Scandinavian Journal of Forest Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/sfor20

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To cite this article: Malin Johansson, Emanuel Erlandsson, Thomas Kronholm & Ola Lindroos (2021) Key drivers and obstacles for performance among forest harvesting service contractors – a qualitative case study from Sweden, Scandinavian Journal of Forest Research, 36:7-8, 598-613, DOI: 10.1080/02827581.2021.1981431

To link to this article: https://doi.org/10.1080/02827581.2021.1981431

SCANDINAVIAN JOURNAL OF FOREST RESEARCH
2021, VOL. 36, NOS. 7–8, 598–613
https://doi.org/10.1080/02827581.2021.1981431

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Key drivers and obstacles for performance among forest harvesting service contractors – a qualitative case study from Sweden

Malin Johansson [a,b], Emanuel Erlandsson[a], Thomas Kronholm[a] and Ola Lindroos [a]

[a]Department of Forest Biomaterials and Technology, Swedish University of Agricultural Sciences, Umeå, Sweden; [b]Stora Enso Skog, Åsgatan, Falun, Sweden

ABSTRACT

The extensive outsourcing of forest harvesting operations means that the operational performance of contractors has an immense impact on the forest industry supply chain. This study describes perceived drivers and obstacles for strong performance in harvesting service based on semi-structured interviews with four production supervisors and eight contractors. The analysis of interview data revealed a wide array of factors considered to drive or hinder the performance. The factors were categorized into five types: Capability, Incentives, Commitment, Involvement and External factors. Factors concerning Capability, especially resources and competence, were most frequently considered by production supervisors as both drivers and hinders. The contractors considered most commonly Incentives to affect performance, especially motivation and strategy, as drivers and the economy as hinder. Both parties considered lack of resources as hinder to performance. For competence, relationship and collaboration interface, on the other hand, the two parties had different views on whether they acted as drivers or hinders. The knowledge presented in this paper is of interest to researchers or practitioners who wishes to understand the complexities underlying successful harvesting service performance. The insights can contribute to the reshaping of business practices to better target and leverage the mechanisms that most strongly affect performance.

ARTICLE HISTORY
Received 1 September 2020
Accepted 12 September 2021

KEYWORDS
Success factors; service values; wood supply chain; business development; logging; entrepreneur

Introduction

In Swedish forestry, harvesting operations are mainly performed by contractors who are hired by forest companies or forest owner associations (Swedish Forest Agency 2018). That is the result of an extensive outsourcing process in the 1980–1990s during which forest companies offered to sell their machinery to machine operators who would continue as contractors instead of employees (Lidén 1995). Thereby, the previous employer became a customer.

Today, most contractors are small and medium-sized enterprises (SMEs), and forest companies often rely on contracts with several contractors to secure the required amount of harvesting operations (Häggström et al. 2013; Kronholm et al. 2019). Many of these forest service contractors engage in long-term business relationships in that they have one large forest company as their sole customer (Furness-Lindén 2008). It is not uncommon that considerable performance variations exist between different contractors. For instance, productivity and machine utilization rates can differ by more than 40% between two contractors (Eriksson and Lindroos 2014). This significantly affects both contractor profitability and customer satisfaction (Eriksson et al. 2015; Erlandsson et al. 2017).

Harvesting operation performance can be assessed from many perspectives. The definition of performance success is multidimensional since different stakeholders can have different opinions of how it should be measured (Erlandsson et al. 2017). From a contractor's point of view, success can be measured in terms of profitability (Mäkinen 1997; Penttinen et al. 2011; Erlandsson and Fjeld 2017), lifestyle objectives (Drolet and LeBel 2010), or satisfaction (Erlandsson and Fjeld 2017). Meeting these objectives is important for a contractor to stay in business, but another requirement for long-term business success is customer satisfaction. However, a contractor's profitability and/or satisfaction do not necessarily correlate with the degree of customer satisfaction (Erlandsson et al. 2017). Customer satisfaction can also be complicated to assess because customers often perceive several value attributes for each service, with each of these attributes affecting customer satisfaction in different ways (Kano 1984). These perceived value attributes have been identified and investigated in previous studies of customer satisfaction with harvesting performance (Eriksson et al. 2015; Erlandsson et al. 2017). The results revealed that customers (i.e. forest companies, forest owner associations, and non-industrial private forest owners) appreciate different

CONTACT Malin Johansson Malin.m.johansson@slu.se Department of Forest Biomaterials and Technology, Swedish University of Agricultural Sciences, Skogsmarksgränd, SE 901 83 Umeå, Sweden

Supplemental data for this article can be accessed at https://doi.org/10.1080/02827581.2021.1981431.

value attributes of the harvesting operations delivered by subcontractors. The value attributes a specific customer perceives as important are case-specific (Erlandsson et al. 2017), and thus, do not always influence the success of harvesting operation performance in the same way.

The current research base has only to a limited extent considered the complexity of contractors' harvesting performance and how the forest company – contractor business relationship can be improved. Eriksson et al. (2015) assessed four general strategies (active sourcing, adapted incentives, active use of power advantage, and tailored contractor development programs) for managing contractors according to contractor capabilities and performance alignment. Moreover, success factors for the customer–harvesting services provider relationship in terms of customer satisfaction (Erlandsson et al. 2017) and contractor profitability (Erlandsson and Fjeld 2017) have been identified. Other studies have specifically focused on the personal motivation factors of contractors (Drolet and LeBel 2010; St-Jean and LeBel 2014). However, the knowledge about interactions between factors that affect performance is limited. Moreover, there is limited knowledge about what reasons contractors and their business contacts at the service buying company perceive as being influential to performance. Such explorative studies could shed new light on the complex topic and would most likely benefit from a qualitative approach and in-depth analysis.

Using a case of one forest company as customer and associated contractors, this study aims to identify perceived drivers and hinders for performance considering that harvesting service consists of many value attributes. As performance is known to be affected by diverse factors, a theoretical framework was developed to handle a part of the complexity underlying performance.

Theoretical framework

Capability

To succeed as a harvesting operation provider, the contractor needs the abilities and qualities to deliver what has been requested by the customer. In a resource-based view (RBV) of a firm, resources are key for competitive performance (Wernerfelt 1984). The theory of RBV divides resources into tangible and intangible assets, with the underlying assumption that resources are heterogeneous and immobile between companies. That causes various case-specific successful strategies to achieve competitive advantage by using different bundles of resources unique for each company. In this way, each business case or project presents an opportunity for companies to bundle their unique assets in a way that will achieve a competitive advantage (Barney 1986). Tangible assets are physical resources such as land, buildings, machinery, equipment and financial capital, whereas intangible assets describe factors that are owned by the company but not physically present, for example, trademarks, patents, and knowledge. The main source of sustainable competitive advantage is intangible resources, since these assets cannot be freely purchased from the market and they are more difficult to copy than physical resources (Grant 1991).

Various organizational characteristics are often described in the forestry contractor performance literature. For instance, good leadership and processes are commonly mentioned in conjunction with high customer satisfaction (Norin and Thorsén 1998) and profitability (Norin and Karlsson 2010; Jylhä et al. 2020). Moreover, Cacot et al. (2010) argue that the profitability of large contractors is affected by knowledge, performance measurements and systematic improvement efforts.

Incentives

A contract is typically used to create a legally binding business agreement that includes set rewards and penalties. Various types of contracts can be used to state the agreements and terms between business parties. The drafting of a contract is a complex procedure that can vary widely for different situations and objectives (Van Weele 2009). Norin and Furness-Lindén (2008) highlight that the two most common approaches for purchasing harvesting services in Sweden are negotiation and invitations to tender. The pricing models for the purchasing of harvesting services can be used to align contractor activities with customer needs. For instance, with a gross, aggregated fee for operations or a piecework rate for the delivered volume. Norin and Furness-Lindén (2008) emphasize that piecework rate for delivered volume can be on different aggregations scales, for instance, site-specific and for all operations. On the other hand, a Canadian study found that many contractors are not primarily motivated by economic revenue, but rather driven by other factors such as independence (being one's own boss), life-style, or passion for the work (Drolet and LeBel 2010).

