

# Satisfaction and Company Loyalty as Expressed by Non-Industrial Private Forest Owners towards Timber Procurement Organizations in Finland

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The satisfaction and company loyalty as expressed by non-industrial, private forest (NIPF) owners towards timber procurement organizations were clarified via a mail questionnaire. The results denoted that there is a positive correlation between the levels of forest owners' expectations (EXP) and perceived performance (PERF). In addition, the lower EXP and the higher PERF were, the greater was the overall satisfaction index (SAT). About two thirds of forest owners were characterized by a negative SAT value or then they were dissatisfied with the performance of the procurement organization in their last timber-sales transaction. Furthermore, the results obtained indicated that the SAT index significantly influences the company loyalty expressed by NIPF owners – their willingness to give favourable reports of the company to the others, and their willingness to engage in future timber-sales transactions with the same company. Nonetheless, the SAT index did not affect the market share of a particular company, and this could be partly accounted for by the similar level of performance among the companies and the lack of competition in the timber trade. Finally, the results revealed several dimensions of timber procurement, and some seller segments to which companies could pay more attention to in order to be able to achieve better satisfaction levels and the loyalty of NIPF owners in the future. One approach to successfully addressing these challenges could be the adopting of a satisfaction decision support system (SatDSS).

**Keywords** company loyalty, decision support system (DSS), non-industrial private forest (NIPF) owner, satisfaction, timber procurement, timber trade

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# 1 Introduction

## 1.1 Background

Several studies have shown that companies can, on an average, lose 10...45 % of their total revenues in the form of quality costs (e.g. Chauvel and Andre 1985, Kane 1986, Smith 1987). Crosby (1979), again, has emphasized that quality costs can be reduced to 2.5 % by executing significant prevention and appraisal quality operations. It has especially been pointed out how important relative company quality is for the success of a company (e.g. Buzzell and Gale 1987, Babich 1992, Gale 1994). The relationship between quality and profitability has been explained through both enhanced customer satisfaction and savings in costs. Furthermore, it has been mentioned that high customer satisfaction levels may lead (i) to customer re-purchasing behaviour (recency, frequency, amount, retention, and longevity), (ii) to a desire by customers to give favourable reports to the others about the company they deal with, and (iii) to the strengthening of the market position of a particular company (e.g. Reichheld 1993, Anderson et al. 1994, Jones and Sasser 1995, Fornell et al. 1996, Zeithaml et al. 1996).

A great number of customer satisfaction studies have defined customer expectations as predictions of perceived performance, and also recognized that both customer expectations and perceptions have a positive effect on customer satisfaction (e.g. Oliver 1980, Churchill and Surprenant 1982, Fornell 1992, Johnson et al. 1996). Customer satisfaction is composed of the output of the customer's evaluation process in the course of which, in brief, the customer compares the balance of his/her perceptions (outputs) and his/her expectations (inputs), and finds reasons for success or failure of the outcomes (see the expectancy disconfirmation, equity, and attribution theories reviewed by Oliver and DeSarbo 1988); if the perceived performance level meets or exceeds expectations, it is said that the customer is satisfied. Respectively, if the perceptions do not meet expectations, it is argued that the customer is dissatisfied. On the other hand, Olshavsky and Miller (1972) and Cronin and Taylor (1992) have offered a performance theo-

ry, which sees the approach to customer satisfaction as being directly related to the product's or the service's perceived performance characteristics.

Kano (1986) has described three levels of customer satisfaction: expected quality, desired quality, and excited quality. He demonstrates that if the service, product, or performance does not include the features of expected quality, the customer is dissatisfied, and adding more features of expected quality does not add to customer's satisfaction. In contrast, the better a company is at providing the desired features, the greater linearly is the satisfaction. Customers do not expect what may be called excited quality dimensions of service, product, or performance. Customers are "wowed", or pleasantly surprised, and very satisfied if there are some excited quality features. Accordingly, Kano (ibid.) set forth that the service, product, or performance of a company must include the expected and desired quality features, and in addition the company has to seek out some of the foremost excited quality features with which to strengthen customer satisfaction.

Timber procurement organizations in Finland have engaged in systematic development of their quality management systems during the past few years (Marsio 1994, Airavaara 1995, Metsäliitto otti... 1996). Timber contractors have been also creating quality systems (Jaakkola 1995, 1996, Herranen 1996). Since procurement organizations determine the mills for their customers, and contractors procurement organizations for their primary customers (Fig. 1), the quality systems in question do not include monitoring of forest owners' satisfaction level. Although there is evidence that non-industrial, private forest (NIPF) owners behave in the timber trade situation like classical customers (e.g. Ollonqvist and Heikkinen 1995), procurement organizations regard them as suppliers in the timber procurement process (Fig. 1). Equally, in this survey, NIPF owners are looked upon as suppliers in relation to timber buyers.

Kärhä (1998a, b) has revealed that managers in the service of major timber procurement organizations feel a need for better tools with which to monitor the satisfaction of forest owners, i.e. satisfaction decision support system (SatDSS).

