

## Article

# Family Forest Owners' Expectations and Perceptions of Service Quality in Timber Transactions in Sweden

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**Abstract:** In Sweden, 59% of the annual gross felling takes place in forests owned by family forest owners (FFOs). Forest companies conduct thousands of timber transactions with FFOs each year, and, most often, harvesting services are provided to them as part of the deal. Delivering services that meet the FFOs' expectations of quality is important for any organization that wants FFOs to be loyal suppliers. The objectives of this study are to clarify FFOs' service quality expectations in timber transactions, show how well forest companies meet these expectations, and identify factors that may influence FFOs' quality assessments. Data were collected through a survey sent out to 973 FFOs, with a response rate of 43% ( $n = 418$ ). The results show that, on average, FFOs perceived that the quality of the services delivered in relation to their latest timber transaction met their expectations on 2 out of 14 quality features: modern equipment (e.g., forest machines) and staff's courtesy towards the FFO. The study concludes that skilled and service-minded employees are highly important for maintaining good relationships with FFOs and that forest companies may have a lot to gain by improving communication and taking the interests of the FFOs into greater consideration.

**Keywords:** SERVQUAL; non-industrial private forest owners; customer relationship management; forestry services; satisfaction



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## 1. Introduction

In Sweden, the forest industry is of significant importance to the country's economy. In 2019, it employed 70,000 workers and exported products to a value of nearly 15 billion euros [1]. To supply the forest industry with raw materials, about 90 million cubic meters of wood is harvested domestically each year from the country's 23.6 million hectares (ha) of productive forestlands [2,3]. A few forest companies have their own forests that, to a varying extent, supply their mills with roundwood. However, a significant share of the timber supply comes from family forest owners (FFOs), who, in recent years, have been responsible for 59% of the annual harvesting volume [2]. This group consists of approximately 320,000 individuals, who, in total, own 48% of Sweden's woodlands [4].

The yearly harvesting volume has been rather stable for the last years, and it is reasonable to expect a high timber demand for the foreseeable future. The development of the bio-economy and the interest in switching to renewable resources will boost demand when new products are developed from wood materials [5]. However, there are indications that the timber buyers will have an increasingly challenging task to procure the volumes needed from FFOs. One reason is that FFOs seem to have become more active in the choice of timber buyer, which increases the competition between timber buyers on the market. Historically, tradition and local networks have guided Swedish FFOs' selection of a timber buyer; in the 1990s, it was still uncommon that they requested offers from different buyers before a timber sale [6]. When a change of timber buyer took place, it was often due to severe dissatisfaction with the previous deal. However, more recent market

analysis by Staal Wästerlund and Kronholm [7] showed that 50% of the studied forest owners had previously sold timber to other timber buyers than the one with whom they made their most recent timber transaction. Furthermore, nearly a fifth of the forest owners had requested price offers from several buyers before closing the deal.

Another aspect affecting the pre-conditions for timber procurement is that the FFOs' socio-demographic characteristics, ownership values, and management objectives have become more diverse. This increased diversity implies that for many FFOs, timber production and regular income from forestry is no longer the only or even the main objective that guides their forest management and harvesting decisions [6,8–18]. For example, Favada et al. [19] have shown that forest owners who put a high value on recreation or are indifferent to the management of their forests harvest less volume than self-employed and multi-objective owners do. Furthermore, Kuuluvainen et al. [20] have shown that female owners harvest less frequently and in total smaller volumes than male owners do, although the volume per single harvest was higher for females. Several other studies have also identified differences between male and female FFOs' management activities and attitudes, such as lower forest management activity and a stronger focus on non-economic values [12,21–25]. Since 38% of the Swedish FFOs are females [4], their management decisions may have a significant effect on the long-term availability of domestic timber. Finally, although Karppinen et al. [18] found that the demographic changes among forest owners, so far, have had a limited effect on the total timber volume in Finland, they identified that the number of FFOs that are active in the timber market had decreased.

At present, only a minor share of harvesting work (~10%) is performed by the FFOs themselves [26]. Instead, most of them buy this service from the timber buying company, which, in turn, often hires contractors to carry out the forest work. In most timber transactions, there is thus a two-way customer–supplier relationship between the FFO and the timber buyer. In this paper, FFOs will be studied in their role as customers. The FFOs' role as service customers can be expected to become more frequent as younger generations of owners will be more urban and have less knowledge and experience of practical forestry work [27]. The supply of services targeted towards FFOs is also increasing as forest companies develop new types of services in order to meet the increasingly diverse needs among FFOs [28,29]. For example, some organizations have developed training packages with the aim to stimulate FFOs to manage their forests actively, which, from the company perspective, is important for future timber supply [30]. By offering services other than harvesting, they also strive to build a stronger commitment between the organization and the FFOs (e.g., through more frequent interaction between timber deals). However, this requires that the provided services are perceived to be of good quality since the FFOs' level of satisfaction will affect their commitment and loyalty to the service provider [31,32]. Therefore, service quality is a key issue for any company in its recruitment and retention of customers and for its long-term profitability [33,34].