Commitment

Eriksson et al. (2017) have emphasized that contractors whose services are well aligned with customer needs are more likely to succeed. Misalignment between the parties can adversely affect contractor profitability as well as lead to conflicts and a lack of trust (either one-way or mutual). Both of these consequences will significantly increase the probability that the contractor will switch to another customer or liquidate the firm. Partnerships characterized by mutual trust rather than power imbalances and dynamics are more likely to be successful in the long run (Högnäs 2000; Eriksson et al. 2017). Moreover, the working environment provided by the customer is important for contractor satisfaction (Erlandsson and Fjeld 2017) and their motivation to stay in business (Ager 2014). An individual's commitment to an organization and working activities has been shown to correlate with performance, as committed individuals tend to be more likely to meet the organization's demands than less committed ones (Porter et al. 1974). This also applies to forestry contractors since the most successful contractors are often highly committed to their customers and tasks (Norin and Thorsén 1998). Commitment based on emotional attachment in the context of a business relationship has been described as "affective commitment". However, commitment also includes a calculative dimension, as the service provider's and client's behaviors can be

affected by the evaluation of different alternatives (Gilliland and Bello 2002). For example, it is common that a forest company will assess alternative service providers, long-term benefits, and switching costs when deciding whether to engage in a business relationship (Morgan and Hunt 1994). In the Swedish context, contractors who offer harvesting services have high investment costs in machinery and rely on only a few large companies to make a living (Erlandsson 2016; Kronholm et al. 2019). Thus, these contractors understand that the cost for terminating a relationship will be rather high and will take this factor into account when deciding to enter a business relationship (Morgan and Hunt 1994; Gilliland and Bello 2002).

A contractor's commitment to the customer organization can be affected by certain promises or labor- and capital-specific efforts from the organization (Ghijisen et al. 2010). In contrast, low levels of trust between the contractor and customer, cases in which the customer is disrespectful towards the contractor, along with unprofessional and dishonest behavior are all attributes of conflictual relationships (Eriksson et al. 2017). These types of relationships can significantly harm commitment and hurt supply chain efficiency (Porter et al. 1974).

Involvement

A contractor can only deliver a requested service if the customer cooperates and provides them with the means to do so. For instance, the accuracy of the provided work order information will enable the contractor to plan and conduct the harvesting operation properly (Gustafsson 2017). In other words, reliable, up-to-date information from the customer will allow the contractor to plan the work well and avoid problematic issues. As such, this dynamic not only affects contractor profitability and satisfaction but customer satisfaction as well (Erlandsson et al. 2017).

Companies tend to cooperate with other members of the supply chain rather than do business on their own. As a result, companies depend on one another and prioritize developing long-lasting business relationships with existing partners rather than looking for new cooperations. This collaboration between companies has been important to achieving business goals (Grönroos 1997). In forestry, the customer has a large impact on how harvesting services are purchased (and paid for), as well as the business models that companies apply (Benjaminsson et al. 2019). As entrepreneurs should maintain a certain independence from their customers, this business relationship structure can hinder contractors' entrepreneurial behaviors, such as taking responsibility for the business and finding innovative solutions for further business development (St-Jean and LeBel 2012). Historically, improvement and development efforts in forestry have mainly been driven by the customers, for example, large forest companies, who hold significant power in dictating the business and operational practices of harvesting services (Ager 2014). On the other hand, entrepreneurial SMEs can be more exposed to supply chain risk since their actions do not always align with the rest of the supply chain members' needs (Falkner and Hiebl 2015). Because harvesting contractors have to invest heavily in machinery (Erlandsson 2016) and often experience small profit margins (Kronholm et al. 2019), they have relatively limited opportunities to develop their business on their own. SMEs are inherently constrained by limited available resources within the company. In this context, the social structure in which the SME is embedded contributes opportunities and resources that are external to the SME (Jack and Anderson 2002). For instance, Jack et al. (2004) emphasize that enterprise performance can be improved by effectively utilizing relationships with family members, business contacts, suppliers, competitors and customers.

Material and methods

Sample

Given the complexity in harvesting service performance, this study was carried out as a case study. This was done by focusing on a large Swedish forest company, representing as a customer for around 120 harvesting contractors. Most of these contractors were SMEs and had the forest company as their only customer. At the time of the data collection, the company organized its work into three geographical regions, with each region further divided into 4–5 districts. In each region, a production manager was responsible for a group of production supervisors, who, in turn, were responsible for being in contact with a group of contractors connected to each district. As a part of their regular work relationship, contractors and production supervisor had frequent contact with each other (most often several times per week), among other things, to discuss expectations and opinions on performance. In-depth interviews with four production supervisors and eight contractors were used to enable the collection of their reflections on factors perceived to affect performance

Snowball sampling was used to select the study participants and followed a specific structure, with the aim to find as much variation of perceptions about performance as possible within a limited sample. The sampling started with semi-structured focus group interviews, including all of the company's production managers, in October 2018. The production managers were considered as key persons because of their wide knowledge about the company and their subordinated local production supervisors and the associated contractors. The production managers were asked to reflect upon the tangible and intangible values that they perceived as most important in harvesting services. To help with this task, the managers were provided with a list of the harvesting service values identified by Eriksson et al. (2015) and Erlandsson et al. (2017). The values on this list have been divided into tangible and intangible value attributes. Examples of tangible values include timber quality, thinning quality, and environmental consideration, while delivery reliability, flexibility, management, collaboration, operates as a business driver, and communication are examples of intangible values. The production managers agreed that the list was suitable to use during the following individual interviews with production supervisors and contractors; however, one change was made as a result of the focus group interviews: delivery

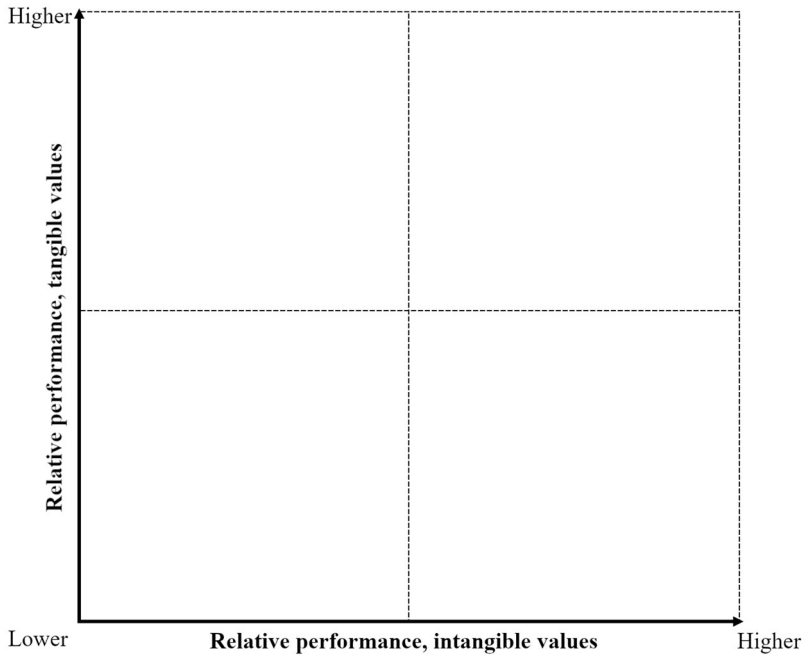

Figure 1. Combinations used to differentiate the performance of the districts and the contractors during the sampling process.

reliability was moved from intangible to tangible values (see Appendix 1). They were then asked to subjectively rank the districts in their respective region according to relative performance in the tangible and intangible values, respectively.

After the ranking exercise, each production manager was asked to explain the reasons for their ranking. They were also asked to reflect on the reasons for performance variations between districts. The purpose of using this approach was both to stimulate and to create a structured basis for discussions on what factors were actually being considered when comparing performances of different districts. A supporting matrix was used to differentiate the districts concerning their relative performance in tangible and intangible values (Figure 1). In order to capture as much variation in performance as possible within a limited sample, the managers were asked to together agree upon four districts to include in the interview sample, one from each of the four performance combinations resulting from sorting districts within the matrix. In their selection, the production managers were further guided in that the selected four districts should cover all of the company's three regions in order to also capture variation in geography.

Four production supervisors responsible for the selected districts with diverse performance were interviewed. In their turn, they contributed to the selection of contractors to interview by individually recommending two contractors with as relatively different performances in tangible and intangible values as possible. The production supervisors in the selected districts were responsible for 6–11 contractors each, which could have yielded a total of 32 contractors for performance assessments. Again, the same matrix used earlier was used as support during the interviews to differentiate contractors concerning their performance in tangible and intangible value attributes in order to select contractors with as diverse performance as possible (Figure 1). The production supervisors were quite free to choose which contractors they recommended for further interviews but were nevertheless guided to consider the positions in the matrix in order to ensure that they suggested contractors within diverse performance results (see Appendix 1). A total of eight contractors (two recommended by each production supervisor) were chosen and asked to participate in an interview for this study. Relative to others, four of them had higher performance in both intangible and tangible values, three had lower performance in both intangible and tangible values, and one had higher performance in intangible and lower in tangible values. The age of the selected contractors ranged from young individuals to contractors who were soon retiring, and the size of the companies varied. For some of the contractors, the investigated forestry company was their only customer, while other had several forestry companies as customers and/or offered additional services to harvesting.

