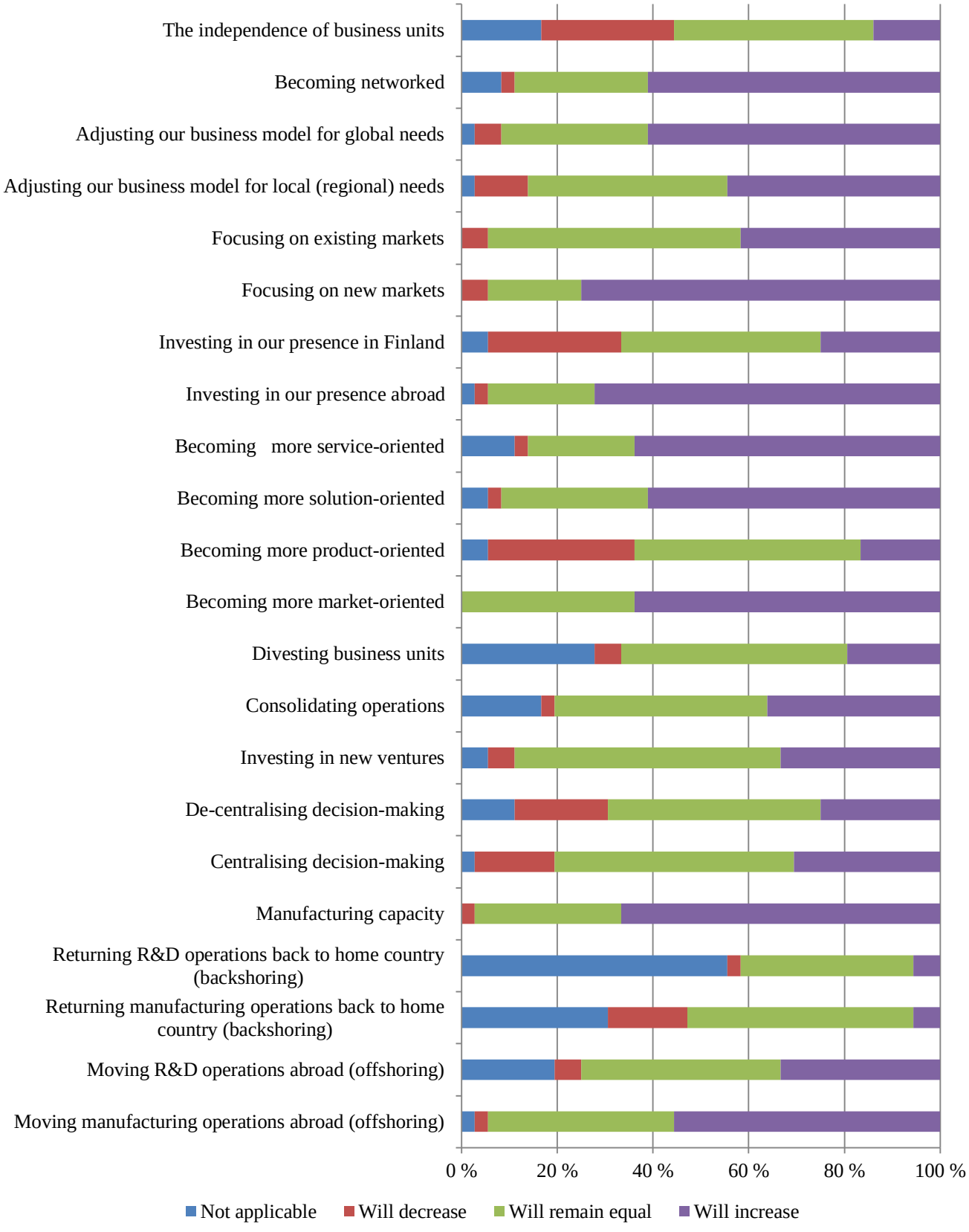


Figure 30: Future business model developments, SMEs



As can be seen from Figures 29 and 30, above, the steps that had been set earlier will only accelerate and increase towards the future. The decrease of investments to Finland will apparently only increase towards the future on behalf of the large companies. In addition, the aim of becoming more market-oriented will seemingly increase as well. What is worth noting from the SMEs' expected future developments, is the decrease of investments in Finland, together with moving from a product-oriented standing point towards a solution or service-based orientation.

Figure 31, below, illustrates the differences on how large companies and SMEs rated themselves on how applicable the given statements were. What can be regarded somewhat disturbing is that the SMEs have few values over five, perhaps reflecting a certain degree of uncertainty in their position. Moreover, although the highest value was given to having an understanding of what role the supply chain has in the company's value chain, the following statement of having a clear roadmap how to develop it scored lower. It can perhaps be understood that larger companies rated themselves higher in international job rotation, as it can be assumed that they have better resource allocation possibilities for such, yet the difference in the use of cross-functional teams between large companies and SMEs is intriguing.

Similarly, Figure 32, further below, illustrates the perceived importance of future capabilities, by company size. What points out is how large companies have six factors rated 6,00 or above, on average, while the SMEs have no capabilities identified as importantly.

Figure 31: Applicability of selected statements to large companies and SMEs

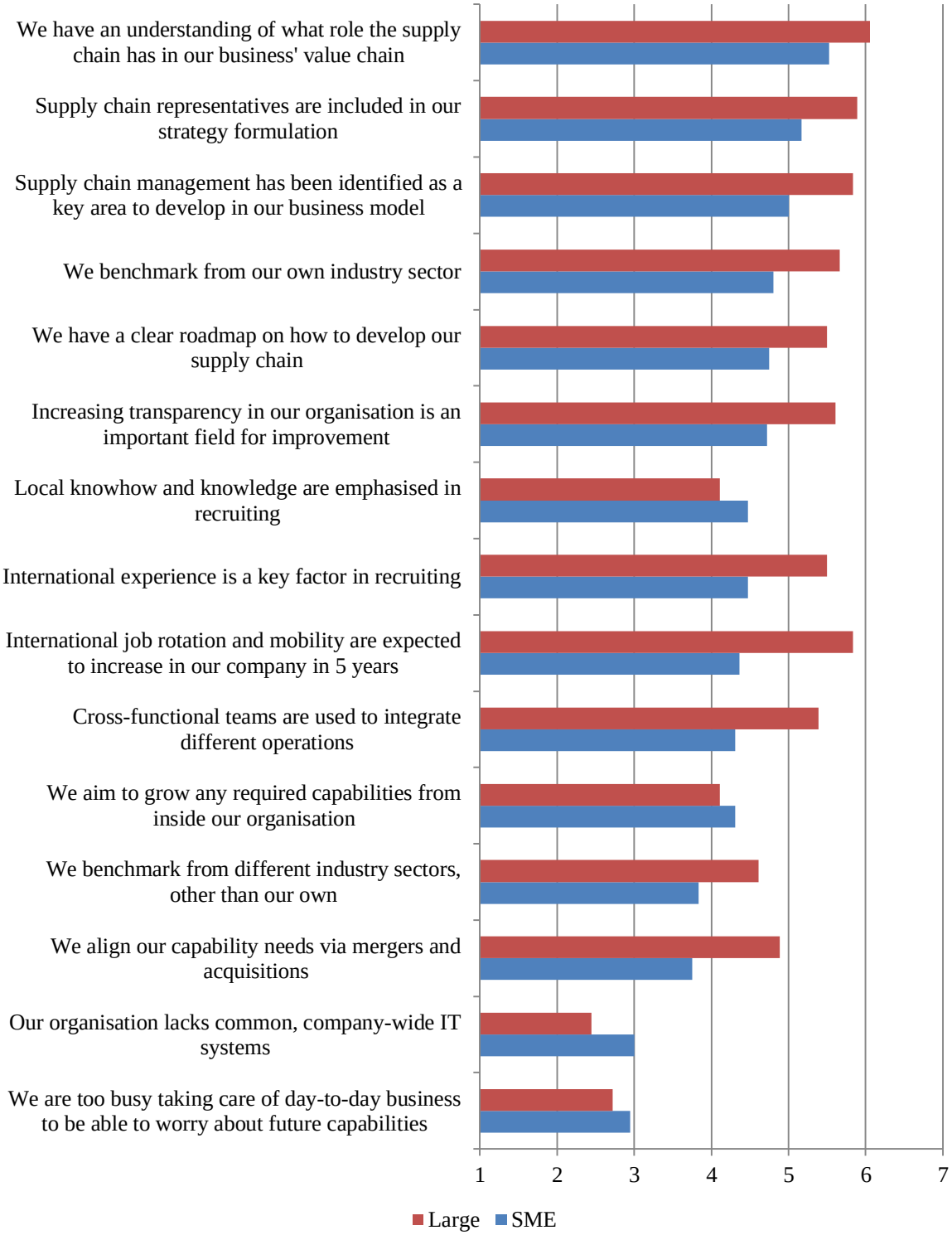
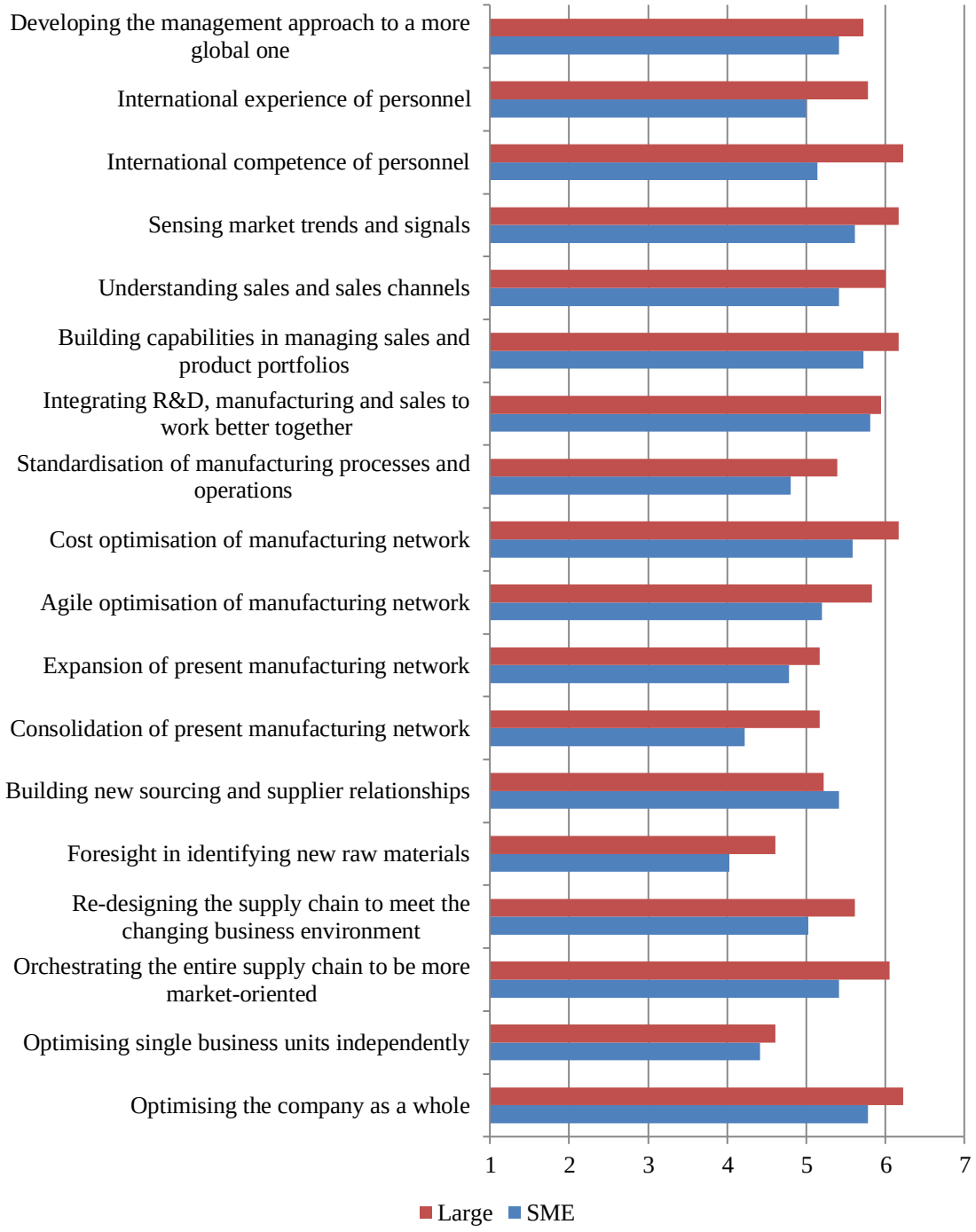


Figure 32: Importance of future capabilities, by company size



Concerning future investment targets, Figure 33, below illustrates the investment priorities for both SMEs and large companies over the past five years. To follow, Figure 34, will illustrate the investment priorities for the five years to come for both company sizes.

Figure 33: Investment priorities for the past five years per company size

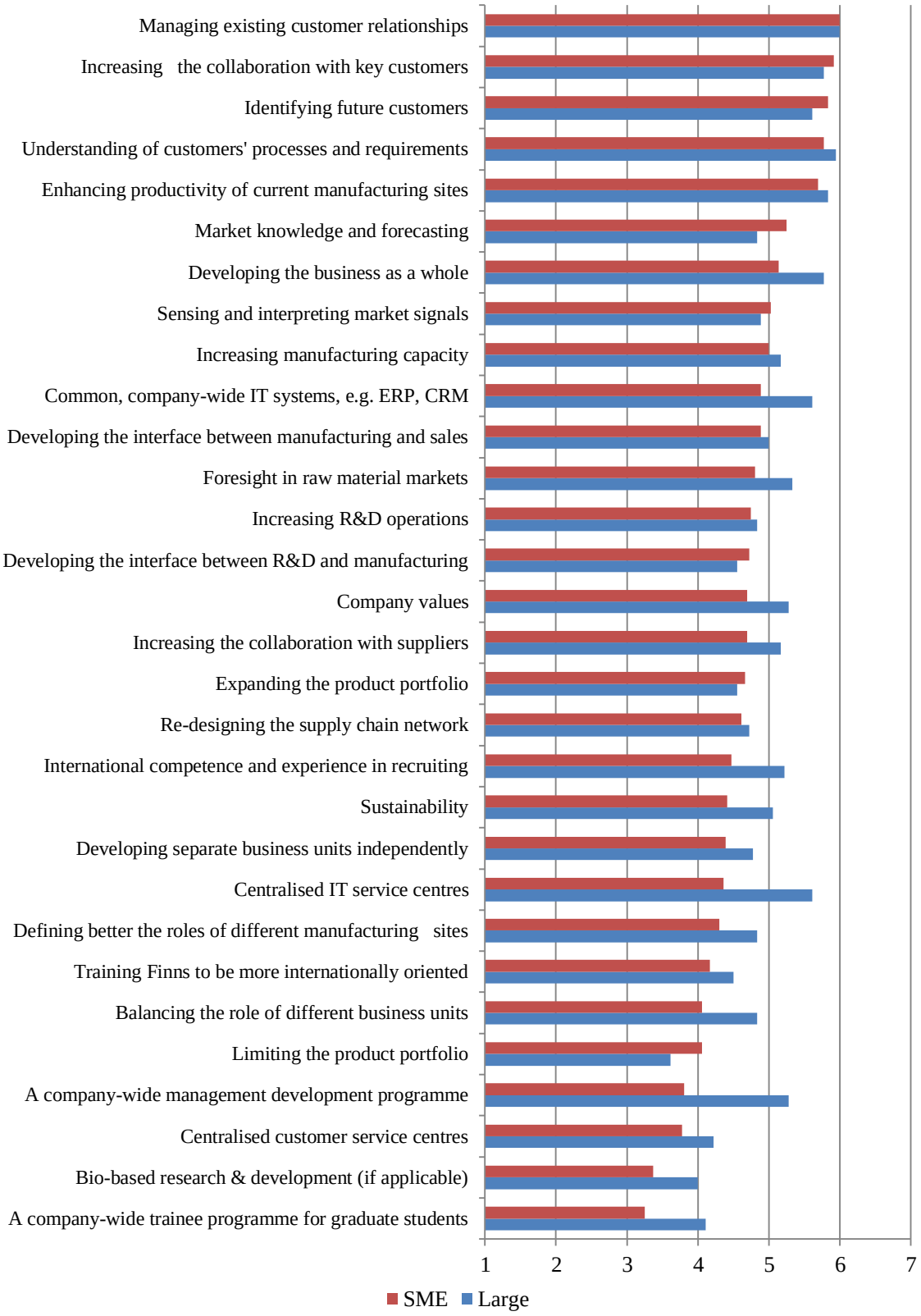
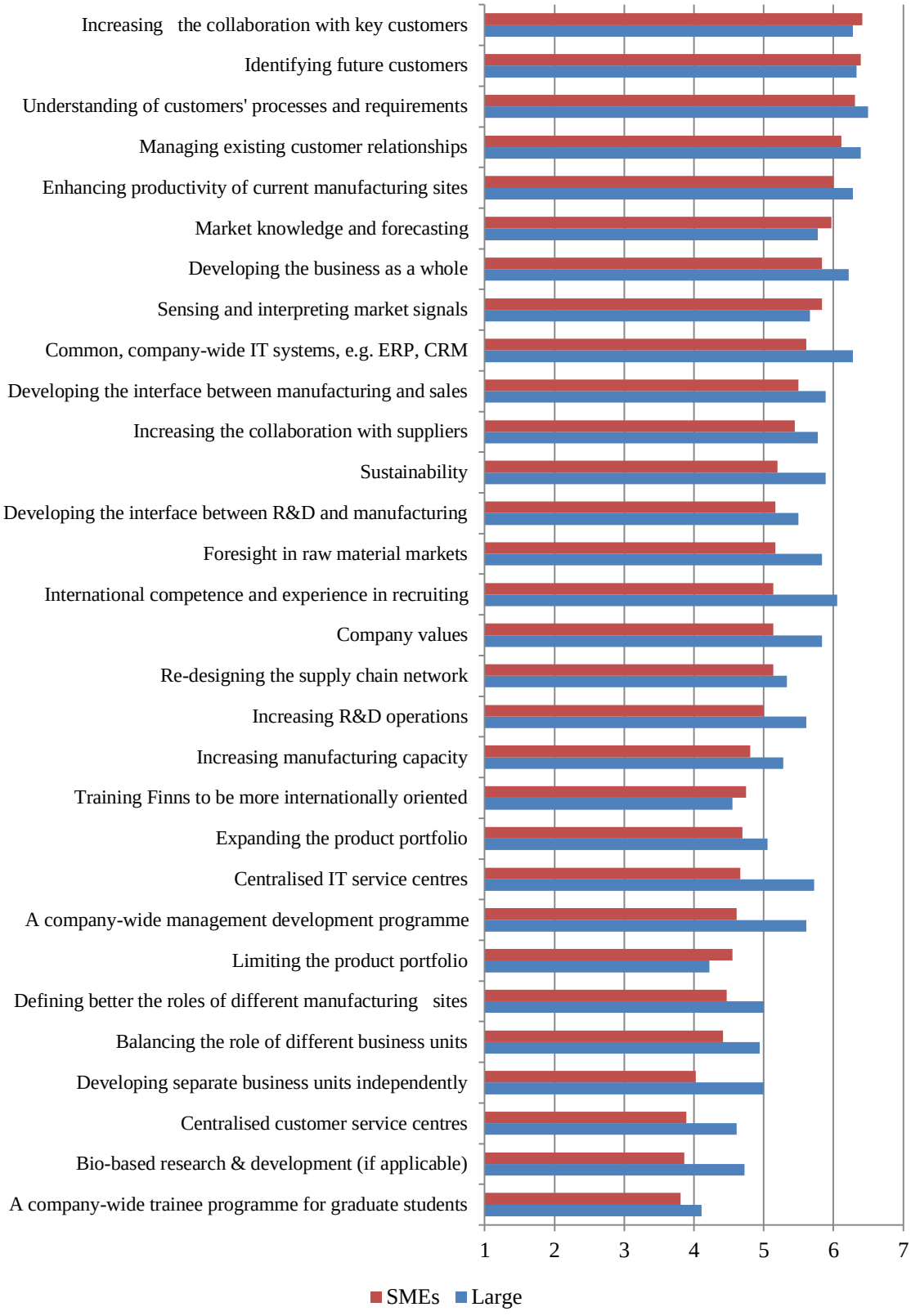


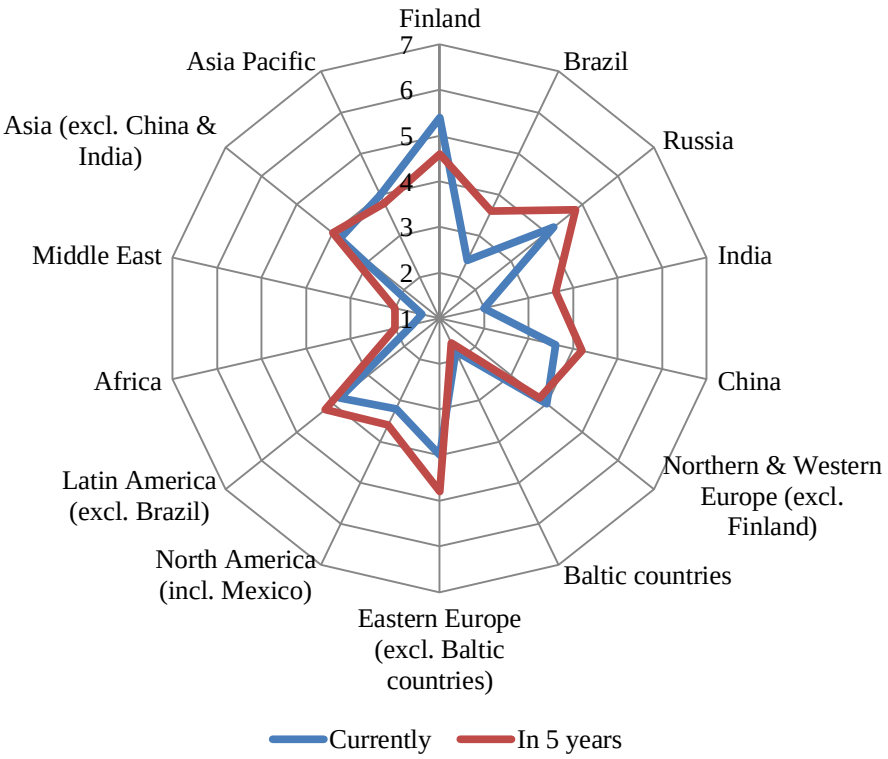
Figure 34: Investment priorities for the next five years per company size



4.3 Forest industry

Given that the sample representing the forest industry is only five companies, the generalizability of the results is very limited. For the same reason, the survey results of the industry will be presented as a whole, instead of trying to draw a distinction between large and small to medium enterprises. However, the total revenue of the companies in the sample was over €20 billion in 2011, representing a substantial proportion of the total industry value. The geographical orientation as it currently lays and the future prospects for the industry are presented below in Figure 35. The somewhat natural growth towards the BRIC countries can be clearly seen towards the future, while also an increase in the position of Eastern Europe for the industry's operations can be expected.

