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WORKING PAPER

Behind closed doors: the potential of lean management in safety audit services*

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April 2013
2013/838

* The authors thank prof. Gerrit Sarens, Louvain School of Management, and prof. Bart Larivière, Ghent University, for their comments on previous versions of the paper.
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D/2013/7012/09

Abstract

Purpose – Lean's influence continues to grow thanks to the success of the concept in manufacturing companies. Safety audit services not only have a context separate from manufacturing and manufacturing services, but also differ fundamentally in nature, calling into question the business logic of lean. This study argues the potential of lean in the business logic of big audit firms, particularly in statutory safety auditing.

Design/methodology/approach – The authors report the findings of a client's management survey in a big safety audit firm.

Findings – The authors' analysis shows that lean management principles fit the business logic. They found that 'audit fees' and 'quick response' become highly determinant in the loyalty of the audit clients. The study also highlights the existence of 'eye balling' – i.e. shopping behaviour and applied pressure on audit firms to cut down on audit fees during contract negotiations.

Practical implications – The paper identifies the first evidence and practical insights for the furthering of research into 'routing' and 'rostering' of safety auditors. Managers of big safety audit firms are doing well to implement lean management principles in order to defend their market share.

Originality/value – The paper provides the first systematic and comprehensive insight into the potential of lean in the business logic of big safety audit firms. To achieve this, the authors develop two models based on the audit and the strategic management literature.

Keywords Business logic, lean, safety audit, Belgium

Paper type Research paper

Introduction

Thanks to the success of the concept of 'lean' operations management systems in countless manufacturing companies, ‘lean’ has become a popular approach to service companies. Intangible services, such as safety audit services and the like, not only have a context separate from manufacturing, but also differs fundamentally in nature, calling into question the business logic of lean. This study argues the potential of lean in the business logic of big audit firms, particularly in statutory safety auditing.

The purpose of statutory safety auditing is to test whether industrial installations comply with the minimum safety and health standards and the regulations of the country at hand. In doing so, they provide reasonable assurance that these installations are compliant. Focussing on statutory safety audit has an outstanding importance because of its economic relevance: in Belgium, the statutory safety sector accounted for approximately 150 million USD in 2010. Internationally – according to the consolidated annual reports of the principal global safety audit firms such as SGS, Bureau Veritas, Dekra, TUV SUD, ... – the sector respectively accounted for 16,071 million USD in 2007. [4]

There are two motivations for this study. First, few studies have examined lean and performance in a service environment focusing only on operational efficiency and failure demand rather than on business logic (e.g. Piercy and Rich, 2008; Staats and Upton, 2011). There is no evidence on the business logic of lean with regards to statutory audit services, notwithstanding the challenges client audit firms have to deal with in the aftermath of the financial crisis – e.g. an increased competition (Gulati and Wohlgezogen 2010). Accordingly lean could offer a solution to safety audit firms that are faced with cost reduction challenges. Since the enforceability of the lean concept is significantly related to the management and employee commitment (Atkinson 2010; Cheung and To 2010), the awareness of need and the

[4] Calculations based on own research

potential of lean management have to be explored now more than ever. According to Hines (2004) there is still confusion over the concept of 'lean' among managers.

Second, there is no evidence for the furthering of research into operations and scheduling in audit services. Lean manufacturing or lean production is a management philosophy that originates from industrial engineering and is focused on eliminating waste in the production and supply chain (Womack and Jones 2003). Intangible services, such as safety audit services, not only have a context separate from manufacturing, but also differ fundamentally in nature, calling into question the business logic of lean.

Management theorists call the holistic view of organizational performance the service profit chain (Heskett et al. 1994). Stated simply, the service profit chain asserts that investment in the value chain that supports frontline workers and effectively increases client value produces satisfied employees and clients, and satisfied clients tend to increased client loyalty, increasing the revenue and profits of the organization. These authors recommend the service profit chain as a framework for constructing a strategic organizational vision, and suggest that, provided service profit chain concepts are carefully interpreted and adapted to an organization's specific situation, they are capable of delivering 'remarkable results' (p. 18).