Data collection

The individual semi-structured interviews with four production supervisors and eight contractors were conducted during the period October–December 2018. All interviews were conducted and analyzed by the same person. All the production supervisors and contractors were asked if they were willing to be interviewed for the aim of this study. Based on the participants' preference, the interviews were conducted at a restaurant during a lunch break or at the participant's office or home, with each interview lasting approximately 1.5–2 h. All of the interviews were recorded with the participants' permission, and the interviewing researcher ensured that the data would be handled in confidence throughout the research process. They were also informed about their right to withdraw their consent of participation and storage of their provided data material without any

need to give reason for it. The participants were free to answer the questions as they liked and a questionnaire with open questions, a list of harvesting service values, and several exercises were used to stimulate the participants' reflections and thus provide rich data relevant to the research topic (see Appendix 1).

All participants were informed about the snowball sampling process. This implies that the participants were aware of the identity of the individuals they had recommended or been recommended by for the interview. However, no participant was given information about another participant's answers. Hence, those being recommended to participate did not know the reason for why they were recommended. Furthermore, when compiling and presenting the results, caution has been taken to not disclose information in such ways that it could be linked to specific participants.

During the interviews, all of the participants were asked to reflect upon tangible and intangible values of the harvesting service. The list with previously identified examples of harvesting service values, which was amended based on the focus group interview, was given to the participants to help stimulate them to reflect upon the values associated with harvesting services. All of the participants were also asked if they could think of other values.

Production supervisors performed a ranking exercise during their interviews to gain information on which value attributes are more important than others. In the ranking exercise, the production supervisors were asked to subjectively rank all the contractors they were responsible for based on the contractors' relative performance in tangible and intangible value attributes. The production supervisors were also asked to explain how contractors' performances in different value attributes had affected the ranking result.

Contractors were asked to assess tangible value performance, intangible value performance, and customer performance during their interviews. Each aspect of performance was symbolized as a line, stretching from poor to strong performance. During the tangible and intangible value performance assessments, the contractors were asked to mark their own performance result on the line according to how they perceived it. They were then asked to indicate where their customer would place them on the line. On the customer performance line, the contractors were asked to mark their perception of how the forestry company performed as a customer, as well as how they thought that the customer would assess themselves. To assess differences between the value attributes, the contractors were asked to explain how their performance in different value attributes affects their own perception, as well as that of the customer, of their intangible and tangible performances.

The participants were also asked to reflect on the reasons for their ratings of their tangible and intangible performance to gain insight into which factors drive and hinder contractor performance. For example, the production supervisors were asked to identify which factors supported and hindered the performance results of the identified contractors, and which of these factors explained the contractors' performance results. Similarly, the contractors were asked to identify factors that either supported or hindered their performance and how these factors explained their performance relative to other contractors.

Analysis

The recorded interviews were transcribed and analyzed by the same person who conducted the interviews. Each participant was given the opportunity to read through the transcript and to notify the interviewing researcher if they wanted to change or add anything. All of the transcripts were coded and subjected to content analysis.

The identified harvesting service values were categorized according to value attributes, which – in turn – were sorted into identified attribute groups. In the production supervisor transcripts, the harvesting value attributes were counted based on: (1) How many contractors the production supervisors related to a value attribute. (2) How many contractors the production supervisors related with a strength respectively weakness in performance in a value attribute. In the contractor transcripts, the value attributes were counted based on: (1) How many of the contractors considered a value attribute when discussing their tangible or intangible performance (services). (2) How many of the contractors considered their performance in a value attribute as a strength or weakness. The counting was made in order to reach information about what value attributes that the participants mostly mentioned in this study and the perceived performance in them.

According to the theoretical framework, identified factors were organized based on the themes of Capability, Incentives, Commitment and Involvement, along with External factors. In the production supervisor transcripts, the occurrence of each factor was counted in each attribute based on: (1) How many contractors that the production supervisors related the factor as the reason behind performance in the attribute. (2) How many of the contractors the production supervisor related the factor as a driver respectively an obstacle for the contractor's performance. In the contractor transcripts, the occurrence of each factor was counted in each attribute based on: (1) How many of the interviewed contractors mentioned the factor to affect their performance in the attribute. (2) How many of the contractors that had related the factor as a driver respectively an obstacle to their performance in the attribute. The frequency at which each identified factor had been considered was also quantified over all value attributes.

Results

Harvesting service performance

A total of 18 value attributes were found to influence harvesting service performance based on the production supervisors' ranking of contractors and the contractors' assessments of their own performance (Table 1). Almost all of the value attributes were mentioned by both production supervisor and contractors. Exceptions included safety work, which was only mentioned by contractors, as well as development potential and development cooperation, which were only mentioned by production supervisors. The value

Table 1. Harvesting service value attributes mentioned by production supervisors and contractors to affect the contractors' harvesting service performance.

			Production supervisors		Contractors	
Group	Value attribute	Description	*n*	%	*n*	%
Adaptability	Collaboration	Facilitates and supports the customer's work, provides suggestions and discusses how problems can be solved in a suitable way.	15	87	8	100
	Flexibility	Adapts to variations and changes according to customer needs.	13	100	7	86
	Operates as business driver	Adapts the work according to private forest owner needs and requests, enables wood procurement from forest owners and provides tips to the customer about possible wood purchasing opportunities from private forest owners.	5	100	6	100
Operational quality	Forest management	Performs harvesting services according to policy and instructions, the work does not cause soil damage, and only causes a low level of damage to the residual stand.	13	54	8	100
	Wood value	High and consistent bucking quality (length and diameter distribution), minimal damage to saw logs.	10	60	8	88
Delivery	Volume production	Describes the volume of harvested wood and the productivity of the operations.	12	58	5	60
	Deliver reliability	The agreed volume is accessible at the roadside at the agreed time.	10	80	7	71
Information	Data-gathering	The contractor can provide logs concerning machines, daily production, and sample trees, along with follow-up documentation about how the work was carried out.	10	40	4	100
	Communication	Informs the customer about problems on time. Provides relevant information regarding the performance ability of both parties.	5	100	6	100
Development	Development potential	Includes aspects related to current conditions, future ambitions, and company objectives.	13	46	–	–
	Continuous improvement	Works independently to improve – usually via gains in efficiency – different activities in the company.	4	50	3	100
	Development contribution	Educates the customer, helps the customer educate other contractors and machine operators. A step ahead in development. Shares information about potential areas for development.	2	100	–	–
	Educates new machine operators	Contributes to more competent machine operators in the forest sector, periodically employs and mentors trainees, runs or collaborates closely with educational institutions for machine operators, good ambassador for the forestry sector.	1	100	1	100
Independence	Professional business relationship	Well versed in negotiations, Skilled in professionally agreeing price and can demonstrate how the customer will benefit. Argues with facts and results.	12	33	2	100
	Administration	Documentation and control of different activities in the company, distribution of site maps and instructions to employees.	4	75	5	60
Stability	Employee management	Successful employer with healthy and motivated employees, low employee turnover, relatively successful in finding and keeping employees.	9	67	6	67
	Long-term reliable business relationship	Has provided harvesting services to the customer over a long time period, predictable and reliable, the customer knows what to expect.	3	33	1	100
Safety	Safety work	Makes sure to prioritize safety, evaluates and avoids possible risks according to health and safety guidelines before the work is started, low numbers of sick leave days.	–	–	3	100

Notes: The frequencies (n) of contractor examples for the identified value attributes are shown, as well as the proportion (%) of instances in which it was considered to have a positive effect on performance. The value attributes were divided into eight attribute groups, sorted in descending order according to the frequency of the total value attributes given by both production supervisors and contractors. The value attributes, in turn, are sorted in descending order according to frequency in the contractor examples given by all participants. Each value attribute is presented as the total number of contractor examples given by production supervisors and the total number of the interviewed contractors that mentioned the value attribute separately, along with the proportion of examples in which the value attribute was mentioned to positively affect the ranking result (production supervisors) or the performance assessment (contractors).

attributes were divided into eight attribute groups (Table 1). The production supervisors commonly mentioned both strengths and weaknesses of contractors' performance in different value attributes, with in total 66% of the examples mentioned as strengths of the contractor performance. Contractors also mentioned both strengths and weaknesses in their perceived performance in the value attributes, and in total, mentioned a higher share (88%) of examples perceived as strengths.

Overall, collaboration was most often mentioned by the participants in total. The production supervisors most commonly mentioned that they appreciate a contractor's collaboration ability. All of the interviewed contractors mentioned that they performed well in collaboration and forest management. The performance result in the wood value attribute was also discussed by all of the contractors, with one reporting this value attribute to be a weaknesses.

The weakness in contractors' performance, most commonly mentioned by the production supervisors, was a lack of professionalism in the business relationship. In contrast, there were only a few occasions when contractors mentioned weaknesses in their own performance results. These weaknesses were mainly related to volume production, volume reliability, administration and employee management.

The production supervisors provided many examples of contractors with both strong and weak performance in professional business relationship, development potential and data-gathering. In contrast, it was only a few or none of the contractors that mentioned their performance in these attributes. On the other hand, many of the contractors mentioned their performance in operating as a business driver (enable wood procurements from forest owners, etc.), communication, administration and safety, while the production supervisors seldom, or not at all, mentioned contractor performance in in those value attributes.