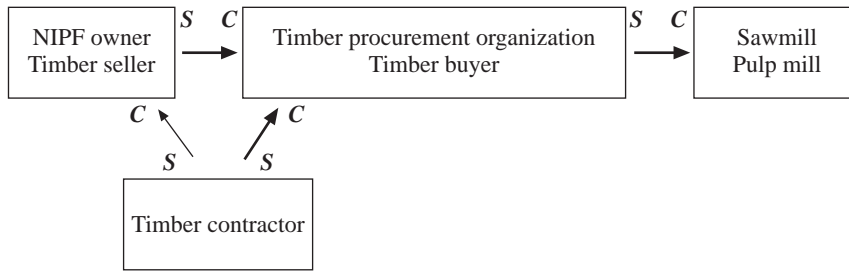


Fig. 1. Timber procurement organizations' and contractors' view concerning customer (C) and supplier (S) relationships in timber procurement.

Moreover, some procurement organizations have begun to survey the satisfaction level of forest owners, who have recently conducted timber transactions with them (Salenius 1996, Puunmyyjämme mielipiteet... 1997). Still, one major problem may remain: the problem that these case studies, in the course of which companies had the quality of their own performance evaluated, fail to reliably compare their own performance in relation to that of others (cf. Buzzell and Gale 1987).

Up to the present, no published extensive studies have been conducted in Finland with regard to the antecedents of forest owners' satisfaction. Nonetheless, some attributes have been identified respecting forest owners' appreciation of their timber dealings with companies: reliability (i.e. company personnel keep to their promises), flexibility (e.g. in organizing payments), competitive price level, understanding the needs of the timber seller, easy timber transactions (e.g. all timber assortments are bought), good logging trace (e.g. no damage to residual stands), concern for nature values, and adherence to logging schedules (e.g. Luikko 1986, Viitanen 1987, Veromaa 1992, Sikanen 1994). Primarily timber sellers consider timber buyers to be reliable, but they have had poor experiences in matters related to the accuracy of timber measurement, price levels, logging trace, attitudes and self-initiative of company personnel, and the administration of financial settlements (e.g. Järveläinen 1983, Järveläinen and Karppinen 1983, Karppinen and Hänninen 1987, Itkonen 1995).

The findings of Kärhä (1998a, b) concerning timber procurement managers' enthusiasm in the

matter of satisfaction level on the part of timber sellers is understandable because timber sellers' satisfaction can be assumed to considerably influence their willingness to sell timber to the same company again (see Virta 1971). Conversely, in Finland, where there are over 430 000 NIPF owners owning ca. 70 % of the growing stock volume and where there are only between 2...17 timber procurement organizations (and two to three of these being big ones) (Kallioniemi 1997, Sevola 1997), there is a state of oligopsony, or even monopsony, in the market situation in many parts of the country. With NIPF owners having hardly any alternative timber buyers to choose from, it can be expected that the poor performance of timber buyers is not as likely to influence the actualised timber-selling behaviour of timber sellers. Timber sellers' bad experiences associated with their most recent timber-sales transaction, however, may lead them to refuse to participate in future timber transactions (cf. Karppinen and Hänninen 1990, Ihalainen 1992).

The environment for timber procurement activities has changed and will certainly continue to change in the future: older and increasingly urban forest owners, emphasis being placed on the values of multiple-use forestry, the merging of big forest companies, changes in the negotiation system of overall price level of roundwood, more active role of small-scale timber buyers – including local forest management associations – in timber procurement operations, increasing volumes in the consumption of roundwood, and so forth. This being the case, all timber procurement organizations, as well as logging contractors, need accurate, up-to-date in-

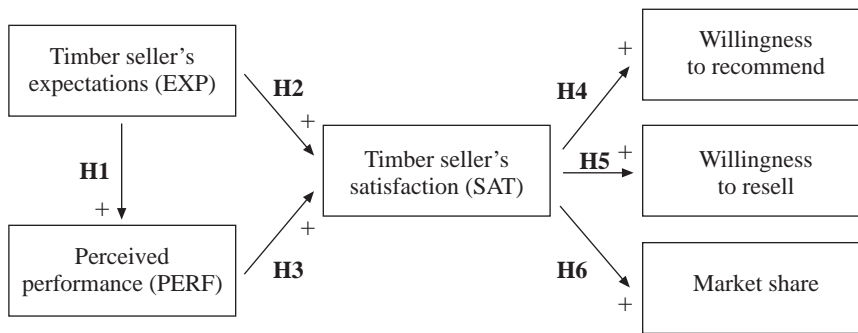


Fig. 2. A framework and hypotheses for the survey.

formation on the demands and satisfaction level of various forest-owner groups. One potential approach to successfully meeting these challenges could be to employ a SatDSS.

## 1.2 Research Aims and Hypothesis

Consequently, the designing of a good satisfaction DSS (SatDSS) via which to manage NIPF owners' satisfaction requires relevant knowledge of forest owners' expectations and experiences regarding the performance of timber procurement organizations. In the present research, the aforementioned antecedents are addressed as also the consequences of satisfaction. The framework of this survey is described in Fig. 2.

The main objectives of the present research undertaking are as follows: (i) To find out the levels of forest owners' expectation, perception, and satisfaction? For example, is there much variation between different owner groups and companies? (ii) To determine Kano's (1986) quality dimensions in timber procurement? (iii) To clarify the effect of satisfaction level on company loyalty? On the basis of previous satisfaction studies, the following hypotheses (Fig. 2) were tested:

- H1: Timber sellers' expectations have a positive influence on perceived performance.  
 H2: Timber sellers' expectations have a positive influence on timber sellers' satisfaction level.  
 H3: Perceived performance has a positive influence on timber sellers' satisfaction level.  
 H4: Timber sellers' satisfaction level has a positive

influence on the willingness of timber sellers to recommend a particular timber buyer company to others.