To our knowledge, few researchers have, so far, investigated FFOs' expectations and perceptions of service quality in timber transactions. There is, thus, limited knowledge about the quality standards by which FFOs evaluate the services they buy and what requirements companies need to fulfill in order to have satisfied customers. Increasing this field of knowledge would contribute to the industry's service development processes by helping managers to focus company resources on those aspects of service design and delivery that matter the most for customers. Furthermore, this could also aid the forest companies in changing their mindsets from a goods-dominant logic into a service-dominant logic, which according to Mattila et al. [29], has been difficult for traditional forest companies. Therefore, the objectives of this study are to clarify FFOs' service quality expectations in timber transactions, show how well forest companies meet these expectations, and identify factors that may influence FFOs' quality assessments.

### *Theoretical Framework*

The study takes its stance on service quality from the conceptual model developed by Parasuraman et al. [35], which defines service quality as the gap between the consumer's expectations of a service and the perception of the service delivered by the service provider. In other words, a positive gap occurs when expectations are exceeded, and, contrarily, a negative gap occurs if expectations are not met. Thereby, the size and direction of this gap will indicate the perceived quality of the service.

Service quality is related to the concept of satisfaction as both factors build on the expectancy/disconfirmation paradigm [34]. A difference between the two concepts is, according to Parasuraman et al. [36] (p. 16), that "*perceived service quality is a global judgment or attitude relating to superiority of the service, whereas satisfaction is related to a specific transaction*". This notion also has implications for how expectations have been conceptualized in the two streams of research. In consumer satisfaction literature, expectations are viewed as the consumer's predictions of what a service provider will offer during the transaction [36]. In service quality literature, expectations are instead considered to be normative and represent standards that service providers constantly must strive to deliver [34]. In this sense, they are also more stable.

The expectations consumers hold are affected by personal elements such as their past experiences, word-of-mouth communications (e.g., friends recommending the service), and personal needs, as well as external communication from the service provider (e.g., advertisements, homepages, newspaper articles). How the consumer perceives the service received is also affected by the firm's communication effort as well as the actual delivery process, including contacts before and after the time of consumption [35]. As noted by Grönroos [37], service consumption is, thus, the consumption of processes, whereas consumption of goods is the consumption of outcomes. In turn, how well the service delivery works from the consumer perspective depends on the firms' understanding of the customers' expectations and their ability to design their services to meet these expectations [35].

In their empirical investigations, Parasuraman et al. [35,36] found that the criteria used by consumers to evaluate service quality were within five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Tangibles include physical objects such as company buildings, staff uniforms, brochures, tools, and equipment. Reliability concerns the company's ability to perform the service as promised. Responsiveness deals with the company's ability and willingness to help the customer and, for example, respond to e-mail or phone calls without delays. Assurance concerns the behavior of personnel and the company's ability to provide the customer with a feeling of safety in the relationship. Finally, empathy includes the company's understanding of the customer's personal needs and the company's willingness to take these into consideration.

## **2. Materials and Methods**

### **2.1. SERVQUAL**

The SERVQUAL instrument, developed by Parasuraman et al. [36], is used for measuring FFOs' expectations and perceptions of service quality. This is an instrument that, after its introduction, has been extensively used in various kinds of service industries. The original instrument consists of a questionnaire with 22 statements covering five service quality dimensions: tangibles (4 items), reliability (5 items), responsiveness (4 items), assurance (4 items), and empathy (5 items). According to Zeithaml et al. [38], the instrument offers a skeleton that can be adapted to fit specific research needs or certain company characteristics. For this study, the statements in the questionnaire were modified to fit the context of forestry services in Sweden. Some of the statements were omitted since they were deemed less relevant in this specific context. Therefore, the questionnaire used in this study contained 14 statements (two for the tangibles dimension and three for each of the other four dimensions), presented in Table 1. These statements were presented in two ways: first, to capture FFOs' expectations and, thereafter, their perceptions of the delivered

service. Therefore, respondents first stated to what extent (on a scale from 1 to 7) they agree that an excellent service provider should be characterized by the feature described by the statement. Thereby, their expectations were captured. In the next part of the questionnaire, the same statements were presented to the respondent, but, this time, they were formulated to capture their perceptions of the service provided by a specific company [36]. In this case, the respondents were instructed to consider the forest company with whom they conducted their most recent timber transaction. For practical reasons, the words ‘forest company’ were used for all types of timber buyers. This was explained to the FFOs in the questionnaire’s cover letter.

