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Finnish forest-based companies in transition to the circular bioeconomy: Drivers,
organizational resources and innovations

ABSTRACT

Forest-based businesses are the center of the transition to the sustainable and competitive circular bioeconomy in Finland. This study explores the transition of Finnish FBS firms to new business models, with a focus on the organizational resources and capabilities needed for transition. It also identifies the important elements in the business environment and the role of innovations in this process. The study uses thematic interviews with managers from various FBS firms and companies from interfacing sectors, all of which have operations in Finland. Despite the differences between firms, the study finds many common drivers and resources that FBS companies highlight as significant in the transition. The study results indicate that intangible and human resources are essential for the transition. An innovative, agile, flexible and encouraging organizational culture is a crucial resource. The culture should be supported by non-hierarchical top management and inspiring employees (so-called power people). Communication and marketing skills, and innovations developed by teams with diverse knowledge are essential. To successfully manage the transition, companies need a deep understanding of what the markets and society require, and they must develop long-term competitiveness through future-oriented strategic thinking. Pursuing sustainability and innovativeness in internal as well as external organizational environment are essential factors. The study presents insights for the researcher community and many societal actors as well as recommendations for the FBS companies to facilitate the transition to new circular bioeconomy businesses. It also contributes to the resource-based perspectives literature, particularly the dynamic capabilities approach.

Key words: Forest-based sector, Finnish companies, Transition, Circular bioeconomy, Resources, Innovations

1. Introduction

Societies and economies everywhere are in transition. In addition to the many widely known global factors, there is also a range of local, more minor change agents affecting the environment. The effort to create more sustainable societies and economies requires new types of thinking. The transition is also affecting various businesses, forcing them to reconsider business strategies and models. Emerging new business models need to be sustainable, circular, renewable, resource-efficient, innovative and inclusive (see, e.g., Boons, 2013; Bocken et al., 2014; Wells, 2016; Hetemäki et al., 2017). Esposito et al. (2018) conclude that to adopt a circular economy model companies need to develop disruptive technology and business models based on longevity, renewability, reuse, repair, upgrade, refurbishment, servitization, capacity sharing, and dematerialization. Contemporary understandings of value and the meaning of value creation are also undergoing changes. According to De Backer et al. (2015), most OECD countries are characterized by a decreasing share of manufacturing in total employment and value added, whereas the role of services is growing in importance.

Innovations in manufacturing and services are expected to become increasingly bundled in products and processes.

A firm's external environment, its corporate and business strategies, and its resource and capability base need to be closely linked to each other (Grant, 2010). For a firm to sustain its competitive advantage, it needs to constantly upgrade its business strategies, models, resources and capabilities. This means that firms become able to meet the challenges of developing old resources and capabilities while creating new ones when identifying and responding to changing demands and opportunities in the business environment (Teece et al., 1997; Eisenhardt and Martin, 2000). Different firms have different approaches in developing capabilities, but in emerging and technology-based industries innovations remain the critical source of competitive advantage and the key goals of strategy formulation (Grant, 2010). To succeed, companies depend on finding innovative solutions that respond to global challenges as well as to stakeholders' demands (Hansen, 2016; Pinkard and O'Grady, 2016; Hetemäki et al., 2017).

The business environment of forest-based sector (FBS) companies¹ is changing rapidly, becoming more multifaceted with increasing complexities (e.g., UNECE/FAO, 2011; Hansen et al., 2013; Hurmekoski and Hetemäki, 2013; Hetemäki et al., 2017). The concepts of sustainability, bioeconomy and circular economy are receiving significant attention in the public discourse, particularly in many public and private sector strategies (de Besi and McCormick, 2015; Ghisellini et al., 2016; Baumgartner and Rauter, 2017). Hetemäki et al. (2017) argue that overarching societal objectives for future decades require a transition to a *circular bioeconomy*. This indicates that connecting the bioeconomy to the circular economy concept is critical because, when combined, the two approaches are stronger in advancing these goals. This means that FBS companies need to restructure their businesses and create novel business models along with the demands set by the surrounding environment.

Yet in the literature the FBS is described as a mature sector with a traditional business culture that is focused on costs and engaged in high-volume production and resistant to change. These characteristics are not linked to innovativeness (Hansen, 2016). Hansen (2016, p. 246) states that "innovation in the bioeconomy will happen with or without current forest sector companies," and participating in the bioeconomy is not possible without innovation in products, processes and business models. The studies indicate that creating innovation calls for expertise from various fields, cross-sectoral collaboration and networks, and the creation of new types of consortia (Näyhä and Pesonen, 2014; Toppinen et al., 2017). It is clear that FBS firms have become interconnected with other sectors and will become more so in the future (Hurmekoski and Hetemäki, 2013; Näyhä et al., 2015). Facilitating innovation in traditional firms should begin by emphasizing organizational culture and the top management's commitment to the transition (Hansen et al., 2014; Näyhä and Pesonen, 2014; Hansen, 2016).

Finland's cultural and economic development has been based on forests for centuries. Path dependency (see Dosi, 1982; Nelson and Winter, 1982) is a well-recognized challenge for the

¹ In this research, the term "forest-based sector (FBS) companies" is understood to include, in addition to companies in the sector, companies which interface with the FBS or utilize raw material and side-streams from the FBS.

traditional Finnish forest industries. For example, Poesche and Lilja (2016) describe past capital intensity and heavy investments, intra- and intercontinental games in mergers and acquisitions, and the narrowly specialized university programs in paper technology as previous key drivers for path dependency in the Finnish forest industry. However, forest-based businesses have more recently been the focus of the transition to the sustainable and competitive circular bioeconomy (Ministry of Economy and Employment of Finland, 2014; Hetemäki et al., 2017; Näyhä, 2019) and many FBS companies are developing new products from wood-based biomass, such as bioenergy, raw material for textile industries, nanofibers, biocomposites, biodegradable plastics, polymers, food additives or pharmaceutical products. Apart from large-scale biorefineries, there is also potential for smaller-scale, decentralized, higher value-added production, as well as businesses based on services (e.g., Ollikainen, 2014; Näyhä et al., 2014; Näyhä et al., 2015; Hetemäki, 2017; Hurmekoski et al., 2018). Altogether, it is believed that the Finnish FBS will in the future produce novel high value-added products in conjunction with traditional forest-based products (Hetemäki, 2014; Ministry of Economy and Employment of Finland, 2014; Hetemäki et al., 2017; Näyhä, 2019).

Wiebke et al. (2018) conclude that a holistic perspective on the role of business models for the successful transition to a forest-based bioeconomy is often lacking in the literature, and many studies only implicitly address certain aspects related to bioeconomy business models. This study explicitly explores the transition of Finnish FBS firms to new sustainable and competitive business models as they respond to current societal initiatives for circular bioeconomy businesses. The study asks how companies can attain long-term competitiveness, what the important elements in the business environment are, and especially what kind of organizational resources and capabilities are needed for the transition. In addition, the role of innovations and innovativeness in this process will be evaluated. The aim is to create a holistic picture of a favorable business environment and resources for the Finnish FBS companies as this picture is defined and understood by the FBS firms themselves. Even though the Finnish FBS is a network of actors with a range of views and understandings that can also be conflicting (Näyhä, 2019), the aim is to present a holistic understanding of these issues by including different actors.

Business strategies and models, organizational resources and dynamic capabilities and their interdependent relationships have been addressed at the theoretical level. However, there remains a need to explore these phenomena at the practical level to improve and update theoretical understandings, and link them to new societal challenges such as sustainability. This empirical study address this need by providing a better understanding of these phenomena, presenting a range of details and different aspects related to company resources and capabilities in transforming organizations. As practical contribution of the study, insights for researcher community both in forest and management sciences, and societal actors can be introduced. Crucially, the study presents recommendations for the FBS companies to facilitate firms' transition to new circular bioeconomy businesses. It also contributes to the literature on resource-based perspectives by extending the understanding of the dynamic capabilities approach.