With regards to client loyalty, by treating both the client satisfaction of auditor competence and quick response, and strategic value dimensions, two conceptual models are developed to explore the potential of lean in the business logic of big safety audit firms. Further we seek to test these models and the related hypotheses using unique client data from a big safety audit firm in Belgium. Finally, we discuss our study's implications for the lean service operations management literature and the literature on theory and practice of both operation and scheduling research.

Background and prior research

Background of statutory safety audit services in Belgium

In Belgium, over the last three decades, newly constructed and altered industrial installations need to undergo an inspection in order to ensure that the installation meets the minimal mechanical, electrical, hydraulic or hydrostatic safety requirements. An independent external safety auditor or audit team verifies the compliance with safety and health standards and regulations. The end product of the audit is the issuance of an audit opinion, i.e. a document that states whether or not the installation is compliant. In the case the installation is not compliant, the infringements are specified in the audit opinion. All sorts of comments that do not refer to violations can also be included. Subsequently, on a periodic basis, the compliance with safety regulations must be recertified by an external safety auditor. An external auditor of an accredited inspection body must annually perform such a compliance audit. So, the clients' management has to appoint an external safety auditor. In Belgium four big firms perform the vast majority of such industrial inspections: (i) AIB-Vinçotte Belgium, (ii) B.T.V., (iii) SGS statutory services Belgium and (iv) OCB.

Lean management in a service environment

There is little empirical knowledge about lean management in a service environment. Service companies have been implementing lean only in recent years. Ahlstrom (2004) acknowledges that lean management can be implemented in a service environment, but with ‘contingencies’. He argues that lean management tools cannot be implemented in the same way in every situation: it needs to be tailored to the particular characteristics of each sector. Piercy and Rich (2008) state that lean is suitable in a pure service environment, i.e. call centre environments. They highlight that service businesses are struggling with customer demands for better quality and managerial demands for cost reduction. In this context, the application

of lean production approaches has been suggested as a means to resolve these problems, reducing costs and improving quality.

Prior theorists note that implementations of lean production may vary across different manufacturing settings due to contextual differences (de Treville and Antonakis, 2006). Intangible services such as safety audit services not only have a context separate from manufacturing or manufacturing services, but also differ fundamentally in nature, calling into question the business logic of lean. However, lean management tools may fit the business logic in the interest of cost reduction. Big audit firms offer much more fee discounts to prevent clients from switching or gaining clients (Carson et al. 2012).

At least three major differences between manufacturing services and statutory audit services also need to be addressed. First, statutory audit services are different from other services, mainly because of its mandatory nature and the intangibility of auditing. Second, the safety inspection can be performed without the client than manufacturing services where the client participates actively in the production process. Third, the issuance of the audit opinion has to be performed independently, and therefore may not always meet the client's expectations.

Research model

Client loyalty as dependent variable

In the available marketing literature, customer loyalty is acknowledged as the primary route to growth and profitability (Hesktett and al. 1994). Womack and Jones (2003) argue that lean management tools are focused on eliminating waste in the production and supply chain, which benefits both the client and client manufacturer. In view of the competition that organisations are faced with in the aftermath of the financial crisis, lean management principles could be significantly correlated to client loyalty.

Independent variables and hypotheses

The present study designs two models based on the determinants of client loyalty. The first model is based on the audit literature and the second model on strategic management literature. The first conceptual model (Figure 1) includes positive relationships between client satisfaction dimensions and loyalty. Client satisfaction is an established concept applied to audit, as firms offer their services to clients in a business market (Behn et al 1999). The degree of satisfaction with regards to safety audit may in this case be informed by the specific needs of clients. In marketing literature Parasuraman et al. (1993) introduced the scale of quality in the service sector based on five dimensions: reliability, assurance, tangibility, empathy and responsiveness. Yet, based on the audit literature, the focal satisfaction dimensions in this model are (i) 'competence' and (ii) 'quick response'. Studies indicate that there is a positive relationship between knowledge competence and client satisfaction in financial audit (Warming-Rasmussen and Jensen 1998). In a way quite similar to how the knowledge of accounting and auditing procedures of financial auditors is crucial to the quality of the audit (DeAngelo 1981; Carcello et al. 1992; Porter 2008), due to its very nature the knowledge of safety regulation and safety standards that safety auditors have is also crucial to the quality of the safety audit. However, since auditors offer their services to their business clients, it is not sufficient that safety auditors have adequate knowledge of safety directives and standards; it is also important that the audit firm is acknowledged by their clients for performing well (Behn, et al. 1997, de Ruyter and Wetzels 1999). Therefore, we are not merely focusing on the client satisfaction of the auditor's competence, but also on the 'quick response' dimension.