**Table 1.** Statements used to study forest owners’ expectations and perceptions of service quality. Respondents ranked the statements on a scale of 1 to 7.

| Dimension      | Expectation Statement  | Perception Statement  | Feature Label         |
|----------------|--|---|-----------------------|
| Tangibles      | Excellent forest companies have access to modern equipment   | The forest company conducting the harvest has access to modern equipment                                      | Equipment             |
|                | Materials produced by the company (e.g., brochures, notices) are clear and informative                     | Materials produced by the company (e.g., brochures, notices) conducting the harvest are clear and informative | Materials             |
| Reliability    | When a forest owner has a problem, excellent forest companies show a sincere interest to solve it          | The forest company conducting the harvest shows a sincere interest in solving problems                        | Problem-solving       |
|                | Excellent forest companies deliver services on time/when promised  | The forest company conducts the service in time/when promised   | Timely delivery       |
|                | Excellent forest companies are careful to be error-free/not to make mistakes                               | The forest company is careful to be error-free/not to make mistakes   | Flawlessness          |
| Responsiveness | Employees of excellent forest companies will tell the forest owner precisely when the harvest will be done | Employees of the forest company will tell precisely when the harvest will be done                             | Precise communication |
|                | Employees of excellent forest companies provide quick service to the forest owner                          | Employees of the forest company provide quick service   | Service quickness     |
|                | Employees of excellent forest companies have a great willingness to help the forest owner                  | Employees of the forest company have a great willingness to help you  | Helpfulness           |
| Assurance      | With excellent forest companies, the forest owner can feel secure with his/her deals                       | You feel safe with your deal  | Security              |
|                | Employees of excellent forest companies are consistently kind to the forest owner                          | Employees of the forest company are consistently kind to you  | Courtesy              |
|                | Employees of excellent forest companies have the proper knowledge to answer the forest owner’s questions   | Employees of the forest company have the proper knowledge to answer your questions                            | Knowledge             |
| Empathy        | At excellent forest companies, I can carry out my errands when it suits me                                 | You can carry out your errands when it suits you  | Accessibility         |
|                | Excellent forest companies have the forest owner’s interests in focus                                      | The forest company has your interests in focus  | Customer focus        |
|                | Employees of excellent forest companies understand the forest owner’s specific needs                       | Employees of the forest company understand your specific needs.   | Customer knowledge    |

## 2.2. Sample

The sampling process was administered by the Swedish Forest Agency based on instructions provided by the authors. A random sample was taken of all FFOs who, in 2011, had made a notification that they intended to do a final-felling on their property. The notification is mandatory for all final-fellings that cover areas larger than 0.5 ha. In many cases, the timber buyers help FFOs with this administrative task and hand in the notification on their behalf. Thus, by restricting the sample to those notifications that had been handed in by a representative on behalf of an individual owner, it was ensured that the FFOs would have a business relationship with a timber buyer and, thereby, be able to answer questions about service quality. The selected sample consisted of 973 FFOs, of which 79% were males and 21% were females. The information collected from the register

included the FFO's name, address, and personal identification number and for which forest property the notification was made. Information about the representative that had made the notification was also collected in order to identify with which organization the FFO had made their timber transaction.

### 2.3. Data Collection

The questionnaire used for data collection consisted of five sections containing 60 questions in total. Sections I and II contained the SERVQUAL instrument described above (Table 1), for which respondents replied to the statements on a scale from 1 (not important) to 7 (absolutely necessary). In Section III, the respondents were asked seven questions about their contacts with the timber buying organization. Section IV contained 17 questions about the FFOs' business relationship with the timber buying organization, and this analysis is out of the scope of this paper. In Section V, the respondents were asked eight questions about their socio-demographic and forest ownership characteristics, including age, sex, level of education, sole or joint ownership of the forest property, length of ownership, residency, membership in forest owners' associations, and if they had a monetary loan connected to the property.

The data for this study were collected between November 2012 and February 2013. The questionnaire was sent out by traditional mail, and the respondents were provided with an envelope that allowed them to return the completed questionnaire free of charge. After sending one reminder, the data collection ended with a response rate of 43% ( $n = 418$ ).

### 2.4. Analysis

A service quality (or SERVQUAL) score, representing the gap between the individual FFO's expectations and perceptions, was calculated for all FFOs on each of the 14 service quality features. This was done by subtracting the expectation score from the perception score [38]. Thereafter, a service quality score for each service quality dimension was calculated as the average of its constituent features. The Cronbach's alpha coefficient was used to assess data consistency. It was 0.58 for tangibles, 0.80 for reliability, 0.84 for responsiveness, 0.79 for assurance, and 0.84 for empathy. This value should preferably be  $>0.7$ , and, thus, all dimensions except tangibles had good internal consistency. However, since the tangibles dimension included only two items, it is also appropriate to check the mean inter-item correlation [39]. For tangibles, it was 0.41, which is almost within the 0.2–0.4 range considered optimal by Briggs and Cheek [40]. Therefore, the tangibles dimension was also considered appropriate to include in the analysis.