2. Theoretical background

2.1 Organizational environment, resources, capabilities and culture

The firm's external environment and its strategies, resources and capabilities have to be connected to each other. For companies, particularly for company managers, it is important to analyze environmental factors around their organization. For them, it is even more important to analyze how the factors are changing and what their likely future development looks like. Furthermore, the high-impact factors—the key drivers for change that will likely have significant importance for the companies' success or failure—should be recognized. Typically, key drivers are interrelated, and they are specific to a certain industry or sector (Johnson et al., 2008).

Johnson et al. (2008) divide factors around organizations into different layers. The *macro-environment* is the highest level, consisting of broad environmental factors that have an impact on nearly all organizations. The *industry or sector* comprises the following layer, and it is composed of firms producing the same products or services. The innermost layer around the organizations consists of *competitors and markets*. Within most industries and sectors, there will be a variety of organizations that have different characteristics and competitive bases. Furthermore, in the markets the requirements and expectations of the customers are different (Johnson et al., 2008). The further from the center, the less impact the company has over the business environment where it operates (Cashian, 2007).

Strategies can be seen as a link between companies and their environment (i.e., there needs to be a *strategic fit* between a company and its environment) (Grant, 2010). During the 1990s, the emphasis in strategy analysis started to shift increasingly to resources and the capabilities of the company, and these became seen as the main source of competitive advantage. This emphasis has come to be known as the *resource-based view* (RBV) of the firm (Collins and Montgomery, 1995; Barney, 2001). Overall, individual resources must work together in order to create *organizational capabilities*, and the resources and capabilities form the basis for building competitive advantage (Grant, 2010). Helfat and Peteraf (2003, p. 999) define organizational capabilities: "The ability of organization to perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result." Organizational capabilities are often used interchangeably with the term "competence" (Hamel and Prahalad, 1992). Furthermore, organizational resources can be categorized in various ways. For example, Grant (2010) divides them into tangible (financial and physical resources), intangible (technology, reputation, culture) and human (skills/know-how, capacity for communication and collaboration, motivation) resources. Grant also (2010) highlights that in the rapidly changing business environment, strategies are less about developing positions of sustained competitive advantage and more about creating flexibility and responsiveness to develop successive temporary advantages. Johnson et al. (2008) emphasize the importance of the notion of strategy more as "stretch" than "fit," meaning that a firm's internal resources need to be constantly developed to meet environmental changes. Accordingly, Helfat and Peteraf (2003) categorize capabilities as "operational" or "dynamic."

The dynamic capabilities approach can be viewed as an extension of the RBV of the firm, in which the evolution of organizational capabilities in the changing business environment are

included (Teece et al. 1997; Helfat and Peteraf, 2003). According to Zahra and George (2002), dynamic capabilities can be seen as change-oriented capabilities, which enable companies to restructure their resource base so that they are able to meet changing customers' needs and competitors' strategies. Shuen et al. (2014) notes that when dynamic capabilities are joined with strategy, the combination enables competencies to be built and restructured to respond to changing markets. Teece (2007) has identified three clusters of dynamic capabilities: sensing change, seizing opportunities and transforming (reconfiguring) organizations. Schoemaker et al. (2018) emphasizes that in turbulent environments it is important to sense market changes before rivals do. Yet sensing opportunities and threats is not enough. Companies have to seize those opportunities in a timely manner by innovating and implementing new systems. In addition, turbulent environments often call for periodic renewal of company, instead of more incremental change of organizational capabilities. Teece (2018) states that with strong dynamic capabilities, companies can create and implement business models effectively, and a company's dynamic capabilities are crucial in a variety of ways to its ability to maintain long-term profitability. Schoemaker et al. (2018) conclude that dynamic capabilities, business model renewal, and leadership have to be closely connected to produce the innovations which are needed in complex business environments.

According to Amui et al. (2017), due to complex business environments, many organizations have been searching for ways to make sustainability a dynamic capability which is integrated in firms' strategies as well as in their business models. For it to become a competitive factor, sustainability has to be innovative and a dynamic part of the strategy. In line with Amui et al. (2017), Mousavi et al. (2018) argues that sensing, seizing and reconfiguring capabilities and related organizational routines all have an essential impact on a firm's sustainable innovation activities. They identify sensing as the most influential dynamic capability because it has a direct effect on firms' sustainable innovation (Mousavi et al., 2018).

The literature presents a variety of definitions for *organizational culture* and models for assessing it. Organizational culture was recently defined by Groysberg et al. (2018, p. 4): "Culture is the tacit social order of an organization: It shapes attitudes and behaviors in wide-ranging and durable ways. Cultural norms define what is encouraged, discouraged, accepted, or rejected within a group. When properly aligned with personal values, drives, and needs, culture can unleash tremendous amounts of energy toward a shared purpose and foster an organization's capacity to thrive." Furthermore, Groysberg et al. (2018) have identified four generally accepted attributes for organizational culture: shared, pervasive, enduring and implicit. *Shared* means that culture cannot exist solely within a single individual, but it lies in shared behaviors and values. *Pervasive* indicates that culture penetrates the whole organization. *Enduring* indicates that organizational culture can direct its members' actions and thoughts over the long run. With collective experiences and the effects of learning on it, organizations are more likely to select employees who appear to fit in the organization. Over time, firms become resistant to change and external influences. Fourth, an often too unnoticed aspect of culture is *implicit*, concerning the ability to respond to and recognize culture instinctively. Since the ability to sense culture appears to be universal, particular themes should be expected to take place across the variety of definitions and models in the field. Furthermore, it is perceived that organizational culture greatly influences the development of capabilities. For example, Hock et al. (2015) found in their analysis that

novelty-oriented cultural values promote capabilities (strategic sensitivity, collective commitment, resource fluidity), which advances business model innovation, but efficiency-oriented cultural values do not indicate positive effects.

2.2 Innovations and innovativeness

Recent discussions on future views of FBS are inevitably linked with innovations and innovativeness. Likewise, there have been various attempts to promote innovations in this sector. These attempts have been facilitated by a range of foundations and programs, such as the EU's Forest-Based Technology Platform (FTP, 2018).

The definitions of innovations and innovativeness given in FBS studies largely comply with the definitions given in other fields as well. According to Hansen et al. (2006, p. 4), "Innovation is creation and/or adoption of new ideas, processes, products, or services that are intended to increase value to the customer and contribute to the performance or effectiveness of the firm". Hansen et al. (2014, p. 1344) define innovativeness as follows: "an innovative individual or firm tends to be an early adopter of new concepts, products and technologies; tends to develop or create new ideas, concepts and products; or some mix of the two" (see also Gebert et al., 2003; Rogers, 2003). Furthermore, the difference between innovativeness and innovation is clarified by Hansen et al. (2014, p. 1344): "innovativeness is characteristic of an individual or company, while an innovation is an outcome, not a characteristic." However, in this study, the respondents partly tend to use these definitions interchangeably.

The level of innovation activity within an industry sector differs generally based on the industry life-cycle (namely, introduction, growth, maturity and decline; Utterback, 1994). Product innovation intensity is generally higher in the early phases of the lifecycle, whereas process innovations become more important as product innovation declines (Utterback, 1994). It has been indicated that FBS companies are innovative in terms of their manufacturing processes, but less proficient in terms of product and business systems innovation, despite the fact that these last two are the innovation types most crucially needed in the transition to a bioeconomy (Hansen, 2016).