There have been reports that the client-auditor relationship is decisive in the field of financial audit work (Beattie et al. 2001, Ismail 2006, McCracken et al. 2008). Arguably, in the auditing context it is important to maintain an ongoing and interactive client-auditor

relationship, so that problems can be resolved as quickly as possible, whenever they may occur. These interactions will involve various types of negotiations and conflicts at different stages of the audit process. Often safety audits are employed during the commissioning stage of newly constructed industrial installations or during maintenance work. The audit production time, the flexibility of the auditor and the possibility to meet the audit deadline can therefore be crucial for client loyalty: this is called 'quick response'.

Accordingly, the hypothesis is formulated as follows:

H1. The higher the satisfaction of the auditor's competence, the more loyal clients are to the audit firm.

H2. The higher the satisfaction with the auditor's quick response, the more loyal clients are to the audit firm.

---------- INSERT FIGURE I ABOUT HERE ----------

The second conceptual model (Figure 1) includes the different value discipline strategies distinguished by Treacy and Wiersema (1995). These authors identified three value discipline strategies – i.e. operational excellence, client intimacy and service leadership. The aim of strategy is to achieve superior value for the client. Hence, client loyalty can also be determined through these dimensions. 'Operational excellence' focuses on providing value by offering the best total cost for a service, with an emphasis on the combination of quality, price, and delivery systems. Organizations that focus on this strategy typically aim to lead their industry in price and convenience. 'Client intimacy' focuses on providing value by developing the best overarching solution for the client. These organizations typically attempt to achieve long-term client loyalty through the constant refinement of services. 'Service leadership' focuses on providing value by developing the best available service.

Organizations that focus on a service leadership strategy often display an emphasis on creativity and innovation and typically produce a continuous stream of state-of-the-art services.

One of the most crucial drivers in audit is the auditor's responsiveness to client needs (Ismail et al. 2006). As mentioned previously, the value of the client intimacy strategy focuses on a strong differential advantage, and engaged auditors by developing the best solution for the client. This requires a good relationship with the client and an interactive client-auditor relationship, so that problems can be resolved efficiently as soon as they arise. Moreover, Ismail et al. (2006) found that auditor engagement is positively related to client satisfaction. Therefore, a client intimacy strategy could create a differential advantage in the context of safety audits.

De Ruyter et al. (1998) found that poorly perceived service quality may also result in high service loyalty for those clients who may not necessarily buy the highest quality service. Such clients may view convenience, price and availability as more important variables affecting overall service quality. In the aftermath of the global financial crisis, client companies had lower earnings and may therefore have applied pressure on audit firms to cut down on audit fees during contract negotiations. Companies recognize that cost cutting is necessary to survive a recession (Gulati et al. 2010). In this context, an operational excellence strategy could also create a differential advantage for safety audit firms. As mentioned before, such a strategy focuses on the combination of quality, price and service chain optimization. Besides, in the aftermath of the financial crisis the investment climate declined drastically. In times of uncertainty, the estimated risk with regards to the return on capital for different types of organizations could be much lower than the cost of capital. Therefore, state-of-the-art safety services and innovation might not be required, and a service leadership strategy might be less relevant. Organizations focusing on this strategy often display an emphasis on

creativity and innovation and typically produce a continuous stream of state-of-the-art services.

Accordingly, the hypotheses are formulated as follows:

H3. The more the operational excellence strategy is picked out, all the more loyal the client will be to the audit firm.

H4. The more the client intimacy strategy is picked out, all the more loyal the client will be to the audit firm.

Size as a control variable

Since in large companies a safety audit team is stationed on-site, the overall customer satisfaction should be higher in the retention segment with regards to other companies. To capture other competitive forces (i) audit fees, (ii) attraction of competition and (iii) switching costs are entered in the first model (Porter 2008).