Key drivers and obstacles

Based on the participants' statements, 14 factors were identified to be affecting performance in one or more of the eight attributes (Table 2). When being categorized into the five themes, the factors were quite evenly distributed. Most of the affecting factors were observed to exert both a driving and hindering effect, which varied between contractors and value attributes (Tables 3 and 4). As visualized in Figure 2, the production supervisors most often mentioned factors connected to a contractor's Capability, especially *resources* and *competence*, when discussing drivers and obstacles to contractor performance. These two factors were among the most common drivers mentioned by the production supervisors, yet were also commonly described as obstacles for contractor performance. A similar observation was made for *personal characteristics* and *economy*, as both of these factors were often mentioned as drivers as well as obstacles.

The contractors mostly mentioned factors connected to Incentives when reflecting on what drove their performance, and factors connected to Capability when discussing obstacles to performance (Figure 2). The Capability theme showed the highest share of obstacles, although *competence* and *systems & processes* were mostly mentioned as drivers. This was because (lack of) *resources* was the factor most often perceived to hinder performance All four of the factors under the Incentive theme were commonly mentioned to drive performance, although the *economy* factor was also commonly identified as an obstacle to performance. The contractors mentioned various drivers at similar frequencies when discussing performance, yet the driving factor that was mentioned most often was *collaboration interface*. There were more differences in the occurrence of hindering factors. The contractors most often mentioned *resources*, *economy*, *collaboration interface* and *logging conditions* when discussing obstacles to performance.

Table 2. Factors that were identified to affect contractor performance in any of the studied value attributes, grouped into five themes. The themes are sorted according to the frequency at which the related factors were mentioned to affect performance (either drive or hinder) in the studied value attributes based on contractor and production supervisor interviews. The factors included in each theme are sorted according to the same logic, i.e. how often the factor was mentioned in conjunction with the studied value attributes by the participating contractor and production supervisors.

Theme	Affecting factor	Description and content
Capability	Resources	Human resources (quantity and competence), material equipment and machinery, financial resources.
	Competence	Contractor's knowledge, experience, skills and talent.
	Systems & processes	Common work routines and standards.
Incentives	Economy	Economic rewards and the estimated impact on profitability.
	Motivation	Lifestyle objectives, possibility to be one's own boss and set own schedule, personal acknowledgement that the work is important and appreciated.
	Strategy	Company goals, e.g. to be an attractive contractor to customers, private landowners and employees.
	Requirements	Abiding by laws and rules, entering into contract agreements
Commitment	Personal characteristics	Contractor's personal attitude, interest, engagement and feeling of responsibility in the work activities.
	Relationship	Contractor's attitude, interest, engagement and feeling of responsibility towards the customer (forestry organization), e.g. trust, loyalty and dependency to the customer, opportunities and possibilities to do other things or work for other customers.
Involvement	Collaboration interface	Customer's adherence to their part of the assignment, contractor accepts help and advice from the customer or other external parties, contractor uses contacts in their network.
	Supplier management	Customer's leadership style, treatment of the contractor, e.g. discussing the contractor's performance results, giving feedback, expressing expectations.
External	Logging conditions	Terrain, weather and wind.
	Competition & economic situation	Market conditions, availability of machine operators on the market, competition from other areas, demand for harvesting operations, other contractors in the area.
	Risk	Balance between potential benefits and losses.

Table 3. The factors mentioned by the production supervisors in specific value attribute groups.

		Value attribute group															
		Adaptability		Operational quality		Delivery		Information quality		Development		Independence		Stability		*All pooled*	
Theme	Factor	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Capability	Resources	3	100	3	33	9	56	1	0	5	40	–	–	5	40	*26*	*50*
	Competence	1	100	4	75	6	50	1	0	3	100	3	100	9	44	*27*	*63*
	Systems & Processes	–	–	3	67	2	50	–	–	2	100	3	100	–	–	*10*	*80*
Incentives	Economy	–	–	6	33	6	100	1	0	2	100	2	100	3	67	*20*	*70*
	Motivation	1	100	3	33	1	100	–	–	1	100	–	–	1	100	*7*	*71*
	Strategy	–	–	–	–	–	–	–	–	4	50	–	–	2	100	*6*	*67*
	Requirements	–	–	1	100	–	–	–	–	1	100	–	–	–	–	*2*	*100*
Commitment	Personal characteristics	2	50	8	88	1	100	4	0	5	60	3	67	2	0	*25*	*56*
	Relationship	6	100	1	100	–	–	–	–	1	100	–	–	–	–	*8*	*100*
Involvement	Collaboration interface	–	–	–	–	2	100	2	100	2	100	1	100	1	100	*8*	*100*
	Supplier management	–	–	1	100	1	100	2	100	1	100	–	–	–	–	*5*	*100*
External	Logging conditions	1	100	1	0	3	0	–	–	–	–	–	–	–	–	*5*	*20*
	Competition & economic situation	–	–	–	–	1	0	–	–	–	–	–	–	1	0	*2*	*0*
	Risk	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
All pooled		*14*	*93*	*31*	*61*	*32*	*63*	*11*	*36*	*27*	*74*	*12*	*92*	*24*	*50*	*151*	*66*

Notes: The frequencies (*n*) of contractor examples for the identified factors are shown, as well as the proportion (%) of instances in which it was mentioned as a driver of the contractors' performance. For the column and row "All pooled" the frequencies (*n*) represent the amount of mentioned examples and not the total number of contractors, as well as the proportion (%) of instances in which it was mentioned as a driver of contractor performance.

Table 4. The factors mentioned by the contractors in specific value attribute groups.

		Value attribute group																	
		Adaptability		Operational quality		Delivery		Information quality		Development		Independence		Stability		Safety		*All pooled*	
Theme	Affecting factor	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Capability	Resources	3	33	6	67	5	60	2	50	4	0	4	25	5	20	–	–	*29*	*38*
	Competence	3	100	4	75	2	100	2	100	4	100	–	–	7	71	3	100	*25*	*88*
	Systems & Processes	2	100	3	100	4	100	3	33	2	100	1	100	3	100	2	100	*20*	*90*
Incentives	Economy	5	0	6	17	5	80	1	100	3	33	5	80	2	50	1	100	*28*	*46*
	Motivation	3	100	2	100	2	100	3	100	6	83	1	100	4	100	2	100	*23*	*96*
	Strategy	5	100	3	100	1	100	2	100	4	100	3	67	4	100	–	–	*22*	*95*
	Requirements	5	100	5	100	2	100	3	100	-	-	2	100	–	–	–	–	*17*	*100*
Commitment	Personal characteristics	4	100	7	86	4	100	2	50	3	100	5	40	1	100	1	0	*27*	*78*
	Relationship	7	86	3	67	1	100	1	100	1	0	5	60	–	–	1	100	*19*	*74*
Involvement	Collaboration interface	7	86	5	60	5	40	2	50	3	100	6	67	3	100	1	100	*32*	*72*
	Supplier management	1	100	3	100	3	100	1	100	2	100	–	–	–	–	1	100	*11*	*100*
External	Logging conditions	1	0	4	0	4	0	–	–	–	–	–	–	–	–	–	–	*9*	*0*
	Competition & economic situation	–	–	1	0	–	–	–	–	–	–	–	–	4	0	–	–	*5*	*0*
	Risk	–	–	–	–	1	0	–	–	–	0	1	0	–	–	–	–	*5*	*0*
All pooled		*46*	*78*	*52*	*67*	*39*	*72*	*22*	*77*	*35*	*69*	*33*	*61*	*33*	*67*	*12*	*92*	*272*	*71*

Notes: The frequencies (*n*) of contractors mentioned the identified factors are shown, as well as the proportion (%) of instances in which it was mentioned as a driver of contractor performance. For the column and row "All pooled" the frequencies (*n*) represent the amount of mentioned examples and not the total number of contractors, as well as the proportion (%) of instances in which it was mentioned as a driver of contractor performance.