Hansen et al. (2014) indicated that within the forest sector, culture is a key driver of innovation. Other studies have noted that top management has a central role in creating an innovative organizational culture (Björkdahl and Börjesson, 2011; Näyhä and Pesonen, 2014; Hansen, 2014; 2016). In addition, it has been indicated that company managers may wrongly believe that when industry has reached the "mature" phase of the life-cycle, it is also beyond innovation (McGahan, 2000). These types of managerial challenges have also been found in the FBS; previous studies have indicated challenges in innovativeness and innovation management in traditional FBS (e.g., Näyhä and Pesonen, 2014; Bull et al., 2015).

In the past, environmental perspectives have largely been neglected in innovation research agendas, but nowadays sustainability is often seen as a main driver for innovations (Nidumolu et al., 2009; Adams et al., 2012). Various terms, such as "eco-innovation," "green innovation," "sustainable innovation" and "environmental innovation," is used for referring to innovation with an emphasis on environmental sustainability (Varadarajan et al., 2017; Xavier et al., 2017). Varadarajan (2017) applies the term "sustainable innovations" in his study, highlighting

that most sustainable innovations decrease the impact of the company's activities on ecosystems, rather than being sustainable innovation in the strictest sense.

2.3 Theoretical frame for the study

In this study, first the Johnson et al. (2008) model is applied for organizing various factors in the business environment, which the respondents indicate as key factors for facilitating the transition process in the FBS. However, it has to be noted that the author has loosely followed the presented model and, for example, combined two of the innermost layers. Secondly, the organizational resources of the companies needed for the transition are organized into tangible, intangible and human capabilities, following roughly the division presented by Grant (RBV, p. 127, 2010). Figure A.1 illustrates the framework described above, and also refers to the numbering in the results section where the findings in question are presented.

The features of organizational culture highlighted in this study are discussed in relation to attributes identified by Groysberg et al. (2018). The focus of this study is to identify FBS firms' change-oriented capabilities which will enable them to restructure their resources for new business models. Resource-based perspectives, particularly the dynamic capabilities approach, are thus used to form the theoretical basis for reflection on the findings. The findings of this study are further discussed in terms of other recent studies conducted on the FBS.

Fig. A.1. Framework for structuring environmental drivers and organizational resources and capabilities of transforming FBS companies. The numbering in the figure corresponds with the numbering in the results sections (modified from Johnson et al. 2008; Grant, 2010).

3. Materials and methods

The methodology used here has also been described earlier in Näyhä (2019), because the data for both manuscripts were gathered from the same interviews. In spring 2017, semi-structured thematic interviews were conducted with 18 company executives and managers from 17 firms representing various forest-based industries and interfacing sectors. All of the participating companies were developing or involved in the development of new products and services as either supplements to their portfolio or as main products. All of them utilized wood-based raw material, and often the use of side-streams was indicated as playing an important role in their production. Additionally, the interviewed firms all have operations in Finland. The companies were chosen so that as many different types of companies as possible were involved in the study. Thus, the FBS companies and the firms interfacing within the FBS that participated have different business strategies, models, features and products. The companies varied, for example, in maturity, size, growth plans, market orientation and the role of new products versus old products in their portfolio and exchanges (business-to-business/business-to-consumers). In addition to traditional FBS products, there were many new wood-based products and services related to those under strategic planning, research and development, commercialization and/or production. These included biofuels, bioenergy, biochemicals, biocomposites, textile fibers, biomedicines, healthcare products, food industry

additives, new types of construction and building materials, interior design products, and packaging materials and solutions. Overall, the scale of the participating companies varied from large, traditional and mature FBS companies transitioning to new businesses to small start-up companies. Most of the companies categorized themselves primarily as bioeconomy actors, and many considered themselves both as bioeconomy and circular economy firms. (For more on company perspectives on the bioeconomy, circular economy and sustainability, see Näyhä, 2019.)

The interviewees were given the main interview topics beforehand during the initial inquiry, so that they would be able to assess if they were likely to possess adequate knowledge about the interview themes. In other words, a requirement for the interviewees was knowledge about the research topics. The personnel contacted held leading positions in the firms (e.g., CEO, chief development officer or chief sustainability officer).

As a whole, the interview questionnaire consisted of three parts: 1) business models and conceptualization; 2) role in the markets, competitiveness and resources; and 3) foreseeing the future. This manuscript is based mainly on the second part, and specific interview questions are presented in Appendix A. Depending on the respondent's knowledge and willingness to elaborate on certain questions or themes, additional questions may have been asked or, respectively, certain questions were left out.

Overall, the data were approached mainly inductively (see Patton, 2002, p. 56; Thomas, 2006, "general inductive analysis"), meaning, for example, that the coding (see also "open coding", in Strauss and Corbin, 1998; Kovalainen and Eriksson, 1998) was not limited to the predetermined themes or theoretical frameworks. An inductive approach was seen as the best applicable option for examining the ongoing novel transition phenomena and related limited and dispersed information on the issues being studied. However, it needs to be mentioned in this context that a purely inductive approach is not possible in any research, because it would require that the researcher has no preconceptions on the studied topic (see Patton, 2002; Eriksson and Kovalainen, 2008). In this study, elements of the deductive approach were included, for example, when interview questions were formulated and the results were presented and interpreted, as previous studies and theoretical frameworks were explored for finding various angles to approach the issues being considered (see also Patton, 2002, p. 56). Overall, researchers often apply both induction and deduction in different phases in their studies, as is the case in the current study, sometimes referring to "abduction" as an approach to combine induction and deduction in one research project (Kovalainen and Eriksson, 1998).

The data were examined using thematic analysis (Braun and Clarke, 2006; Guest et al., 2006). The interviews were transcribed and ATLAS.ti was used as an analysis tool. The analysis loosely followed the step-by-step guide presented by Braun and Clarke (2006). Basic rules for open coding created by Eriksson and Kovalainen (2008, p. 164, modified from Strauss, 1990; Strauss and Corbin, 1998) were also applied during the analysis process. The interviews were first read through in order to obtain an overall understanding of the contents (similarly to open coding). The next phase was to code preliminary themes (note that categories are used interchangeably with codes in this study) in the data that were evaluated as being of central importance in relation to the research goal (i.e., understanding the theme is similar to the description presented by Braun and Clarke (2006, p. 10): "A theme captures something

important about the data in relation to the research question...”). After this, contents and coded themes were reevaluated and more detailed sub-codes were assigned, if needed. Then the codes were reorganized in order to compose broader-level main themes. At the end, data and created codes and themes were re-evaluated again, and possible supplementary information was searched for from the data in order to establish a final understanding and to develop interpretations.

In this study, the key aims of striving for the trustworthiness (see also Guba and Lincoln, 1985) of the study is that the approach, sample and interview themes have been chosen, structured and analyzed in a way that there is concordance between them. In this manner, the overall aim is to produce as full an understanding as possible of the studied issues (see also “verification strategies” in Morse et al., 2002, p. 18; in Sousa, 2014, Fig. 1), and thereby arrive at reliable findings (see also Silverman, 2005, p. 242). To strengthen the validity of the research, critical thinking during the data analysis (coding) was supported by the constant comparative method and deviant case analysis (Silverman, 2005). The first method refers to the practice that the analysis was started with a small part of the data and by defining preliminary themes and concepts, then it was continued by expanding the analyzed data corpus (i.e., by including more interviews). Second, “deviant case analysis” refers to an approach in which anomalous and divergent opinions were also seen as important in creating a comprehensive understanding. Modifying preliminary classifications (themes) was part of the process. Data were also interpreted based on various perspectives (see “theoretical triangulation” in Denzin, 1970). In addition, the readers of this study are offered material for evaluating its quality, such as the detailed description of the research process and numerous quotes from the interviews (Appendix B).