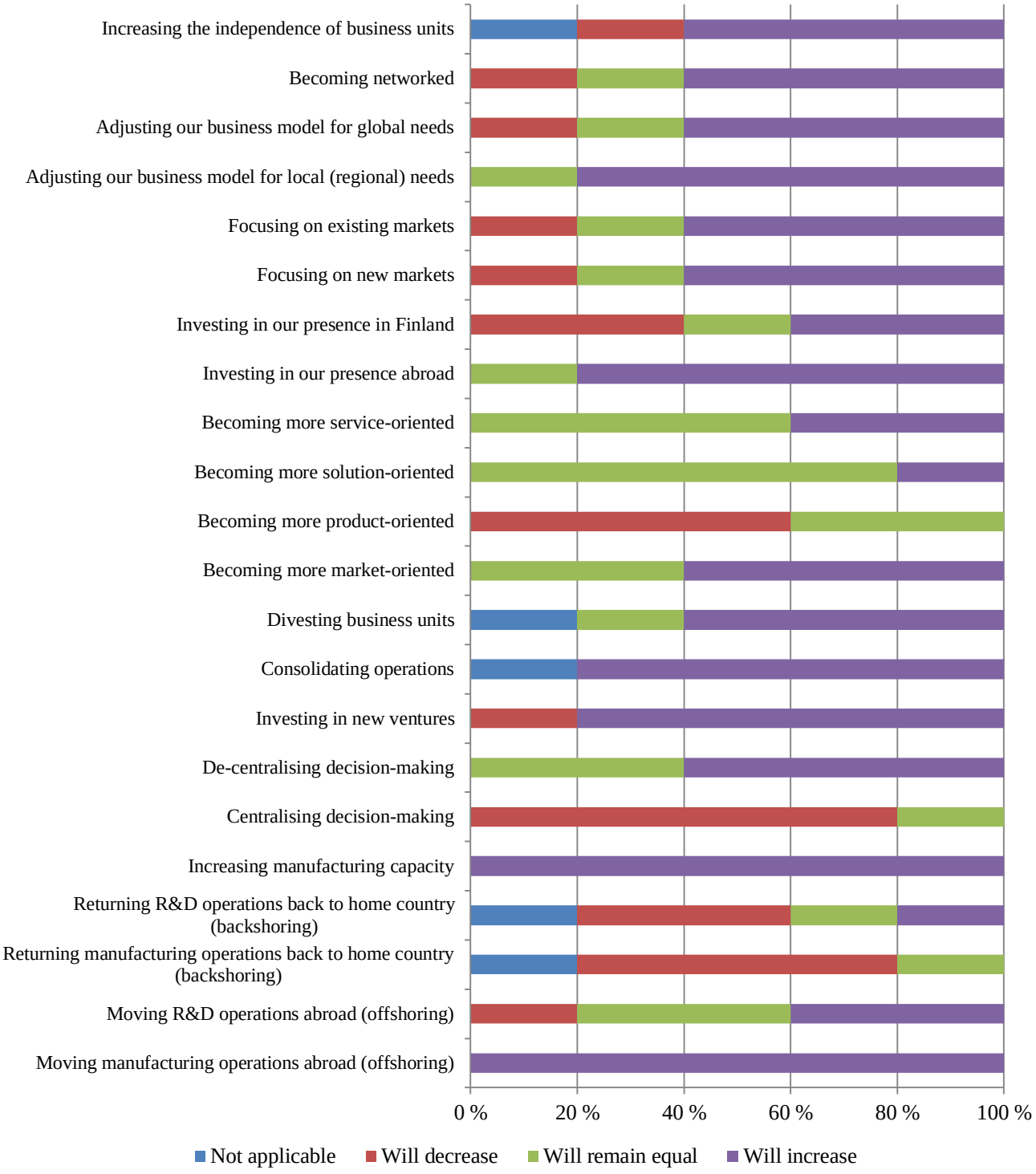
Figure 35: The geographical importance for the forest industry's operations



In terms of the business models present in the industry, it may not be a surprise that the *Creator* is the predominant one, with no changes portrayed to occur in the next five years. Moreover, there would seem to be a slight increase in the footloose orientation in the industry, yet a more elaborate study with a larger sample would be required to be able to determine the shift with a greater degree of certainty.

There are a few surprises when examining the past and future development of the industry's business models. Firstly, unlike the general trend in the sample of industries, the forest industry would be on the way towards a de-centralised decision-making model, augmenting the independence of business units. Secondly, contrary to the general trend, investments in the industry's presence in Finland are expected to grow. Figure 36, below, exemplifies the future developments in the forest industry's business models.

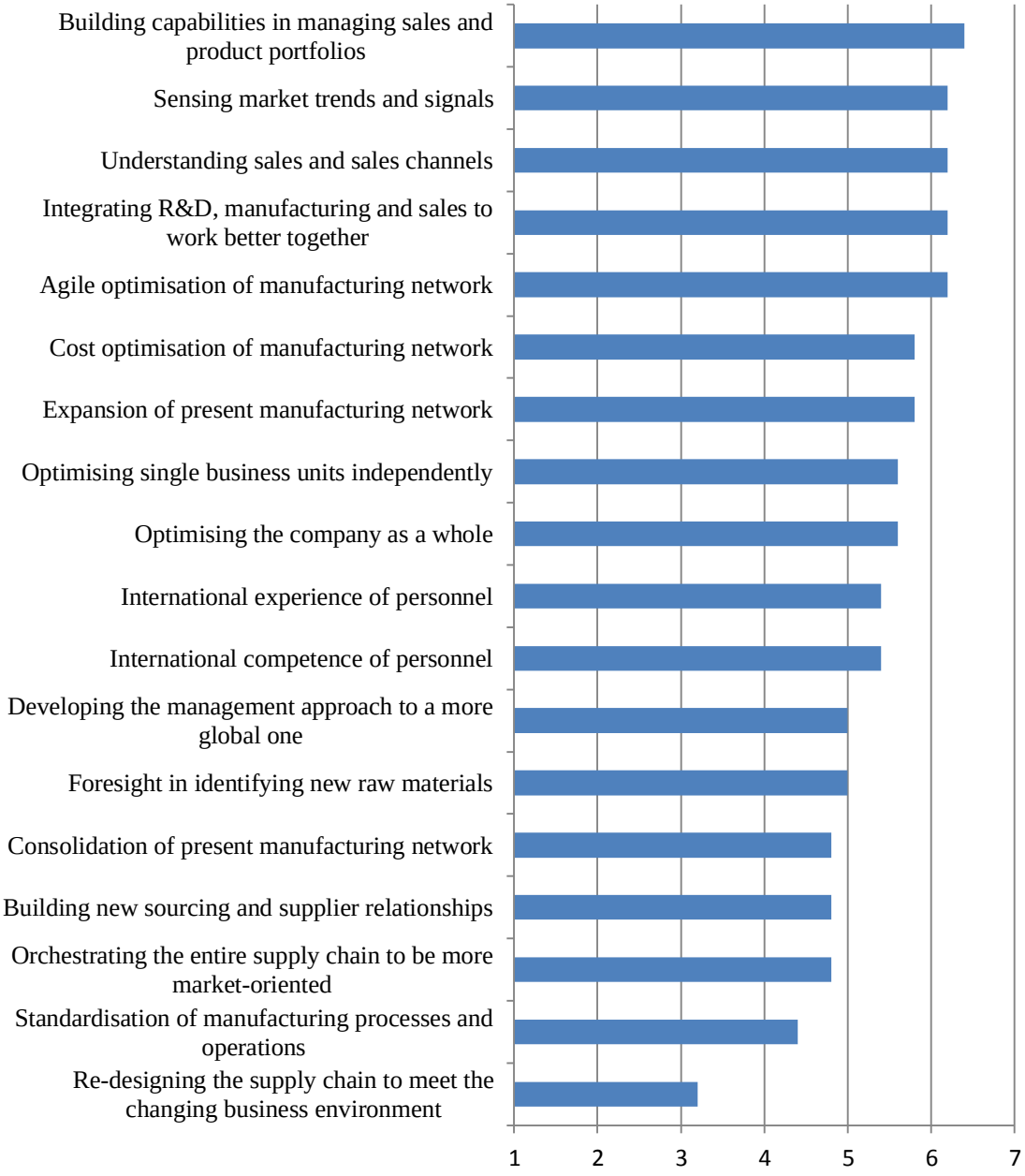
Figure 36: Future developments of the forest industry



In terms of the current situation of the industry, it is worth noting that although the industry respondents claim to have an understanding of the position of their supply chain in the entire value chain, there is a noteworthy drop in the certainty of having a

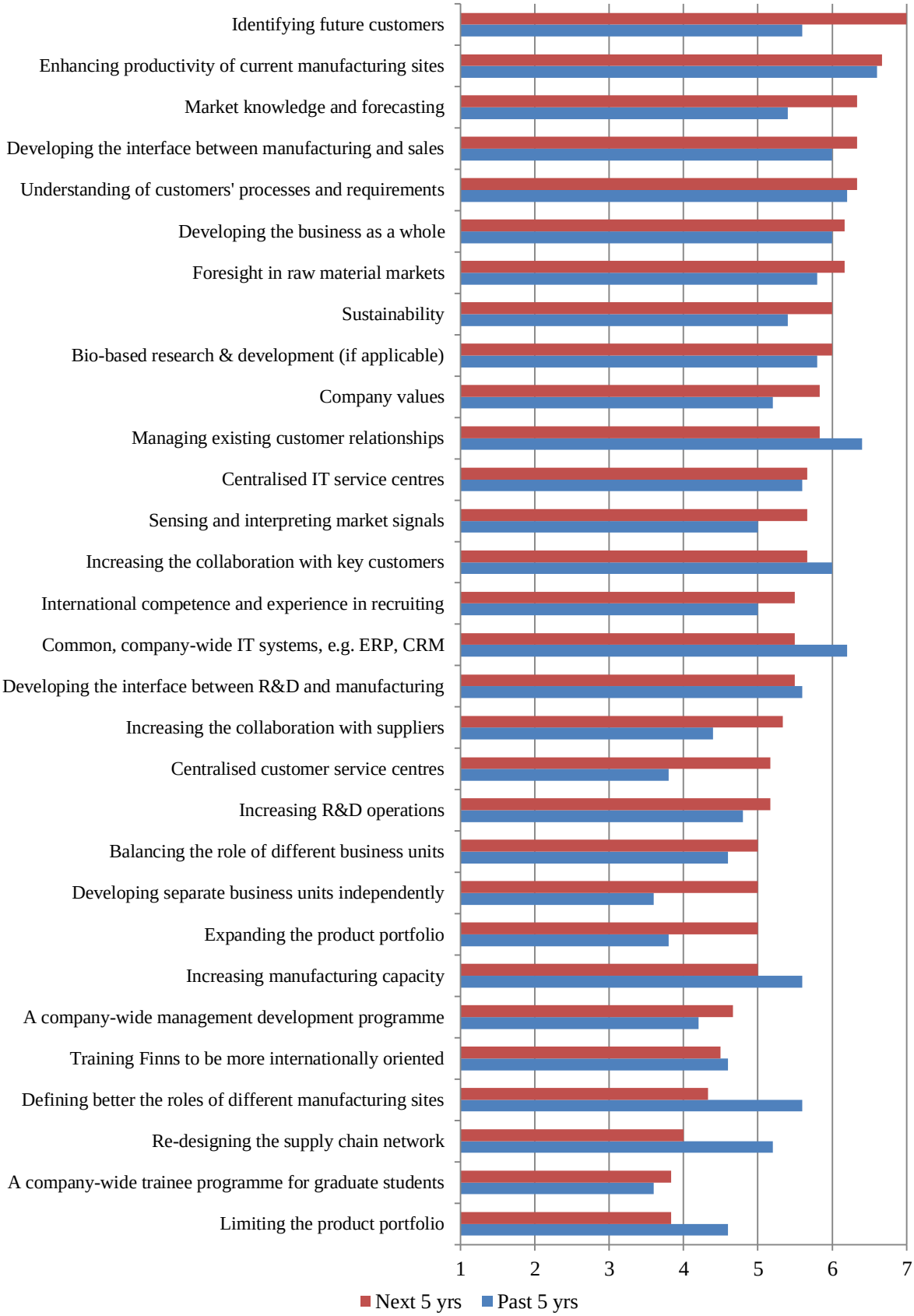
clear roadmap on how to develop the supply chain. Besides the difference in the perceived importance and the actual development plans, there are no main contradictions. On the contrary, the industry is heavily taking on benchmarking both from within and outside the industry sector, together with adopting well the use of cross-functional teams, with an aim of decreasing the thresholds between operations. Concerning the position of future capabilities for the industry, as presented below in Figure 37, what is emphasised is the orientation towards foresight and developing sales.

Figure 37: Importance of future capabilities, forest industry



Concerning the fields where the industry has been investing and will be investing in the future as well, the clearest increase is targeted at identifying new customers, as presented in Figure 38, below. In concurrence with the importance of future capabilities, the focus of the forest industry is expected to be in developing the interfaces between R&D, manufacturing and sales, together with developing overall foresight and forecasts.

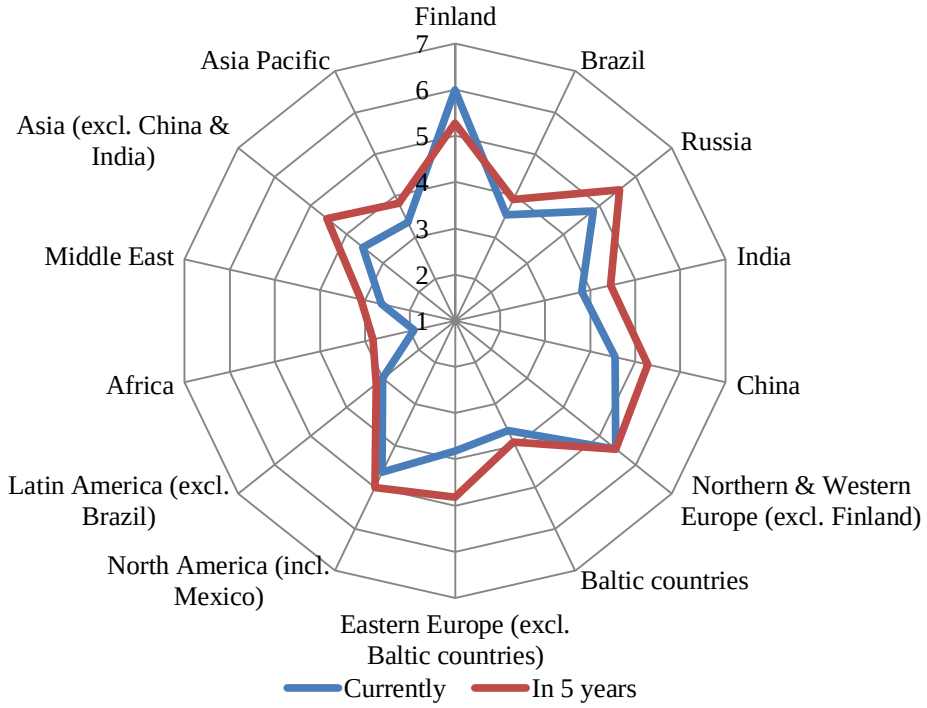
Figure 38: Past and future investment targets of the forest industry



4.4 Chemical industry

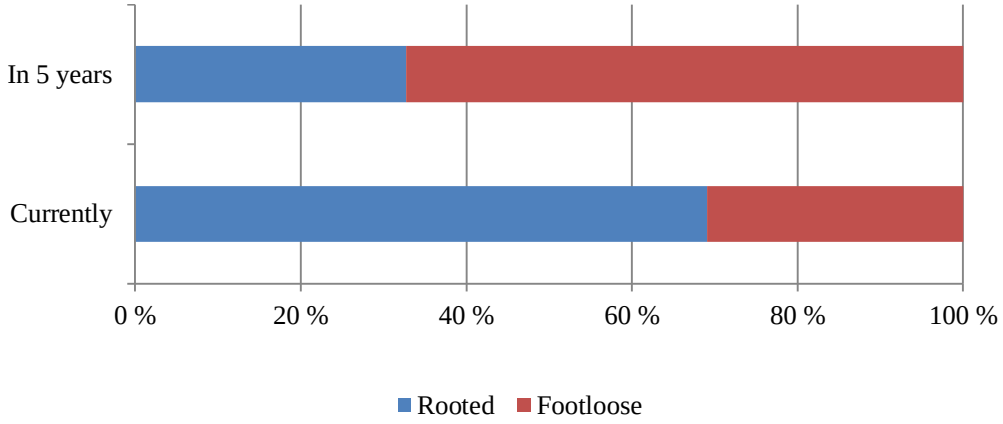
Similarly to the forest industry, the sample of respondents under the chemical industry, 11, does not enable a useful distinction between large companies and SMEs. So-being, the industry sector will also be presented as a whole. The total revenue of the respondent companies exceeded 86 billion euros in 2011, having a relatively good balance of large companies (6) and SMEs (5) in the sample. Geography wise, the industry sector would seem to be expanding in all directions, only decreasing the presence in Finland, as presented below in Figure 39.

Figure 39: The geographical importance for the chemical industry's operations



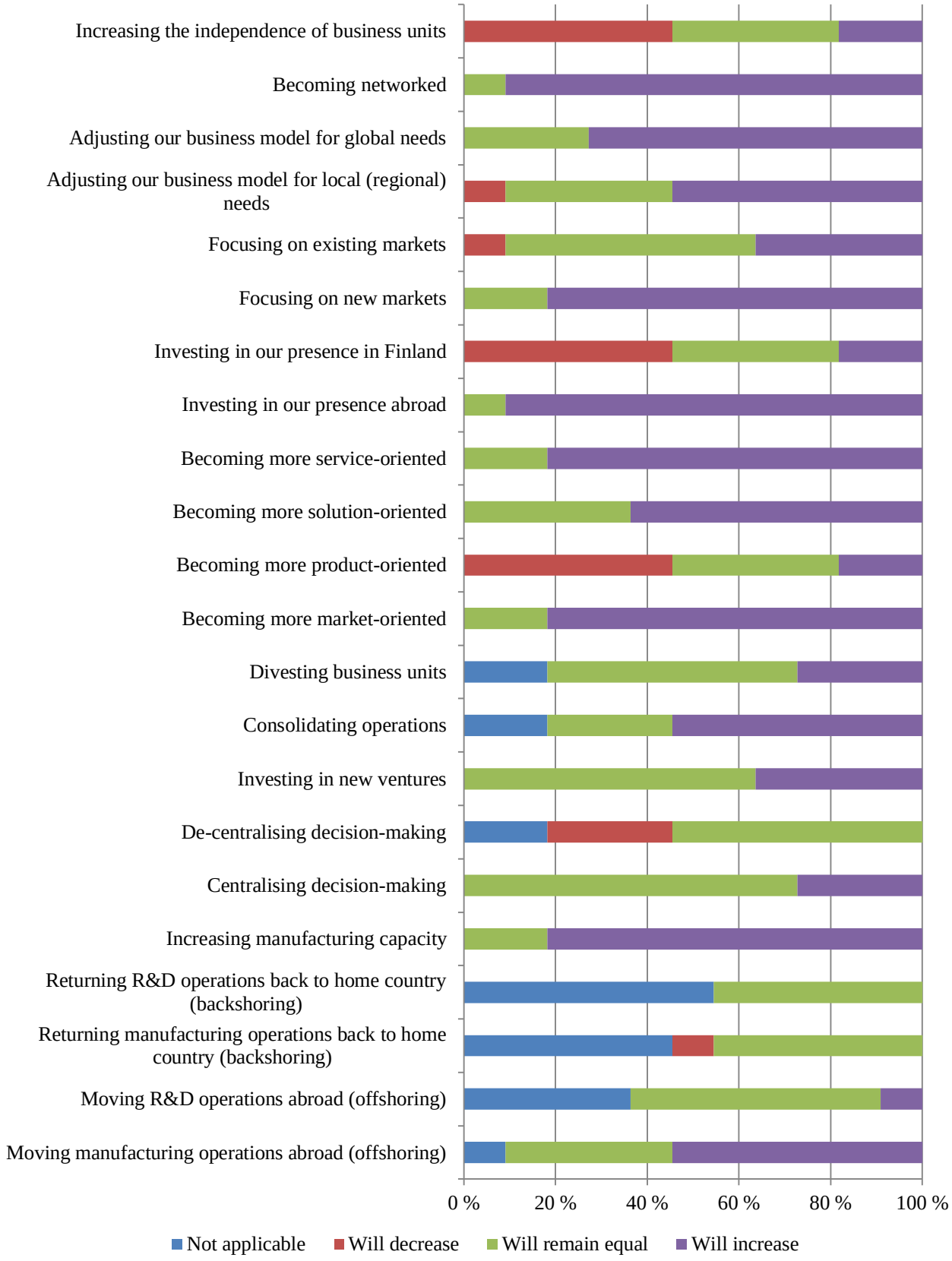
The overall business models in the industry apparently are and will remain almost exclusively that of the Creator, while one having adopted the model of distributor. Moreover, perhaps in accordance with the geographical expansion, the orientation of the industry's production network is expected to skew itself increasingly more towards being footloose, as exemplified below, in Figure 40.