Methodology

Sample

In this study, the client's management are the auditor clients. The addresses were gathered from a big safety audit firm in Belgium. Measures were taken to ensure that the sample included companies with various shares of turnover – i.e. low turnover, growth segment and retention segment. The share of turnover is a ratio that is based on the size of the client's company and the client's total audit fees in a year. The company's size is measured in terms of the total number of employees. The following sizes were considered: < 50 employees, 50-250 employees and > 250 employees.

The focus of this study lies on the growth segment and the retention segment. The clients' audit fees in the growth segment ranges from 15,000 USD to 200,000 USD. It was

necessary to omit 162 companies because of faulty email addresses, leaving a total sample of 884 companies.

Questionnaire and operationalization of factors

To develop and test the hypotheses, a questionnaire was developed based on the literature and pre-tests. The questionnaire – which was translated to Dutch – was comprised of close-ended questions arranged into several sections (the Appendix). All questions were answered using a seven-point Likert-type scale anchored at 1 (fully disagree or fully dissatisfied) and 7 (fully agree or fully satisfied).

Client satisfaction dimensions are measured by questions about the specific satisfaction dimensions in absolute terms and the overall satisfaction in relation to all different aspects of the service rendered. The auditor’s competence is measured by means of questions about the auditor's knowledge of safety regulations and standards. The quick response is measured by means of questions about the audit production time, meeting deadlines and the auditor's flexibility.

In the strategic management literature there is a dearth of survey-based reflective measures with regards to generic strategic value dimensions. Therefore we searched for relevant, survey-based reflective indicators in the marketing literature. These factors are based on their strategic value definitions.

The questionnaire was pretested in two steps. Firstly, one senior auditor, a regional director, and the corporate sales and marketing director of the audit firm were asked to browse through the questionnaire and comment on the items. The decision to engage these individuals in the first stage of the process was motivated by their knowledge of the audit work and the relevance of the questions. Secondly, six health and safety managers were asked to complete the questionnaire and comment on whatever questions they found unclear. After each stage, the questionnaire was revised and refined.

Data gathering

The questionnaire was electronically distributed to the audit firm clients in Flanders together with a cover letter describing the purpose of the study. The addresses of the client companies were obtained through stratified random sampling. 884 questionnaires were distributed at the end of July 2010 and a reminder was sent one week later. A total of 275 usable questionnaires were returned before the deadline of August 2010. This gives us a response rate of 31 percent. The response rate corresponds with those of other, similar studies; for example, in de Ruyter and Wetzels (1999) the response rate was 24 percent, in Ismail et al. (2006) 23 percent. Accordingly, our response rate can be considered most acceptable for an e-mail survey in this subject area.

Of the total number of respondents, 91 percent was employed in the growth segment. All respondents were asked to report their titles, and it was found that the respondents included safety and health managers and technical managers. Of the respondents, 32 percent included audit client companies with more then 250 employees, and 27 percent between 50 and 250 employees; 91 percent of the companies had been active for more than 10 years.

The willingness of the respondents to respond was very high. 64 percent of the respondents started the survey within two days and 21 percent responded within two days after the reminder. Non-response bias did not appear to be a factor since there were no significant differences between early and late responses (Armstrong & Overton 1977).

Results

Descriptive statistics

Table I provides some descriptive statistics for the different variables included in both models. Remember that judgments were elicited on a 7-point scale. The segmentation of the companies was based on the size of the audit client, and the client's audit fees. Table I illustrates that respondents in both segments were neither satisfied nor dissatisfied with the

audit fee, and switching costs were perceived as average, with the mean responses ranging from 4.11 to 4.94. While, generally speaking, other variables scored high, we noticed significant differences between both segments with regards to quick response and competence. More specifically, for quick response the mean was 5.42 (SD = 0.66) in the growth segment, compared to 6.02 (SD = 0.66) in the retention segment.

---------- INSERT TABLE I ABOUT HERE ----------

---------- INSERT TABLE II ABOUT HERE ----------

Table II provides Spearman correlation coefficients of the different factors. All measures except attraction of competition are highly correlated with the lean management factor – i.e. quick response. The magnitudes of the correlations between the other independent variables do not suggest collinearity problems. Additionally, it can be concluded that both model fits are very satisfactory. As can be seen in Table III, the respective adjusted R^2 of Model 1 and 2 are 0.82 and 0.60.