4. Results

4.1 Key macro-environment factors of transforming FBS companies

According to the respondents of this study, globally accepted and recognized goals are important macro-environment drivers for the transition of Finnish FBS companies to a circular bioeconomy. The most important aim indicated was mitigating global warming, an unsurprising finding when one considers the prevailing challenges of today’s society. The respondents also highlighted the essential role of FBS actors and their activities in solving other global challenges, such as replacing plastics or other fossil-based products through sustainable materials and products. (For more details on company perspectives on the bioeconomy, circular economy and sustainability as well as macro-level perspectives on transition, see Näyhä, 2019.)

This study also showed that EU- and national-level policies and regulation have a key role as prerequisites for new businesses and as transition drivers. Similar findings are presented in other Finnish studies (see Lahtinen, 2016). The interviewees emphasized that policies should indicate the goals for natural resources utilization and the framework for sustainability criteria, but not the precise ways and practices by means of which these should be realized by companies.

Quotation 1

Many of the respondents believed that in order to encourage new businesses and innovations, it would be crucial to avoid unnecessary restrictions and regulations. The respondents pointed out, for example, that markets should more freely define the use of raw materials. Furthermore, predictable and less turbulent legislation, support for companies in the early phases (e.g., when constructing infrastructure) and mechanisms to control dysfunctional products and their access to the markets were seen as important factors.

Finnish firms were seen as having many advantages over other countries, which is understandable when taking into consideration the nationality and cultural-related perspectives and values of the respondents. The advantages included, most of all, a wealth of forest resources and a long tradition and extensive knowledge of utilizing these resources as well many new, unexplored opportunities related to them (see also Näyhä, 2019). In this context, however (also discussed in Näyhä, 2019), it would be important to understand that relying too much on past merits can lead to neglecting new innovations and related future potential. Many smaller companies viewed the general lack of esteem for entrepreneurship in Finnish society as one of their key challenges. It was also indicated that insufficient support systems and a fear of failure often prevent the progress of many excellent innovations and business ideas, thus bringing up one of the key conundrums, which touch other business sectors in Finland as well (see Lahtinen et al., 2016).

In line with the current trend of increasing value chain distribution in FBS (see Pelli, 2018; Pelli et al., 2018), the interviewees also brought up that companies need to evaluate business environments in different locations (i.e., they need to consider which region or country offers the most favorable environment to operate in).

4.2 Key industry and market environment factors of transforming FBS companies

The respondents believed that high-quality education and scientific knowledge in Finland create the basis for the development of new products and services, but educational aims and the content of the current study programs should better meet the practical needs of companies. Exporting education and know-how is recognized as an important business opportunity for several fields in Finland (see OKM, 2016). In this light, putting effort into developing education programs targeting the specific needs of the new FBS businesses could also facilitate achieving the overall national goals for education export.

The interviewees also highlighted the crucial importance of considering the needs and opinions of a variety of stakeholders, and avoiding putting too much focus only on shareholders' opinions. In particular, commitment (i.e., benefits and responsibilities should be shared with local communities) and the acceptance of local stakeholders were seen as important. These views are well aligned with the current trend of increasing the focus on CRS practices, ethics and values in stakeholder management (see Fernández-Guadaño and Sarria-Pedroza, 2018; Schaltegger and Burrit, 2018). Overall, companies should place more emphasis on active networking and dialogue with stakeholders. The respondents pointed out that specifically authorities should be informed more fully about available new products. It was also mentioned that functional bio-based products in the markets decrease skepticism of the

stakeholders, and therefore the (regulatory) mechanisms for controlling the entry of new products to the markets is important (as indicated also in Section 4.1 above). These findings clearly call for new, more efficient ways of establishing stakeholder dialogue and closer interaction with stakeholders.

As was highlighted by the respondents, companies obviously have to strive to meet the needs of their consumers. The interviewees indicated that companies need to place increasing emphasis on the specific attributes that customers are looking for and are willing to pay for (e.g., a variety of sustainable solutions). The respondents also emphasized that dialogue with customers is a key to obtaining an understanding of their real needs, and practical perspectives should be included in the initial innovation process. In other words, ideas and the innovations should be developed together with customers. It was also pointed out that the same value basis between consumers and producers creates the foundation for successful customer relationships and brings faithful customers to companies.

Quotation 2

Interpreting the above findings from a dynamic capabilities perspective, an effective business model of a company needs to articulate how a business actually creates value for its customers: what the unmet customer needs are, how those are addressed and how the value is captured (Teece, 2018). Some respondents also emphasized that many companies have difficulties understanding the needs and the mindset of the future generation, which naturally would be the starting point for the innovation process. More emphasis should be put on the needs of new generation customers and other stakeholders. This in turn refers to the fact that the strategy formulation processes of companies should be intrinsically linked with strategic foresight (see Vecchiato and Proveta, 2010; Rohrbeck and Kum, 2018) more closely.

It would also be important to create collaborations and partnerships in order to advance new intellectual capacities and innovations. The respondents emphasized the establishment of transdisciplinary business ecosystems. (This issue will be discussed in more detail in Section 4.4.1 below.)

In addition, the respondents noted that it is important to understand the significance of spearhead actors and products in advancing novel businesses and new brands in the field. It was pointed out that it is “difficult to be a pioneer and spread the message” alone. When viewed from the dynamic capabilities perspective, companies with strong dynamic capabilities not only adapt to the business ecosystems but they also shape them through innovations, as spearhead actors do in these cases (Teece, 2007). According to the respondents, spearhead products also indicate to the stakeholders a company’s innovativeness and capabilities to restructure its business.

4.3 Tangible organizational resources and capabilities needed for FBS companies’ transition

For FBS businesses, it is self-explanatory that wood-based raw material was seen as a key tangible resource; raw material quality, availability, sustainability, origin and communicating about it, competitive pricing and efficiency were the aspects that the most respondents

pointed out. Raw material issues are particularly important for the big companies, which need large amounts of biomass for their operations.

The interviewees often referred to “normal requirements” or “basic needs,” implying financial resources, technical solutions and their development, infrastructure and logistics, all of which are needed. Risk financing and finding investors for new businesses and taking related risks were often seen as a challenge.

Quotation 3

Additionally, the interviewees mentioned the right location of the facility in regards to resources, collaborators and customers as well as resources for planning, building and maintaining infrastructure, which should be efficient, modern and competitive. The chosen wording of “normal requirements” or “basic needs” reflects the direction that these resources are viewed from rather than their basis for any type of businesses. In general, they are easily observable and understandable requirements for the stakeholders compared, for example, to the many intangible and human-related capabilities. It was also mentioned that companies should carefully choose their focus areas, and target resources toward those.

From the practical point of view, it was seen as important that there is a structured process or model in the firms for facilitating initial ideas and innovation, starting from an initial decision of where to focus, going through R&D, until the commercialization and marketing phases. The respondents stressed that a very challenging phase for the Finnish actors, particularly for small firms, is the scaling up of production. The interviewees also reminded that plenty of work and time is needed before innovation reaches the commercialization phase.

Quotation 4

In addition to impatient companies, impatient shareholders can also be a risk for the innovating process, because they often expect innovations to be commercialized in a shorter timeframe. Also for this reason, open and efficient communication with the stakeholders would be important, meaning that shareholders should be better informed about the various steps and challenges related to innovation processes.

The representatives of mature process industry companies further pointed out that process or product modifications, or changing ways of actions, may require plenty of organizational resources and can have many significant and beneficial impacts, but they are not easily identified as innovations (as opposed to brand-new products) by actors outside the company.