Relationships between the FFOs' socio-demographic and forest ownership characteristics and their service quality scores were then investigated using *t*-tests, analysis of variance (ANOVA), and correlation.

## 3. Results

### 3.1. Description of Respondents

The respondents' average age was 60.7 years, and 83% of them were males. This implies that male FFOs were slightly more inclined to complete the questionnaire as their share of the sample was 79%. The majority of FFOs (61%) were single owners of the forest property. Some 77% of the respondents had owned the forest for more than 10 years, while 10% had owned it for less than 5 years and the rest between 5 to 10 years. The vast majority (79%) lived in the same municipality as their forest property was located. Concerning the level of their education, respondents were evenly distributed between basic education (32%), upper secondary school (35%), and university/college (33%). The share of respondents with a monetary loan connected to the property was 51%. The majority (59%) were members of a forest owners' association. In connection to their last timber deal, the respondents had, on average, been in contact with the timber buyer 4.5 times. However, those who had reported problems were found to have significantly more contact ( $p = 0.005$ ). For this group, the average number of times of contact was 5.9, while it was 4.0 for those

who had not experienced any problem. Some 25% of the respondents had experienced some kind of problem in connection to their latest timber deal.

### 3.2. Overall Expectations and Perceptions of Service Quality

The service quality features with the highest expectations among FFOs were security, problem solving, knowledge, helpfulness, and flawlessness (Table 2). However, most features were found to have fairly high expectations, with scores ranging from 5.5 to 6.4. Accessibility, i.e., the possibility to carry out errands whenever it suited the FFO, was the feature with the lowest expectations. Notably, it was also the only feature that did not have a statistically significant gap between expectations and perception scores. Nonetheless, the features of equipment and courtesy, which had relatively low expectation scores, had the highest share of FFOs who had their expectations fulfilled (i.e., a service quality score  $\geq 0$ ). The highest share of dissatisfied FFOs was found for the features of precise communication and customer focus.

**Table 2.** FFOs' average expectation score, perception score, and service quality score for the 14 quality features. The proportion (%) of FFOs who had their expectations fulfilled (service quality score  $\geq 0$ ) is also shown for each quality feature. Paired sample *t*-tests showed significant differences between expectations and perception scores on all but one feature (\* indicates significance at  $p < 0.001$ ).

| Quality Feature         | Expectation Score |     | Perception Score |     | Service Quality Score | Share of FFOs with Fulfilled Expectations (%) |
|-------------------------|-------------------|-----|------------------|-----|-----------------------|---|
|                         | Avg.              | SD  | Avg.             | SD  |                       |   |
| Equipment *             | 5.8               | 1.4 | 6.1              | 1.1 | 0.3                   | 81  |
| Materials *             | 5.7               | 1.1 | 5.3              | 1.3 | −0.4                  | 64  |
| Problem-solving *       | 6.3               | 1.1 | 5.9              | 1.3 | −0.4                  | 64  |
| Timely delivery *       | 6.0               | 1.2 | 5.4              | 1.7 | −0.6                  | 61  |
| Flawlessness *          | 6.2               | 1.1 | 5.6              | 1.4 | −0.6                  | 61  |
| Precise communication * | 5.7               | 1.4 | 5.0              | 1.8 | −0.7                  | 55  |
| Service quickness *     | 5.9               | 1.2 | 5.5              | 1.4 | −0.4                  | 62  |
| Helpfulness *           | 6.2               | 1.1 | 5.8              | 1.4 | −0.3                  | 64  |
| Security *              | 6.4               | 1.1 | 6.0              | 1.4 | −0.4                  | 64  |
| Courtesy *              | 5.7               | 1.4 | 6.1              | 1.2 | 0.4                   | 86  |
| Knowledge *             | 6.2               | 1.1 | 5.9              | 1.3 | −0.3                  | 70  |
| Accessibility           | 5.5               | 1.3 | 5.6              | 1.4 | −0.1                  | 72  |
| Customer focus *        | 6.1               | 1.2 | 5.4              | 1.4 | −0.7                  | 57  |
| Customer knowledge *    | 6.1               | 1.2 | 5.7              | 1.4 | −0.4                  | 65  |

### 3.3. Tangibles

In relation to tangibles, it was found that FFOs who had made their timber transaction with a forest owners' association had a significantly lower service quality score than others for tangibles on the dimension level ( $-0.19$  vs.  $0.08$ ,  $p = 0.037$ ). However, although their average score was lower on both equipment and materials, they were not statistically significant when analyzed at the feature level. Furthermore, small but significant negative correlations were found between the number of times of contact the FFOs had with the company in connection to the transaction and their service quality scores for equipment ( $r = -0.108$ ,  $p = 0.043$ ), materials ( $r = -0.173$ ,  $p = 0.001$ ), and tangibles overall ( $r = -0.161$ ,  $p = 0.002$ ). Finally, as shown in Table 3, FFOs who had experienced problems in relation to their timber deal considered the service quality to be significantly lower compared to those without problems ( $p < 0.01$ ).