Tests of hypotheses

It is surprising that there is no significant relationship between competence and client loyalty (t-value for H1 = 1.489) (Table III). There is, however, a significant relationship between quick response and client loyalty (t-value for H2 = 3.167). Regarding the perceived value strategy, there are positive relationships between the client intimacy and operational excellence strategy. Consequently, the service leadership shows no significant relationship. Hence, only H1 is rejected; the other hypotheses are accepted.

The tests of the client segmentation reveal that quick response and overall customer satisfaction is higher in the retention segment than in the growth segment (Table I). These

findings are consistent with the expected relationship.

---------- INSERT TABLE III ABOUT HERE ----------

Discussion

Quick Response and 'eye balling' in safety audit services

The audit clients seem to attach considerable importance to quick response. Remarkably, the knowledge competence of the auditor is not significant. The fact that competence did not attain statistical significance can be related to the fact that the audit fee plays a more important role in the aftermath of the financial crisis. The analysis shows that audit fees are highly determinant in the loyalty of the client managers. Client managers could become highly motivated to negotiate audit fees; hence, audit fees become more significant. It may also highlight the possibility of 'eye balling' in statutory safety audit services and of the shopping behavior of client management. Especially, since switching costs, which are perceived as average, is the most important determinant of client loyalty. Hence, with a view to defending their market positions, big safety audit firms are doing well to implement lean management principles.

---------- INSERT FIGURE II ABOUT HERE ----------

Generating a competitive advantage via 'routing' and 'rostering'

The strategy that entails both client intimacy as well as operational excellence being the value disciplines induces client loyalty. As stated before, the crucial driver of client loyalty is the satisfaction with 'quick response'. This requires an ongoing and interactive relationship. Most safety audit services are performed in situations where time is of the essence. Besides, only with clients in the retention segment, a safety audit team is permanently stationed at the client's site and on stand by. Hence, lean management tools on operational service level such

as ‘routing’ and ‘rostering’ can generate competitive advantages.

Conclusion

Lean’s influence continues to grow thanks to the success of the concept in manufacturing companies. Intangible services, such as safety audit services, not only have a context separate from manufacturing, but also differs fundamentally in nature, calling into question the business logic of lean. This study argues the potential of lean in the business logic of big audit firms, particularly in statutory safety auditing. Our analysis shows that lean management principles fit the business logic of big safety audit firms. We also found that the audit fee becomes highly determinant in the appointment of the audit firm. Besides, the study also highlights the existence of ‘eye balling’ – i.e. shopping behaviour and applied pressure on audit firms to cut down on audit fees during contract negotiations.

Our research has several managerial and theoretical implications. First, big safety audit firms are doing well to implement lean management principles in order to defend their market positions. Most safety audit services are performed in situations where time is of the essence. The success of statutory safety audit is dependent on knowing the audit client’s need and when the audit has to be performed. Furthermore, the audit has to be performed in a cost-efficient manner. For the academic community, our research identifies the first evidence and practical insights for the furthering of research into ‘routing’ and ‘rostering’ of safety auditors.

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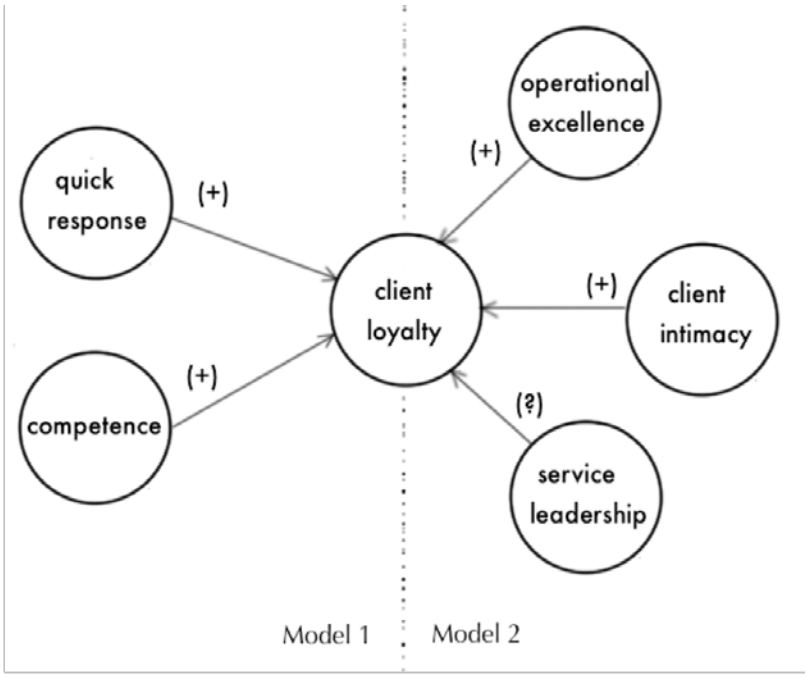
Figure 1.