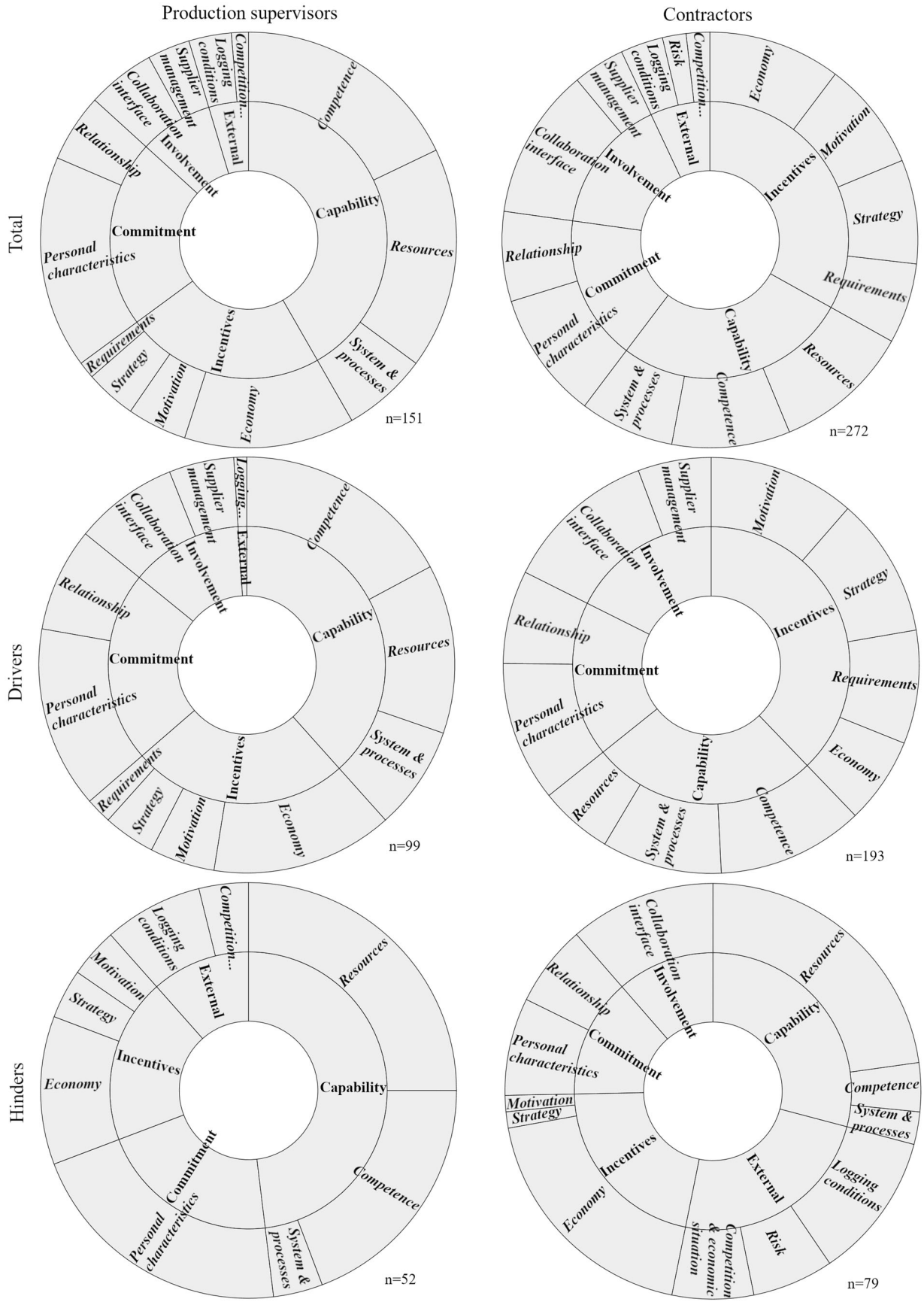

Figure 2. The proportions of the themes and factors within examples given (*n*) by the production supervisors and contractors, organized as total instances of cases in which the theme/affecting factor was mentioned as an obstacle or driver. The themes and factors are sorted according to frequency, with the theme that was mentioned most often at the top of each circle (frequency of mentions then progresses clockwise in descending order).

In general, the participants mentioned examples of how Capability, Incentives, Commitment and Involvement are drivers of performance more often than they provided examples of how these themes are obstacles to performance. The factors in the External theme were not mentioned very often, but both parties mainly considered these factors as obstacles to performance (Tables 3 and 4). Notably, *logging conditions*, that is, bad terrain and weather, were mentioned as a limitation to harvesting service performance. Both the production supervisors and contractors considered that *competition & economic situation* hindered contractor performance. The high demand for harvesting at the time of the study meant that the contractors did not need to compete heavily for harvesting contracts, yet they found difficulties finding employees from the small pool of skilled machine operators.

Resources, although often described as driver of strong performances, was the factor most often mentioned as an obstacle by both parties (Figure 2 and Tables 3 and 4). Both parties addressed the relative lack of machine operators as a concern, while contractors also mentioned the lack of financial capital as an obstacle. Contractor *competence* was another obstacle that was frequently mentioned by both production supervisors and contractors. Nevertheless, *competence* was mentioned both as a driver and an obstacle in these parties' explanations. This factor was the most common driver mentioned by the production supervisors, although this factor was also included in a relatively high share (37%) of examples concerning obstacles to contractor performance. The contractors, on the other hand, mostly mentioned *competence* in a positive light. A similar pattern was noted for *collaboration interface*, which was the most common factor mentioned by the contractors during discussions of performance results. Although this factor represented the driver most frequently given by contractors, it was also mentioned in a relatively high share (28%) of the examples of obstacles to performance provided by contractors. The production supervisors only mentioned *collaboration interface* when providing examples of what drives contractor performance. Both production supervisors and contractors only mentioned *requirements* and *supplier management* as drivers of performance. The production supervisors only considered the *relationship* factor in examples of what drives contractor performance, while some of the contractors also considered this factor as an obstacle to performance.

Drivers and obstacles across the different harvesting service value attributes

The frequencies at which affecting factors – as both a driver and obstacle – were mentioned varied across the different value attributes. As shown in Tables 3 and 4, the production supervisors' and contractors' perceptions of contractor performance showed discrepancies in how the identified factors affected contractor performance across the various value attributes. Even if a factor was commonly mentioned as a driver or obstacle to strong performance, it could have variable effects on performance across the various harvesting service value attributes. The most commonly mentioned factor affecting contractor performance, *resources*, was perceived to influence many value attributes. For example, the production supervisors often mentioned that a contractor's *resources* affect the delivery performance result (Table 3), while most contractors considered that their *resources* affect their performance result in operational quality. However, many contractors also mentioned that *resources* had impacted on their delivery performance result (Table 4).

The factor most often mentioned by the production supervisors, *competence*, was related to contractors' performance results in most of the value attributes. Most of the production supervisors' examples of how contractor competence influences performance were linked to stability (Table 3), with the same result holding true for the contractors' responses (Table 4). Interestingly, the production supervisors gave almost the same number of examples for how a contractor's *competence* can drive and hinder stability performance (Table 3). In contrast, the contractors mostly perceived their *competence* to drive stability performance (Table 4).

The contractors most often perceived *collaboration interface* to affect adaptability performance, while the production supervisors mentioned how this factor was linked to delivery, information, and development performance. Nevertheless, a considerable number of the interviewed contractors felt that *collaboration interface* affected their delivery, information, and development performances.

The production supervisors gave a few examples of factors that influence contractors' performance in value attributes connected to adaptability, although these value attributes (especially collaboration and flexibility) were more commonly mentioned in their perceptions of contractors' performance (Table 1). As shown in Table 3, all of these examples except for one described drivers for contractors' adaptability performance. In these descriptions, *relationship* was the most common factor associated with a contractor's adaptability performance. The one obstacle that the production supervisors mentioned for adaptability performance was a contractor's *personal characteristics*. As shown in Table 4, the contractors linked various factors to their performance in the adaptability value attributes. Similar to the production supervisors (Table 3), the contractors commonly mentioned the *relationship* factor as a driver for adaptability performance (Table 4). However, one contractor felt that the *relationship* factor could hinder a contractor's adaptability performance. The most common perceived obstacle to adaptability performance was *economy*, and this was especially relevant in the short-term time scale.

Certain drivers and obstacles to performance were more commonly mentioned than others in conjunction with the value attributes that were generally identified as contractor weaknesses (Tables 1, 3 and 4). For instance, the production supervisors commonly mentioned that *competence* and *system & processes* positively influence independence, while *personal characteristics* were negatively linked to this value attribute. Some of the contractors considered that strong performance in the independence value attribute positively affected the *economy* factor, whereas *resources* and *personal characteristics* were mainly perceived to hinder independence.

The *economy* factor was commonly mentioned as both a driver and obstacle of many value attributes (Tables 3 and 4). Both parties most often mentioned that a contractor's delivery performance was driven by the *economy* factor, that is, by direct economic gains. Furthermore, the most common obstacle to operational quality performance – as identified by both parties – was the *economy* factor (i.e. lack of economic incentives).

Discussion

This study identified various drivers and obstacles to contractors' harvesting service performance and organized them in themes according to a theoretical framework. The results confirm that harvesting service performance is a complex, multifactorial metric. Harvesting services comprise many value attributes and – for this reason – it is difficult to compare the performances of different contractors since their performance across different value attributes can vary widely. Moreover, the results revealed that performance in these attributes is affected by many different factors. As multiple factors were commonly found to influence the performance in each value attribute, it is likely that interactions between factors exist, which will subsequently impact contractor performance in the different attributes.