**Table 3.** Average service quality scores on equipment, materials, and the dimension tangibles for groups with and without problems during the timber deal. Differences between groups were significant on all three items ( $p < 0.01$ ).

| Problems with the Deal? | Equipment | Materials | Tangibles (Dimension) |
|-------------------------|-----------|-----------|-----------------------|
| No                      | 0.39      | −0.12     | 0.14                  |
| Yes                     | −0.10     | −0.69     | −0.42                 |

### 3.4. Reliability

A significant difference was found between FFOs with the lowest education level (elementary school) and those with upper secondary level education or university degrees concerning service quality on the feature of timely delivery ( $p = 0.012$ ). The first group had their expectations nearly fulfilled (−0.16), while the latter two groups had a somewhat larger gap between their expectations and perceptions (−0.71 and −0.80). In relation to timely delivery, there was also a tendency that the service quality score was higher among older FFOs, but the correlation was weak ( $r = 0.093$ ,  $p = 0.065$ ). Furthermore, there were significant negative correlations between the number of contacts and the service quality score on all three reliability features and on the dimension level (Table 4).

**Table 4.** Pearson correlation coefficients for the reliability dimension and its three features. All correlations are significant at the 0.01 level (2-tailed).

| Variable                   | Problem-Solving | Timely Delivery | Flawlessness | Reliability (Dimension) |
|----------------------------|-----------------|-----------------|--------------|-------------------------|
| Number of times of contact | −0.280          | −0.243          | −0.258       | −0.303                  |

FFOs who had experienced problems were also significantly more negative towards service quality than others on all features of reliability (Table 5). Finally, it was found that the FFOs who had initiated their timber deals through a tendering procedure were significantly more dissatisfied with the company's care to avoid errors (i.e., flawlessness) compared to those who had contacted the timber buyer directly ( $p = 0.027$ ). The average service quality scores for these two groups were −0.96 and −0.37, respectively.

**Table 5.** Average service quality score for groups with and without problems during the timber deal. Differences between groups are significant on all items ( $p < 0.01$ ).

| Problems with the Deal? | Problem-Solving | Timely Delivery | Flawlessness | Reliability (Dimension) |
|-------------------------|-----------------|-----------------|--------------|-------------------------|
| No                      | −0.09           | −0.22           | −0.22        | −0.18                   |
| Yes                     | −1.20           | −1.43           | −1.44        | −1.36                   |

### 3.5. Responsiveness

As shown in Table 6, female FFOs were found to be significantly more negative than males in relation to service speed ( $p = 0.027$ ), helpfulness ( $p = 0.006$ ), and responsiveness at the dimension level ( $p = 0.030$ ). There was also a tendency that they were more negative concerning the precision of communication ( $p = 0.078$ ).

**Table 6.** Average service quality score for males and females in relation to features of responsiveness. Differences between groups are significant ( $p < 0.05$ ) on all items except precise communication.

| Sex    | Precise Communication | Quick Service | Helpfulness | Responsiveness (Dimension) |
|--------|-----------------------|---------------|-------------|----------------------------|
| Male   | −0.65                 | −0.27         | −0.26       | −0.38                      |
| Female | −1.12                 | −0.85         | −0.79       | −0.92                      |

FFOs who had more often been in contact with the timber buyer were found to be more negative towards the quality of the company's responsiveness features than those with less contact. The strongest correlation was found in relation to their perception of the company's helpfulness (Table 7). In addition, those who had experienced problems in connection to the timber deal were found to be more negative on all features and on responsiveness in general ( $p < 0.01$ ); especially, the precision of communication was considered by this group to be well below expectations (Table 8).