H5: Timber sellers' satisfaction level has a positive influence on the willingness of timber sellers to sell again to the same company.

H6: Timber sellers' satisfaction level has a positive influence on the market share of a particular company.

## 2 Material and Methods

### 2.1 Questionnaire

This research undertaken was executed in the form of a mail questionnaire. NIPF owners involved in the survey were asked to report on matters connected to their timber-selling behaviour, especially regarding the background to *their most recent timber-sales transaction* carried out during the past ten years (1987...1996), and of course some important variables on themselves and the woodlots they own. Their expectations were determined using the importance attached by the subject to the various aspects of the timber trade (cf. Teas 1993). Timber sellers' expectations and perceived performance were employed using a graduated scale of 4...10 (expectations: 4 = not at all important...10 = extremely important; and perceptions: 4 = terrible...10 = excellent). There were, in all, forty different characteristics of the timber procurement process. These were generated by keeping in mind the

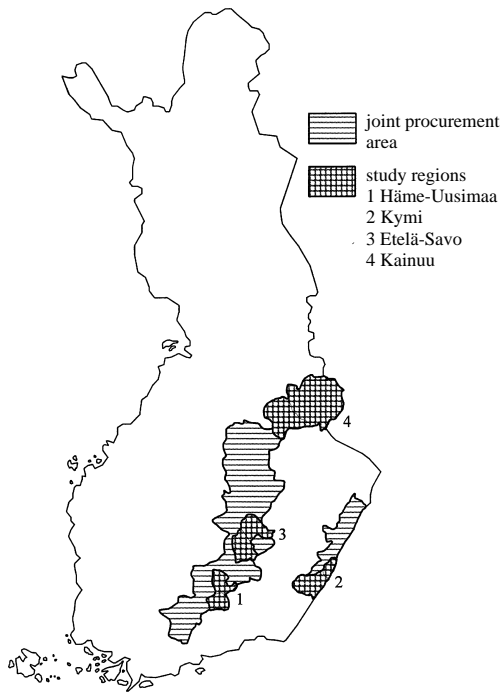


Fig. 3. A map of the joint procurement areas of the major companies before merges, and the study regions.

dimensions of quality of service and of product (Parasuraman et al. 1985, Garvin 1987). In addition, the respondents rated their overall experience value using the same scale (4...10).

Kano's (1986) quality factors were pinpointed comparing the quartiles of the overall satisfaction distribution. First of all, the expected quality dimensions were found in order to compare the perceived performance of the forty characteristics within the most dissatisfied (lower quartile) and the slightly dissatisfied (median quartile) groups. The excited quality dimensions were determined by comparing the perceived performance of the different characteristics in the most satisfied (upper quartile) and the slightly dissatisfied (median quartile) groups. There were no distinct desired quality features in this study.

The company loyalty of forest owners was clarified using three indicators: how willingly forest owners recommended the company they had most recently engaged with in a timber trans-

action; how willingly they were prepared to sell again to the same company; and what is the realized timber-selling behaviour of forest owners (or what are the market shares of companies in given areas). The market shares of each company within each sample area were received from the local forest management associations (LFMAs) in the area. The market shares were those in early 1996.

## 2.2 Sample and Number of Responses

The sample areas consisted of four areas (Häme-Uusimaa, Kymi, Etelä-Savo, and Kainuu Forestry Centres (FCs)) – comprising nine LFMA (Fig. 3). Characteristically, the procurement actions were carried out by all major timber procurement organizations prior to merges (in 1995) in all these selected areas. The NIPF owners were divided into four categories according to the size of their woodlots: 10...40 ha, 41...70 ha, 71...100 ha, and 100+ ha. Stratified random sampling was applied, with FCs and woodlot-size classes as the strata. Eighty NIPF owners were selected from each FC and representing each of the aforementioned woodlot-size classes. Thus, 320 forest owners were selected from each of the four FCs for inclusion in this study.

The questionnaire forms were sent out to a total of 1280 NIPF owners in late August–early September of 1996. The addresses were obtained from the databases of the FCs and LFMA. However, there was no information on the recency or frequency of forest owners' timber transactions. Forest owners sent back 597 completed questionnaire forms. Owing to incorrectly filled forms, 72 of the responses had to be rejected. The number of acceptable responses was reduced to 525, giving a response percentage of 41 % (varying between 36...45 % among the FCs).

## 2.3 Data Processing

The antecedents and consequences of satisfaction were analysed using percentage shares, mean values, standard deviations (sd), confidence intervals, and Spearman's correlations ( $r_s$ ). The differences between quality factors, seller seg-

ments, and companies were analysed using the Mann-Whitney's U-test and the Kruskal-Wallis' one-way ANOVA test. Non-parametric methods were applied since the circumstances (normal distribution of samples) for using parametric tests did not exist.

## 2.4 Information about Subjects and their Timber-Selling Behaviour

Eighty-nine per cent of the respondents were male and 11 % female. The subjects' average age was 52 years (sd = 13.0). Almost half of subjects (49 %) were farmers, 24 % pensioners, 20 % wage-earners, and 7 % none of the above (others). The subjects lived at an average distance of 32 kilometers from their woodlots (sd = 93.6), whose average size was 102 hectares (sd = 106.3). They stated that wood production is the most important form of utilizing their woodlot (index = 2.86 [maximum index value = 3.00]); second place went to recreational use (i.e. outdoor recreation, hunting) (1.22), collection of by-products (i.e. wild berries, mushrooms) (0.91), and conservation of forest nature and landscape (0.64).