Based on the production supervisor and contractor interviews, many of the factors could exert either a driving or hindering effect on performance, with the effect differing between value attributes. The production supervisors and contractors in this study generally had similar views about how various factors affect performance. Examples include the drivers behind operational quality, delivery, adaptability and stability, and obstacles to operational quality, development, and independence. There were, however, some notable differences in the parties' perspectives. The production supervisors and contractors had different perceptions about the drivers for development, independence and information quality, and obstacles to delivery, adaptability, stability and information quality. This shows that contractors and the customer can agree about what drives performance in a certain value attribute but can disagree about what hinders this performance and vice versa. Notable differences were observed for the parties' perceptions of contractor *competence*. The contractors mainly talked about the relationship between *competence* and certain value attributes in a positive light, while the production supervisors provided examples describing both positive and negative effects of contractor *competence* on performance. An opposite trend was observed for the *relationship* and *collaboration interface* factors. For both of these factors, the production supervisors provided examples about how their *relationship* and *collaboration interface* with the contractors positively influences performance. On the other hand, the contractors mentioned that these two factors are drivers of performance, yet also provided examples in which the *relationship* and *collaboration interface* with the customer had hindered their performance. Thus, the results indicate that it is easier for both parties to identify obstacles to performance in the other party than in themselves.

The categorizations of the factors revealed that harvesting service performance could be considered to be driven and hindered through a mixture of five themes. The theoretical framework including these themes, along with the factors that were identified to affect performance through its application, are discussed in more detail below.

Capability

The results indicate that a contractor's capability is crucial to harvesting service performance. The interviewed participants mentioned various factors when discussing Capability. The participants identified three main factors – *resources*, *competence,* and *systems & processes* – to influence Capability.

In line with RBV thinking (Wernerfelt 1984; Barney 1986; Grant 1991), the results of this study indicate that both production supervisors and contractors consider *resources* and *competence* to be key factors in harvesting service performance. In this study, the *resources* factor included both physical and non-physical resources, in line with the description by Grant (1991). *Competence*, on the other hand, is an example of a non-physical resource. This study separates the contractor's own competence from the competence of their employees. Thus, employee competence is included in the *resources* factor instead of the *competence* factor, which exclusively reflects the contractor's own competence. A lack of skilled machine operators was the most common obstacle that the participants mentioned when discussing the *resources* factor. Finding skilled machine operators has also been identified as a challenge for contractors in other European countries (Kronholm et al. 2019), especially for small contractors (Jylhä et al. 2020).

When considering *competence,* the contractor's leadership skills may improve the competence of the machine operator over time. Leadership skills were often identified by the production supervisors as a reason for the positive performance results of larger contractor companies, whereas an excessive focus on operational parts was provided as a reason for why some companies performed poorly. In contrast, the production supervisors' opinions changed when they discussed smaller contractors, as strong operational skills (e.g. handling of machines) were mentioned to positively influence performance but leadership skills were seldom mentioned. – To some extent, this may be explained by the nature of the work. Larger contractors have more employees operating the machines and, as such, will take on a clear management role (both internally and externally), with more time spent on managing the company rather than operating the machines (Jylhä et al. 2020). This does not mean that smaller contractors do not need leadership skills, but rather that the importance of leadership skills may increase successively with the size of the organization. Both contractors and customers should therefore benefit from assess the contractor's leadership and operational skills, as both of these factors are relevant to the sustainability of the business. However, the suggestion that required contractor skills depend on organization size should be investigated further. For example, future research could investigate how contractors develop and leverage

different skills according to available business opportunities and how these decisions have consequences on their performance.

Incentives

The results indicated that pricing models affect contractor performance, especially since the *economy* factor was clearly mentioned to drive some value attributes and hinder others. On the other hand, contractors can be satisfied with low profitability (Erlandsson and Fjeld 2017) and may not be primarily motivated by economic incentives (Drolet and LeBel 2010). Accordingly, the contractors interviewed in this study more commonly mentioned the *motivation*, *strategy* and *requirement* factors to drive their performance, while economic incentives were more commonly mentioned to hinder performance. This was especially relevant for adaptability performance, as all respondents positively assessed the performance of most contractors in this theme. The most common obstacle that contractors mentioned when discussing their adaptability performance was the lack of economic incentives.

Commitment

In line with the theory that successful contractors are committed to their customer organizations (Porter et al. 1974; Norin and Thorsén 1998; Eriksson et al. 2017), the results of this study indicated that contractors' *personal characteristics* and *relationship* with the customer were perceive to affect harvesting service performance. Based on their discussions of *personal characteristics*, it seems as though the productions supervisors consider that contractor commitment mostly relies on the actions of the contractors. Notably, operational quality was mentioned to be driven by contractors' *personal characteristics*, that is, high enthusiasm and pride in performance. The contractors confirmed that *personal characteristics* drive operational quality performance, as they often described their own pride at performing well in these attributes. The *relationship* was also mentioned by both parties, but to a significantly higher degree by the contractors. The *relationship* factor seemed to be a common driver of the strong performance reported for adaptability. Many contractors were described to be adept at activities related to adaptability, which indicates a strong commitment to the *relationship*. Individuals tend to make more of an effort if they are committed to the task (Porter et al. 1974; Morgan and Hunt 1994; Gilliland and Bello 2002); hence, it can be expected that contractors will make more of an effort for customers they are committed to. In discussions linked to the relationship factor, many production supervisors and contractors mentioned a mutual trust between the parties as a driver of performance, with this characteristic especially mentioned for the adaptability value attribute. The contractors commonly experienced that their efforts in adaptability will improve the long-term *relationship* with the customer, which indicated a high level of trust in the customer. On the other hand, some contractors mentioned that their *relationship* with the customer could hinder their performance in development and independence. Since the development and independence performances of many contractors were identified as weaknesses by the production supervisors, it may be fruitful for both parties to reconsider the contractors' commitment to the customer's organization in order to improve development and independence.. Historically, the customers of harvesting service have taken the responsibility for development (Ager 2014). Hence, when customers start to require that contractors are responsible for improving their development and independence efforts, it may take time before contractors are committed to these activities in terms of *personal characteristics* and *relationship* with the customer.

Involvement

The results indicates that the performance of contractors is often perceived to be affected by the *collaboration interface* with the customer and other collaboration parties. The *collaboration interface* was perceived to drive adaptability because the *collaboration interface* was key to interacting with customers who were not acting and/or communicating as they should. For instance, work order information of insufficient quality or that was delivered just before harvesting execution was perceived to drive contractors' adaptability performance but hinder their delivery performance, which instead was driven by the *economy* factor. This provides more support to earlier studies' identification of timely and reliable work order information as important for contractor profitability and satisfaction as well as for customer satisfaction (Erlandsson et al. 2017; Gustafsson 2017).

On the other hand, many contractors witnessed the driving effects of *collaboration interface* because they received help and guidance from the customer and other parties when they asked for it. Both production supervisors and contractors expressed that a contractor's decision to use their contacts and business partners for help and advice supported their performance. This perceptions of the driving effects of collaboration interface indicates that contractors can improve their performance by effectively utilizing their network, which reflects what has previously been reported by Jack et al. (2004).

Both parties only discussed the supplier management factor as a driver of performance, and in numerous value attributes. This finding indicates that the production supervisor's leadership affects the contractor's performance and that both parties notice the driving effects of good leadership from the customer side.

External factors

Numerous factors that were mentioned as obstacles to contractor performance were neither connected to the contractor nor the customer. These factors included *logging conditions*, *competition & economic situation, and risk*. The external factors were predominantly perceived to hinder performance; however, one production supervisor considered that *logging conditions* were a driver for adaptability performance. This result indicates that the role of External factors is

easier to notice when they are hindering performance. The results concerning External factors are also in line with previously mentioned indications that both production supervisors and contractors more readily identified weaknesses in others than in themselves. Following this train of thought, the participants may have preferred to mention external obstacles rather than obstacles related to one of the business partners.

Stakeholders should be aware of External factors when assessing a business relationship. As some of these External factors occur seasonally (Uusitalo 2005), they can be – to some degree – considered in advance. Moreover, knowledge about External factors can be used to predict productivity and to steer the wood flow (Eriksson and Lindroos 2014).

Interactions between affecting factors

It is important to consider all of the factors investigated in this study from a multidimensional perspective in that each factor can influence how the other factors affect performance. For example, a contractor's Capability can affect their possibility to react to different Incentives. Thus, aligning Incentives with customer requirements, as discussed by Eriksson et al. (2015), may not have the expected effect if the contractor does not have the Capability to react. Nevertheless, Incentives may affect how contractors build their Capability for service performance. For example, Benjaminsson et al. (2019) argue that customer demands, as well as how they pay for the service, affect a contractor's business model, and thus, Capability. On the other hand, this study indicates that certain contractors occupy unique niches on the market based on their decision – conscious or not – to specifically focus on certain value attributes. However, the identified perceptions still show that the customer affects the contractors business model. *Supplier management* efforts can also affect a contractor's Capability; for instance, the production supervisor may actively engage and give feedback to a contractor in order to improve their performance. Thus, Involvement from customers and other partners affects a contractor's Capability, which, in turn, affects service performance. The reverse can also be true, as existing Capability will influence the need for Involvement from customers and other partners to drive performance. In the context of Swedish forestry, the customers are often described to have a dominant position in the forest company–contractor relationship. For this reason, the customer is also interested in improving the contractor's Capability as this will influence the customer's ability to secure a long-term supply of wood (Benjaminsson et al. 2019). The intensity of these efforts may well be related to contractor Capability, as the company will need to invest more resources into contractors with poor Capability than contractors with a high level of Capability. In contrast, a high degree of customer involvement in the contractor business models has been argued to decrease innovation in contractor organizations (Mattila et al. 2013; Benjaminsson et al. 2019).