**Table 7.** Pearson correlation coefficients for the reliability dimension and its three features. All correlations are significant at the 0.01 level (2-tailed).

| Variable           | Precise Communication | Quick Service | Helpfulness | Responsiveness (Dimension) |
|--------------------|-----------------------|---------------|-------------|----------------------------|
| Number of contacts | −0.201                | −0.190        | −0.274      | −0.249                     |

**Table 8.** Average service quality score for groups with and without problems during the timber deal. Differences between groups are significant on all items ( $p < 0.01$ ).

| Problems with the Deal? | Precise Communication | Quick Service | Helpfulness | Responsiveness (Dimension) |
|-------------------------|-----------------------|---------------|-------------|----------------------------|
| No                      | −0.37                 | −0.10         | −0.06       | −0.16                      |
| Yes                     | −1.69                 | −1.09         | −1.16       | −1.33                      |

FFOs' perception of service speed differed between those who had loans on their forestry property and those without, where those with loans had their expectations fulfilled to a larger extent ( $p = 0.019$ ). The service quality scores for these groups were  $-0.19$  and  $-0.57$ , respectively. Another identified difference was that FFOs who had previously done timber deals with other companies were significantly more satisfied with the helpfulness of the current company compared to those who had not traded with other timber buyers before ( $p = 0.027$ ). However, with the average scores being  $-0.18$  and  $-0.50$ , the difference was still relatively small. Finally, there was a tendency that those who had traded with a forest owners' association were more dissatisfied with communication than those who had traded with other types of forest companies ( $p = 0.088$ ). The groups' average scores for this feature were  $-0.59$  and  $-0.94$ , respectively.

### 3.6. Assurance

In relation to the assurance dimension and its underlying features, members of forest owners' associations were found to be less satisfied than other FFOs (Table 9). The difference between the groups was statistically significant for courtesy ( $p = 0.025$ ) and the overall score for the dimension feature ( $p = 0.025$ ), while there was a negative tendency for the knowledge ( $p = 0.079$ ) and security features ( $p = 0.072$ ). However, no significant differences were found for these assurance features between the FFOs who had made their timber deal with an association and those who did not.

**Table 9.** Average service quality score for members and non-members of forest owners' associations. Differences between groups are significant for courtesy and assurance (dimension) ( $p < 0.05$ ).

| Member of Forest Owners' Association | Security | Courtesy | Knowledge | Assurance (Dimension) |
|--------------------------------------|----------|----------|-----------|-----------------------|
| No                                   | −0.29    | 0.58     | −0.10     | −0.06                 |
| Yes                                  | −0.55    | 0.24     | −0.35     | −0.21                 |

A negative correlation was found between the number of timber deals the FFOs' had previously conducted and their rating of the courtesy shown by the current timber buyer ( $r = -0.118$ ,  $p = 0.027$ ). Further, there was a strong tendency that FFOs who had previously

dealt with other companies rated security lower than others ( $p = 0.055$ ). Their scores were  $-0.59$  and  $-0.31$ , respectively. This was also the case for the assurance dimension overall, for which the average service quality scores were  $-0.21$  and  $-0.01$  ( $p = 0.068$ ). FFOs who had experienced problems were again found to perceive the quality of service to be significantly lower ( $p < 0.01$ ), as shown in Table 10, and, again, there were significant negative correlations between the number of times of contact with the timber buyer and the service quality scores (Table 11). Finally, there was a tendency that FFOs ranked the knowledge feature differently depending on how they had initiated the deal ( $p = 0.064$ ). On this feature, the FFOs who had contacted the timber buyer directly had an average score of  $-0.12$ , while those who practiced tendering had an average of  $-0.53$ . The same groups also tended to differ in their perception of security, for which the average scores were  $-0.33$  and  $-0.80$ , respectively ( $p = 0.099$ ).

**Table 10.** Average service quality score for groups with and without problems during the timber deal. Differences between groups are significant on all items ( $p < 0.01$ ).

| Problems with the Deal? | Security | Courtesy | Knowledge | Assurance (Dimension) |
|-------------------------|----------|----------|-----------|-----------------------|
| No                      | $-0.14$  | $0.54$   | $0.01$    | $0.14$                |
| Yes                     | $-1.34$  | $-0.05$  | $-1.00$   | $-0.79$               |

**Table 11.** Pearson correlation coefficients for the reliability dimension and its three features. All correlations are significant at the 0.01 level (2-tailed).

| Variable           | Security | Courtesy | Knowledge | Assurance (Dimension) |
|--------------------|----------|----------|-----------|-----------------------|
| Number of contacts | $-0.336$ | $-0.214$ | $-0.296$  | $-0.335$              |

### 3.7. Empathy

In relation to the features of empathy, a significant negative correlation was found between an increasing number of timber deals and the perceived quality of accessibility ( $r = -0.131$ ,  $p = 0.015$ ). It was found that those who had contacted the timber buyer directly were more satisfied with the company's customer focus than those who had made their transactions after tendering ( $p = 0.002$ ). The groups' average service quality scores on this feature were  $-0.49$  and  $-1.25$ , respectively. Further, a similar difference between the two groups was also significant on the empathy dimension level, again with tendering FFOs being more dissatisfied ( $-0.18$  vs.  $-0.76$ ,  $p = 0.008$ ). Like on previous features, it was found that those who had a higher number of contacts with the company were also more dissatisfied (Table 12). Likewise, those who had experienced problems were found to rank the quality of service significantly lower on all aspects of the empathy dimension compared to those without problems ( $p < 0.01$ ). Customer focus was the feature with the largest gap between expected and delivered service quality (Table 13).