During the past ten years, the respondents had made, on an average, 6.4 timber-sales transactions (sd = 4.9), resulting in an average of 3.1 m<sup>3</sup> ha<sup>-1</sup> a<sup>-1</sup> (sd = 2.7). The most recent timber-sales transaction's average size was 506 m<sup>3</sup> (sd = 539.9). What may be referred to as regular sellers accounted for 19 % of the subjects with the rest (81 %) being occasional sellers. A subject was regarded to be a regular or constant seller if he/she had made at least four timber-sales transactions during the past ten years, and moreover that three quarters of his/her timber-sales transactions had been made with the same company. The subjects estimated that the share of incomes obtained from forestry was ca. 29 % in the 1990s (sd = 23.7).

Ninety-six per cent of the last timber-sales transactions had been made in the 1990s. Eighty-four per cent of the most recent timber-sales transactions had been made with the biggest three or four timber procurement organizations. Thirty-eight per cent of the last timber-sales transactions had been delivery sales, and 62 % standing

sales, 48 % mainly thinning, and 52 % regeneration felling. The respondents evaluated that the most important motives for their most recent timber-sales transactions had been need for income from selling timber (index = 1.76 [maximum index value = 3.00]), silvicultural reasons (1.75), extensive, unused harvesting possibilities (0.80), good price paid for timber (0.71), and taxation reasons (0.32).

## 3 Results

### 3.1 Antecedents of Satisfaction

The overall level of forest owners' *expectations* (EXP) (average value of all forty characteristics) was 8.77 (sd = 0.73). The expectations of forest owners were highest in regard to the following attributes: timber buyer is solvent (mean value 9.66), timber measurement is true (9.54), company personnel are reliable (9.47), border and shape of stand marked for harvesting complies with contract (9.37), and logging causes slight root and stem damage to remaining trees (9.31). On the contrary, from the forest owners' point of view, the least noteworthy points in timber procurement are as follows: constant contact with forest owner (7.50), checking the situation with a company representative in the stand marked for harvesting prior to starting harvesting operation (8.04), self-initiative of company personnel (8.05), corresponding number of preserving living and dead trees are left (8.10), and occupational guidance in matters connected to timber trade (8.37).

In terms of socio-economic classes, the EXP level of pensioner forest owners was significantly higher than those of the other groups (Table 1). In addition, those forest owners, who had sold their timber on the stump, and whose cutting areas were mainly composed of regeneration felling, appeared to have statistically higher EXP levels. There were no significant differences among the other owner groups.

The overall level of *perceived performance* (PERF), i.e. the average value of all forty characteristics, of the forest owners was 8.50 (sd = 0.81). From the forest owners' point of view, company

**Table 1.** Expectation (EXP), perceived performance (PERF), and satisfaction (SAT) levels of some forest-owner groups. Scale used as regards the EXP and PERF levels was from 4 to 10 in the questionnaire.

Variable group	EXP (4...10)	PERF (4...10) Mean ± sd	SAT	Statistically significant differences between groups
<b>Socio-economic group</b>				
Farmers [1]	8.73 ± 0.68	8.51 ± 0.75	-0.22 ± 0.56	EXP: 1...2*
Pensioners [2]	8.89 ± 0.74	8.66 ± 0.80	-0.23 ± 0.49	PERF: 2...3*, 2...4*
Wage-earners [3]	8.74 ± 0.81	8.37 ± 0.86	-0.37 ± 0.67	
Others [4]	8.65 ± 0.82	8.18 ± 1.00	-0.44 ± 0.97	
<b>Selling method</b>				
Standing sale	8.83 ± 0.70	8.53 ± 0.79	-0.30 ± 0.59	EXP*
Delivery sale	8.70 ± 0.73	8.47 ± 0.82	-0.23 ± 0.64	
<b>Felling method</b>				
Regeneration felling	8.84 ± 0.67	8.56 ± 0.78	-0.28 ± 0.58	EXP*
Thinning	8.70 ± 0.77	8.45 ± 0.83	-0.27 ± 0.64	
<b>Permanence of trade relation</b>				
Regular seller	8.90 ± 0.64	8.69 ± 0.75	-0.21 ± 0.62	PERF*
Occasional seller	8.74 ± 0.75	8.45 ± 0.82	-0.29 ± 0.60	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

characteristics connected to great success as timber buyers include solvency (mean value 9.62), border and shape of stand marked for harvesting complying with contract (9.20), company personnel are reliable (8.95), timber measurement is true (8.94), and buffer belts of trees are left around lakes, rivers, and stream systems (8.93). Similarly, timber sellers were of the opinion that the most negative aspects in dealing with companies were having to be infrequently in touch with them (7.22), no checking situation in their stand marked for harvesting before felling (7.77), poor self-initiative of company personnel (7.79), slight possibility to choose harvesting method (mechanized/motor-manual) (7.99), and too much stemwood is left as logging residues (8.07).

When comparing the observed performance levels of the various socio-economic groups, it is to be seen that wage-earners and the group others experienced the lowest PERF levels of all (Table 1). Correspondingly, pensioners, who demonstrated relatively high EXP levels, also had the highest PERF levels. Moreover, regular timber sellers recognized statistically higher PERF levels than occasional sellers. The results

illustrated that when a timber seller evaluates the performance of a timber buyer organization in terms of his/her timber-sales transaction, he/she compares his/her perceptions to what was expected. This is supported by the clearly positive correlation between the EXP and PERF levels ( $r_s = 0.646$ ;  $p = 0.000$ ) (Fig. 4).