The degree of Commitment to service performance can be argued to be affected by Incentives and Involvement from other parties. For instance, different Incentives provided by the customer can affect the *Relationship* between the parties and the contractor's *Personal characteristics* in terms of willingness, care and interest in the performance of different value attributes. This is relevant because Swedish harvesting service contractors usually only have one or a few important customers. As such, the customer can leverage their dominant position in the business relationship to convince the contractor to act in a certain way (Eriksson et al. 2015). Since Commitment can be argued to influence how Involvement affects service performance, the customer must nevertheless be careful as to not disrupt the *relationship* too much (Maloni and Benton 2000). For instance, a contractor with a high level of trust and loyalty to the customer may be more receptive to improvements suggested by the customer than a contractor with lower levels of trust and loyalty. Thus, Involvement efforts can both harm and encourage Commitment to service performance. How the customer fulfills their part of the assignment, and the consequences of these actions, may affect Commitment over time.

Value attributes

The presented results indicate that contractors are a blend of professionals characterized by unique focuses on different value attributes. Some contractors perform strongly across many value attributes, while others perform strongly in a few. Regardless of whether the decision to focus on certain value attributes is conscious or not, this result indicates the existence of different niches and business models among contractors. Furthermore, even if a customer has not considered a certain value attribute, it may still be important for both parties' interests. In general, service companies that are one step ahead and provide unexpected beneficial values can reach excellent customer satisfaction and a better market position (Kano 1984), which should be true also for harvesting contractors.

The results of this study indicate that production supervisors may be satisfied with contractors due to strong adaptability performance even if they perform poorly in other value attributes compared to their competition. As was shown in this study, the production supervisors appreciate contractors who perform strongly in adaptability because they can make changes in short time to the work order. This indicates that customers will be satisfied by contractors that demonstrate high adaptability, that is, rapid problem-solving ability, regardless if the problem was caused by the customer or the contractor. Based on those observations, it seems that adaptability is one of the most important attributes for a contractor maintaining customer satisfaction and harvesting service operations in the long-term. On the other hand, Erlandsson and Fjeld (2017) report that reliable, on-time work order information increases the contractors' satisfaction.

Customer demand for harvesting services can vary extensively between months (Erlandsson and Fjeld 2017), and it is reasonable to assume that this applies to the contractors in this study. According to the participating customers, most of the contractors performed strongly in collaboration and flexibility. These two attributes have previously been identified as important aspects of harvesting service provision

(Mäkinen 1997; Eriksson et al. 2015; Erlandsson et al. 2017). The main explanations for why these attributes are important for all contractors to address is that the industry is affected by seasonal variation in weather conditions and wood demand (Uusitalo 2005), as well as uncertainties in harvesting service demand (Erlandsson 2013). Managers at forest companies apply different methods to provide contractors with an even workflow and stable income throughout the year. This includes working with contractors who own a fleet of flexible machines that can operate in both thinning and harvesting (Erlandsson 2013) and providing harvesting sites based on how the stand conditions influence productivity (Norin and Furness-Lindén 2008; Eriksson and Lindroos 2014). These adaptations to fluctuating harvesting demand throughout the year prove the importance of collaboration and flexibility in harvesting service provision.

Study limitations

The sampling process aimed at finding a sample of maximum variation and diversity of performances in the harvesting service to reach multiple perspectives within a limited sample, a common approach in qualitative research (Creswell and Poth 2016). The study was conducted as a case of the real-life context with one large forest company as customer and associated contractors as providers of harvesting service. Thus, this does not represent all customers' and service providers' perceptions, neither all production supervisors' and contractors' perspectives. Nevertheless, the study succeeded to reach a broad spectrum of examples with different perspectives of factors affecting the value attributes in harvesting service. In contrast to other studies based on surveys (Drolet and LeBel 2010; Erlandsson et al. 2017), the result of this study is built on in-depth interviews within a case study. The strength is that new perspectives can be explored when the participants can reflect upon their experiences, and the interviewer can contribute with follow-up questions for gaining further details and understanding. Therefore, despite the relatively small sample, the results widen the insights about the complexity behind successful harvesting service provision. However, due to the intrinsic features of qualitative research, it is important to keep in mind that the results are a range of case-specific examples of different perspectives built on a sample of 12 persons and may not represent all contexts or cases. Therefore, these insights and case-specific examples can be used as indications, rather than conclusive results when researchers and practitioners consider performance in harvesting service in similar contexts.

The results do not consider the weight and importance of each value attribute or affecting factor. Previous studies have shown harvesting service provision to be a complex, multifactorial process (Eriksson et al. 2015; Erlandsson and Fjeld 2017), and the framework applied in this case study was designed based on previously identified customer service values. These examples of customer values that are relevant to harvesting service provision were shown to all of the participants at an early stage of every interview. This decision was made to simplify the interview process and leave more time for the participants to reflect on the drivers and obstacles that influenced the various value attributes. Therefore, the harvesting service values mentioned by the participants can be expected to have been highly influenced by the given examples. However, new value attributes were also identified in the analysis. These values were not mentioned as often as the previously identified values. This does not mean that these new values are any less important than previously identified values since expressed importance is not necessarily equivalent to perceived importance. Furthermore, it is natural that some values are not mentioned because they are taken for granted or are considered completely necessary to customer satisfaction (Kano 1984). In other words, even if a value is important, it may not come to a participant's mind during the interview situation. Moreover, it may be even more difficult for a participant to identify additional value attributes when they are provided with a list of specific values associated with harvesting service provision. With regards to the ranking exercise, it may be difficult for the customer to reliably compare contractor performance across all of the value attributes. The results from the ranking of a contractor's performance across tangible and intangible values in relation to other contractors depend on how each participant weights the importance of various value attributes. Furthermore, even if the production supervisors work for the same company, it is possible that they have different perceptions of the relative importance of various value attributes. During the interviews, participants were asked to provide examples of value attributes other than the cost of harvesting services. Although the cost of harvesting services is an important attribute, the presented research tried to describe the wide array of value attributes relevant to harvesting services rather than quantify them in monetary terms. The selection process for participants was designed to maximize – with the available time and monetary resources – the possibility of obtaining as many distinct perspectives as possible by gathering participants from different districts and performance groups. The frequency at which certain value attributes, as well as drivers and obstacles to performance, were mentioned reflect the participants' opinions during the interview situation. As such, it is impossible to know if their responses would have been different in a less formal environment, or if they had been given a longer time to reflect on their answers, yet the applied methodology increased the likelihood of obtaining a wide spectrum of opinions.

In this study, the production supervisors evaluated the contractors' performances, which was contrasted to the contractors' evaluations of their own performances. Frequent discussions about and evaluations of performance is an essential part of the production supervisor–contractor business relationship. Nevertheless, some individuals may have considered the study's questions to be sensitive, and that it potentially could harm the business relationship between parties if the information could be linked to any participant. Thus, there is a risk for bias in the participants' answers if they had any doubts on the researchers' ethics. To minimize such risks, all participants were clearly informed about how the information they shared would be used and handled. However, it is impossible to know if all participants fully

trusted the researchers. Moreover, the methodology is intrinsically related to a certain risk of biased answers due to purposely or unpurposely dishonest participants. However, the consent process reduced that risk of bias and increased the probability that the participants shared their honest thoughts during the interviews.

Future research

Even though numerous approaches for handling variations in wood demand exist today, various parties of the timber supplier chain are still exposed to several risks and obstacles. For example, although forestry companies will try to provide contractors with an even work flow, there will be cases – due to myriad factors – in which contractors will have to change the scale of their operations temporarily to meet customer demand. Erlandsson and Fjeld (2017) argue that contractors have different sensitivities to workflow variations depending on expectations and company structure. This study identified that the *economy* factor can negatively affect Adaptability; therefore, the expectation that a contractor will show high Adaptability may adversely affect the contractor's profitability. For this reason, further investigation can be recommended on how contractors can develop their companies to be tolerant to a changing market environment. Moreover, further investigations are recommended on drivers and obstacles to these types of changes; for instance, what models customers use to purchase harvesting services and how adaptability can be promoted without jeopardizing contractor profitability and satisfaction.