Figure 40: The chemical industry's production network orientation currently and in five years



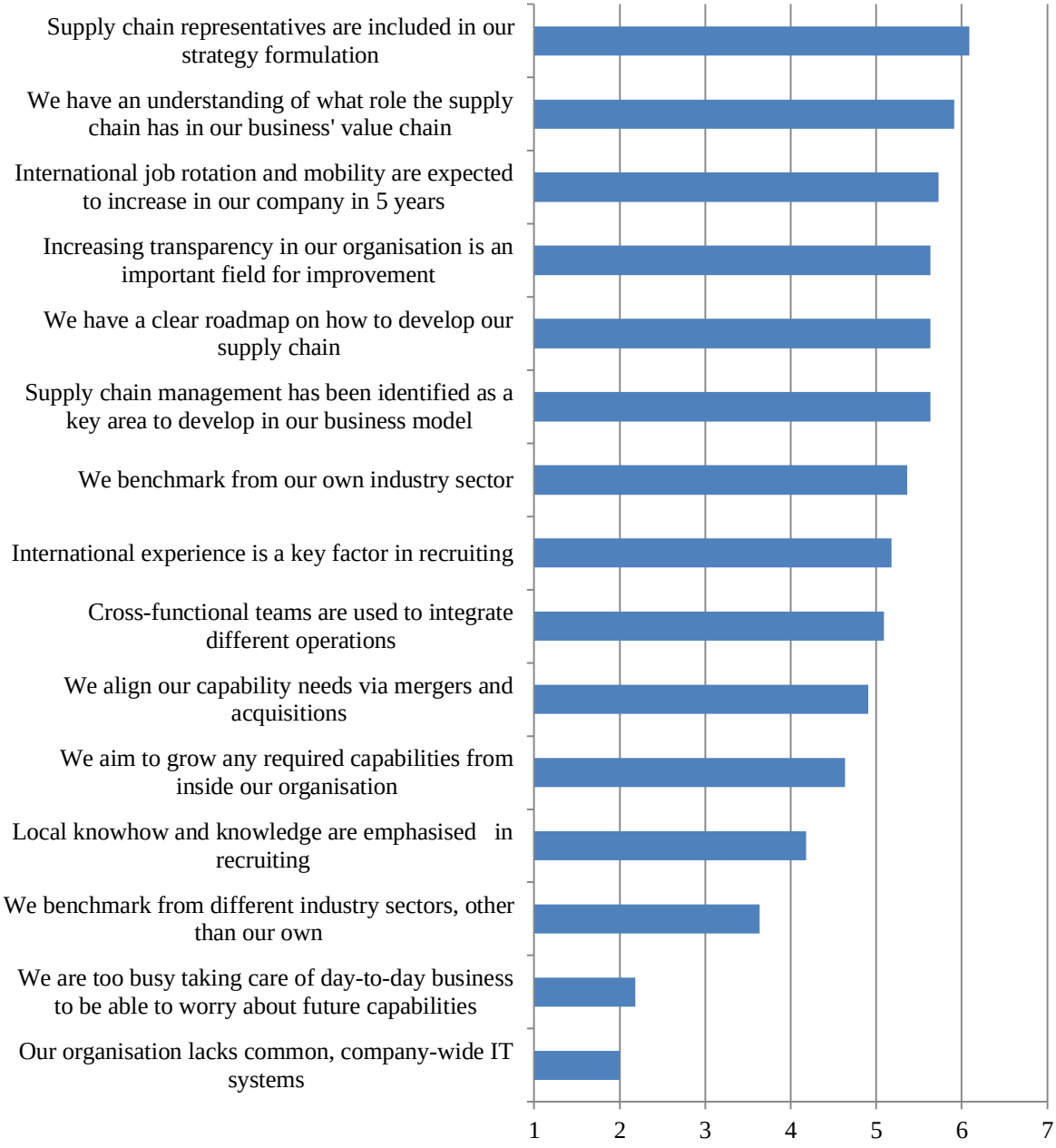
The past five years have been characterised by a transition in the industry's business model. Strong input has been made to adjust the industry's business model to a more global one, while also increasing manufacturing capacity and companies centralising their decision-making. Backshoring, on the other hand, cannot be regarded a practice in the industry's past, and it is not seen to become one either. What marks the evolution from the past five years to the future is the accelerated decrease in investing in Finland and removing the independence of business units. Figure 41, below, illustrates the future estimated developments in the industry.

Figure 41: Future developments of the chemical industry



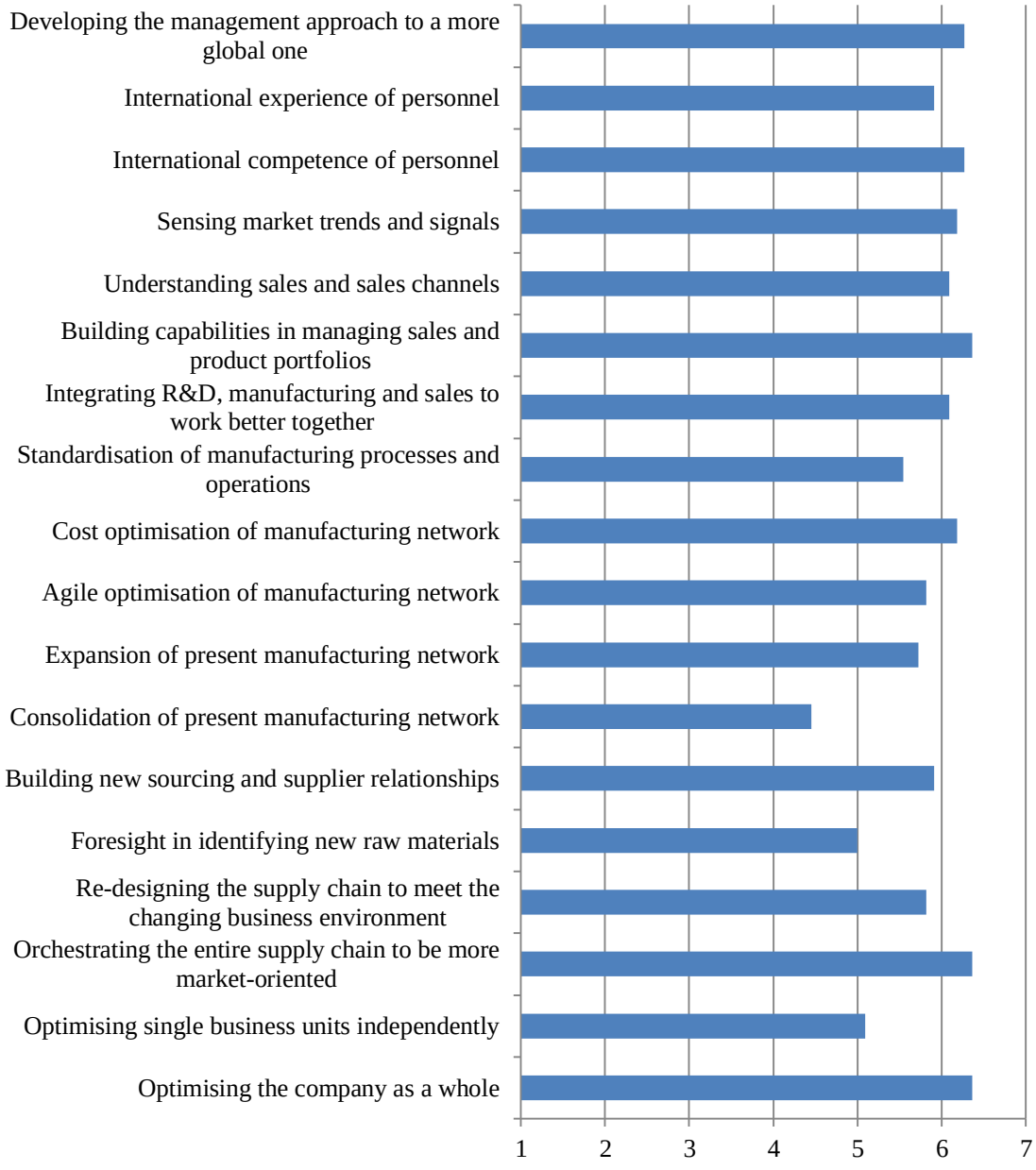
When considering how the companies perceive their operations currently, what is highlighted is the relatively strong commitment towards the supply chain and its development. Perhaps such appreciation describes the importance of the field for the industry, in terms of competitiveness and development. This is supported by Figure 42, below, which presents how the respondents in the chemical industry position themselves according to selected statements.

Figure 42: Applicability of selected statements to the chemical industry



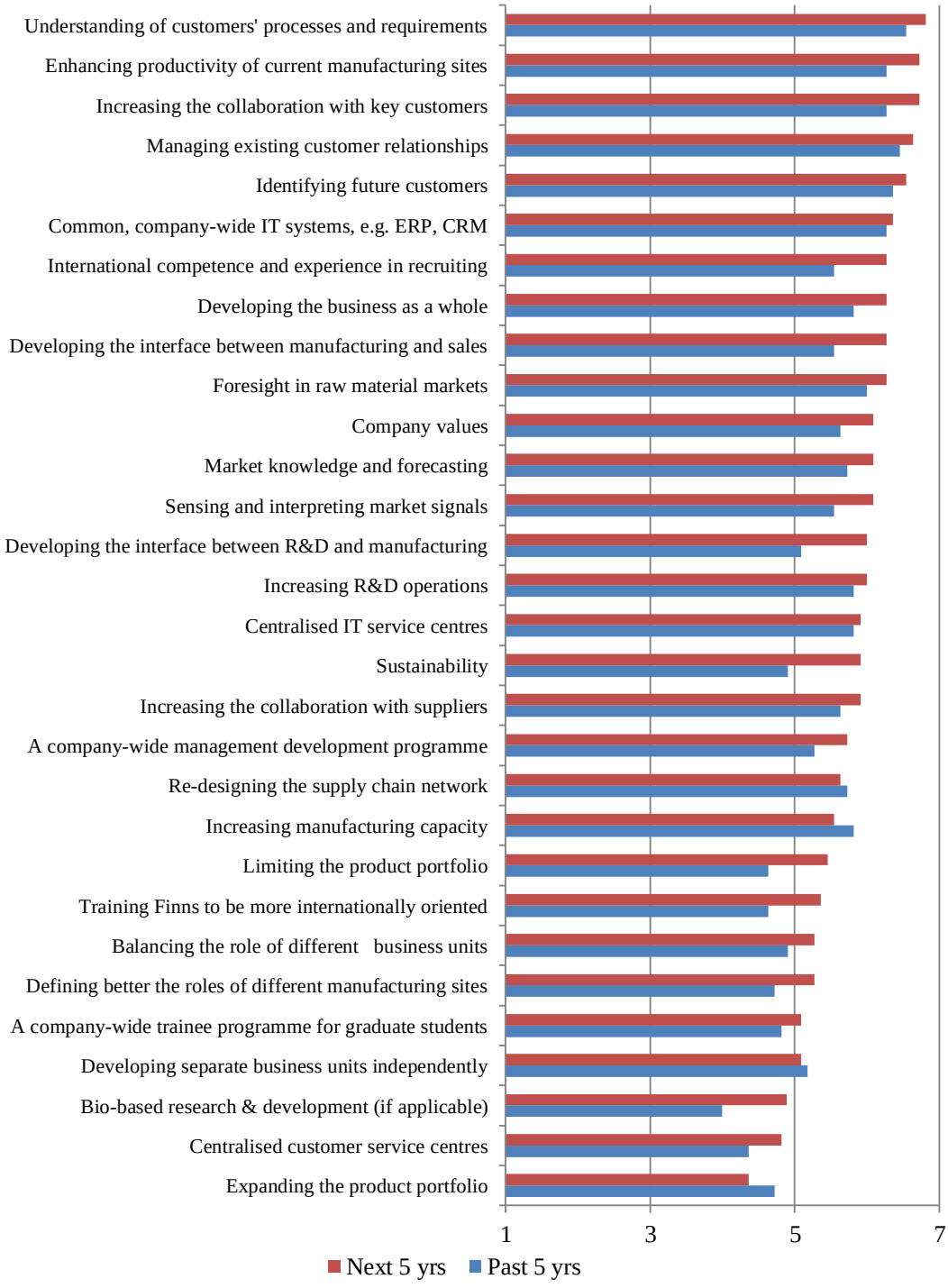
In turn, when examining the relative importance of future capabilities for the industry, it is worth noting that there are nine factors that are considered very important, with mean sample values higher than 6. Not only are they in line with the general guidelines that the entire manufacturing industry seems to promote, but the chemical industry sector would seem to accentuate international competence as well. Figure 43, to follow, describes the perceived importance of future capabilities.

Figure 43: Importance of future capabilities, chemical industry



Concerning future investment targets, interestingly enough the largest growth towards the future is expected to occur in sustainability. Other targets of additional investing include developing the interface between R&D and manufacturing and, perhaps understandably, bio-based R&D is also expected to grow. Figure 44, below exemplifies the industry's past and future investment targets.

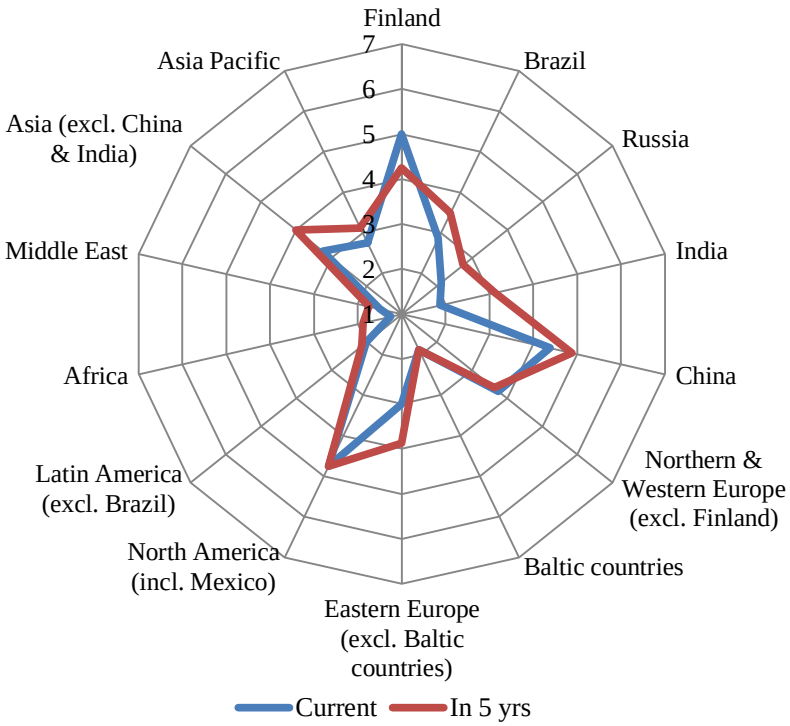
Figure 44: Past and future investment targets of the chemical industry



4.5 Electronics & electro-technical industry

Similarly to the forest and chemical industry, the sample size under the electronics and electro-technical industry is not sufficient to separate large companies and SMEs. Hence, the sector will be presented as a whole. The total revenue of the respondent companies was €14,5 billion in 2011, composed of four large companies and four SMEs. In terms of geographical importance for the sector's operations, the growth is mainly targeted at China, North America and Asia, as seen in Figure 45, below.

Figure 45: The geographical importance for the electronics & electro-technical industry's operations

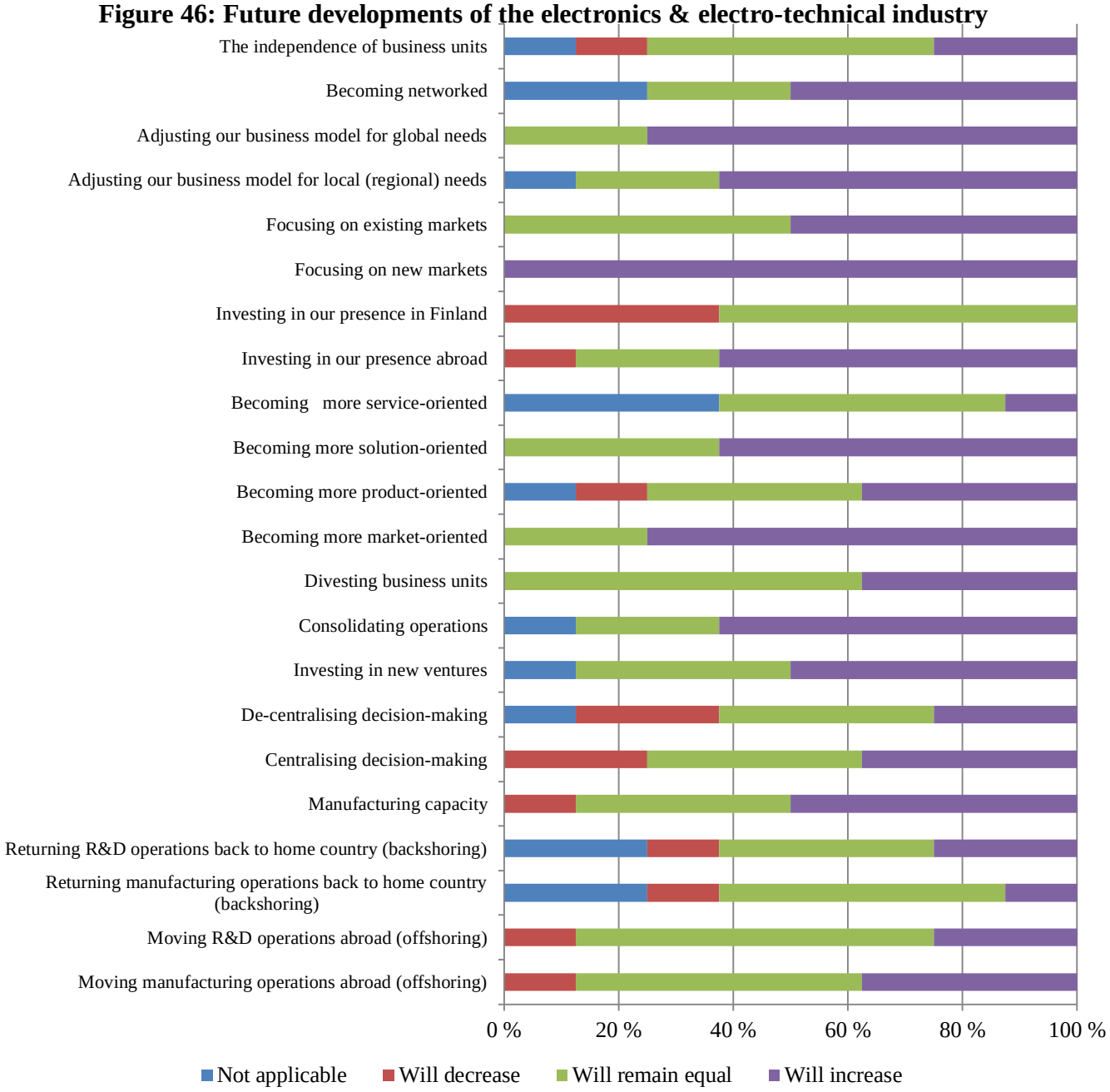


In terms of business models and the rooted-footloose orientation, the electronics and electro-technical sector provides an interesting exception in the examined context of the manufacturing industry. Although the predominant business models are that of the Creator and Distributor, in five years it is expected that a degree of transition will occur from being a distributor to being a Landlord, i.e. providing the temporary use of either tangible or intangible assets. In terms of the production network, the greatest surprise is

the slight transition towards the rooted orientation, as opposed to the general trend of becoming more footloose oriented.

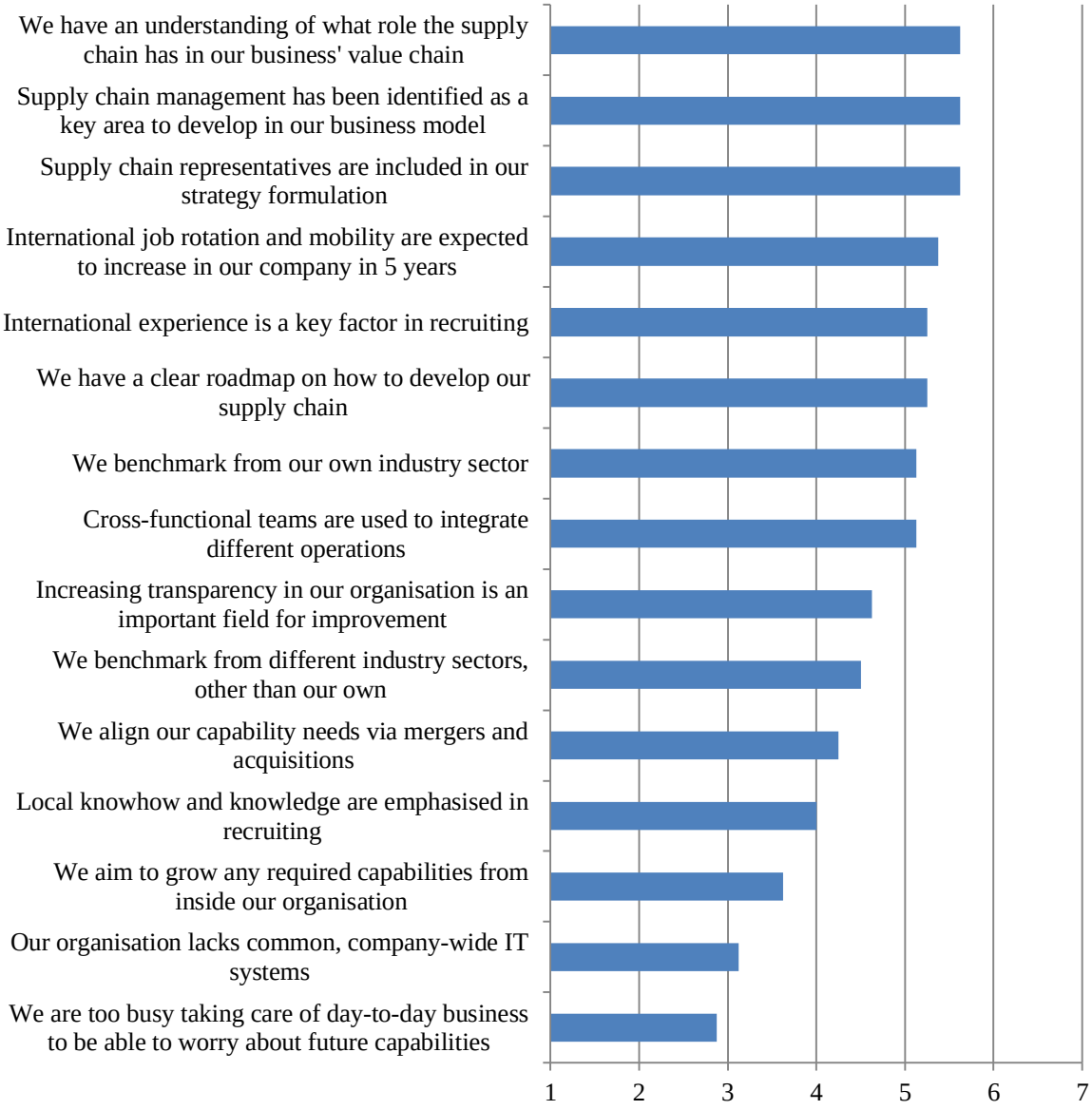
When comparing the ways that the business models have developed in the industry sector over the past five years to the expected development paths, what stands out is the increase in the global orientation. In addition, there is a slight increase in backshoring R&D and manufacturing operations, while simultaneously decreasing offshoring. Figure 46, below, presents the future development ways of the industry sector.