Quotation 5

This finding reflects the well-recognized phenomenon that innovation activity differs based on the industry life-cycle, and process innovations typically become more important in the later phases of the life cycle (Utterback, 1994; Hansen, 2016). Some respondents commented, however, that the word *innovation* should not be used misleadingly, meaning that a difference has to be made between product modification and a brand-new product. The respondents also pointed out the growing role of service-based businesses: various new

intangible “add-ons” attached to traditional products or completely new services tailored to customers’ needs, which reflects the current trend of servitization (see De Backer et al. 2015).

Overall, the interviewees identified raw material issues as being at the core of tangible organizational resources and capabilities. These encompass questions related to how to direct wood-based biomass resources and guarantee the availability of biomass for different uses, and how to achieve sustainable and resource efficient resource utilization (see also Näyhä, 2019). Technical solutions and infrastructure were also noted in the study, but similarly to Roos et al. (2014), they were not seen to be main challenges in the transition to new businesses in the FBS.

4.4 Intangible and human-related resources and capabilities needed for FBS companies’ transition

4.4.1 Innovative, agile and encouraging organizational culture

All the respondents somehow indicated that the transition to new businesses is not possible without innovations and an innovative organizational culture, a finding that is in line with various studies in the field (see Näyhä and Pesonen, 2014; Hansen, 2016). This finding is also aligned with the dynamic capabilities approach. For example, Schoemaker et al. (2018) argue that in volatile, uncertain, complex, and ambiguous (VUCA) business environments, deeply rooted ordinary capabilities can actually be harmful for companies’ renewal process, whereas firms focusing on new product and process developments and on business model innovation will be able to leverage their dynamic capabilities. What are the specific attributes pointed out by this study that should be nourished in the organizational culture when companies are transforming toward novel businesses, and when innovativeness and innovations are *sine qua non* for companies?

The study indicates that willingness, belief and reactivity in change need to be embedded in the organization.

Quotation 6

Are large companies inflexible and cautious? Are start-up companies the ones that speed up the transition? These questions were regularly brought up by the respondents in the context of FBS transition. The answers for the questions largely depend on which angle you are looking at things. Representatives from large company tend to highlight more than do those from smaller companies that traditional businesses guarantee income, traditional products are still needed, and, overall, traditional businesses make innovations and R&D possible in companies. It was also stressed that large companies are not resistant to change as such, but they lack needed capabilities. In addition, the large Finnish FBS companies were considered as forerunners in many senses, compared to the other countries (e.g., the U.S.; see also Näyhä, 2019).

The respondents of this study emphasized that developing new products and services is challenging and always contains risks, yet these just need to be taken. This means that the courage to take risks, the ability to learn from mistakes, the potential to regenerate, and being flexible and agile should also be essential parts of the organization and its culture. Flexibility and agility were particularly associated with small companies, which are able to react faster to the requirements of the business environment by changing their portfolios. Accordingly, Schoemaker et al. (2018) state that those firms that master the three cluster of dynamic capabilities (sensing, seizing, transforming) are able to respond faster to changing business environments than are the companies that lack these capabilities. Smaller initial investments and a non-hierarchical organizational structure were also often linked with smaller companies, and were also considered as reasons for their more agile and flexible actions. However, flexibility and agility can often be challenges for larger companies. These views related to large-scale process industry companies are understandable because these firms' large initial investments and high fixed costs can make changing direction slower than for smaller companies.

Quotation 7

The interviewees emphasized that it is of crucial importance for the transition that organizational culture encourages employees toward continuous innovativeness, imagination and creativity. The respondents further stressed that of the abilities to be nourished in the transforming organizations, it is important to challenge employees and the company to develop open-minded, new ideas. For example, Salvato and Vassolo (2017, p. 1728) argue that it is possible to enhance dynamic capabilities, innovation and strategic adaptation in firms when employees are given opportunities to “act, think and feel free creatively, thus envisioning opportunities to improve how the firm operates”. They emphasize that managers should facilitate constructive dialogue between their employees.

This study indicates that organizational culture should also facilitate continuous knowledge development without forgetting already existing scientific results and experience, which should be utilized more fully as a basis for new developmental programs. Emphasis was put on creating partnerships and transdisciplinary business ecosystems (see also Section 4.2) in order to advance new intellectual capacities and innovations. In the business ecosystems, different companies could develop and/or start manufacturing of new products and services in close collaboration. For example, new smaller-scale start-up companies could be connected to a bigger-scale industrial facility and utilize its side-streams. Lahtinen et al. (2016) has highlighted the important role of business ecosystems in Finnish start-up development, and the effective and adaptable policy framework to support these systems. Their study also emphasizes that the management and development of ecosystems require novel management strategies, new types of work distribution, and openness between the companies.

However, the respondents stressed that Finnish companies are often too cautious to share their ideas with other companies, and despite many existing networks, genuine collaboration and aspiration to work together is lacking. It was also mentioned that collaboration between

companies, and also between firms and their potential customers, should be started earlier than currently is the practice; brainstorming of initial ideas should already be done together.

Potentials related to small-scale production, utilizing minor raw material streams and producing higher value-added products should be explored carefully. Some of the respondents criticized that large companies (which traditionally base their businesses on bulk production) do not know how to manage the processes of higher value-added products, nor do they have the patience or resources to conduct R&D if there is no profit in a short timeframe. In addition, some respondents pointed out that large companies often lack knowledge about the end markets of these products (see also 4.4.2). Also in this context, the respondents recommended collaboration, particularly with those actors which are closer to the customers and end markets.

4.4.2 Knowledge of new markets, organizational cultures, communication and marketing

According to this study, a needed knowledge base and technical skills are often found in Finnish companies, compared to communication and marketing skills, which are indicated to be inadequate in many ways. The respondents pointed out that communicating and marketing are especially problematic for small companies because they do not have the resources needed for developing those skills.

Quotation 8

The knowledge of value chains and international markets is crucial for those companies, transitioning toward new business. The challenges identified included the frequent need to find new markets and the lack of validity for old ways of marketing traditional products. Therefore, alongside communication and language skills, knowledge of different organizational and national cultures is important when entering new markets. Different customers often need marketing messages and strategies that are specifically modified and targeted for their needs. The interviewees stressed that sometimes issues considered self-evident by the companies are difficult for their customers to understand. They also emphasized that firms should market to their customers the features and values (see also Section 4.2.) related to a certain material, product or service, not only products or services as such.

Quotation 9

The respondents emphasized that Finnish people are too modest when marketing their knowledge and new products, a quality that is widely recognized as a challenge for Finnish companies in various fields. The interviewees highlighted, however, that there is a new generation emerging with new capabilities, confidence and a bolder attitude. Overall, the respondents emphasized that an understanding of the business environment, its requirements and market dynamics is the basis for a successful new business. A lack of marketing skills and resources for developing those, as well as the need for more confident attitude have been recognized as a challenge in Finland in a variety of contexts, such as in

numerous ministry reports (Lahtinen et al., 2016; Rikama, 2017), public discussion (Kalliola, 2018; Laaksonen, 2018) and academic studies (Kauppinen, 2017; Nurmi, 2004).

4.4.3 Flexible employees and multidisciplinary teams

Employees are the crucial resource for companies and the wellbeing of the personnel was highlighted in the study.

Quotation 10

Agile organizations cannot exist without flexible employees. A readiness to rethink and the ability to learn are important features for employees working in the transforming company. Markelova Evans and Salaiz (2018), among others, argue that in fast changing business environments, utilizing employees' abilities to sense and seize new opportunities is a valuable intangible organizational asset which can help firms create dynamic capabilities. The results of the current study suggest that these abilities are specifically important for people already working in the field or as seniors in the firms. This reflects the fact that traditionally in the Finnish forest industry, leaders and managers have been hired from inside the organization, often meaning that they have long career paths in the same company. Some respondents differentiated between the roles of employees in the innovation process, dividing them into employees who innovate and people who conduct the actual research and development work; at the same time, they stressed that both types of employees are needed. Independent thinking, not leaning too much on supervisors, was highlighted by the respondents. In addition, commitment to the task at hand was seen as an important ability. Understanding regulatory frameworks in the different business environments as well as being familiar with sustainability values and the goals of the circular bioeconomy were also seen as important capabilities of employees.