Acknowledgements

The authors would like to thank all participants who took their time to be interviewed in this study.The authors would also like to thank the anonymous reviewers for their contructive suggestions on how to improve this article. This study was conducted as a part of the research school Bioeconomy-adapted forest management (BECFOR) and financed with support of Stora Enso AB.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Malin Johansson http://orcid.org/0000-0003-1156-4277
Ola Lindroos http://orcid.org/0000-0002-7112-4460

References

Ager B. 2014. Skogsarbetets humanisering och rationalisering från 1900 och framåt [The humanization and rationalization of forestry from 1900 and forward] [doctoral thesis]. Luleå University of Technology, Luleå, Sweden (in Swedish).

Barney JB. 1986. Strategic factor markets: expectations, luck, and business strategy. Manage Sci. 32(10):1231–1241. doi:10.1287/mnsc.32.10.1231.

Benjaminsson F, Kronholm T, Erlandsson E. 2019. A framework for characterizing business models applied by forestry service contractors. Scand J Forest Res. 34(8):779–788. doi:10.1080/02827581.2019.1623304.

Cacot E, Emeyriat R, Bouvet A, Helou TE. 2010. Tools and analysis of key success factors for mechanized forest contractors specializing in mechanized harvesting in the Aquitaine region. Proceedings of the FORMEC 2010; July 11–14 2010; Padova, Italy.

Creswell JW, Poth CN. 2016. Qualitative inquiry and research design: choosing among five approaches. Thousand Oaks, California: Sage Publications.

Drolet S, LeBel L. 2010. Forest harvesting entrepreneurs, perception of their business status and its influence on performance evaluation. Forest Policy Econ. 12(4):287–298. doi:10.1016/j.forpol.2009.11.004.

Eriksson M, LeBel L, Lindroos O. 2015. Management of outsourced forest harvesting operations for better customer-contractor alignment. Forest Pol Econ. 53:45–55. doi:10.1016/j.forpol.2015.01.002.

Eriksson M, LeBel L, Lindroos O. 2017. The effect of customer–contractor alignment in forest harvesting services on contractor profitability and the risk for relationship breakdown. Forests. 8:360. doi:10.3390/f8100360.

Eriksson M, Lindroos O. 2014. Productivity of harvesters and forwarders in CTL operations in northern Sweden based on large follow-up datasets. Int J Forest Eng. 25(3):179–200. doi:10.1080/14942119.2014.974309.

Erlandsson E. 2013. The impact of industrial context on procurement, management and development of harvesting services: a comparison of two Swedish Forest owners' associations. Forests. 4(4):1171–1198. doi:10.3390/f4041171.

Erlandsson E. 2016. The triad perspective on business models for wood harvesting-tailoring for service satisfaction within forest owners associations [doctoral thesis]. Acta Universitatis agriculturae Sueciae, 124.

Erlandsson E, Fjeld D. 2017. Impacts of service buyer management on contractor profitability and satisfaction – a Swedish case study. Int J Forest Eng. 28(3):148–156. doi:10.1080/14942119.2017.1367235.

Erlandsson E, Fjeld D, Lidestav G. 2017. Measuring quality perception and satisfaction for wood harvesting services with a triad perspective. Int J Forest Eng. 28(1):18–33. doi:10.1080/14942119.2017.1257304.

Falkner EM, Hiebl MRW. 2015. Risk management in SMEs: A systematic review of available evidence. J Risk Fin. 16(2):122–144. doi:10.1108/JRF-06-2014-0079.

Furness-Lindén A. 2008. Affärsutveckling i relationen stor kund/liten leverantör—Vad kan skogsbruket lära? [Business development: large customer-small supplier relations. what can forestry learn from the process?]. Skogforsk, Uppsala, Sweden (in Swedish).

Ghijisen PWT, Semeijn J, Ernstson S. 2010. Supplier satisfaction and commitment: The role of influence strategies and supplier development. J Purch Suppl Manage. 16(1):17–26.

Gilliland DI, Bello DC. 2002. Two sides to attitudinal commitment: The effect of calculative and loyalty commitment on enforcement mechanisms in distribution channels. J Acad Market Sci. 30:24–43. doi:10.1177/03079450094306.

Grant RM. 1991. The resource-based theory of competitive advantage: implications for strategy formulation. Calif Manage Rev. 33(3):114–135. doi:10.2307/41166664.

Grönroos C. 1997. Value-driven relational marketing: from products to resources and competencies. J Market Manage. 13(5):407–419. doi:10.1080/0267257X.1997.9964482.

Gustafsson Å. 2017. Assessing work order information quality in harvesting. Silva Fenn. 51(4):6989. doi:10.14214/sf.6989.

Häggström C, Kawasaki A, Lidestav G. 2013. Profiles of forestry contractors and development of the forestry-contracting sector in Sweden. Scand J Forest Res. 28(4):395–404. doi:10.1080/02827581.2012.738826.

Högnäs T. 2000. Towards supplier partnerships in timber harvesting and transportation. Vantaa: Metsähallitus.

Jack SL, Anderson AR. 2002. The effects of embeddedness on the entrepreneurial process. J Bus Venturing. 17:467–487. doi:10.1016/S0883-9026(01)00076-3.

Jack SL, Dodd SD, Anderson AR. 2004. Social structures and entrepreneurial networks: The strength of strong ties. Int J Entrepren Innov. 5(2):107–120. doi:10.5367/000000004773863264.

Jylhä P, Rikkonen P, Hamunen K. (2020). Size matters – an analysis of business models and the financial performance of Finnish wood-harvesting companies. Silva Fenn, 54(4). doi:10.14214/sf.10392

Kano N. 1984. Attractive quality and must-be quality. Hinshitsu. 14:39–48.
Kronholm T, Sosa A, Bowditch E, Pohlschneider S, Hamunen K, Rikkonen P. 2019. State of the art and development needs of forestry service contractors in the northern periphery and Arctic region. Helsinki: FOBIA, Natural Resources Institute Finland.
Lidén E. 1995. Forest machine contractors in Swedish industrial forestry – significance and conditions during 1986–1993 [doctoral thesis]. Swedish Universtity of Agricultural Sciences, Garpenberg, Sweden.
Mäkinen P. 1997. Success factors for forest machine entrepreneurs. J Forest Eng. 8(2):27–35..
Maloni MJ, Benton WC. 2000. Power influences in the supply chain. J Bus Logist. 21(1):42–73.
Mattila O, Toppinen A, Tervo M. 2013. Non-industrial private forestry service markets in a flux: results from a qualitative analysis on Finland. SmallScale Forest. 12:559–578. doi:10.1007/s11842-012-9231-1.
Morgan R, Hunt S. 1994. The commitment-trust theory of relationship marketing. J Market. 58(3):20–38. doi:10.1177/002224299405800302.
Norin K, Furness-Lindén A. 2008. Vägar till professionell upphandling av tjänster i skogsbruket—Erfarenheter, förslag och inspirationskälla [Ways to improve the procurement of services in forestry—experience, recommendations and inspiration]. Skogforsk, Uppsala, Sweden. (in Swedish).
Norin K, Karlsson A. 2010. Så arbetar en vinnare—Djupintervjuer med tio lönsamma skogsentreprenörer [What makes a winner? Searching interviews with 10 successful forestry contractor businesses]. Skogforsk, Uppsala, Sweden. (in Swedish).
Norin K, Thorsén Å. 1998. Skogsbrukets "bästa" entreprenadföretag – deras starka sidor och vad de vill förbättra [The top logging contractors – their strengths and aims]. Skogforsk Resultat, No. 9. Skogforsk, Uppsala, Sweden. (In Swedish with a summary in English).
Penttinen M, Rummukainen A, Mikkola J. 2011. Profitability, liquidity and solvency of wood harvesting contractors in Finland. Smallscale Forest. 10(2):211–229.
Porter LW, Steers RM, Mowday RT, Boulian PV. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. J Appl Psychol. 59(5):603–609. doi:10.1037/h0037335.
St-Jean E, LeBel L. 2012. The influence of decisional autonomy on performance and strategic choices – The case of subcontracting SMEs in logging operations. Global Perspectives on Sustainable Forest Management, IntechOpen, London, England, 59–74.
St-Jean E, LeBel L. 2014. The influence of start-up motivations on forest entrepreneurs' performance. J Small Business Entrepren. 27(4):392–405. doi:10.1080/08276331.2015.1088299.
Swedish Forest Agency. 2018. Forestry labour force in 2017. Jönköping: Swedish Official Statistics. Swedish Forest Agency.
Uusitalo J. 2005. A framework for CTL method-based wood procurement logistics. Int J Forest Eng. 16:37–46.
Van Weele AJ. 2009. Purchasing and supply chain management: analysis, strategy, planning and practice. Hampshire: Cengage Learning EMEA.
Wernerfelt B. 1984. A resource-based view of the firm. Strateg Manage J. 5 (2):171–180. doi:10.1002/smj.4250050207.