Every forest owners also conveyed their overall experience value for the performance of timber buyers with respect to their most recent timber-sales transaction. This overall experience value (EV) averaged 8.54 (sd = 0.95). There was a statistically significant correlation between the PERF and EV levels ( $r_s = 0.707$ ;  $p = 0.000$ ).

### 3.2 Overall Satisfaction Index

The calculated overall satisfaction index (SAT) (average value of the disparity of expectation (EXP) and perceived performance (PERF) levels) was -0.27 (sd = 0.61). Sixty-four per cent of timber sellers had a negative SAT, i.e. they were dissatisfied. The rest of the subjects (36 %) had a positive SAT (Fig. 5). The biggest negative sat-

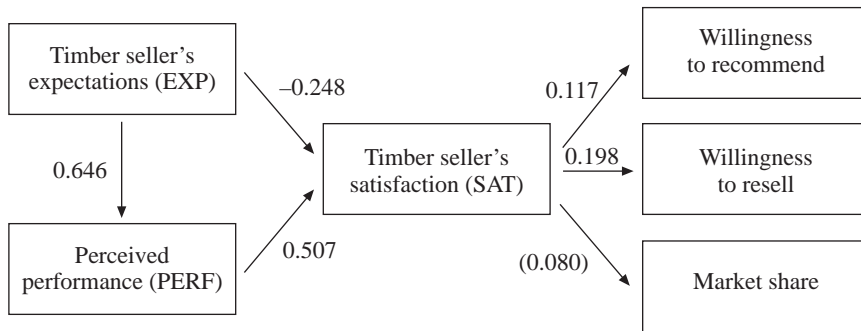


Fig. 4. Correlations of timber seller's satisfaction elements in timber-sales transaction.

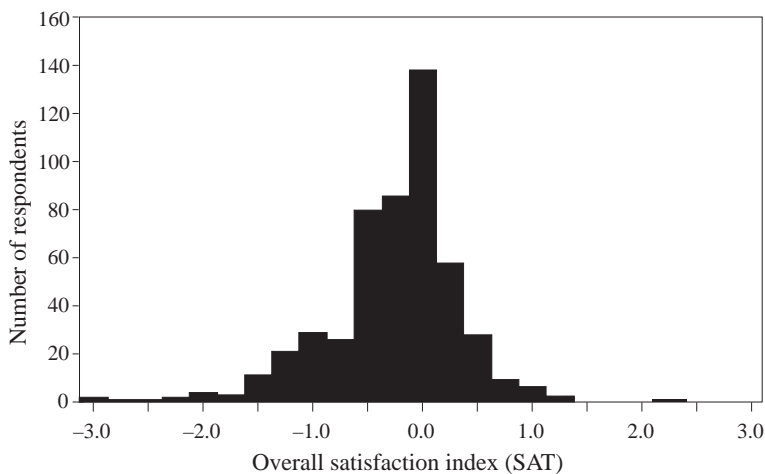


Fig. 5. Timber-selling forest owners' satisfaction distribution.

isfaction indices among the timber sellers were obtained in connection with the following: (i) cross-cutting of stems to maximize the sawlog portion, (ii) only a little stemwood being left as logging residues, (iii) slight damage to residual stands, (iv) competitive price level, and (v) short stumps (Fig. 6). That is, timber sellers were deeply dissatisfied with these attributes. On the other hand, timber sellers were manifestly satisfied with the following points: retention of corresponding numbers of living and dead trees, courtesy of company personnel, no logging in biodiversity areas, ease of timber trade, and possibility to enter into a timber-sales transaction with a familiar company representative.

It appeared that forest owners' satisfaction level towards timber-purchasing organizations – and especially large such organizations – was almost of the same level (Table 2). There were no statistical differences between the SAT levels of these organizations. In addition, neither were there any significant differences among the various forest-owner groups (Table 1). However, the findings indicated that both EXP and PERF have a strong effect on the overall satisfaction index; the higher the level of EXP, the lower the SAT level ( $r_s = -0.248$ ;  $p = 0.000$ ). Vice versa, the higher the PERF level, the higher the SAT level ( $r_s = 0.507$ ;  $p = 0.000$ ) (Fig. 4).