Figure 46: Future developments of the electronics & electro-technical industry



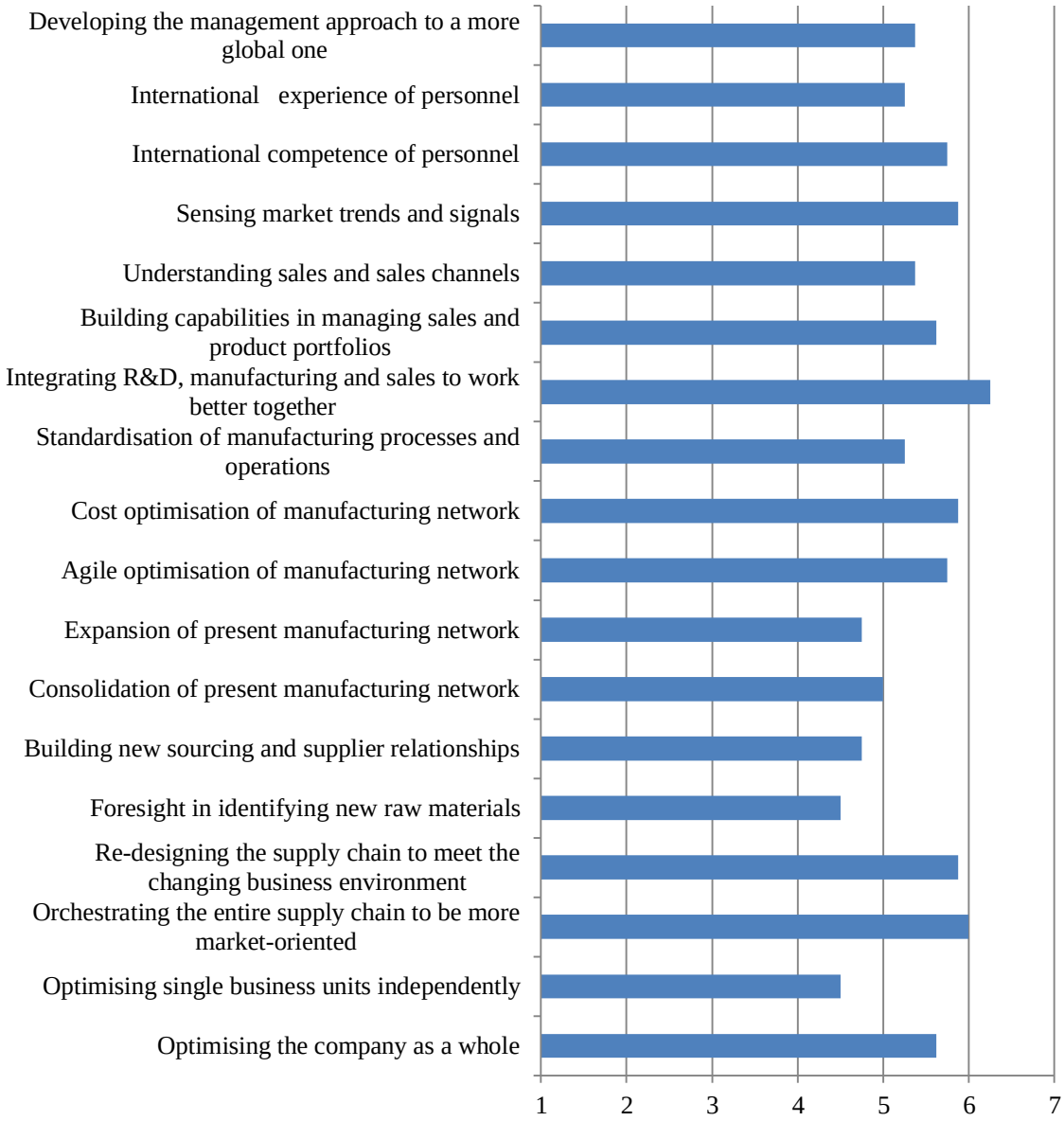
Another interesting characteristic about the electronics & electro-technical industry sector is that there seems to be a relatively good understanding of the desired position of the supply chain, together with having a structure on how to reach that desired status. Other matters of distinctive importance for the industry sector can be regarded as the appreciated position of international experience in recruiting and international job rotation, accompanied by the increasing use of cross-functional teams in order to better integrate different operations together, as illustrated in Figure 47, below.

Figure 47: Applicability of selected statements to the electronics & electro-technical industry



The projected future capabilities, in turn, are more skewed towards developing the interfaces between R&D, manufacturing and sales, while also identifying the supply chain itself as a target for improvement. Figure 48, below illustrates the importance of future capabilities more elaborately.

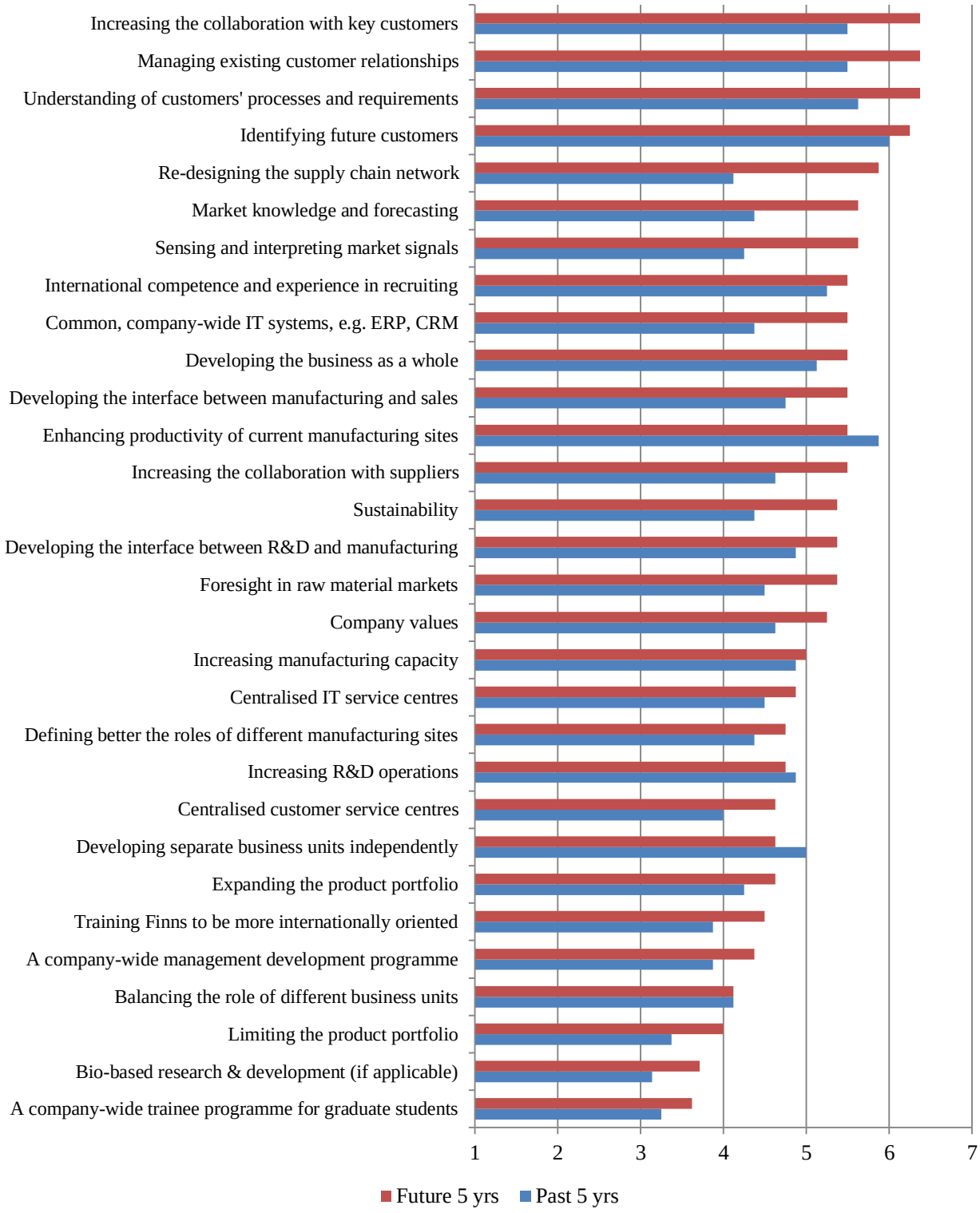
Figure 48: Importance of future capabilities, electronics & electro-technical industry



When examining the past and future investment targets, on the other hand, four distinctive increases are expected: i) re-designing the supply network; ii) sensing and interpreting market signals; iii) market knowledge and forecasting; and iv)

sustainability. Instead, the amount of R&D operations and enhancing the productivity of current manufacturing sites is expected to decrease, as illustrated by Figure 49, below.

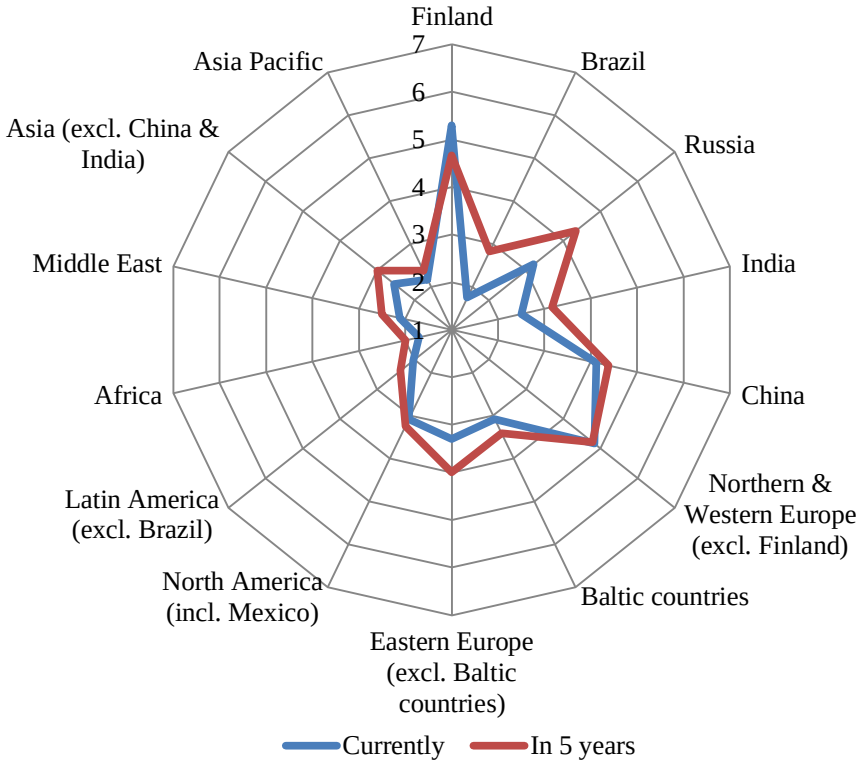
Figure 49: Past and future investment targets of the electronics & electro-technical industry



4.6 Metal processing & mechanical engineering industry

When joining the responses from the metal processing and the mechanical engineering industries for analytical purposes, the total number of respondents is 24, with a total revenue of 17 billion euros in 2011. However, for consistency in presenting the results, large companies and SMEs will not be separated within the industry sector. The geographical orientation of the industry is presented in Figure 50, below.

Figure 50: The geographical importance for the metal processing & mechanical engineering industry's operations



The development of business models is seen to follow the general trend as well, of having no greater alterations to the business models themselves. The most common business model is that of the Creator, with some practicing the Distributor's approach, with no great change expected to occur in the next five years. Similarly to the overall, trend in the manufacturing industry, the metal and mechanical engineering sector will skew itself towards the footloose production network orientation in the future. In terms of the way the industry sector's business models have developed and are expected to

develop towards the future, Figure 51, below, will illustrate the future development trends. What ought to be pointed out is that the independence of business units is expected to greatly decrease, yet the de-centralisation of decision-making is seen to increase in the future.

Figure 51: Future developments of the electronics & electro-technical industry

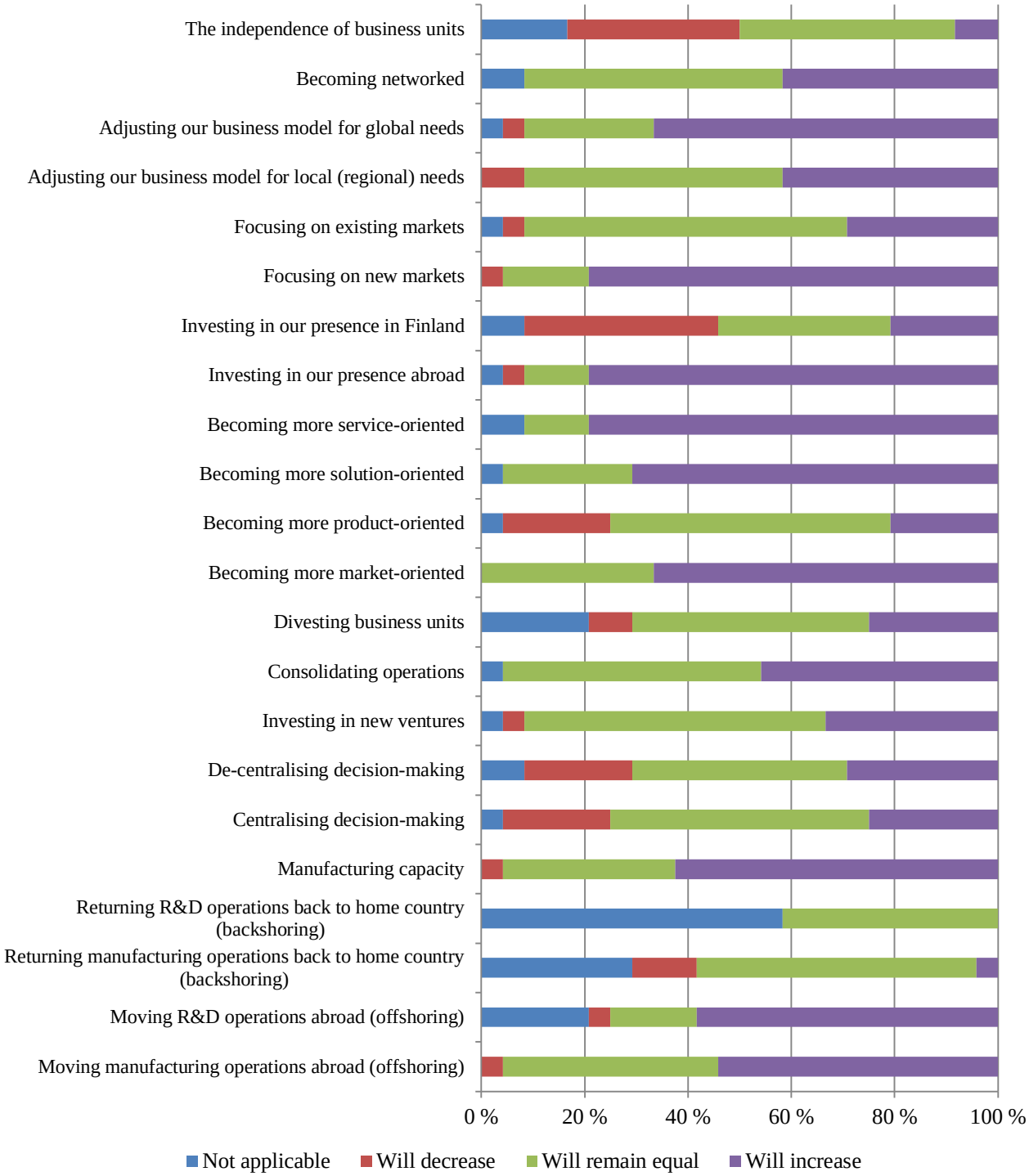


Figure 52, below, represents how applicable a number of selected statements are to the metal processing and mechanical engineering industry. Similarly to the other industry sectors in the scope of the study, there seems to be a high understanding of the position of the supply chain for the firms' value, yet a clear development plan is less apparent. What can be considered interesting is the fact that local know-how is ranked higher than international experience in recruiting.

Figure 52: Applicability of selected statements to the metal processing and mechanical engineering industry

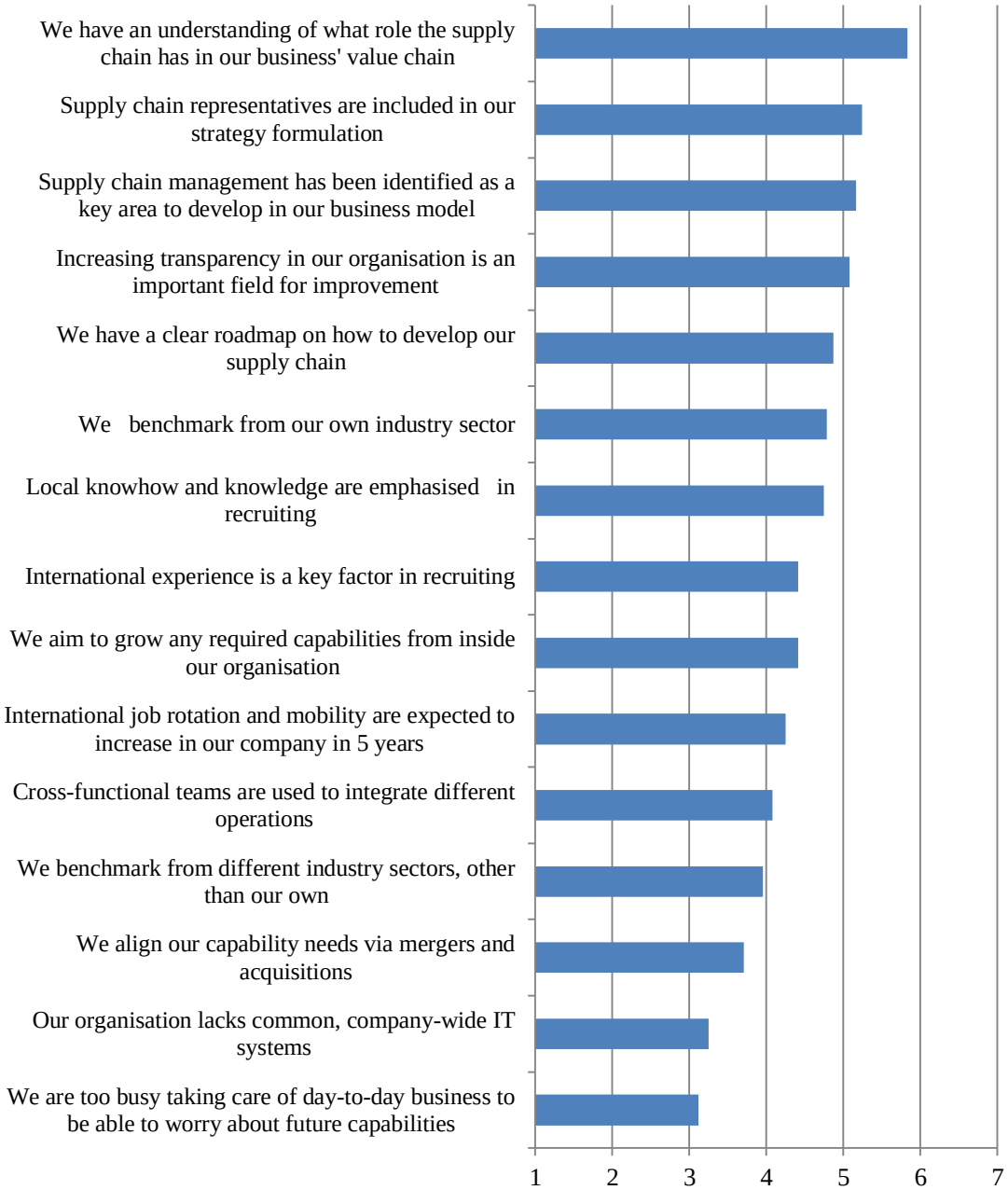
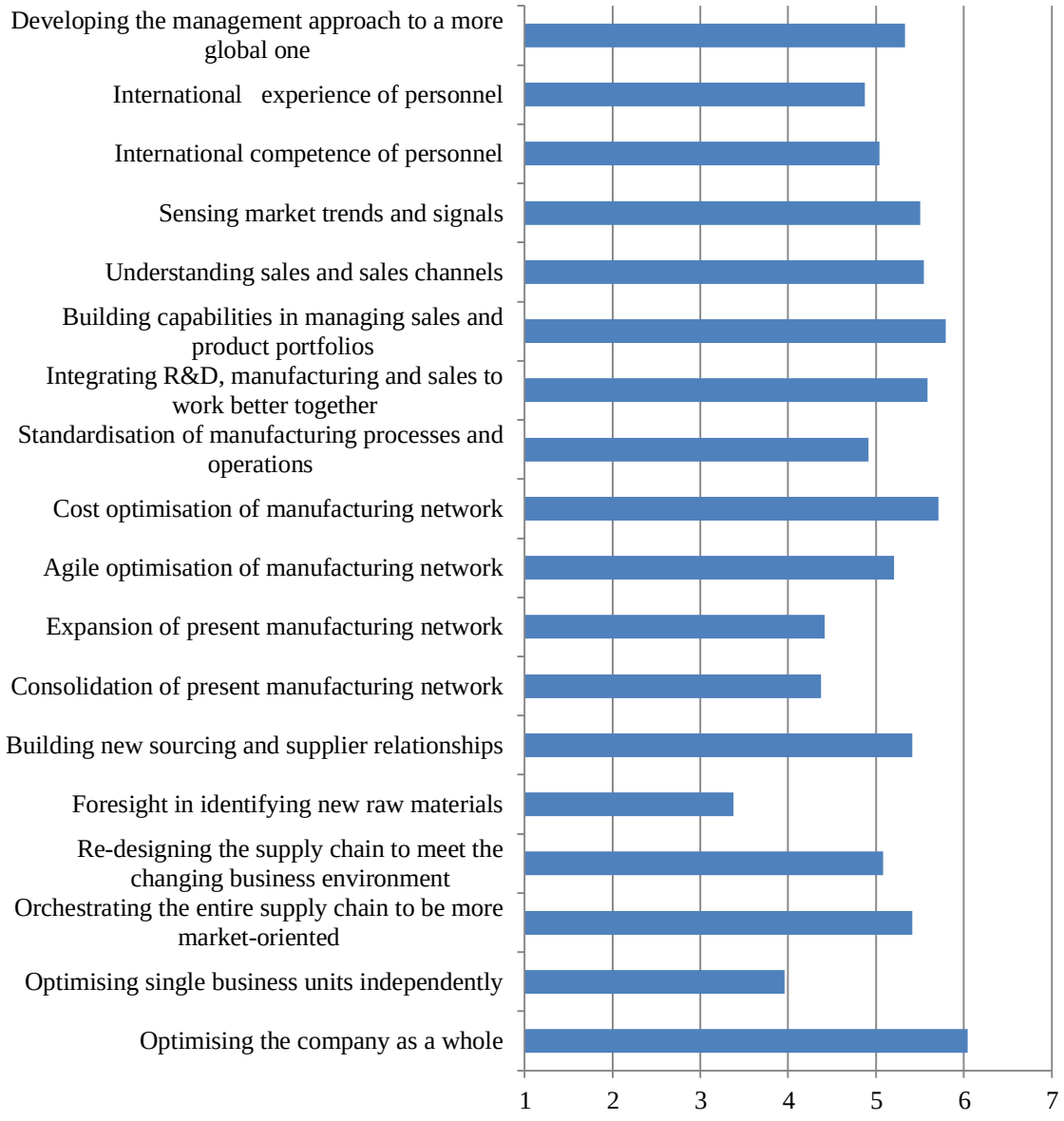


Figure 53, below, presents the importance of future capabilities that the respondents valued. In addition to optimising the company as a whole, a large emphasis is directed to integrating the interfaces of R&D, manufacturing and sales, with a focus on sales.