**Table 12.** Pearson correlation coefficients for the reliability dimension and its three features. All correlations are significant at the 0.01 level (2-tailed).

| Variable           | Accessibility | Customer Focus | Customer Knowledge | Empathy (Dimension) |
|--------------------|---------------|----------------|--------------------|---------------------|
| Number of contacts | $-0.220$      | $-0.285$       | $-0.250$           | $-0.299$            |

**Table 13.** Average service quality score for groups with and without problems during the timber deal. Differences between groups are significant on all items ( $p < 0.01$ ).

| Problems with the Deal? | Accessibility | Customer Focus | Customer Knowledge | Empathy (Dimension) |
|-------------------------|---------------|----------------|--------------------|---------------------|
| No                      | 0.22          | −0.37          | −0.10              | −0.07               |
| Yes                     | −0.48         | −1.51          | −1.14              | −1.03               |

#### 4. Discussion

This study investigated FFOs' expectations and the perceived performance of timber buyers' service quality using an adapted version of the SERVQUAL instrument, which measures service quality as the gap between expectations and perceived performance. Kärhä and Oinas [31] have used a similar method to measure FFOs' satisfaction with timber buyers, which also shows the close relationship between the two concepts [34,36]. However, in contrast to Kärhä and Oinas [31], this study did not investigate factors directly related to the logging operations (e.g., stump heights and forest damages) since only features included in the SERVQUAL framework were considered. However, the outcomes of the logging operations are also likely to affect FFOs' perceptions of these quality dimensions.

The results show that FFOs, in general, have high expectations of their service providers and that, in many cases, it is challenging for the forest companies to meet or even exceed them in their service delivery. Only in four of the studied quality features were the share of forest owners with fulfilled expectations  $\geq 70\%$ , and, in three of those, the expectations were lower than on many other features. Interestingly, the FFOs' expectations were highest on intangible features related to the dimensions of assurance, responsiveness, and reliability. In particular, they had high expectations of the timber buyers solving their problems, having proper knowledge, being helpful, and providing a feeling of security during the transaction. In contrast, tangible features such as equipment and materials were considered less important. For FFOs, the result of the harvesting work is usually the most important aspect [41], which indicates that it is more important for forest companies to have machines that are suitable for the specific task rather than always having the most modern ones. It should also be taken into account that many FFOs might not even see the equipment used by the forest company if they do not have the possibility to visit the forest while the forest operations are in progress. However, it is important to note that the question referred to equipment in general and not only forest machines.

Based on the results of this study, forest companies should consider how they can improve their communication with FFOs since the precision of communication was the feature with the lowest service quality score, followed by information materials. Furthermore, although FFOs had relatively low expectations of these two features, many of them did not get their expectations fulfilled. That FFOs perceive communication to be poor is not a new phenomenon. Two decades ago, Kärhä and Tammiruusu [42] identified that slow information flows and limited contact between FFOs and timber buyers led to dissatisfaction. Indeed, Kärhä et al. [43] have recently shown that FFOs still request more information and better feedback. This concerns, for example, the results of the logging operations, the silvicultural conditions of the remaining stand, and future harvesting possibilities. Furthermore, the type of information that is demanded differs between groups, which calls for a more customer-oriented approach. However, as shown in this present study, customer focus was also a service quality feature in which forest companies' service performance was perceived to be relatively poor. Like Kärhä et al. [43] point out, forest companies could possibly improve their performance in this area by developing new information services in relation to timber transactions that, to a greater extent, take into account the different needs of various groups of FFOs. It is somewhat surprising that the development of technological support services to FFOs has not gone further. In the future, the demand for more information may also continue to grow as younger generations have been found to have a greater desire and need for information since they often are less familiar with forestry

compared to previous owners [30,44]. To aid this development, future research could focus on how to utilize the large amount of data produced by modern logging machines in the development of new types of information services to FFOs.

Only a few differences were found between FFOs, depending on their characteristics, but one that is interesting to pay attention to is that female owners perceive timber buyers' responsiveness to be of lower quality than males do, especially in what concerns communication, which ranked far below their expectations, especially concerning the preciseness of communication, which was far below their expectations. Thus, timber buyers may need to reconsider their approach towards female FFOs, and they should take into consideration that female FFOs, in general, conduct timber deals less frequently than males [20]. Furthermore, this is a group that often has less experience in practical forestry and also feels more insecure in their role as foresters [21], which may affect their service needs.