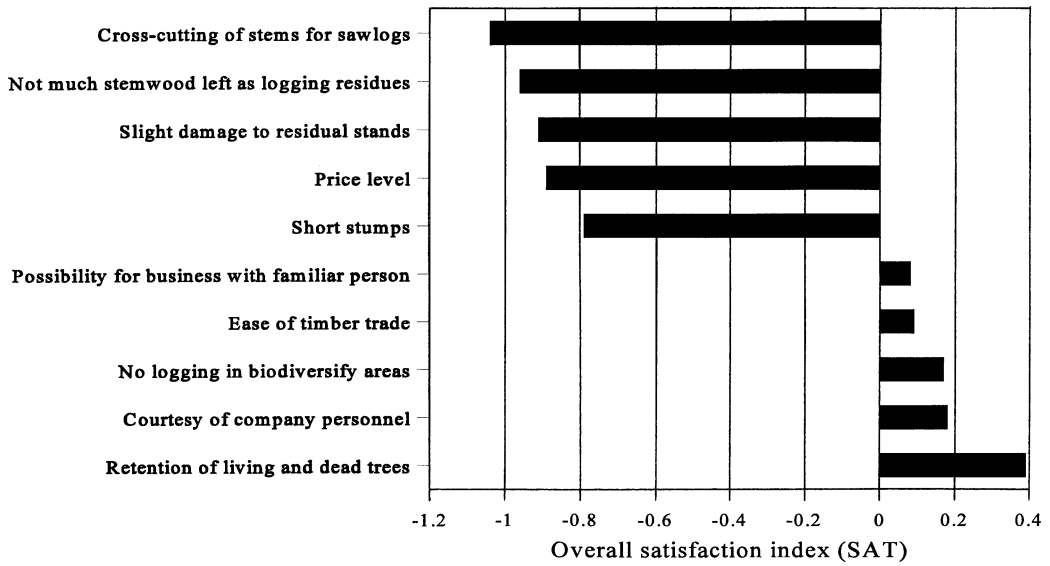


Fig. 6. Five procurement points with which forest owners were most dissatisfied, and five points with which they were most satisfied.

Table 2. Expectation (EXP), perceived performance (PERF), and satisfaction (SAT) levels of timber sellers with respect to timber procurement organizations.

Organization	Number of transactions, unit	EXP (4...10)	PERF (4...10)	SAT
		Mean ± sd		
Large company # 1	171	8.79 ± 0.70	8.50 ± 0.84	-0.28 ± 0.64
Large company # 2	134	8.84 ± 0.68	8.53 ± 0.80	-0.30 ± 0.61
Large company # 3	128	8.73 ± 0.79	8.48 ± 0.78	-0.29 ± 0.61
Other organizations	89	8.66 ± 0.79	8.44 ± 0.82	-0.20 ± 0.51

### 3.3 Dimensions of Kano’s Quality Factors

In this study, distinct dimensions of the desired quality factor were not revealed with regard to the timber procurement operation. Nevertheless, several characteristics of timber procurement could be classified in terms of the expected quality dimensions; the most significant characteristics consisted of both service features (reliability of company personnel, understanding of the needs of seller, positive and interested attitude of company personnel, competence of company personnel), and some performance features of harvesting

(slight damage to residual stands, not much stemwood left as logging residues, moderate ruts along strip roads, short stumps) (Table 3).

There were, moreover, some attributes which turned out to be the excited quality dimensions. The foremost among these were as follows: speediness of service provided, cross-cutting of stems to maximize sawlog grades, contactability of company personnel, expressing logging schedule by timber seller being realized, professional guidance in matters concerning the timber trade, and business-like attitude of company personnel to complaints by timber seller (Table 3).

**Table 3.** Foremost dimensions of expected and excited quality factors in timber procurement.

Expected quality features	Excited quality features
Reliability of company personnel ***	Speediness of service provided **
Slight damage to residual stands ***	Cross-cutting of stems for sawlogs **
Understanding needs of timber seller ***	Accessibility of company personnel *
Not much stemwood left as logging residues ***	Logging schedule of timber seller realized *
Slight ruts along strip roads ***	Professional guidance in matters concerning timber-sales transaction *
Short stumps ***	Business-like attitude of personnel concerning complaints *
Positive and interested attitude of company personnel ***	Information about start of harvesting to timber seller *
Competence of company personnel ***	Possibility to choose harvesting method *
Strip road network according to recommendations ***	Constant contact with timber seller *
Purchase all timber grades **	Ease of conducting timber-sales transaction *
Competitive price level **	Border and shape of cutting area complies with contract *
Intensity of harvesting complies with contract **	No logging residues on paths and in ditches *

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### 3.4 Consequences of Satisfaction

*Recommending company to others* Eight per cent of the respondents felt that they could not recommend to others the company with which they had made their most recent timber-sales transaction. All the same, most forest owners reported that they could recommend the company to other forest owners (Table 4). There was no significant difference between the EXP levels of timber sellers inclined to recommend a company and those non-inclined to recommend. Instead, both perception and satisfaction levels of the “inclined to recommend” timber sellers were statistically higher than those of “non-inclined to recommend” sellers.

Background variables depicted “non-inclined to recommend” timber sellers as follows: they are older, enter into timber-sales transactions less frequently, and are less dependent on incomes from forestry than “inclined to recommend” sellers (Table 4). Furthermore, overall satisfaction level had a positive effect on the willingness of timber sellers to recommend the company ( $r_s = 0.117$ ;  $p < 0.05$ ) (Fig. 4).

*Re-selling willingness* Only three per cent of the timber sellers recognized that their willingness to sell timber again to the same timber

buyer had been reduced (Table 5). Almost three quarters (72 %) of the respondents did, however, stress that their last timber trade did not affect their selling intentions. One quarter of the timber sellers were of the opinion that their last timber-sales transaction increased their willingness to resell to the same company in the future. There were statistically significant differences among all three groups as to their expectation, perceived performance, and satisfaction levels (Table 5).

The foremost background variables demonstrated that those timber sellers, who stated that their willingness to resell was reduced due to their most recent timber-sales transaction, (i) placed less emphasis on nature conservation in their value hierarchy, (ii) had a smaller index of silvicultural reasons for their most recent timber-sales transaction, (iii) mostly sold their timber on the stump, and (iv) sold appreciably bigger timber quantities than those, who stressed that their most recent timber-sales transaction neither influenced their timber-sales willingness or that its influence was a positive one (Table 5). All in all, the SAT level appeared to have a positive dependency on the forest owners’ willingness to sell again to the same company ( $r_s = 0.198$ ;  $p = 0.000$ ) (Figs. 4 and 7).