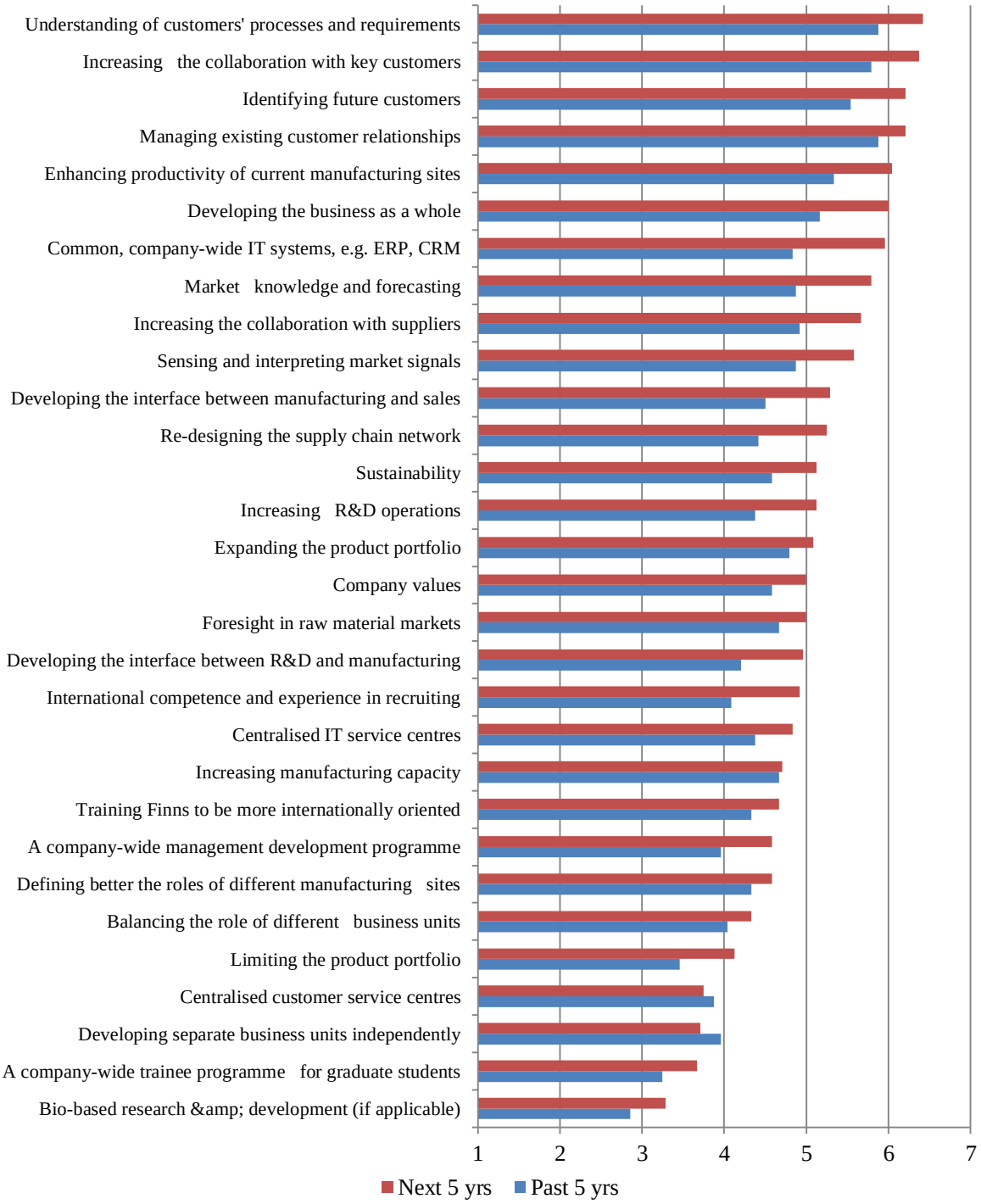
Figure 53: Importance of future capabilities, metal processing & mechanical engineering industry



As illustrated below in Figure 54, the only two areas where investments are expected to decrease are related to developing separate business units independently and centralised

customer service centres. Conversely, the largest growth is expected to occur under adopting common, company-wide IT systems and market knowledge and forecasting. Figure 54, below, describes the change in a more descriptive manner.

Figure 54: Past and future investment targets of the metal & mechanical engineering industry



5 ANALYSIS AND DISCUSSION

Before the concluding remarks, this chapter will first analyse and then discuss the results from the combined perspective of the quantitative and qualitative phases. As opposed to the previous chapter that presented the results per industry sector, this chapter will be structured according to the research objectives, i.e. identification of critical management capabilities, development of the prevailing business models and future investment targets in the Finnish manufacturing industry. Under each section, however, some of the sector-specific features will be introduced, in order to gain an understanding of the nuances between them.

Given the point of view of strategic management, the investment targets and identified capability requirements for the future will be examined separately, in order to identify how well they are aligned with each other. After all, this matter will suggest how well the strategies in the industry are formulated and implemented, with particular regard to whether firms are investing in the fields that they deem important for them.

5.1 Business models and their development

When examining the survey results, it may not be a great surprise that the majority of the business models of the respondents belong to Weill et al.'s (2005) classification of Creator, followed by Distributors. After all, the scope of the study is under the manufacturing industry. In essence, this division reflects the importance of possessing the capabilities in product design, while maintaining the option for outsourcing the manufacturing itself.

What poses an interesting concern, however, is the very limited expected change in the business models with regard to the future. This matter is of particular interest, especially due to the strong past and portrayed future changes in the business environments of the studied industries. The VP of business development from a forestry company, for instance, explained that it was the change in the business environment that drove to the re-configuration of the business model, i.e. realising that being product-oriented is not

good enough anymore in today's world. Instead, the company is becoming increasingly customer-oriented while simultaneously seeking a service business as well. Similarly, the VP of production of a mechanical engineering company stated that *"It's useless to look in the rear mirror. The business field has changed significantly and it has also shrunk quite a lot because of the change."* Despite these illustrative statements, however, the business models themselves are not expected to change notably towards the future.

When taking into consideration the companies' future international expansion or the portrayed investments abroad, together with the transition of manufacturing and R&D operations, the existing geography of the business models can be expected to spread further – globally. The SVP of supply chain and manufacturing of a mechanical engineering company, for instance, emphasised the need for *"balancing a global coverage of production and also knowhow, not having one specialised centre of knowledge. (...) [there is the] need for establishing and consolidating common practises, shifting from a region-specific to global oriented."*

This orientation of internationalisation or rolling-out at a greater global scale can be expected to pose increased challenges in managing operations and coordinating activities. The overall trend seems to have been to centralise decision-making in the past, while interestingly enough, there seems to be a change in sight. Signs of an increase in de-centralisation of decision-making are identified, for instance. An EVP of supply chain management from the chemical industry pointed out, despite centralised control over certain aspects, the local actors will maintain a strong role in the operational level, as *"Although logistics governance and supply chain planning is centralised from the HQ, the actual decision-makers will be across the globe. It's inevitable."*

Figure 55 below illustrates a selection of the past developments, and Figure 56, further below, presents a selection of the expected developments in the companies' business models. The tendency of moving away from being product-oriented and instead focusing on the market demand and building services or solutions around the product offering is expected to largely increase. In addition, the adjustment of the firms'

business models is said to be increasingly adjusted for global and local needs. The underlying matter behind this idea, according to a Chief Supply Chain Officer of a mechanical engineering company and the EVP of supply chain management of another mechanical engineering company is the need to be able to adopt a Western business model and products to local markets. It is increasingly challenging to compete e.g. in Asian countries such as China or India with a Western product built on and built with Western technology; a middle or low-segment product in the portfolio is needed.

Figure 55: Selected past developments in the companies' business models

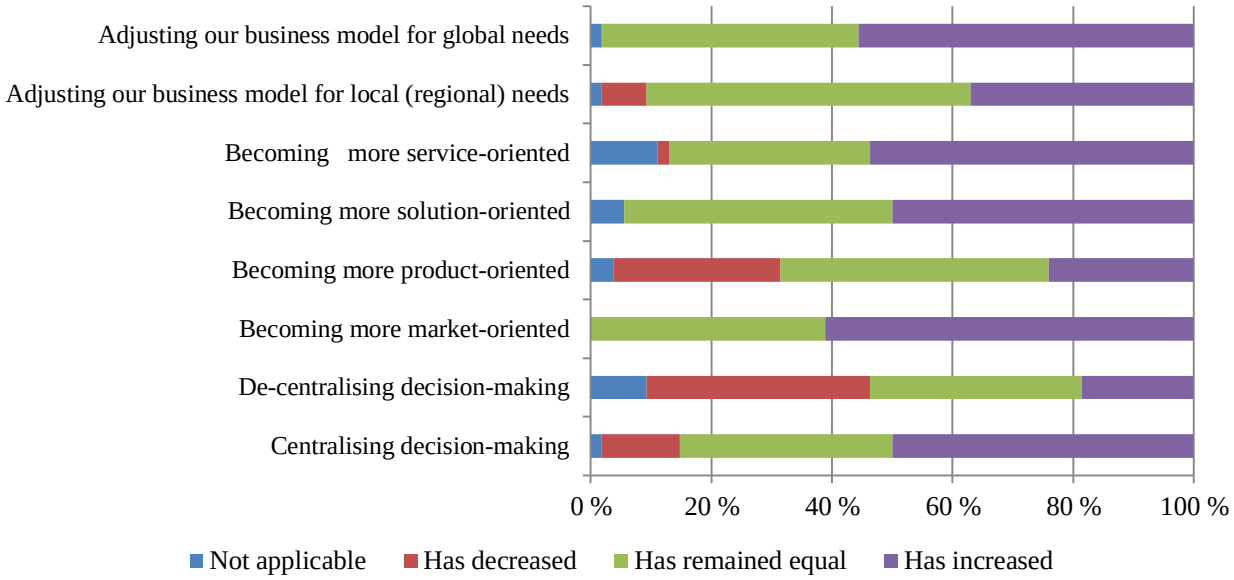
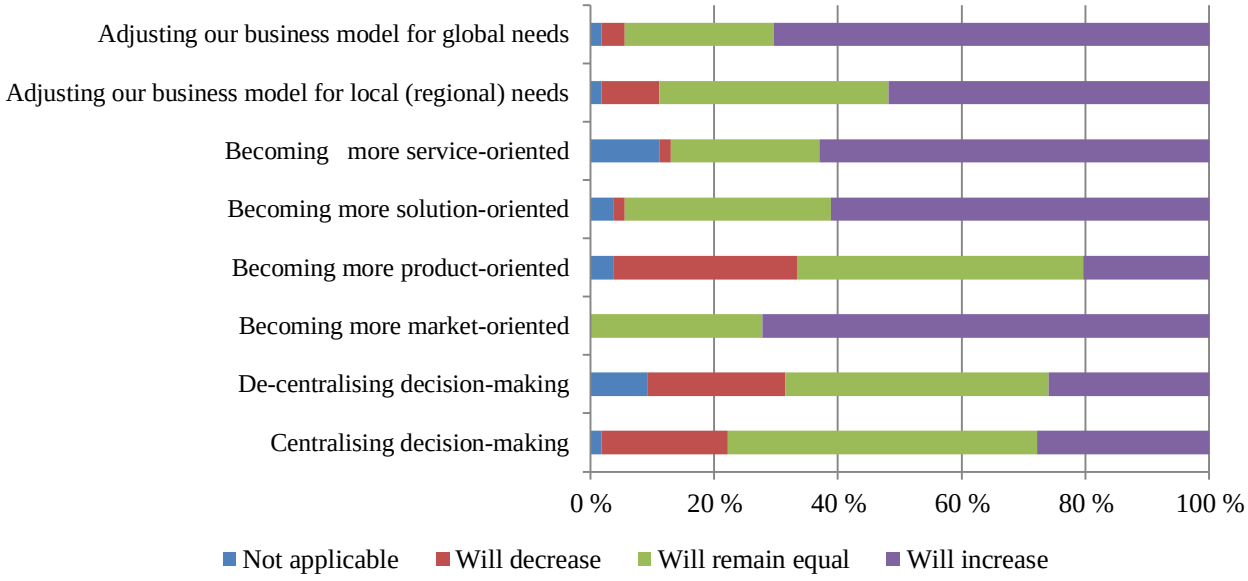


Figure 56: Selected expected developments in the companies' business models



The shift towards the footloose orientation in the firms' production networks (Ferdows, 2008) is seen to go well hand-in-hand with the expected future developments of becoming increasingly internationalised. After all, the increase in being process-oriented and pursuing explicit knowledge plays an important role in said orientation, as it enables the easier transfer of production locations.

In fact, the CEO of a chemical company even mentioned having standardised processes across the company to be a critical capability. The SVP of supply chain and manufacturing from a mechanical engineering company mentioned the importance of standardised processes in a de-centralised organisation, with reference to the interfaces:

> *"When talking about the interface between R&D and manufacturing, you need a concurrent engineering or concurrent product development as a single, global process, which continues all the way until product implementation. Then if we're dealing with the interface between sales and manufacturing, you need a concurrent planning process. Careful planning has to be done formally correctly, if sales is somewhere and manufacturing elsewhere, it's a global process that moulds these two together."*

Similarly, the head of manufacturing operations of an electronics company touched upon the matter of standardised processes, yet from a network management perspective:

> *"Pretty much what managing a factory network boils down to, is overall agility and the multi-disciplinary understanding of products. The key element is that processes are not completely, but sufficiently alike. This enables the smooth transition of transferring a product to be manufactured, as the material flows and product structures etc. are already there."*

Given the aforementioned perspectives, there seem to be no drastic developments in sight in the business models when categorised and strictly examined under Weill et al.'s (2005) framework. It would seem that product design will likely be kept at the core of firms' operations in the future. However, it is clear that substantial change has occurred

– and the development across industry sectors will most likely keep on taking place. In practise, it is the orientation and focus of the companies that has, and would seem to continue to evolve, while also gaining an understanding of the necessity to adjust one's business model to suit the global environment. The main driver for this transformation seems to be seeking growth in new and growing markets. Simultaneously, the geographical coverage and locations of not only the firms' manufacturing and R&D operations, but how the supply chain is constructed, are taken into consideration as well. In fact, supply chain re-design and planning was raised as an imperative area to take into consideration in the chemical, electronics and forest industries in the upcoming years.

So-being, although the business models themselves may have not shifted under the archetypes defined by Weill et al. (2005), this only presents a fraction of the truth. The Finnish manufacturing industry has undergone great structural changes and it is clear that successful firms are re-designing their business model, in terms of their operations, customer base and strategies.

5.2 Future capabilities

According to the conducted survey, the most important capabilities to possess concerning the future were identified to mainly rest upon the interfaces between R&D, manufacturing and sales, optimising the company as a whole and cost optimising the manufacturing network. Figure 57, below, illustrates the differences per industry sector in the perceived importance of the future capabilities.

When juxtaposing the portrayed future capability requirements with the direction of the overall development of the business models, they would seem to be aligned rather ell to each other. The identified capabilities would seem to aim at remedying one the concerns raised from the president of a business unit in the mechanical engineering industry: *"It's the traditional sin of the Finnish industry, i.e. industrial marketing cannot be said that it would be a forte."* Moreover, the CEO of a metal processing industry raised the priority for developing capabilities that arise from the customers' needs. Similarly, the head of

manufacturing operations from a firm in the electronics industry particularly mentioned that one of their top priorities, in terms of future capabilities is:

"(...) to synchronise a triangle where sales, R&D and manufacturing are knit better together. In its current state we are somewhat separate from each other, i.e. sales sells whatever and product development does their own thing and then we try to glue the promises together, somehow. It will never function such way."

Moreover, from the mechanical engineering industry's interviews, it became evident that the business pace is only accelerating. According to the president of a business unit in the sector, as a future capability, continuous development in all fields is required only to stay in place. The SVP of supply chain and manufacturing from a different company in the same industry, on the other hand, emphasised the need for all employees to work longer hours in order to only catch up with the competition. These views would suggest that the dominant view in the industry, as a whole, would be in accordance with Baumol's (2004) views concerning the Red-Queen games.

On a different note, the VP of operations of an electronics company, which is more B2C-oriented than those of the previous two excerpts, accentuated the importance of foresight in understanding the markets: *"Yes, I would emphasise the understanding of market signals. We are, after all, in the consumer business, where it is the consumer who constantly makes the decisions whether they have a demand for our products or not".* Although the importance of agility and the seamless interaction between the identified interfaces was also present in the interview quoted above, the importance of market foresight and market trend sensing was also stressed. As an example, it was said that the value of having all technological developments in the product is less important than e.g. being able to have a 3G connection to social media – it all depends on what the consumers demand.

Figure 57: Importance of selected future capabilities per industry sector

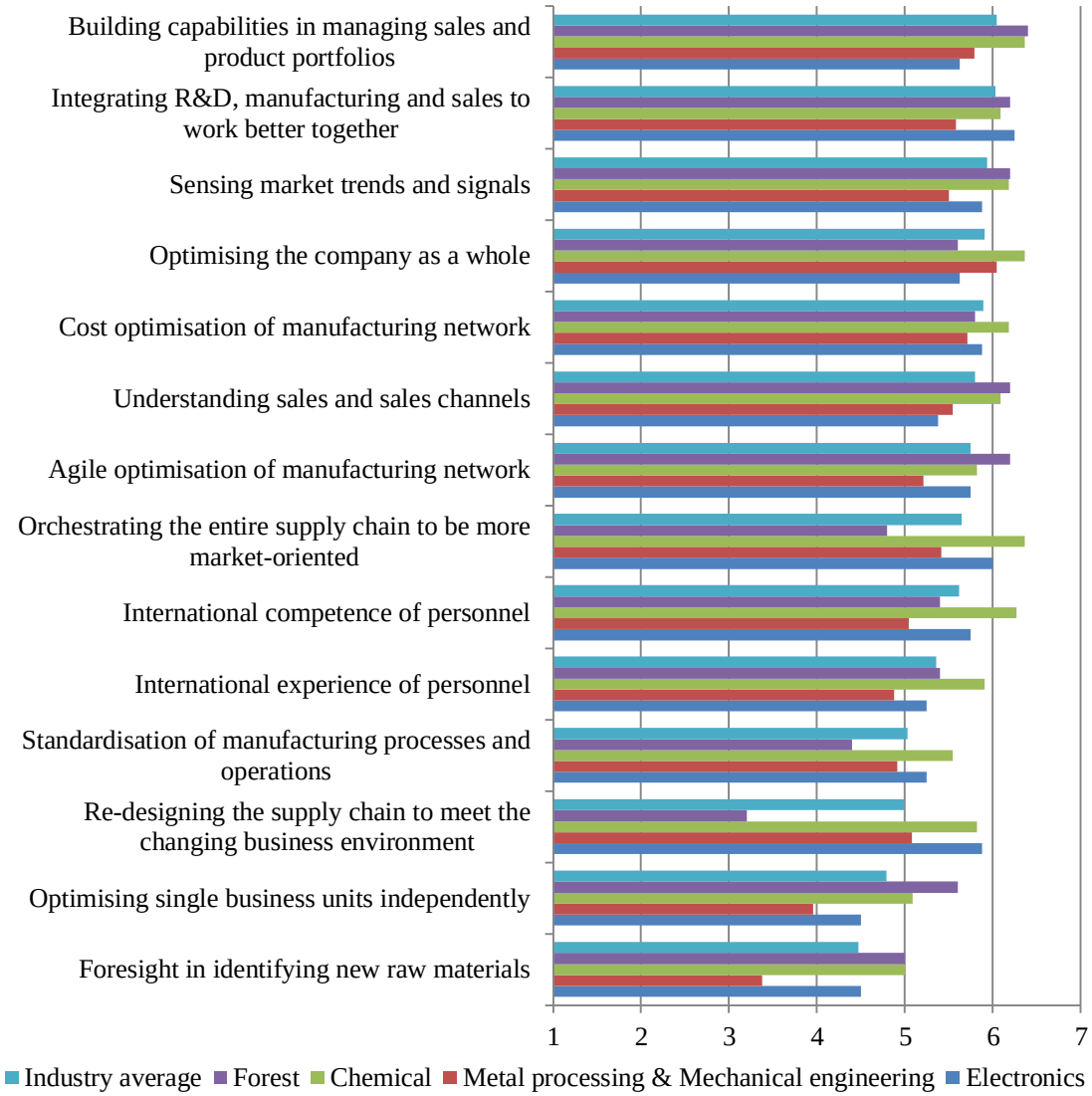
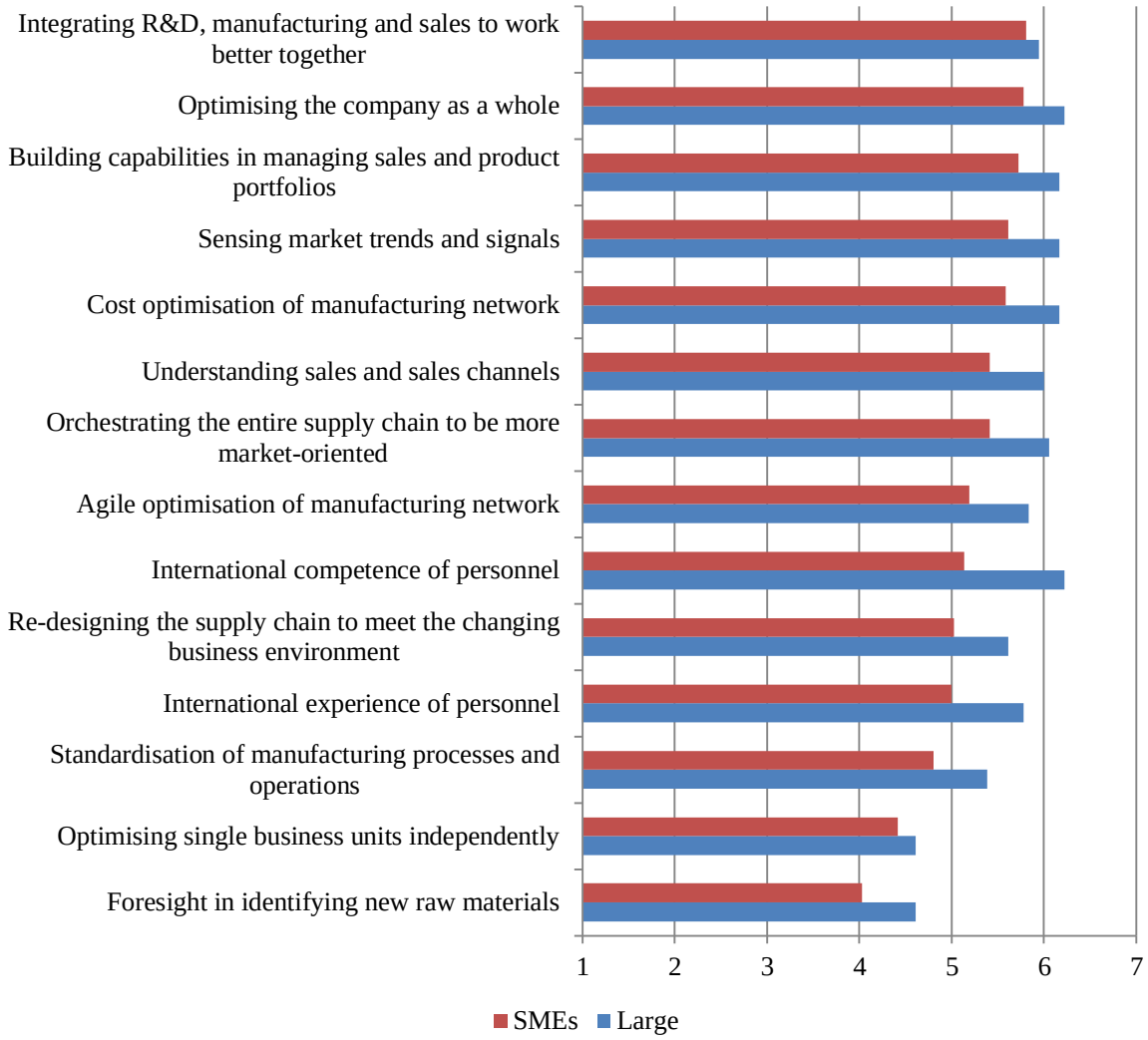


Figure 57 above demonstrates the differences between sectors in terms of future capability requirements. The difference can be explained by the varying priorities that the companies allocate to the given capabilities, or alternatively, due to the fact that some of the capabilities might be already existing in the respondent companies. On the other hand, the different stages of maturity of the industry sectors and operation networks can be an explaining factor as well.