Employees are needed who have an interdisciplinary background and/or certain specific skills (such as design and architectural know-how, electric automation skills, logistical understanding, laboratory skills, ecological, microbiological and biochemical knowledge and knowledge of conversion technologies) that can respond to the various needs of the transforming companies. Naturally, specific know-how in wood-based raw material is important, but employees outside the FBS (e.g., from cosmetics or car or food industries) should also be recruited in order to create new types of synergies.

Quotation 11

The importance of heterogeneous human capital for developing capabilities has long been recognized in the context of RBV (see Barney et al., 2011).

In relation to understanding customer demands (see 4.4.2 above), the interviewees emphasized a customer-oriented approach and service skills, referring to the ability of employees to conduct successful dialogue and interactions with customers. Marketing experience and a better understanding of new markets could be attained also by hiring people

outside the FBS or through partners. Overall, the role of intra- and inter-organizational teams, combining different types of know-how, was highlighted.

4.4.4 Non-hierarchical top management and “power people” as a source of innovative atmosphere

The crucial resource in terms of successful transition is the leadership of the organization. The respondents emphasized that compact, not overly hierarchical top management is needed to support finding new directions. Top-down management and hierarchical and/or a matrix organizational structure (where separate teams are responsible for innovating) were seen as problems, particularly in large companies. This connects with the view that smaller companies and start-up companies are often also seen to be more flexible and more agile to react to changes.

The respondents indicated that the main tasks for management are to guarantee innovativeness and the agility of the company by means of an encouraging atmosphere and key resources. Management needs to indicate encouragement and trust vis-à-vis employees' innovativeness, and they have to challenge employees to think differently.

Quotation 12

In addition, recruiting new employees with various backgrounds and new ideas was indicated to be an important responsibility of company management. Schoemaker et al. (2018) highlight the importance of leaders and of strategic leadership skills such as the ability to challenge current mindsets, engage others to develop new insights and provide compelling strategic visions.

Some of the respondents also stressed that small start-up companies often have researchers in the lead positions of the organization, which may not be an ideal solution. Overall, it appears that the management of start-up companies need to manage “the whole picture”; they often need versatile skills starting from initial innovation development and finding risk funders to personnel management, scaling-up and marketing. Accordingly, Schoemaker et al. (2018, p.37) point out that a single visionary leader in a small startup “is a possible shortcut”, but in most cases it requires time, effort, and teamwork. These findings in turn points to the need for support mechanisms for start-up companies at both the local and national levels.

Importantly, it was brought up that every organization needs “power people,” those who are particularly enthusiastic and inspire others to use their creativeness and to be innovative.

5 Discussion

For firms and their managers, RBV (see Grant, 2010) emphasizes that it is important to analyze environmental factors around the organization. The dynamic capabilities approach (see Teece 2007; 2018) highlights companies' abilities to address environmental change and renew their resources in a way that they can innovate and respond to change while maintaining their

competitiveness. This study indicates that large-scale companies and SMEs in FBS are able to recognize and analyze present business environmental factors well. The firms seem to have a thorough understanding of the resources and capabilities needed for transition, and they are able to recognize related bottlenecks and challenges. Though the challenges have largely been identified, this study demonstrates that the developmental pathways and concrete processes to solve the challenges and develop new capabilities are often insufficient. In terms of cluster of dynamic capabilities (Teece, 2007, see also section 2.1), “sensing” appears to be the least challenging for companies, whereas actual “transforming” is much more difficult. In addition, the companies have difficulty analyzing future developments in their surrounding environment and reformulating their business models and actions accordingly.

5.1 Intangible and human-related capabilities as facilitators for transition

This study emphasizes several intangible and human-related capabilities of the organizations as key facilitators for the transition of the companies.

The current study indicates that an innovative, agile and encouraging organizational culture, which in turn facilitates the development of needed resources, capabilities and innovations, creates the basis for successful transitions. Although several other FBS studies also indicate the importance of organizational culture and atmosphere on the development of capabilities, innovativeness and innovations (see Björkdahl and Börjesson, 2011; Hansen et al., 2014; Pesonen and Näyhä, 2014; Toppinen et al., 2017), it is somewhat surprising that the cultural perspective was highlighted so prominently in this study. Efficiency goals and efficiency-oriented cultural values have been indicated to have negative effects on business model innovation, whereas capabilities such as resource fluidity and strategic sensitivity promote innovations (Hock et al., 2015). In this study, efficiency orientation was seen as a typical feature more for larger, mature companies, affecting firms’ innovativeness as well. Previous studies also suggest that systematic strategies, structured processes and implementation guidelines on innovation-related actions are lacking in companies, and management should pay more attention to this aspect (Hansen et al., 2007; 2014; Björkdahl and Börjesson, 2011). Related to this, Hansen et al. (2010) highlight that more innovation-focused organizational culture is needed in companies, which in turn should be supported by policies and more industry-focused academic research and education. This current study fully supports these views.

According to this study, top managers and “power people” are a source of innovative and encouraging atmosphere in companies. The top management’s key role in creating an innovative organizational culture has been highlighted in other FBS studies as well (e.g., Björkdahl and Börjesson, 2011; Näyhä and Pesonen, 2014; Hansen, 2014; 2016). It is noteworthy, however, that the current study indicates that it is not only the top managers, who have a great impact on atmosphere and culture, but also other inspiring employees (“power people”) who encourage their colleagues. In addition, this study points to multi-skilled employees and teams, which can be supported by non-hierarchical structures in the companies, as critical resources.

The key role of human resources, particularly that of organization leaders and employees, as a source of dynamic capabilities has been recognized in numerous other studies, as reported in several contexts in the results section already. Teece (2007; 2018) states that strong dynamic capabilities are not attained without business models that support innovativeness. In most cases managerial competencies are crucial for refining business models so that innovativeness is possible in companies (Teece, 2007; 2018). Since dynamic capabilities encompass a variety of organizational processes, they require leaders who are able to design and operationalize them in a specific organizational context (Schoemaker et al., 2018). Wolgemuth et al. (2019) indicates that managers can facilitate employee participation through trust and informal control of their employees. Yet they also conclude that dynamic capabilities are not only a managerial task, as is often presented in the literature; instead, employee involvement helps companies unleash the strategic value of the dynamic capabilities. They propose that companies which involve employees in decision making and transition processes seem to make more considered decisions, adjust more quickly, and facilitate the transition process more efficiently. Overall, the results of my study and of others suggest that transforming FBS companies should focus on the capabilities and skills of their leaders and managers since they have a crucial role in creating the atmosphere and encouraging their employees.

Furthermore, the findings of this study reflect that successful development of competencies requires common, cross-organizational values, goals and cultural understanding. These findings bring to the fore the organizational culture attributes of *shared* and *pervasive* (identified by Groysberg et al. 2018), which means that culture exists in common values and behaviors that penetrate the whole organization and further influence the capacity development. Groysberg et al. (2018) also recognized *enduring* as one of the attributes of the organizational culture. One of the dangers related to this attribute is that in the long run companies can become resistant to change. This phenomenon has been clearly recognized in earlier studies in mature forest industry companies (see Näyhä and Pesonen 2012; 2014). As previously noted above, innovations, flexibility and agility were raised as important capabilities for firms' transitions, and they were seen as challenges for larger companies (see also Poesche and Lilja, 2016). It is interesting, however, that in the current study large Finnish FBS companies were at the same time also considered as forerunners in terms of new forest-based businesses when compared to other countries (see also Näyhä, 2019).