**Table 4.** Forest owners' expectation (EXP), perceived performance (PERF), and satisfaction (SAT) levels, and some significant background variables connected to their willingness to recommend their most recent timber buyer.

Variable	Non-inclined-to-recommend seller (n = 39)	Inclined-to-recommend seller (n = 452)	Statistically significant differences between groups
	Mean (95 % confidence interval for mean)		
EXP (4...10)	8.49 (8.11...8.87)	8.81 (8.75...8.87)	
PERF (4...10)	7.86 (7.46...8.26)	8.58 (8.51...8.65)	***
SAT	-0.63 (-0.92...-0.34)	-0.24 (-0.29...-0.19)	*
Age, a	57	52	**
Income from forestry, %	23	29	*
Number of transactions (during the past ten years), unit	4.5	6.5	**

\* p &lt; 0.05, \*\* p &lt; 0.01, \*\*\* p &lt; 0.001

**Table 5.** Forest owners' expectation (EXP), perceived performance (PERF), and satisfaction (SAT) levels, and some significant background variables connected to their willingness to resell to the same timber buyer.

Variable	Willingness reduced (n = 17) [1]	No change in willingness (n = 373) [2]	Willingness increased (n = 127) [3]	Stat. significant differences between groups (1...3)
	Mean (95 % confidence interval for mean)			
EXP (4...10)	8.05 (7.42...8.68)	8.75 (8.68...8.82)	8.94 (8.82...9.06)	1...2*, 1...3**, 2...3*
PERF (4...10)	7.14 (6.65...7.61)	8.45 (8.37...8.53)	8.84 (8.72...8.96)	1...2***, 1...3***, 2...3***
SAT	-1.05 (-1.46...-0.64)	-0.29 (-0.36...-0.22)	-0.10 (-0.21...0.01)	1...2***, 1...3***, 2...3**
Importance of conservation of forest nature, index	0.29	0.64	0.69	1...3**
Silvicultural reason for timber sale, index	1.41	1.86	1.50	2...3**
Share of standing sales, %	88	62	56	1...2*, 1...3*
Size of most recent timber-sales transaction, m <sup>3</sup>	1351	482	464	1...2***, 1...3***

\* p &lt; 0.05, \*\* p &lt; 0.01, \*\*\* p &lt; 0.001

*Market share* A company's market share can be regarded as representing the cumulative, realized timber-selling behaviour considering timber sellers' satisfaction in a given micro-area. In this study, timber sellers' satisfaction with re-

spect to a particular company did not seem to affect the company's market share in the given area. There was no statistically significant correlation between the SAT and market share ( $r_s = 0.080$ ;  $p = 0.660$ ) (Fig. 4).

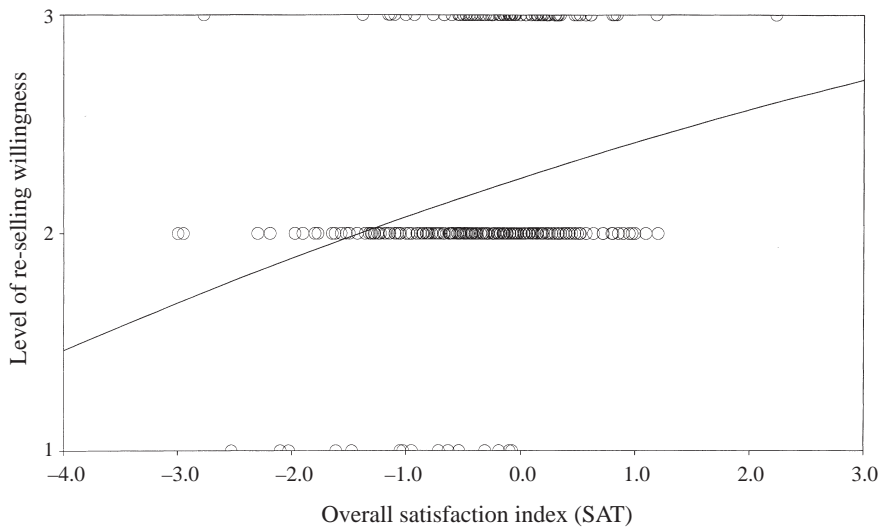


Fig. 7. Influence of overall satisfaction index on the re-selling willingness of timber sellers. Levels of re-selling willingness: 1 = Willingness reduced; 2 = No change in willingness; and 3 = Willingness increased.

## 4 Discussion

The results argued in favour of the understanding that NIPF owners are not entirely satisfied with all aspects of timber procurement. Forest owners were particularly dissatisfied with the poor degree of utilization of stems in the course of logging (i.e. stems are not cross-cut to maximize the sawlog portion, and a lot of stemwood is left as logging residues) (Fig. 6). This kind of argument may be obtained with respect to the prevailing customer-orientation in timber procurement – i.e. timber procurement organizations purchase for their customers (sawmills and pulp mills) timber meeting the dimension requirements of the mills. In addition, timber sellers were dissatisfied with the damage to standing trees caused by logging. However, a recent extensive survey focusing on the logging trace displayed that logging damage to the residual stands has decreased from previous years' level, and is nowadays mostly deemed to be of good level (Hartikainen 1996).