A recurring finding on all service quality dimensions was that FFOs who had experienced problems in connection to their timber deals perceived the quality of service to be lower than those who did not have any problems. Common problems experienced by FFOs in relation to timber transactions are forest damage caused by the logging operations and lower revenues due to unfavorable bucking of the harvested trees [7,31]. The FFOs who experienced problems also had significantly more contact time with the timber buyer, which is logical, considering that the problems need to be discussed and solved between the timber buyer and the FFO. This also explains why there were significant negative correlations between the number of times of contact and the perceptions of service quality. Avoiding mistakes is thus important for timber buyers as it leads to more work and dissatisfied timber suppliers. Besides economic reasons, dissatisfaction is the most common reason for FFOs to change timber buyers [6,7]. However, since problems always will occur in this type of business, it is important to have good procedures to handle them. In this study, 25% of the respondents had experienced problems, but how representative this figure is for the entire Swedish timber market is still unknown. In other words, whether or not FFOs with problems have been more inclined to participate in this survey is an open question. However, no differences were identified between respondents and non-respondents in terms of ownership attributes that could indicate that this was the case. Since Kindstrand [45] has noted that the views on forestry may differ between FFOs and professional foresters, it would also be interesting to know to what extent the timber buyers share the FFOs' perception of these situations as problems or failures.

The results also show that forest companies are not considered to be putting enough focus on the FFOs' interests since this was one of the quality features with the largest gap between expected quality and perceived service performance. The changing characteristics of FFOs also imply that the services need to be adapted to meet the needs of different types of owners. However, the forest companies have been found to be rather slow in their adaptation to this new market environment where more and more FFOs have diverse ownership objectives and are not merely focused on timber production [28].

A limitation of this study is that some of the service quality dimensions were only measured on a couple of features, and, therefore, it will not give a complete understanding of service quality in timber transactions. Furthermore, to include only two features in the tangibles dimension decreased the reliability of this dimension, indicated by a lower Cronbach's alpha compared to the other dimensions that all included three items each. More studies are thus needed. This is partly to study additional quality features, but qualitative studies could also provide a deeper understanding of FFOs' expectations and perceptions of the features. For example, since the present study did not investigate the relative importance of each service quality dimension, future studies could ask FFOs to rank or weigh the service quality dimension, which could help forest companies to avoid spending more money than necessary on developing features with low influence on their overall satisfaction. Another approach to determine relative importance, suggested by Parasuraman et al. [36], would be to ask the respondents to give an overall service quality

perception score and then regress this to the dimension scores. Unfortunately, such a question was not included in the questionnaire used in this study.

It is important to note that the opinions expressed in this study may not be representative of all FFOs in Sweden but primarily for those who were active in the timber market when the study was conducted. The mean age of the FFOs who participated in the study was in line with the national average for all owners, but females were underrepresented compared to FFOs in general [4]. This could potentially be explained by male owners' higher activity in the timber market [20], which makes it more likely to find them in the national register for timber harvesting notifications. If the same database is used for future studies, a stratified sample could be made in order to avoid this sort of misrepresentation. Another approach would be to take the sample from a national register containing all owners, but then a large proportion of the sample may not have conducted a timber deal close in time to the survey. Finally, compared to some other recent surveys of Swedish FFOs that have had a response rate of 50–60% [12,46,47], the response rate of the present study was somewhat lower (43%). A second reminder to non-respondents could have increased the participation rate to some extent, but that was not considered feasible due to the limited time and money available for this study. Although male owners were slightly keener to answer than female owners were, the risk for any major effects on the results is considered small since the overrepresentation was only four percentage points when comparing the proportion of males in the sample with the share of male respondents.

## 5. Conclusions

A conclusion of this study is that skilled and service-minded employees are highly important for forest companies that want to live up to FFOs' service quality expectations. In general, FFOs have high expectations, but, in the majority of cases, forest companies are also able to meet them. FFOs who had experienced problems in connection to their latest timber deal perceived the service quality to be significantly lower than those who had not faced any problems. Therefore, forest companies that are able to minimize the outcomes that FFOs perceive to be errors and mistakes will be in a better position to maintain successful business relationships with them. The study also highlights that although FFOs had relatively low expectations on the communication feature, the forest companies, at the aggregated level, did not fulfill these. A recommendation to timber buyers and forest companies is to consider how they can improve their communication with FFOs, which may offer them good odds to accomplish better results through minor adjustments such as developing their current services and communication routines or introducing new types of information services. As FFOs' expectations are low, there should be good opportunities to achieve significant improvements through relatively small adjustments. Finally, since this study was limited to 14 service quality features, which were only investigated from the FFOs' perspective, this study highlights only some of all aspects related to a timber transaction. Therefore, more studies focusing on different aspects of service quality are needed in order to get a more comprehensive understanding of FFOs' service quality expectations and perceptions. This also applies to our understanding of the forest companies' service performance.

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