The respondents recognized the need for multidisciplinary knowledge, referring to recruitments outside the FBS and the creation of intra- and inter-organizational teams and partnerships, which in turn can facilitate the adoption of new practices and transition. Creating partnerships in order to promote intellectual capacities and innovations are also emphasized in earlier studies. For example, Dangelico (2016) emphasizes building networks and cross-functional interaction when developing successful green product innovations. Roos et al. (2014) conclude that making contacts and sharing knowledge are important for the innovation process and market launch. The use of open innovation in the context of sustainability innovations has also been studied (e.g., Rauter et al., 2018), and the involvement of different partners in the firms' processes can provide beneficial knowledge in terms of companies' innovation activities. However, this study also brings up the lack of trust

between the actors as a challenge, and therefore, genuine collaboration and information sharing are the issues which should definitely receive more attention in the Finnish FBS in the future.

This study identifies challenges in communication, marketing and commercialization. Deeper interaction between the companies and their customers, and between the firms and their other stakeholders, should be established, so that firms would be able to understand and respond to stakeholders' current and future needs and values. In addition, Finnish actors often lack the courage and bold attitude when marketing their products and know-how. These phenomena have been well reported in several other FBS studies (e.g., Näyhä and Pesonen, 2014; Hansen et al., 2014; Toppinen et al., 2017). For example, Roos et al. (2014) emphasize companies' knowledge about end-users in the commercialization of new materials. The types of skills and market expertise needed are different than those used when marketing traditional bulk products. They further suggest that producers need to identify new values related to new materials (Roos et al., 2014). This important perspective is indicated by the current study as well: firms should familiarize their customers better with the values and features specific to a certain material, product or service. This study also points out that the same value basis connects companies and their customers, creating unique, long-term relationships. This indicates that strong stakeholder orientation is essential to transforming companies. (See section 5.2 for a more detailed discussion on forest industry's stakeholder orientation.) Overall, challenges in communicating and marketing seem to be well recognized among the companies, but for some reason these remain unsolved in the Finnish FBS and in Finnish society at large. This is surprising because paying attention to these is crucial for the success of new businesses. For companies it would be important to recognize the shared values and communicate these to their customers. Firms should also strive to offer alternatives for products and services in order to meet needs that customers do not even yet recognize themselves. The aim should be to fulfill their current needs as well as their future ones (see also Hamel and Prahalad, 1994). This requires that companies have a thorough understanding of their customers' values and demands while making an effort to understand future needs through strategic foresight practices (see also Vecchiato and Proveta, 2010). Transforming FBS companies should also proudly market their new products (see also Table 2).

Yet alongside internal resources and capabilities, support from the business environment and interaction between different actors is needed to facilitate transition. This study identifies global sustainability goals and the aims for sustainable circular bioeconomy—indicated in many terms by EU and national level policies—as drivers for FBS transition. Core issues that also need to be given more emphasis, and which are specifically connected with the Finnish society and mentality, are the general attitude toward entrepreneurship, and how the unsuccessful entrepreneurs are treated. Bankruptcies are often seen as massive failures, and losing face in unsuccessful businesses is seen to be too risky (see Nurmi, 2004). These have a negative effect on establishing new FBS initiatives and start-ups, even though a developable initial idea would exist. However, these are very challenging issues, deeply rooted in Finnish culture, to be influenced. The respondents expressed hope in a new, bolder generation bringing a change in attitudes, but such a shift hardly occurs unaided. Developing and

establishing a support system and structures will facilitate the development. For example, better risk-financing and local networks would be important for SMEs. It is also clear that behavioral changes, teamwork skills, encouragement of self-esteem and positive attitudes toward entrepreneurship should be included in education at an early phase. In general, the Finnish education system is seen to be of a high quality, but the emphasis might be too much on technical skills and not enough on marketing and communication skills.

5.2 Strategic evolution and future development of FBS businesses: creating stronger stakeholder and sustainability orientation

As stated in section 5.1, FBS companies face challenges in exploring and foreseeing future developments in their business environment, which in turn creates difficulties in their strategic planning.

According to Toppinen et al. (2013), the strategic orientation of the forest industry has developed through four distinct stages. The first started in the 1950s from forestry orientation, continued through production orientation, market/customer orientation, and sustainability and increased stakeholder orientation in 2010s, along with growing service orientation. Respectively, for the future, Toppinen et al. (2013, pp. 419–420) highlight the importance of three development areas in forest industry's strategic orientation: "(1) continuing of the required adjustment strategies coupled with the changing geographic focus in the face of changing industry demand and relative competitiveness between different production and consumption regions in the world, (2) addressing the role of industry in the overall goals and agendas toward greening economies and global sustainable development, and (3) foreseeable societal development toward growing service orientation in business-to-business markets".

When they are examined in the light of strategic evolution and future development paths presented by Toppinen et al. (2013), the results of this study suggest that the studied companies continue to rely on *customer orientation* to some extent. This appears to be the case even though the firms clearly indicated their ambition to include broad views and the demands of various stakeholders in their strategic development. *Strong stakeholder orientation*, however, requires deep interaction and shared values between the companies and their customers and other stakeholders. From a resource-based perspective, stakeholder management and relations with key stakeholders have long been recognized as one of the crucial strategic resources affecting the company's competitiveness (see Hillman and Keim, 2001). Teece (2018) emphasizes that designing good business models requires a deep understanding of customers' needs as well. One of the main challenges in FBS is that transition towards more versatile business models and expanded product portfolios also means greater variations in stakeholders' views, which in turn creates further challenges to fulfilling the possibly conflicting demands of stakeholders (Mikkilä, 2006; Joensuu et al., 2018).

It is notable that the current study indicates that company representatives assess *sustainability* as being at the core of their firms' visions, strategies and business models. They believe that sustainability aspects are considered throughout the transition processes in the companies (see Näyhä, 2019). For example, being familiar with sustainability values and goals as well as

with the principles of the circular bioeconomy is seen as an important set of capabilities for employees to possess. The objectivity of these respondents' evaluations on their own company's sustainability management and implementation can be questioned. Yet it is clear that sustainability has, now and increasingly in the future, a predominant role as a driver and as a challenge for FBS companies. Likewise, sustainability is an important part of the strategy formulation processes as well as of the actual strategies of firms in a fast-changing environment. This importance makes it a dynamic capability that enables future success and long-term profitability (see also Amui et al., 2017; Teece, 2018). Aligning further with resource-based perspectives, CSR and sustainability-related activities are seen to provide both internal and external benefits for the companies. These benefits can help companies to develop new resources and capabilities (such as know-how, corporate culture, reputation and employee motivation) that facilitate companies' strategic, sustainable competitive advantage (Branco and Rodriguez, 2006; Barney, 2011; Williams and Siegel, 2011). Toppinen et al. (2013) further state that, in the future, corporate responsibility activities will increasingly be an inseparable part of forest industry companies' strategic management. Sustainability is also nowadays often seen as a main driver for innovations (Nidumolu et al., 2009; Adams et al., 2012).

In this study services-based business were discussed relatively little (which is naturally affected also by the selection of the involved companies), indicating that the third developmental path presented by Toppinen et al. (2013) is still largely unrealized among the Finnish FBS companies. However, other studies (such as Näyhä et al., 2015; Pelli et al., 2018; Pelli, 2018) have demonstrated that the significant potential related to FBS services business should be given more emphasis.