Respectively, forest owners appeared to be pleased with the fact that companies attach importance to environmental values (i.e. living and

dead trees are retained on harvesting sites, and no logging is carried out in areas with significant biodiversity values) (Fig. 6). These observations are supported by the results obtained by Niemelä and Arnkil (1997). It must be noted, nonetheless, that the subjects interviewed in this survey did not place marked stress on the function of conservation of forest nature, whose mean index was 0.64, whereas wood production, for example, received the index value of 2.86.

The survey results confirmed Hypothesis #1 (H1), i.e. that expectations strongly affect perceptions. Moreover, the expectations influenced the satisfaction level, but the direction of interdependence was not the same – positive – as that suggested by Hypothesis #2 (H2) (cf. Figs. 2 and 4). Perceived performance had a positive effect on satisfaction just as is stated in Hypothesis #3 (H3). Generally speaking, the correlations of the antecedents of satisfaction indicated that perceived performance patently determines the satisfaction level in timber-sales transaction situations, and hence these findings supported the doctrines of the performance theory. In fact, several studies have put forward that perceptions have a greater effect on satisfaction than do ex-

peceptions (e.g. Cronin and Taylor 1992, Anderson and Sullivan 1993, Gupta and Stewart 1996).

The results also set forth that timber sellers' willingness to recommend a timber procurement company (Hypothesis #4), and their willingness to resell to the same company (Hypothesis #5) are dependent on satisfaction level (see Fig. 4). On the other hand, the form of this loyalty showed that there is only little competition in the field of timber sales in Finland – even though every major procurement organization operates in all the sample areas covered by this study (cf. Fig. 7 and Jones and Sasser 1995). This point may be seen to reflect that there are no several potential alternative timber buyers for forest owners when selling timber. Further, by means of the loyalty segments, the optimal or desirable satisfaction level ( $-0.21...+0.01$ ) was clarified for the performance of timber procurement organizations connected to the positive intentions of timber seller (Table 5). This confidence interval of the likely re-selling forest owner's satisfaction index seems to be good enough also for the "inclined to recommend" timber seller (Table 4).

There was no support for Hypothesis #6 (H6) owing to no statistical correlation existing between the satisfaction indices and the market shares of companies. One reason for this may be in that a small-market-share company may serve a niche market quite well, whereas a large-market-share company must serve a more diverse and heterogeneous set of customers (Fornell 1992, Griffin and Hauser 1993). Therefore, the relationship between satisfaction and market share could also be negative. This survey's result is essentially logical concerning the similar satisfaction levels of companies and there being hardly any competition (Table 2, Fig. 7). Besides timber seller's satisfaction, other variables – for example, some customer bonds between forest owner and procurement organization (i.e. forestry service contracts; memberships; long-term, traditional timber-sales transaction relation: "Already in my father's time we sold..."); stressed monetary motives (i.e. need for income from selling timber; good price paid for timber) for timber-sales transaction; location of mills with respect to the procurement area; some extra (strategic) stakes for marketing and purchasing operations – have a major impact on the actualised

timber-selling behaviour of forest owners, and thus the market share of a company in a specific area.

The response rate of this survey was 41 per cent. This is not a very low percentage in comparison with a similar previous study (Salenius 1996). Because of lack of beforehand knowledge of the selling behaviour of the forest owners in this study, there were definitely numerous forest owners not able to take part in the survey – for the reason of not having sold timber during the past ten years. For instance, in the studies by Karppinen and Hänninen (1990) and Ihalainen (1992) more than a quarter of the subjects had not sold timber at all.

The number of farmers weighted probably in this material due to their general greater interest in timber-sales transaction affairs, and their larger woodlots (Ollonqvist and Heikkinen 1995, Ripatti 1995). Since farmers usually make more delivery sales, accordingly also the share of delivery sales transactions was emphasized in this research (cf. Sevola 1997). When comparing previous satisfaction-related studies, it can be noticed that the number of very satisfied sellers was evidently small in this survey (cf. Peterson and Wilson 1992, Jones and Sasser 1995). Correspondingly, it can be estimated that most of the very dissatisfied forest owners participated in this survey (cf. Peterson and Wilson 1992, Jones and Sasser 1995).

The results introduced several dimensions of timber procurement, and some seller segments to which companies could pay more attention in order to better manage the satisfaction and loyalty of NIPF owners in the future. In particular, procurement organizations have to improve the quality of their performance in the functions that received the biggest negative satisfaction indices (Fig. 6), and that referred to the foremost expected or excited quality features (Table 3). On considering that the results asserted the relevancy of disconfirmation and equity theories (i.e. timber seller compares his/her perceptions or outputs to his/her expectations or inputs), it means that attention has to be paid to timber sellers' expectations. This is the case assuming that homogeneous segments are constructed regarding sellers' expectation levels. The survey put forth some interesting segments: (i) traditional segments (e.g.

socio-economic groups) (Table 1), and (ii) modern loyalty segments (Tables 4 and 5).

Although nowadays it seems to be a fact that there is very little competition in the timber market in Finland, it can be assumed that the future will presumably involve stiffer competition in the light of calculations about the steadily growing volumes related to the consumption of roundwood (Seppälä 1993, Kilpailukykyinen yritystoiminta... 1995). In such more competitive timber trade situations organizations that make timely investments in addressing forest owners' satisfaction requirements in everyday performance will gain more loyal and regular sellers (cf. Jones and Sasser 1995). This can be achieved more easily by taking into account the following two points: (i) nowadays only one fifth of timber sellers are regular sellers, and (ii) their re-selling willingness will increase, even if their satisfaction index is not markedly positive ( $-0.21...+0.01$ ).

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