The separation between large companies and SMES often highlights important differences related to size. Figure 58, below, presents a selection of the future capabilities, drawing a distinction between large companies and SMEs. As the EVP of operations of an electronics company mentioned, the risk aversity that small and medium-sized companies have is apparent in all fields. In part, this can be related to the ownership structure of the company, yet also the limited resource pool available plays a role as well. For such reason, it may not be considered a surprise that large companies predominantly rate the required future capabilities higher in importance. However, the position of integrating better the triangle between R&D, manufacturing and sales is almost equally valued between SMEs and large companies. This would suggest that the capability to integrate these three fields may be considered among the most important capability for an organisation to possess, regardless of company size, ownership structure or industry sector.

Figure 58: Importance of selected future capabilities between large companies and SMEs



Given the overall understanding of the direction that the Finnish manufacturing industry is headed towards, there seems to be a degree of consensus concerning the priority for future capabilities. The increasingly international orientation is aligned with the expected required future capabilities in the upcoming years. Particular regard is given to the specified interfaces in the supply chain, together with developing sales and foresight capabilities, while optimising the company as a whole. Naturally, there are industry sector-specific differences, as presented above, yet the direction of the defined manufacturing industry, in terms of future capabilities – as an entirety – seems to be quite well-defined.

Keeping the above in mind and examining the matter from a management capability perspective, two carrying themes are raised:

i) increasingly international operations;
ii) managing the company as a whole.

Concerning the role of international operations, the CEO of an interviewed chemical company expanded on the concept of global business. In fact, international experience has been taken as a factor in considering promotions in the company. In order to be promoted to a manager level, one has had to be present in at least two foreign countries in two different functions. Not only is this part of educating the employee to understand the company's way of functioning, but it also supports the key capability identified by the CEO:

> *"What we need in the future… global thinking. Business is global and you can't start thinking about it based on national preconditions, and as the company is lead, the decision should be made based on what is best for the company, and if necessary, sub-optimise a country or unit. Even though you have a passport from a certain country, it does not give you the right to optimise in favour of the country, as you have to act in the best interest of the company."*

Along these lines, an interviewee from the electronics industry and one from the mechanical engineering industry raised and accentuated the role of network management. Given that the overall tendency in the industry structures is seen to become increasingly interconnected, with the whole optimised instead of individual business units, the ability to manage the firms' networks is key. The SVP of strategy of a metal mechanical company phrased the situation as follows: *"We are dependent on our network. (…) We are exactly as strong as our network, and that is a capability, if you think about the future of the Finnish industry, network management… That is a must. It should be taught in all disciplines."* Furthermore, the head of operations of an electronics company raised the difficulty of said practise, since optimising the company as a whole requires the complete buy-in from multiple actors in the network. Sometimes this may include acquiring the buy-in from external controllers who may not always

understand why a certain facility's inventory is not fully optimised, individually. According to the interviewee, this has led to frequent discussions about how worthwhile the chosen approach is in reality.

5.3 Investment targets

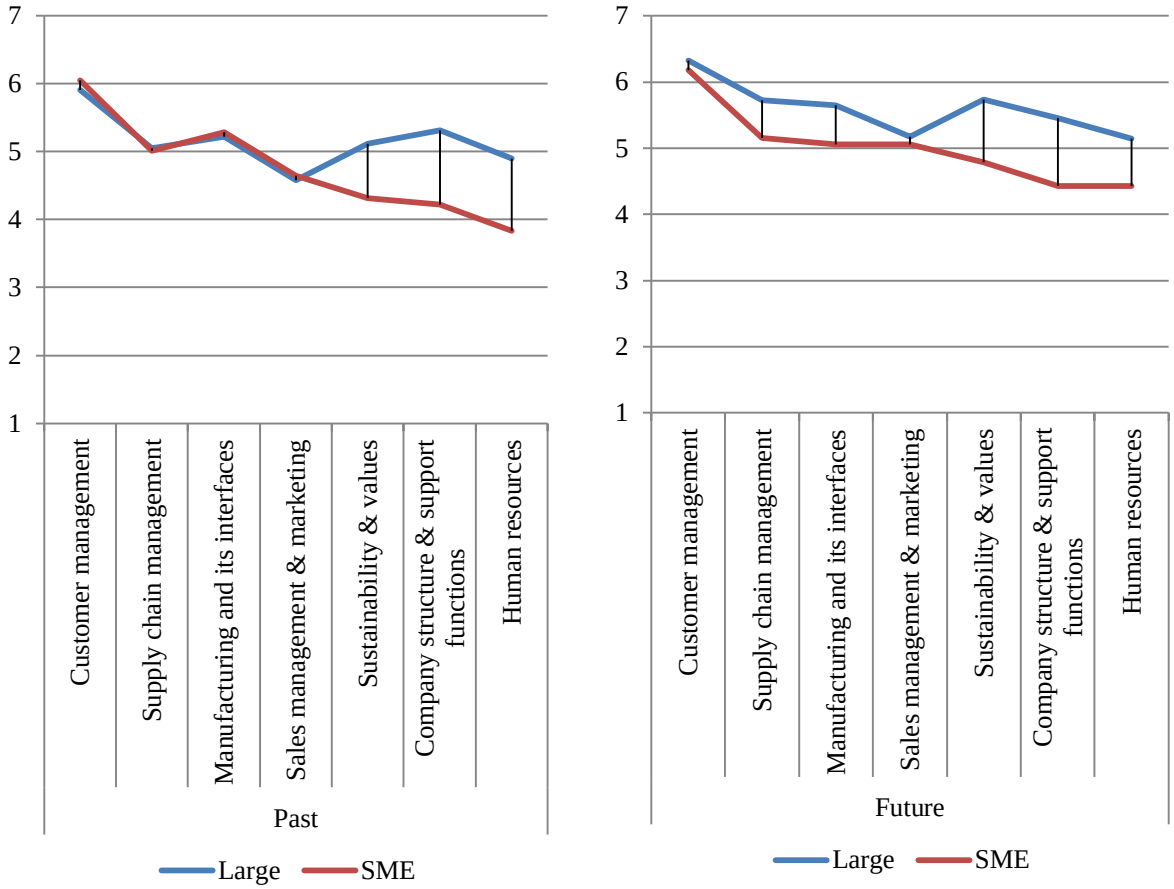
It is important to take into consideration the way individual companies invest and evaluate the investment directions of individual industry sectors. Figure 59, below illustrates the past and future investment targets, by company size. For clarity, the investment topics are grouped into seven categories. The grouping of the categories is presented as in the survey, in Table 7, below.

Table 7: Construction of identified investment categories

Grouped category	Customer mgt	Supply chain mgt	Manufacturing and its interfaces	Sales mgt & marketing	Sustainability & values	Company structure & support functions	Human resources
Composition of category	Understanding of customers' processes and requirements	Increasing the collaboration with suppliers	Increasing manufacturing capacity	Limiting the product portfolio	Bio-based research & development (if applicable)	Developing the business as a whole	International competence and experience in recruiting
	Managing existing customer relationships	Foresight in raw material markets	Enhancing productivity of current manufacturing sites	Expanding the product portfolio	Sustainability	Developing separate business units independently	Training Finns to be more internationally oriented
	Identifying future customers	Re-designing the supply chain network	Defining better the roles of different manufacturing sites	Sensing and interpreting market signals	Company values	Balancing the role of different business units	A company-wide trainee programme for graduate students
	Increasing the collaboration with key customers	Increasing R&D operations	Developing the interface between R&D and manufacturing	Market knowledge and forecasting		Centralised customer service centres	A company-wide management development programme
			Developing the interface between manufacturing and sales			Centralised IT service centres	
						Common, company-wide IT systems, e.g. ERP, CRM	

What can be seen from Figure 59, below, is that towards the future the distinctions between the investments of large companies and SMEs are expected to grow. In the past, both groups invested relatively identically and towards the future the large companies are reacting to the change. Although keeping in mind the more limited resources that SMEs have compared to large firms, the question rises whether SMEs are aware of the transformation of the industry, and if so, why are they not re-considering their investment plans? Furthermore, the difference in portraying the importance of international competence in human resources between the company classes is also highlighted, with large companies placing – perhaps understandably – more emphasis to this investment group.

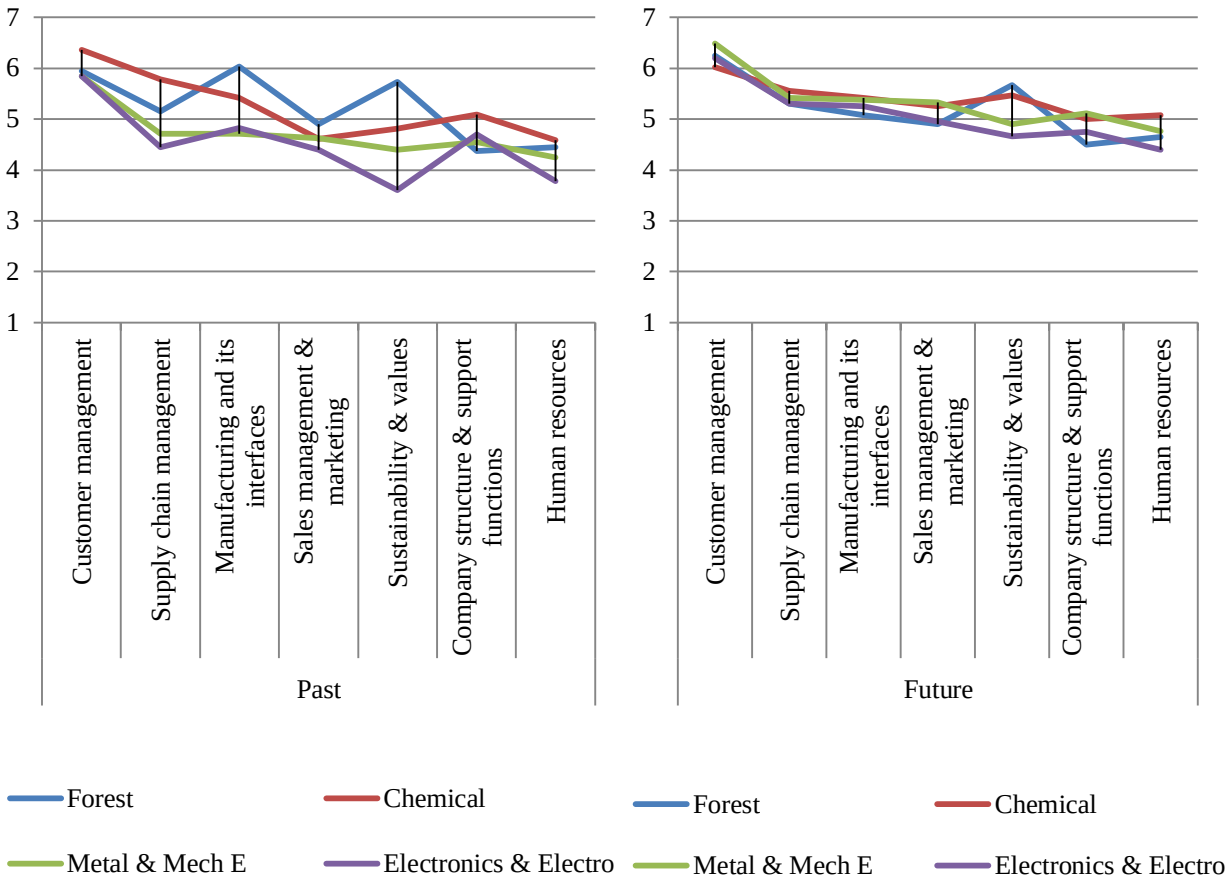
Figure 59: Past and future investment targets by company size



Both groups of companies are expected to be seeking greater growth from expanding their operations abroad. However, given the differences of the company sizes, it can be

understood that larger companies not only have a larger geographical presence but also an assumed greater need for international experience than SMEs. Figure 60, below, presents the past and future investment targets according to the defined industry sectors.

Figure 60: Past and future investment targets by industry sector



Three matters can be pointed out when examining Figure 60, above. Firstly, the variation between the investment targets between the industry sectors is expected to decrease towards the future. This would suggest that, on a global level, the challenges and demands are common across industry sectors. However, some of the industry-specific features will be emphasised and maintained, e.g. high sustainability in the forest industry sector. As previously mentioned the SVP of business development of a forest industry company stated that sustainability has been raised as an over-arching theme to their entire business mentality. Similarly, the VP of business development of a different

company in the same industry stated that sustainability and acting in an ethical manner has, in fact, become a method of differentiating the firm from competitors on a global scale.

Secondly, it is apparent that firms in these sectors plan to increase their investments in practically all fields in the next five years. Hence, the investment plans are assumed to become seemingly more consistent with each other. As a reflection of the mechanical engineering industry's investment mentality, one interviewee phrased the matter of targeting investment areas at a larger perspective, in terms of the need to improve constantly or otherwise facing losses:

> *"If I'm asked whether there is an area where I think that we do not have any work to do… well, not really. Everything needs to be advanced but you cannot win everywhere at once, i.e. it goes somewhat like during the next couple of years the priority is to raise the investments over to this side and I'm sure that after that there'll be the next wave of priorities. But there's the positive side that once you get the engine running, you cannot screw it up in two months. There are strengths present which are self-sustaining but if you remain trenched where you are currently… in the financial results it may not show in a few years, but eventually the foundation starts to decay and success will be hindered."*

Thirdly, and finally, it is apparent that the future efforts will be skewed towards optimising the identified interface triangle in the supply chain, while maintaining a strong focus on sales and customer relationships. This focus can be seen as being aligned and in accordance with the portrayed, overall industry trend and identified future capability necessities of the manufacturing industry.

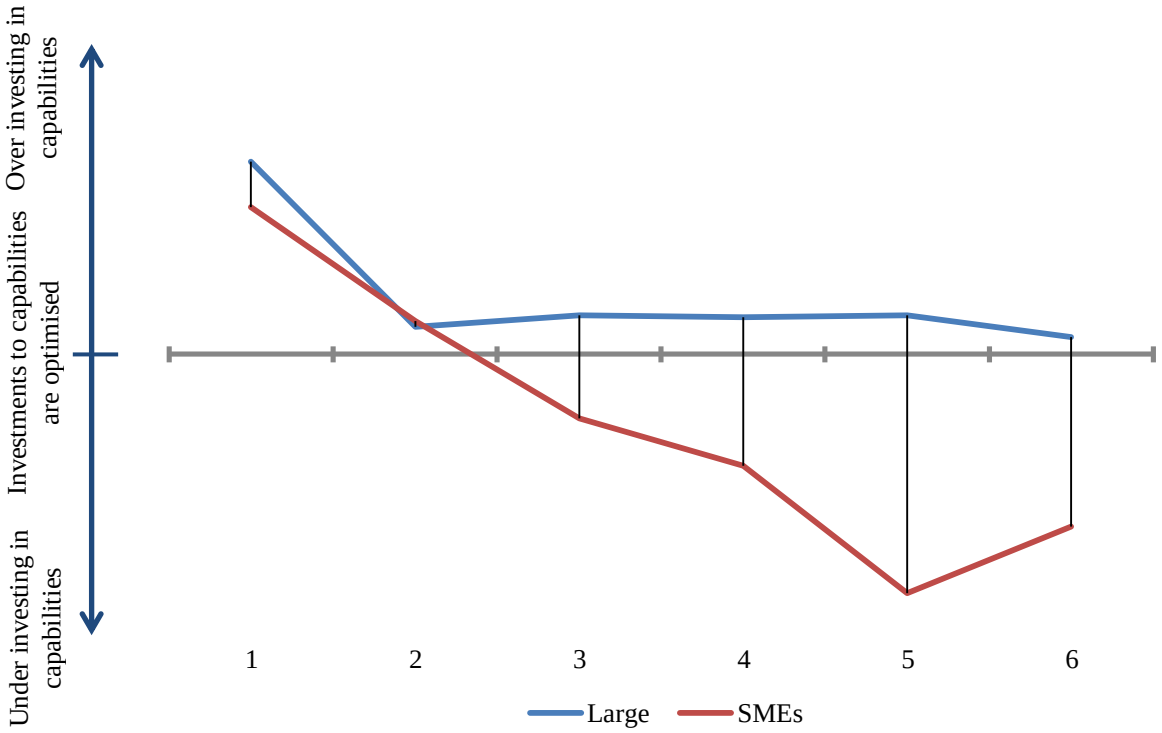
5.4 Alignment of investment targets and future capabilities

Having presented the investment targets of the past and future, it is relevant to examine how well the future investment targets and the rated importance of future capabilities are aligned with each other. The comparison poses an interesting setting to examine firms' strategies and how well they align their operations to it.

The respondents of the survey were asked to rate the importance of 30 future investment targets and 18 future capabilities on a scale from 1-7. The results were then compiled per company, creating six categories of comparison, labelled 1 – 6. The numbers represent the priority of the investment targets and future capabilities, i.e. under group 1 there are the six most important investment targets and three most important capabilities concerning the future. Under group 6, on the other hand, there are the six investment targets of least importance, as well as the corresponding future capabilities that were rated least important.

The investment targets and capabilities within each group were then matched to each other, in order to identify how well they correspond to each other – i.e. is the firm investing in what it deems important. The groups were then compared against each other, to gain insight into when a firm is over or under investing in a capability. For instance, if a capability was rated higher than its investment importance, the firm is considered to under invest. If the firm's investment priority is higher than the importance of the future capability, over investing is considered to take place. Figure 61, below, illustrates how the investment targets and future capabilities are aligned with each other in large firms and SMEs. The logic behind the scale in is that the closer zero, the more aligned the investment targets are to the future capabilities.

Figure 61: Alignment of investment targets and future capabilities, large firms and SMEs

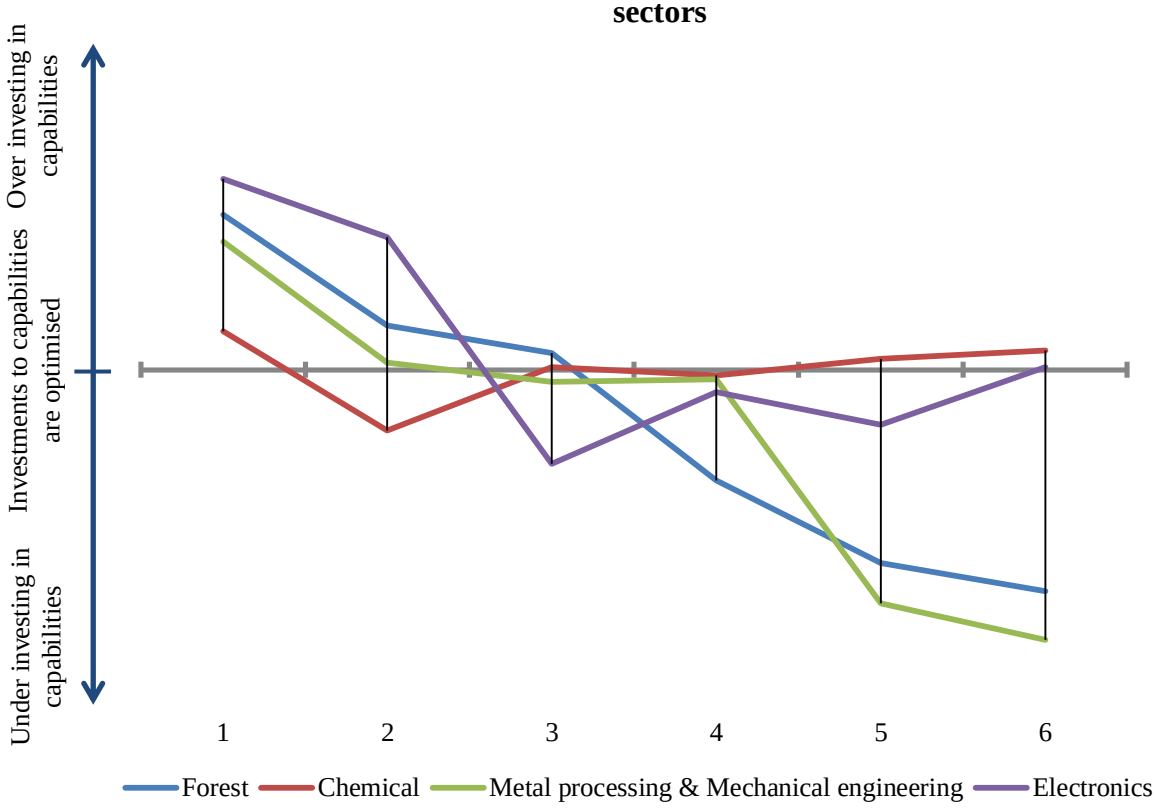


Interestingly enough, there are seemingly no greater differences between the two company sizes in the first four priority groups, especially as SMEs would seem to over invest in the first two. However, the fifth and sixth group demonstrate a greater distinction between the two company classes. This can be partly explained due to the resource constraints on the side of SMEs, and the priorities for allocating said resources. The over investing on behalf of the large companies on the least important group, on the other hand, may suggest a long-term orientation or foresight in developing said capabilities.

Since the large companies tend to be closer to the optimal zero level, this would indicate that their investments are better aligned to their capability needs. This would hence suggest a better implementation of their strategy compared to that of SMEs. However, the differences between the two company classes, with particular regard to their respective resource pools, are to be kept in mind. However, it also ought to be considered that operational effectiveness and strategy are not the same (Porter, 1996).

Figure 62, below, presents the same methodology to represent the alignment of investment targets and future capabilities per industry sector.

Figure 62: Alignment of investment targets and future capabilities, industry sectors



Based on the Figure above, one would deduce that the chemical industry would have its investments and future capabilities aligned best. The first greater difference in the alignment between industry sectors becomes present after the third group, continuing from there on. Moreover, the alignment of the investments and capabilities in the forest industry decreases dramatically after the third group. Perhaps this signals a strong commitment to their priorities and less attention is paid to the matters of lesser importance.