6 Conclusions and recommendations

Finnish FBS companies indicate, in both their current actions and their future plans, a strong willingness to participate in a sustainable circular bioeconomy (see also Näyhä, 2019). This study explored the transition of FBS firms toward new business models as companies seek to respond to current societal endeavors for more sustainable economies. The specific aim of this study was to analyze key business environment drivers and organizational capabilities as well as explore the role of innovations and innovativeness in firms' transitions.

This study supports the views of previous FBS studies in many ways, but it also presents interesting findings that are specific to the Finnish FBS. Different FBS actors have various goals and business models in their pursuit to fulfill the demands and expectations of their customers and stakeholders, and a wide variety of capabilities and expertise are needed in companies. This study shows, however, that there are many common resources, features, challenges and drivers that various FBS companies highlight as significant in the transition process, a surprising finding considering the many differences in the features of the participating firms. Importantly, in this study various intangible and human-related organizational capabilities and resources were given the most notably emphasis by the respondents. In short, transition requires flexible employees and multidisciplinary teams and

collaboration nourished by an innovative organizational culture, which in turn is supported by encouraging top management and “power people.” Overall, pursuing sustainability and innovativeness in internal as well as external organizational environment are essential factors for company transitions, and both need to penetrate through firms and all environmental layers around them. Table 1 summarizes the key external factors in the business environment and crucial organizational resources and capabilities facilitating the firms’ transitions and future competitiveness. (Note that Table 1 follows the framework and numbering presented in Figure A.1 and corresponds with the numbering of the results sections). The key challenges are summarized in the following paragraphs.

Table 1. Key business environment factors and organizational resources and capabilities affecting FBS firms’ transition and innovation processes (Numbering in the figure corresponds to Figure A.1 and the related results sections)

It is demanding for any organization to restructure its strategies and business models to match the changing business environment. A prominent challenge in the context of Finnish FBS firms is that companies often struggle with their stakeholder relationships. The companies should be able to conduct a more successful dialogue with their stakeholders, and optimize and position their products and services in a way that fulfills the exact requirements of the target market, their customers and other stakeholders. More open dialogue and intensive collaboration should also be established with other FBS firms, avoiding an overly cautious attitude. These issues highlight the fact more flexibility and agility are needed in companies, but they were often seen as lacking especially in large-scale (hierarchical) companies. Moreover, a challenge in Finnish culture is that entrepreneurship is characterized by a fear of failure and anxiety over big risks. In addition, despite the fact that Finnish actors were evaluated to be good at innovating, handling technical solutions and managing small-scale demonstrations, problems emerge in the scale-up phase, meaning that production quantities and different usages are difficult to extend. The risk financing—that is crucial for start-ups—is often also lacking. Companies face challenges when commercializing and marketing their new products.

Even though strategies, resources and dynamic capabilities and their interdependent relationships in organizations are addressed at the theoretical level in literature, there is still a need to examine these issues from an empirical perspective. As a key theoretical contribution, this study shows that intangible and human related dynamic capabilities are necessities for successful transition. Company leaders and employees should form the core of the most valuable asset of the companies. Their combined and strong dynamic capabilities to lead, manage, collaborate, innovate, communicate, market, and create the overall organization culture, all of which supports the renewal, are the key. These capabilities enable the agile transition of the company itself while facilitating the transition of the society where it operates.

On the basis of this research (as well as of the other studies referred to in this study), several recommendations to facilitate FBS firms’ transition to new businesses can be presented (Table 2).

Table 2. Recommendations to facilitate FBS firms' transition to new FBS circular bioeconomy businesses

Overall, this study indicates that in order to successfully manage the transition, companies need to have a deep understanding of what is needed, required and accepted by the markets and society, and they must develop the organizational resources and capabilities to sustainably respond to these requirements. It is important to note, however, that in addition to the current needs, companies must prepare for future needs and challenges, meaning that achieving long-term competitiveness requires future-oriented strategic thinking. It also needs to be remembered that this transition is not dependent only on the companies; wide-scale societal effort is also needed.

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Appendix A. Semi-structured interview questionnaire: themes and questions

1. Competitiveness

1.1. Who are the most important competitors for your organization? Are there any changes to be expected in the future?

1.2. What are the cornerstones for the competitiveness of your organization?

2. Resources

2.1. Describe the favorable operational environment for your organization (you can approach the issue at different levels).

2.2. What kind of key resources, capabilities and instruments are needed in the transformation to bio- and circular economies and in the changing business environment?

3. Innovations

3.1. What is the significance of innovations and innovativeness for your organization in the changing business environment (particularly regarding bio- and circular economies)?

3.2. What kinds of drivers and challenges do you see in the situation (described above)?

3.3. Do you see that a lack of flexibility and the cautiousness of organizations/management creates barriers for transformation/innovativeness?

Appendix B. Quotations

4.1	
Quotation 1: (respondent B)	<i>By caricaturing a bit, instead of some committees trying to invent how to solve some issues, they should invent where to aim and which are the boundary conditions. And then these are indicated to the actor.</i>

	<i>[...] In my opinion, this is a big threat for development. Legislators and specialists have a tendency to aim to define beforehand how this particular problem should be solved. This limits development.</i>
4.2	
Quotation 2: (respondent E)	<i>People and companies which share the same value base in their businesses will be faithful customers for us.</i>
4.3	
Quotation 3: (respondent F)	<i>In my opinion, the problem related to risk financing and scientific and innovative financing in Finland is again, where can you get risk money if not from risk funders, because there is too much risk. In my opinion, that describes this situation as well.</i>
Quotation 4: (respondent D)	<i>It took 10 years from coming up with the idea to actual business, so that it started to make profit. It takes perseverance and persistence.</i>
Quotation 5: (respondent C)	<i>For example, it is not understood that in process industry we don't produce so many, if any (new products), like in cargo goods or in the chemical industry, where tens or hundreds of new products come every year. In our case, it can be an improved product or improved process. And when we are researching some entirely new issue, the development work will easily take 10 years. It is different than, for example, changing the appearance of a keyboard or something.</i>
4.4.1	
Quotation 6: (respondent E)	<i>Strong belief in newness, that you can change. Sometimes you just need to try your wings and see if this thing is working. This applies to society, large organizations, everything. Sure, there are people who are resistant to change. But we don't have any other choice than change. And forest industry has changed in a great way.</i>
Quotation 7: (respondent A)	<i>In fact, a significant barrier for rapid change in our industry is that we have invested so much money in these large production facilities. We cannot simply change our production activities just like that. We are</i>

	<i>integrally bound to our current assets. Start-ups can change direction rather fast, if the first idea does not work.</i>
4.4.2	
Quotation 8: (respondent F)	<i>It is the quality and reliability of Finnish science. Everybody talks about it like this. Nobody denies it. And the country's reputation is so cool that everybody wonders how we cannot sell our products.</i>
Quotation 9: (respondent E)	<i>Learn to market and sell certain features to the customers. Instead of material, sell the features related to wood fiber. And you need to shift from the strict habits of the forest industry. [...] And explain values and what they are related to. Depending on the different markets, you need to take a certain stance in your marketing.</i>
4.4.3	
Quotation 10: (respondent D)	<i>Of course, personnel is a definite resource. Without people, we cannot do anything. Without knowledge, we cannot do anything. Particularly if we talk about new products and how they are developed. Ideas come from people.</i>
Quotation 11: (respondent E)	<i>And when we know forest, fiber, pulp parts and we are joined with people from the cosmetics, car or food industry, great things will be created.</i>
4.4.4	
Quotation 12: (respondent E)	<i>If we start with the organization, there needs to be enough resources, ideas and unlimited innovativeness. Let people invent freely. And in the firms, we need strong support from the top management for us to move toward new things.</i>