It ought to be considered that Figures 61 and 62 above are only to be considered as indicative and representative of the way investments and future capabilities are aligned. The lack of precision is due, in part, to the fact that not all 30 indicated investment targets can be directly linked to the 18 future capabilities, while some investment targets

can be defined to cover or touch upon multiple capabilities. Furthermore, the contents and order of each priority group varies from company to company, for which a direct comparison, as such, cannot be carried out with this analytical approach.

However, the composition of matching each priority group with each other was used to illustrate the possible mismatches in the field. The difference in investment allocation and investment performance suggests creates a degree of concern in a number of firms with regard to their strategy implementation. Often the limited pool of resources to be allocated is, understandably, assigned to the highest priorities. However, strong and continuous under investing in the lower-priority capabilities can create concerns in the future, in case a sudden or disruptive change in the external environment, for instance, would call for a strong possession of a capability in the near future that is currently considered a low-priority one. For a more successful strategy implementation, investments and future capabilities ought to be better aligned with each other.

Touching upon the topic, in terms of corporate strategy, the SVP of strategy and M&A of a mechanical engineering company raised an important topic, highlighting the importance of strategic flexibility and reaction speed of implementing the formulated decisions:

> *"When all cycles, both economic and those of products, become shorter the old-fashioned strategic planning that was taught in the school of economics, well, it doesn't work today. You can't make 5-year plans anymore. Rather, you set a goal to take that course and then you do the best you can to sale in the middle of the market turmoil to the established direction."*

Building on the above, an additional concern is directly connected to the understanding of what to develop. As an example, the clarity of the development plans concerning the supply chain is raised. As illustrated below in Figure 63, below, 70% of the respondents answered to have their investment plans concerning their supply chain aligned with the respective future capabilities. Out of the 30% that do not, 8% are large companies and 22% are SMEs. Interestingly enough, although the vast majority of the respondents claim to have their investments and capabilities concerning their supply chain aligned

with each other, 56% of the respondents answered that they do not have a clear roadmap on how to develop it. This is illustrated in Figure 64, further below, describes the matter.

Figure 63: Alignment of future investments and capabilities, the supply chain

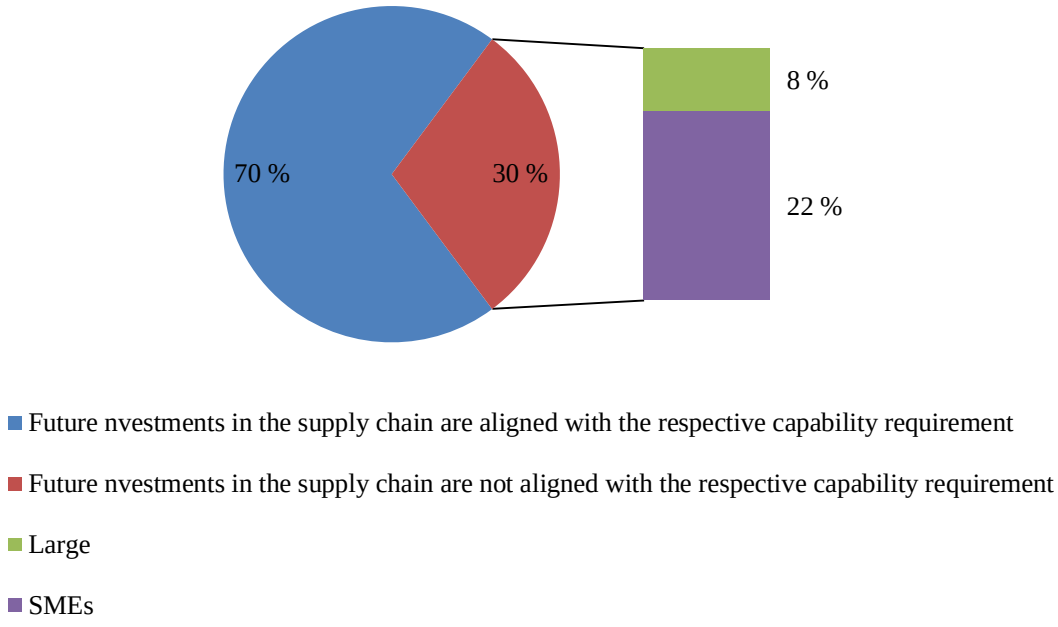
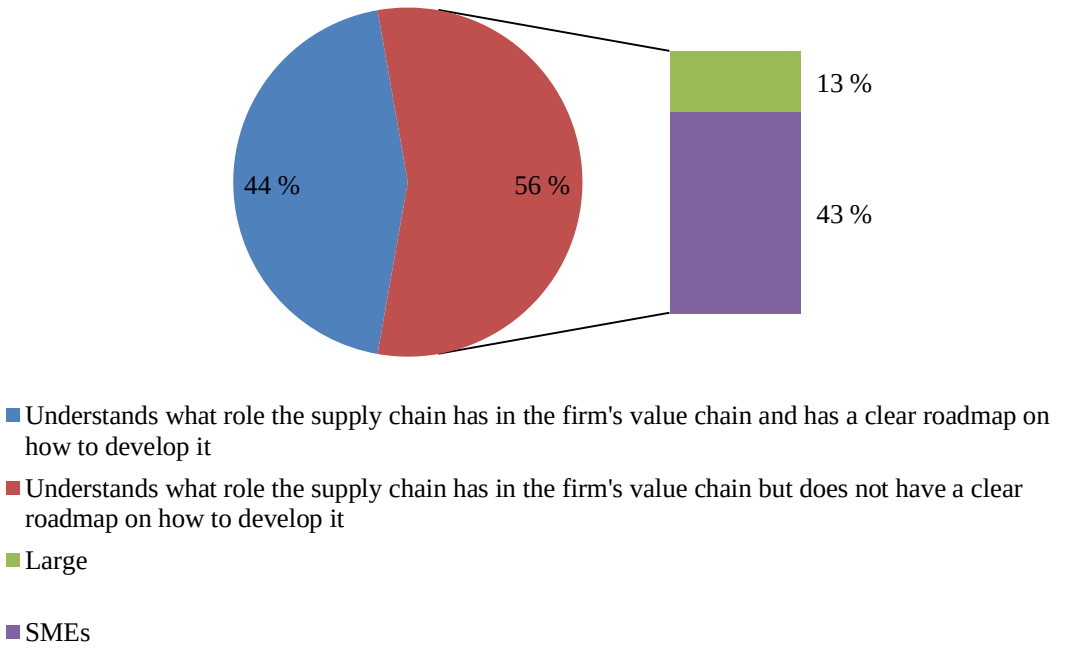


Figure 64: Comparison of understanding the role of the firm's supply chain and having a clear roadmap for it



As previously mentioned, the investment targets and future capabilities are best aligned in the survey regarding the firms' supply chain. However, as illustrated in Figure 64, the majority of the respondents answered that they do not have clear development plans for their supply chain – despite recognising its role in the firm's value chain. Hence, the question is raised whether firms are able to successfully formulate and implement their strategies or development plans absent a clear understanding of what needs to be developed, and how.

5.5 Discussion

The presented data provides a basis for a set of interesting findings. Firstly, in accordance with Mälkiä (2011) and Deloitte (2011), the transition of manufacturing operations abroad can be expected to accelerate in the years to come. However, the transferral is becoming larger and broader than merely touching upon manufacturing, as R&D operations are expected to become increasingly transferred outside national borders as well. This notion is evident also from the decrease in investments targeted to Finland, while the industry has a clear focus on new markets, and hence directing future investments increasingly abroad. In essence, this orientation will increase the necessity for internationally competent employees, while also increase the adopting and use of virtual management and communication tools, as the EVP of supply chain management of a mechanical engineering company indicated. Then again, the SVP of operations of an electronics company noted that the outsourcing of both manufacturing and R&D is not always a smooth transition:

> *"There are signs of it when manufacturing and product development leaves the country to Asia, the Asian product development beats the European one. But the solutions are poor, they cannot be produced anymore. That's why it is important that manufacturing would also stay in Finland. The value of the whole package, of being able to productise… and many times the design for manufacturing is important."*

Although there seems to be a small signal present concerning backshoring, only the future will tell if it will become an actual trend or not. This was also noted by the head of manufacturing operations of an electronics company.

Secondly, the importance of international markets can be expected to increase in the future for the industry. Simultaneously, the difference in geographical orientation between large companies and SMEs can be deemed natural, i.e. large companies shifting further abroad seeking greater returns through new and emerging markets, while SMEs can be assumed to increase their trade primarily in the neighbouring countries.

The shift, however, creates a worrying atmosphere in terms of the role of Finland in the national manufacturing industry's footprint. Historically a large number of the SMEs have grown on top and around the business ecosystem of large companies (Eloranta et al., 2010). When the large companies moved their operations abroad, some of the subcontractors internationalised themselves as well in the process. Those that did not expand beyond national borders, on the other hand, were left in a quite difficult position. The future internationalisation of SMEs that is portrayed in the study, however, signals that said firms have realised the nature of today's business world. Hence, they can be expected to increasingly direct their future business abroad, to the neighbouring countries, as it can be considered somewhat of a necessity for future survival.

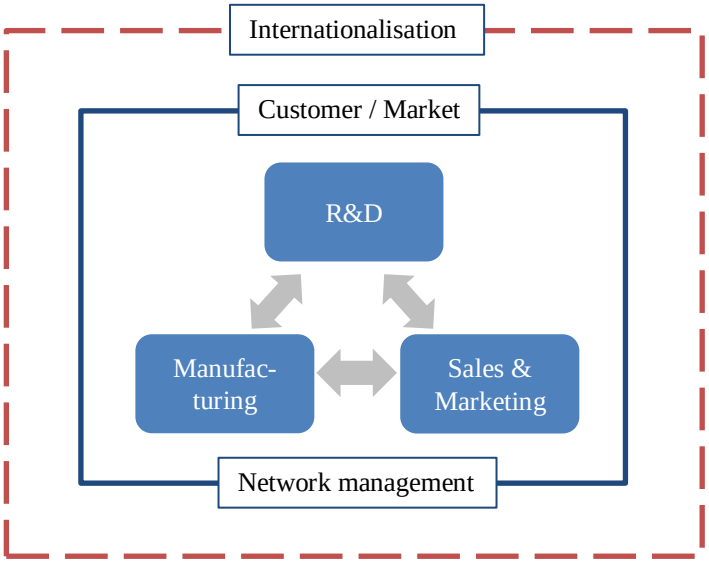
Thirdly, de-centralising decision-making and optimising the company as a whole are two of the overall directions in which the industry may direct their business models in the future. It goes without saying that there are sector-specific differences in the orientation, yet the general tendency in re-defining their organisational processes will require strong managerial skills from all sides of the organisation. Since firms have different profiles and structures, it can be assumed that there is a difference in the platforms and processes to build upon. It has also been pointed out in a number of occasions that the capability of managing the network as whole is considered a critical capability.

With regard to the first three findings, an overarching, or supportive, fourth finding is the realisation that the industry's production network are expected to become increasingly footloose (Ferdows, 2008) in the future. Although there are various nuances that guide towards being footloose, many also support the findings presented above. For instance, since the companies are portrayed to become increasingly de-centrally controlled, the importance of processes and tacit knowledge in the organisation can be expected to increase. Similarly, given that it is the designing of the product that will be kept primarily in-house in the future as well, the footloose orientation enables maintaining said activities as competitive advantage – as opposed to maintaining manufacturing, as a such, as the key competitive edge.

Finally, the fifth finding that can be identified from the study is that competition in the future is expected to be heavily based on optimising the supply chain, with particular regard to the interfaces between R&D, manufacturing and marketing. However, it ought to be taken into account that the concept of marketing is seen also to include sales and sales management, since these have been identified key areas of development. Behind this triangle there is the constant and increasing amount of internationalisation – touching upon not only the supply chain itself but the organisation and both its operational and strategic activities, collectively. Similarly, a constant need to develop includes managing and optimising the entire network under which the company operates.

Figure 65, below illustrates the described model. At the core of the model there are the identified interfaces of R&D, manufacturing and sales, which are to be aligned with each other. The interfaces are also to be adapted and managed as a network, in an environment that is based on the customer and market, under an increasingly international atmosphere. It is worth nothing, however, that the concept of what the terms 'customer' and 'market' entail differs considerably from region to region, for which the configuration of the supply chain ought to be defined accordingly. Furthermore, given the increasing internationalisation of clients, operations and raw materials, managing the entire network is to taken into consideration in such perspective as well.

Figure 65: Model guiding future competitiveness in the manufacturing industry



However, the above model should be adapted to sector-specific requirements, particularly with regard to which section of the supply chain interface triangle poses the best possibilities for value creation. For instance, based on the survey results, one could argue that the chemical industry would be more inclined towards R&D in the future, while the electronics and forest industries would focus more on sales marketing. The metal processing and mechanical engineering industry, on the other hand, would have to balance R&D and manufacturing activities, namely to take into consideration the customer's requirements and possibly adapt or de-engineer their products to emerging, non-Western markets.

Some of the actions to take that would develop the identified requirements include the further adoption of cross-functional teams and alternatively, job rotation between functions and locations (Deloitte, 2003). Some of the interviewed firms have taken up systematic cross-functional practices, while other firms have deeply-rooted job rotation policies. In addition, there are firms that have begun to adopt such practices, yet remain in the early stages of making the best use of them.

As illustrated in the results chapter, it can be deemed natural that international job rotation will increase more in large companies compared to SMEs, given the greater and

existing opportunities for such. Similarly, although the use of cross-functional teams or positions seems to be present in both company size categories, their use seems to be more heavily accentuated among large companies.

6 CONCLUSION

The presented topic is an important one for multiple stakeholders, especially given the recent news, developments and structural changes concerning the Finnish manufacturing industry. This study set out to identify how the present business models in the Finnish manufacturing industry will evolve towards the future, together with aiming to identify the critical management capabilities and investment targets that the industry could be expected to pursue.

The manufacturing industry as a whole is seen to most likely decrease its investments in Finland towards the future. The firms investing in Finland in the future are predominantly SMEs. The large companies, on the other hand, are expected target almost exclusively new and emerging markets to expand their operations. Hence, the main question remains what the position of Finland will be in the industry's equation in the future. The scenario is of great interest, particularly when not only manufacturing operations are considered to be outsourced, but R&D operations and other functions as well are likely to be transferred abroad at an accelerating pace, regardless of company size.

So-being, while keeping mind the sector-specific features and characteristics, the overall tendency of the industry is to become increasingly networked and internationally-oriented. Simultaneously, as production networks are expected to become increasingly footloose, the importance of Finland for the industry can be considered to decrease even further – especially when considering that historical reasons is among the most important factors for firms' presence in the country (Mälkiä, 2011). A growth in the de-centralisation of decision-making is in sight, while the design of products will be seemingly kept in tight, in-house control of firms in the future as well. Hence, the importance of manufacturing, as an element for competitive advantage in the firm's profile, is expected to decrease.

Given the evolution of the business models and production networks, the predominant future management capabilities can be seen to play an important role in the company evolution as well. Most of all the capability to optimise the company as a whole and

network management ought to be highlighted. It is no longer the single operation or individual business unit performance that will create the main competitive advantage for the firms, but rather, how well the entirety and network, as a whole, are optimised that would perhaps make the difference. Simultaneously, it is the interface between R&D, manufacturing and sales/marketing that is seen as the crucial triangle to develop to a new level. Thus, developing capabilities that address the defined interfaces are also to be considered as crucial management capabilities for the future.

The examined industry sectors are expected to harmonise their investment targets in the next five years. Nevertheless, there are notable differences in the approach and structures that large companies and SMEs have towards developing their operations. It seems as if large companies overall have a clearer understanding of both the direction they are headed to and their investment plans, i.e. future capabilities and investment plans are aligned better. While acknowledging the differences between large companies and SMEs in terms of agility, this would, however, suggest that the large firms' corporate strategies are implemented more successfully than those of SMEs.

Large companies are seen to expand further geographically in the future and are expected to invest accordingly. The SMEs that will focus on regional or nearby expansion are assumed to, perhaps understandably, invest more carefully than the large companies. The four investment areas where the clearest differences in future investing between large and SMEs are expected to be:

i) Customer management;
ii) Supply chain management;
iii) Manufacturing and its interfaces;
iv) Sales management & marketing.

An alternative view of understanding the future differences in investing would be to suggest that large companies are reacting to the occurring change, while SMEs continue to invest in the same ways as previously.

6.1 Managerial implications

The results of the study are of interest from a managerial perspective, especially as they strengthen the overall understanding and general perception of the direction the industry is moving. The study served as the follow-up to last year's study, creating a continuum on the concern over the future of the Finnish industry, while also drawing attention to the offshoring and transferal of both manufacturing *and* R&D operations.

In practise, the importance of strategic planning, strategy formulation, implementation and foresight, accompanied by the microfoundations of dynamic capabilities (Teece, 2007) are accentuated all around the results of the study. In fact, strategic management can be considered an overarching theme covering the entire research scope. Given the outcome of the study, a number of factors is raised to be considered in developing one's own business operations, namely towards the structure and organisation of the company. Also, a clear direction is given to consider in terms of running the business in the future: optimising the identified, critical interfaces of the supply chain. Simultaneously, as the prevailing business environment is becoming increasingly international in all aspects, it goes without saying that schemes addressing the global aspect of business are to be taken into practise. Said schemes include the emphasis of international experience in recruiting, company-wide management and graduate programmes, international job rotation and the use of cross-functional teams.

6.2 Contributions to academia

The contributions of this study in the field of academia are largely related to the understanding of industry evolution, with a defined palette considering the firms' management capabilities, business models and investment targets. The study provides a platform to build on for further research, within the defined scope. The study also deepens the understanding of the way different companies align their business model, future capabilities and investment targets with each other, while simultaneously emphasising the role and importance of proper strategic management.

6.2.1 Suggestions for further research

Taking into consideration Mälkiä's (2011) thesis, focusing on the reasons for firms to internationalise their manufacturing operations, this study served as a natural second phase to the topic of the future of the Finnish industry. This thesis opens further possibilities to specialise in a specific industry sector, given the existing findings on industry sector-specific capabilities and investment targets, together with presenting an existing and tested research structure.

As this and the previous study have been scoped under the future of the Finnish industry, a suggestion for further research could be changing the approach and taking under examination the reasons for firms to invest or develop their operations in Finland. Loosely along the guidelines of Jorma Eloranta's (2012) proposal, instead of taking predominantly Finnish firms as the scope, an alternative could be to study foreign firms and their logic for choosing or not choosing Finland as a location for their operations.

Optionally, from a broader perspective, the equivalent investment study can be conducted in other countries as well. Similarly, the notion of studying a national industry's future can easily be adapted to other countries – perhaps laying the foundation for a larger scale of studies concerning the future of the manufacturing or other defined industries in specific countries.

Finally, this study poses interesting opportunities to elaborate and further examination on the context of strategic management as well as network management. Furthermore, the differences in the ways of aligning firm capabilities with the developing business model and business environment could also serve as a topic for further research. In particular, the study unveiled multiple possibilities to deepen one's understanding of the firm's production network and the way the interfaces are managed within it, in an increasingly global environment.

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8 APPENDICES

8.1 Appendix 1: Interview guides (Finnish & English)

Haastattelukysymykset:	**Johtamiskyvykkyydet globaaleissa operaatioissa**
Kyvykkyyksien määritelmä:	resurssit, rakenteet sekä vakiintuneet toimintatavat ja prosessit, joiden pohjalta organisaatio kasvattaa ja kehittää liiketoimintaansa.
Johtamiskyvykkyyksien määritelmä:	resurssit, rakenteet sekä vakiintuneet toimintatavat ja prosessit, jotka mahdollistavat organisaation hallinnan, koordinoinnin ja johtamisen.

Tausta: liiketoimintamalli, tuotannon rooli

1. Miten kuvailisitte yrityksenne liiketoimintamallia?

2. Mikä on tuotannon asema liiketoimintamallissanne?

3. Miten yrityksenne liiketoimintamalli on muuttunut viimeisen viiden vuoden aikana?

Kyvykkyydet, tärkeys, kehityssuunta

4. Miten kuvailisitte yrityksenne kyvykkyyksiä (ks. määritelmä) tuotantoon ja toimitusverkon hallintaan liittyvissä toiminnoissa?

5. Mitkä ovat organisaatiollenne tärkeimmät kyvykkyydet operaatioiden johtamisen kannalta?

6. Miten ko. johtamiskyvykkyydet ovat kehittyneet kansainvälistymisenne myötä? Mitkä tekijät ovat johtaneet kyvykkyystarpeiden muuttumiseen?

7. Mitä kyvykkyyksiä tarvitsette korostetusti tulevaisuudessa, mihin aiotte investoida, miksi?

Rajapinnat, synergiat / koordinointi

8. Millaista yhteistyötä tuotannon ja toimitusketjun eri osa-alueiden välillä on?

9. Miten yhteistyö T&K:n ja tuotannon, sekä tuotannon ja myynnin rajapintojen välillä on järjestetty? Mitkä tekijät ovat yrityksellenne merkittäviä ko. rajapintojen johtamisen kannalta? Miksi?

Kyvykkyydet ja liiketoimintamalli, strategian linja

10. Millä toimenpiteillä yrityksenne kyvykkyydet sovitetaan muuttuvaan liiketoimintaympäristöön?

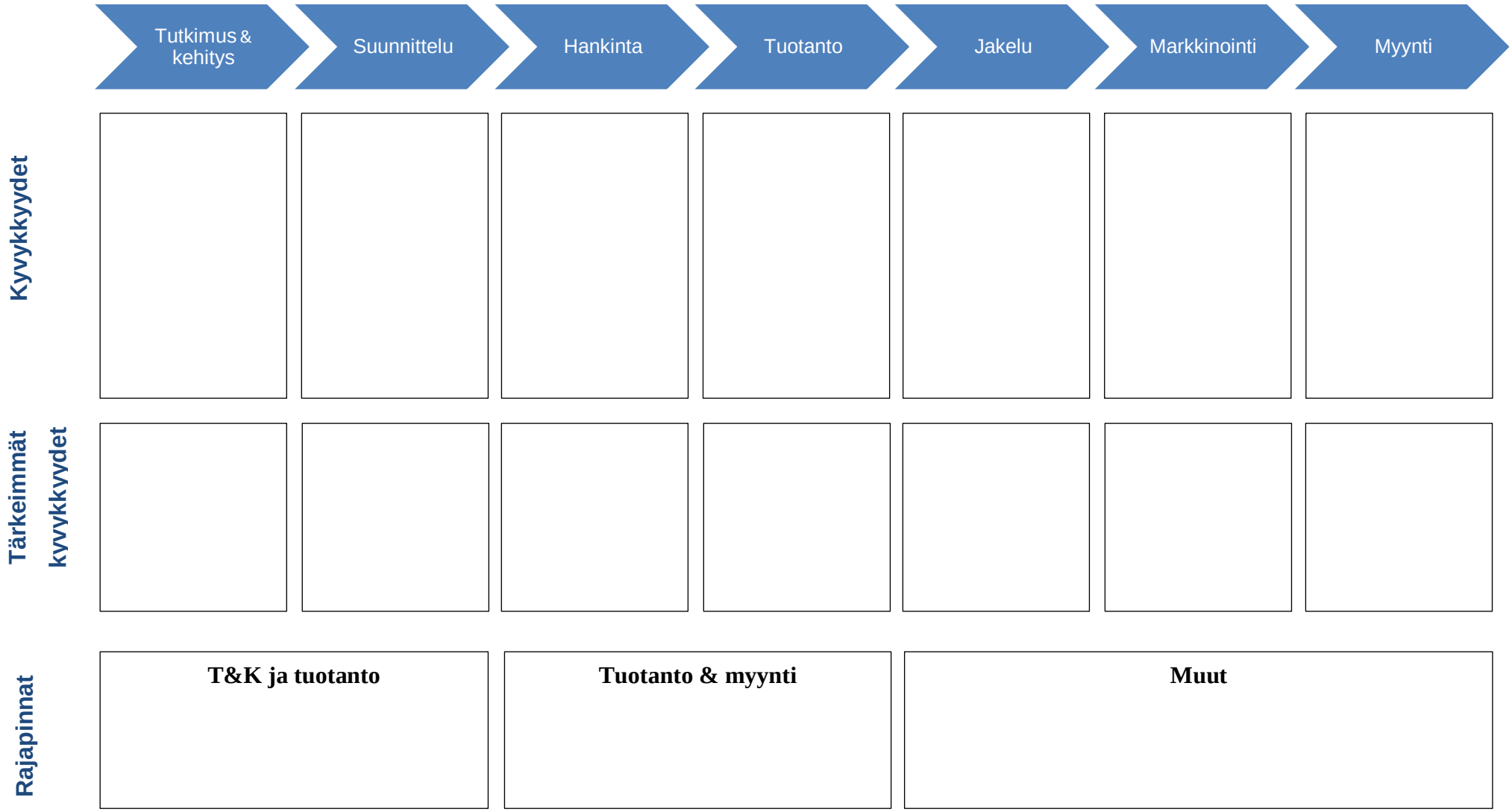
11. Millä tavoin ko. kyvykkyydet on kohdennettu yrityksenne liiketoimintamalliin, tavoitteisiin ja strategiaan?

12. Miten yrityksessänne liiketoiminnan ja operaatioiden kehitys on organisoitu ja johdettu?

13. Minkälaisia resursseja olette kohdentaneet operaatioiden kehittämiseen?

Kyvykkyyskartta: Suomen Teollisuuden Tulevaisuus, vaihe 2

Yritys:



Interview questions: Management capabilities in global operations

Definition of capabilities:	the resources, structures and established practices and processes based on which the organisation builds and develops its business.
Definition of management capabilities:	the resources, structures and established procedures and processes that enable the organisation's control, coordination and management.

Background: business model, role of manufacturing

1. How would you describe your organisation's business model?
2. What is the position of manufacturing in the business model?
3. How has your organisation's business model evolved during the past five years?

Capabilities, their importance, development direction

4. How would you describe your company's capabilities (see definition) in terms of managing the manufacturing and supply chain?
5. What are the most important and critical capabilities for managing operations in your organisation?
6. How have said management capabilities evolved along with your organisation's internationalisation? What factors have affected the shift in the capability requirements?
7. What capabilities will you require increasingly in the future? What are you investing in, why?

Interfaces, synergies / coordination

8. What kind of cooperation do the different phases of the supply chain and manufacturing have with each other?

9. How is the cooperation between the interface of R&D and manufacturing, and the interface between manufacturing and sales, organized? What factors are significant for your organisation in managing said interfaces? Why?

Capabilities and the business model, strategic alignment

10. What procedures and actions are taken to align your organisation's capabilities with the changing business environment?

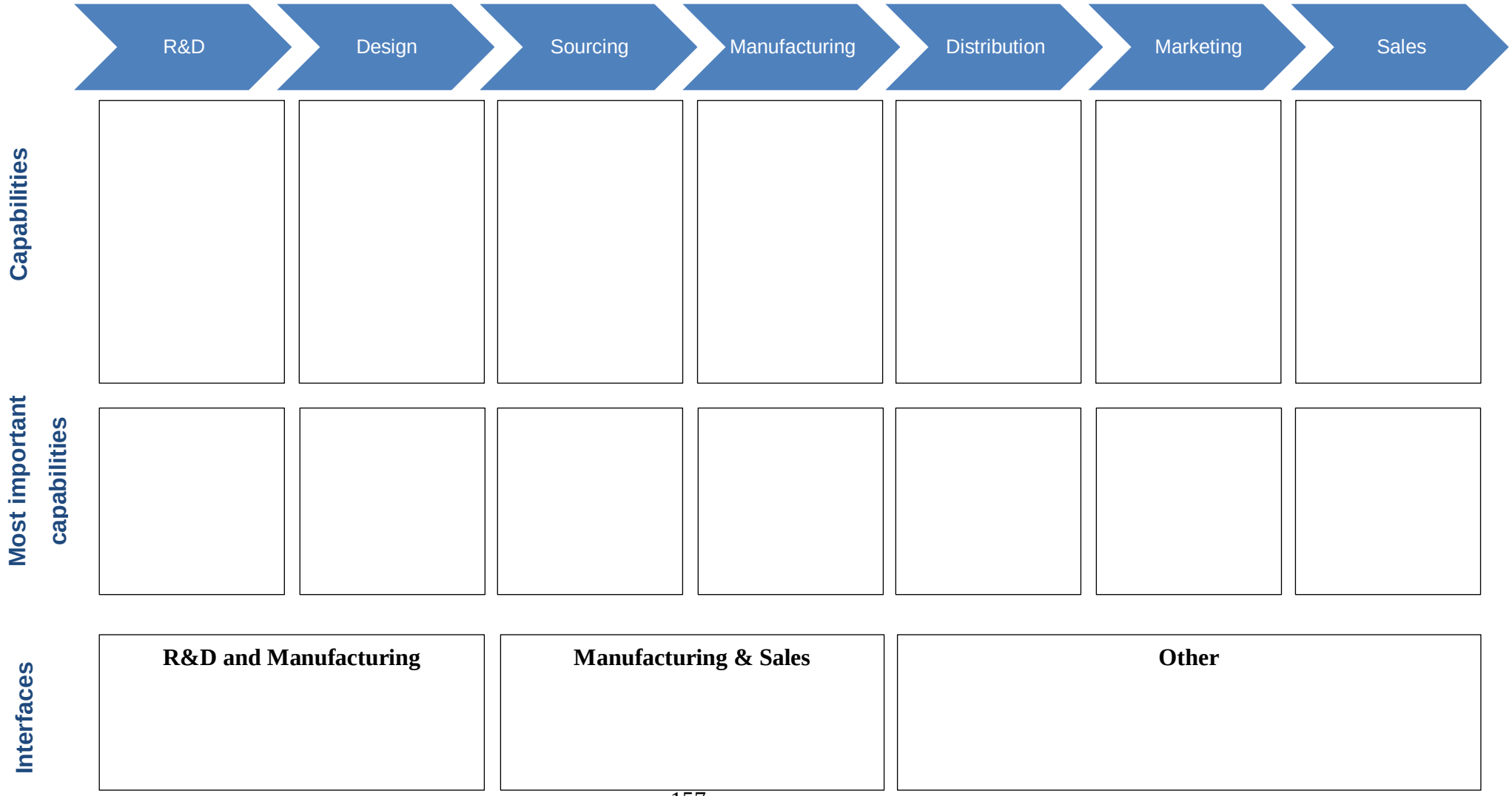
11. How are your organisation's capabilities aligned with your current business model, objectives and strategy?

12. How is the development of your organisation's business model and operations organized and lead?

13. What kind of resources have you allocated to develop your operations?

Capability Map: The Future of the Finnish Industry, phase 2

Company:



8.2 Appendix 2: Online survey (English)

Suomen teollisuuden tulevaisuus, osa 2

Would you like to share your thoughts on the future of the Finnish industry? Last year, in cooperation with the Aalto University, Deloitte conducted a study on the future of the Finnish manufacturing industry, '*Suomen teollisuuden tulevaisuus'*, mainly focusing on the reasons why companies transfer their manufacturing operations abroad.

Building on the findings from 2011, this year's study will focus on identifying what implications this internationalisation has on the companies themselves. We also aim at gaining an understanding of the future necessities of the industry, as a whole. The purpose of this second phase is to expand the discussion over the future of the Finnish industry, while building a better understanding of what investments are to be made and what capabilities will be needed in order to succeed in the future.

The survey takes approx. 25 minutes and all answers will be treated as confidential. The answers will be only aggregated with those of other respondents for analysis. The deadline for the responses is set for Friday, August 24th at 18.00hrs (GMT+2). In case of any questions or concerns, please, do not hesitate in contacting Tatu Isotalo, tatu.isotalo@deloitte.fi.

Thank you, in advance, for taking part in the survey. Your responses are valued and highly appreciated.

Background information

1. What is your job title in the company? *

◯ Managing director

◯ Head of operations

◯ Head of production

◯ Production manager

◯ Plant manager

◯ Other, please specify

2. My answers will focus on the: *

◯ Corporate level

◯ Regional level

◯ Business unit level

3. Where is your corporate headquarters located? *

◯ Finland

◯ Abroad, please specify

4. What is the primary form of ownership of your company? *

◯ Private company owned by entrepreneurs (e.g. family company)

◯ Private company owned by Finnish investors

◯ Private company owned by international investors

◯ Publicly traded company

◯ Other, please specify

5. Please indicate the primary standard industrial classification (TOL 2008) of your company. *

◯ Forest Industry (16-17 Metsäteollisuus)

◯ Chemical Industry (19-22 Kemianteollisuus)

◯ Metal Processing (24 Metallien jalostus)

◯ Mechanical Engineering (25,28,29,30,33 Kone- ja metallituoteteollisuus)

◯ Electronics and the Electrotechnical Industry (26-27 Sähkö- ja elektroniikkateollisuus)

◯ Manufacture of Furniture (31 Huonekalujen valmistus)

○ Other, please specify:

6. Please fill out the following financial information on your company for 2011: *

Revenue, MEUR *

_____

EBIT % of revenue *

_____

7. Please estimate the number of employees in your company.

In Finland*

_____

Abroad_____

8. Which kind of customers do you serve? *

☐ Businesses

☐ Consumers

9. How many at least 50-percent owned manufacturing locations does your company have?

In Finland *

_____

Abroad

_____

10. How important are the following regions currently, and in the next 5 years, concerning your company's operations? *

Scale 1-7, where 1: Not important; 4: Moderately important; 7: Extremely important

	Currently	**In 5 years**
	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Finland *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Brazil *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Russia *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
India *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
China *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Northern & Western Europe (excl. Finland) *	○○○○○○○	○○○○○○○
Baltic countries *	○○○○○○○	○○○○○○○
Eastern Europe (excl. Baltic countries) *	○○○○○○○	○○○○○○○
North America (incl. Mexico) *	○○○○○○○	○○○○○○○
Latin America (excl. Brazil) *	○○○○○○○	○○○○○○○
Africa *	○○○○○○○	○○○○○○○
Middle East *	○○○○○○○	○○○○○○○
Asia (excl. China & India) *	○○○○○○○	○○○○○○○
Asia Pacific *	○○○○○○○	○○○○○○○

Business models and their development

11. Which one of the statements below would best describe your company's current and future (in 5 years) business model? *

	Current	In 5 years
We design and manufacture our products ourselves	○	○
We design our products but outsource their manufacturing	○	○
We manufacture products designed by other companies	○	○
We provide the temporary use of tangible or intangible assets	○	○
We match possible buyers and sellers together	○	○

12. Below there are five statement pairs. Please choose the one statement from each pair that best reflects your company's production network currently, and in the future (in 5 years). *

Please select only one statement for 'currently' and only one for 'in 5 years' under each pair.

	Currently *	In 5 years *
Production network		
1) We have a local / regional production network	☐	☐
1) We have a global production network	☐	☐
Focus area		
2) We are more operations-focused	☐	☐
2) We are more source-focused	☐	☐
Type of knowledge		
3) Tacit knowledge ('know-how') is more important for our operations	☐	☐

3) Explicit knowledge (e.g. manuals and procedures) is more important for our operations	☐	☐

What drives change

4) Internal factors are more important in initiating change	☐	☐
4) External factors are more important in initiating change	☐	☐

Role of manufacturing

5) Manufacturing is the primary contributor to our competitiveness	☐	☐
5) Manufacturing is only a secondary contributor to our competitiveness	☐	☐

13. Please indicate how your company's business model has evolved over the past 5 years and how it is expected to evolve in the next 5 years. *

	Over the past 5 years				**In the next 5 years**			
	Not applicable	Has decreased	Has remained equal	Has increased	Not applicable	Will decrease	Will remain equal	Will increase
Manufacturing and R&D								
Moving manufacturing operations abroad (offshoring) *	○	○	○	○	○	○	○	○
Moving R&D operations abroad (offshoring) *	○	○	○	○	○	○	○	○

Returning manufacturing operations back to home country (backshoring) *	○	○	○	○	○	○	○	○
Returning R&D operations back to home country (backshoring) *	○	○	○	○	○	○	○	○
Manufacturing capacity *	○	○	○	○	○	○	○	○

Decision-making and structure

Centralising decision-making *	○	○	○	○	○	○	○	○

De-centralising decision-making *	○	○	○	○	○	○	○	○
Investing in new ventures *	○	○	○	○	○	○	○	○
Consolidating operations *	○	○	○	○	○	○	○	○
Divesting business units *	○	○	○	○	○	○	○	○

Orientation

Becoming more market-oriented *	○	○	○	○	○	○	○	○
Becoming more product-oriented *	○	○	○	○	○	○	○	○

Becoming more solution-oriented *	○	○	○	○	○	○	○	○
Becoming more service-oriented *	○	○	○	○	○	○	○	○

Presence and markets

Investing in our presence abroad *	○	○	○	○	○	○	○	○
Investing in our presence in Finland *	○	○	○	○	○	○	○	○
Focusing on new markets *	○	○	○	○	○	○	○	○

Focusing on existing markets *	○	○	○	○	○	○	○	○
Managing and developing the business model								
Adjusting our business model for local (regional) needs *	○	○	○	○	○	○	○	○
Adjusting our business model for global needs *	○	○	○	○	○	○	○	○
Becoming networked *	○	○	○	○	○	○	○	○

The independence of business units *	○	○	○	○	○	○	○	○

14. How would you position your company in relation to the following statements? *

Scale 1-7, where 1: Completely agree; 4: Neither agree nor disagree; 7: Completely agree

	1	2	3	4	5	6	7	
Organisational structure								
Our organisation is centrally managed *	○	○	○	○	○	○	○	Our organisation is de-centrally managed
We have a function-focused organisation *	○	○	○	○	○	○	○	We have a process-focused organisation
We have a local organisation *	○	○	○	○	○	○	○	We have a global organisation
We have a business unit-lead structure *	○	○	○	○	○	○	○	We have a corporate-lead structure

We have a centralised profit distribution (principal company) *	○ ○ ○ ○ ○ ○ ○	We have a de-centralised profit distribution

Management: its location, structure and role

It is important that our top management is fully located where our corporate HQ is *	○ ○ ○ ○ ○ ○ ○	It is important that our top management is fully spread out geographically
The geographical location of top management plays an important role *	○ ○ ○ ○ ○ ○ ○	The geographical location of top management is irrelevant
The geographical location of middle management plays an important role *	○ ○ ○ ○ ○ ○ ○	The geographical location of middle management is irrelevant
Our business units are managed independently and separately *	○ ○ ○ ○ ○ ○ ○	Our business units are managed as a network

Sharing between units and in the organisation

Knowledge sharing between our business units is poor *	○ ○ ○ ○ ○ ○ ○	Knowledge sharing between our business units is excellent
Transferring technology between our manufacturing units is poor *	○ ○ ○ ○ ○ ○ ○	Transferring technology between our manufacturing units is excellent
Sharing best practices between our manufacturing units is poor *	○ ○ ○ ○ ○ ○ ○	Sharing best practices between our manufacturing units is excellent
We have designated people who are in charge of sensing market signals and trends *	○ ○ ○ ○ ○ ○ ○	Our entire organisation takes part in sensing market signals and trends

Manufacturing capacity, roles and standards

We are poor in shifting manufacturing capacity across units *	○ ○ ○ ○ ○ ○ ○	We are excellent in shifting manufacturing capacity across units

Each of our manufacturing units has its own, unique manufacturing processes *	○ ○ ○ ○ ○ ○ ○	We have fully standardised processes in manufacturing
Manufacturing processes do not have to be completely standardised *	○ ○ ○ ○ ○ ○ ○	It is critical that manufacturing processes are completely standardised
Our manufacturing sites have no defined roles *	○ ○ ○ ○ ○ ○ ○	Our manufacturing sites have a clear definition of roles

15. How are the statements below applicable to your organisation? *

Scale 1-7, where 1: Not applicable; 4: Moderately applicable; 7: Fully applicable

	1	2	3	4	5	6	7
Strategy formulation & the supply chain							
Supply chain representatives are included in our strategy formulation *	○	○	○	○	○	○	○

Supply chain management has been identified as a key area to develop in our business model *	○ ○ ○ ○ ○ ○ ○
We have a clear roadmap on how to develop our supply chain *	○ ○ ○ ○ ○ ○ ○
We have an understanding of what role the supply chain has in our business' value chain *	○ ○ ○ ○ ○ ○ ○

Aligning capabilities with the business environment

We align our capability needs via mergers and acquisitions *	○ ○ ○ ○ ○ ○ ○
We aim to grow any required capabilities from inside our organisation *	○ ○ ○ ○ ○ ○ ○
We are too busy taking care of day-to-day business to be able to worry about future capabilities *	○ ○ ○ ○ ○ ○ ○
Cross-functional teams are used to integrate different operations *	○ ○ ○ ○ ○ ○ ○
We benchmark from different industry sectors, other than our own *	○ ○ ○ ○ ○ ○ ○
We benchmark from our	○ ○ ○ ○ ○ ○ ○

own industry sector *

HR, IT and transparency

International experience is a key factor in recruiting *	○ ○ ○ ○ ○ ○ ○
Local knowhow and knowledge are emphasised in recruiting *	○ ○ ○ ○ ○ ○ ○
International job rotation and mobility are expected to increase in our company in 5 years *	○ ○ ○ ○ ○ ○ ○
Our organisation lacks common, company-wide IT systems *	○ ○ ○ ○ ○ ○ ○
Increasing transparency in our organisation is an important field for improvement *	○ ○ ○ ○ ○ ○ ○

Future capabilities and investment targets

16. How important would you consider the capabilities listed below concerning the next 5 years for your company? *

Scale 1-7, where 1: Not at all important; 4: Moderately important; 7: Extremely important

	1 2 3 4 5 6 7
Optimising the company	
Optimising the company as a whole *	○○○○○○○
Optimising single business units independently *	○○○○○○○
Organising the supply chain	
Orchestrating the entire supply chain to be more market-oriented *	○○○○○○○
Re-designing the supply chain to meet the changing business environment *	○○○○○○○
Foresight in identifying new raw materials *	○○○○○○○
Building new sourcing and supplier relationships *	○○○○○○○

Manufacturing

Consolidation of present manufacturing network *	○○○○○○○
Expansion of present manufacturing network *	○○○○○○○
Agile *(ketterä)* optimisation of manufacturing network *	○○○○○○○
Cost optimisation of manufacturing network *	○○○○○○○
Standardisation of manufacturing processes and operations *	○○○○○○○
Integrating R&D, manufacturing and sales to work better together *	○○○○○○○

Sales & marketing

Building capabilities in managing sales and product portfolios *	○○○○○○○
Understanding sales and sales channels *	○○○○○○○
Sensing market trends and signals *	○○○○○○○

Human resources

International competence of personnel *	○○○○○○○
International experience of personnel *	○○○○○○○
Developing the management approach to a more global one *	○○○○○○○

17. How important have the following investment targets been over the past 5 years, and how important will they become in the next 5 years for your company? *

Scale 1-7, where 1: Very low importance; 4: Moderate importance; 7: Very high importance

	Over the past 5 years	**In the next 5 years**
	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Customer management		
Understanding of customers' processes and requirements *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Managing existing customer relationships *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Identifying future customers *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Increasing the collaboration with key customers *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Supply chain management

		○ ○ ○ ○ ○ ○ ○
Increasing the collaboration with suppliers *	○ ○ ○ ○ ○ ○ ○	
Foresight in raw material markets *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Re-designing the supply chain network *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Increasing R&D operations *	○ ○ ○ ○ ○ ○ ○	
		○ ○ ○ ○ ○ ○ ○

Manufacturing
and its interfaces

○ ○ ○ ○ ○ ○ ○

Increasing manufacturing capacity * ○ ○ ○ ○ ○ ○ ○

Enhancing productivity of current manufacturing sites * ○ ○ ○ ○ ○ ○ ○

○ ○ ○ ○ ○ ○ ○

Defining better the roles of different manufacturing sites * ○ ○ ○ ○ ○ ○ ○

○ ○ ○ ○ ○ ○ ○

Developing the interface between R&D and manufacturing * ○ ○ ○ ○ ○ ○ ○

○ ○ ○ ○ ○ ○ ○

Developing the interface between manufacturing and sales * ○ ○ ○ ○ ○ ○ ○

○ ○ ○ ○ ○ ○ ○

Sales management & marketing

		○ ○ ○ ○ ○ ○ ○
Limiting the product portfolio *	○ ○ ○ ○ ○ ○ ○	
Expanding the product portfolio *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Sensing and interpreting market signals *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Market knowledge and forecasting *	○ ○ ○ ○ ○ ○ ○	
		○ ○ ○ ○ ○ ○ ○

Sustainability & values

Bio-based research & development *(if applicable)*	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Sustainability *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Company values *	○ ○ ○ ○ ○ ○ ○	
		○ ○ ○ ○ ○ ○ ○

Company structure & support functions

Developing the business as a whole *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Developing separate business units independently *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
		○ ○ ○ ○ ○ ○ ○
Balancing the role of different business units *	○ ○ ○ ○ ○ ○ ○	
Centralised customer service centres *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Centralised IT service centres *	○ ○ ○ ○ ○ ○ ○	
		○ ○ ○ ○ ○ ○ ○

Common, company-wide IT systems, e.g. ERP, CRM *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Human resources

International competence and experience in recruiting *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Training Finns to be more internationally oriented *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
A company-wide trainee programme for graduate students *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
A company-wide management development programme *	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○
Other, please specify:	○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○

Final remarks

18. Would you like to attend a separate meeting to discuss the findings of the research? *

○ Yes ○ No

19. Do you have any comments or questions concerning the survey?

_____

_____

_____