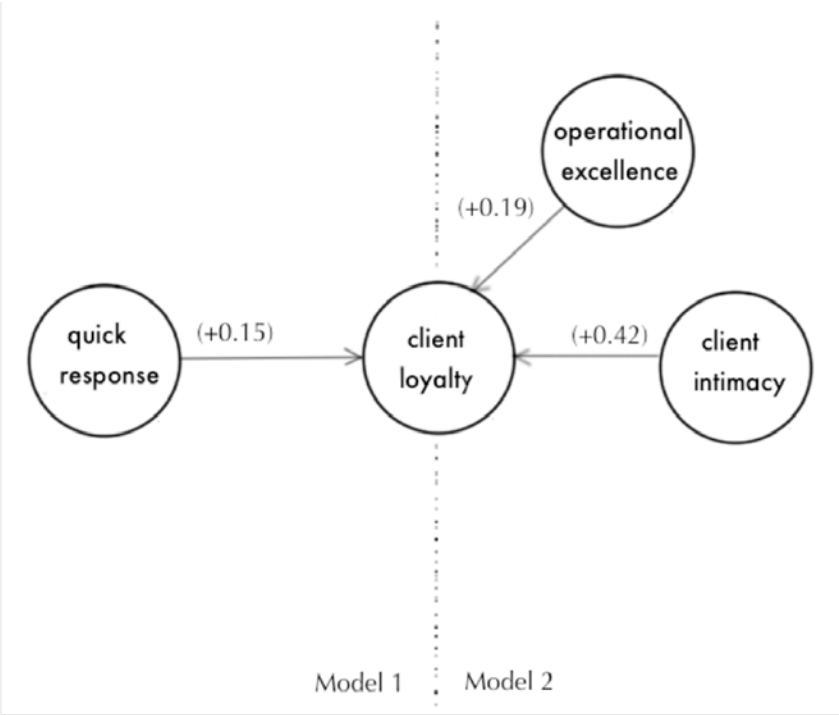
The Conceptual Model



Nota. All variables are measured from a client perspective

Figure 2.

Results of
OLS regression



Note. All variables are measured from a client perspective

Varlable	Growth segment n=51		Retention segment n=14		difference	
	Mean	SD	Mean	SD		
Customer Loyalty	5,08	0,79	5,53	0,61	0,45	**
Quick Response	5,42	0,66	6,02	0,66	0,60	**
Competence	5,87	0,78	6,57	0,51	0,71	***
Switch costs	4,24	1,67	4,94	1,34	0,70	
Audit Fee	4,11	1,42	4,27	0,96	0,16	
Attraction of Competition	5,09	0,88	5,00	0,83	-0,09	
Overall Customer Satisfaction	5,70	0,58	6,12	0,53	0,42	**

TABEL I.

DESCRIPTIVE STATISTICS

	overall customer satisfaction	attraction of competition	switching cost	audit fee	quick response	competence
overall customer satisfaction	1	-,184*	,297**	,381**	,571**	,608**
attraction of competition		1	-,176*	,039	-,144	-,098
switching cost			1	,276**	,268**	,282**
audit fee				1	,292**	,355**
quick response					1	,539**
competence						1

Table II.

CORRELATION MATRIX

Variable	Model I					Model II				
	Coefficients		t-Value	p-Value	*VIF*	Coefficients		t-Value	*p*-Value	*VIF*
Quick response	0,148	***	3,167	0,002	2,083					
Competence	0,068		1,489	0,138	1,973					
Switch costs	0,428	***	11,202	0	1,236					
Audit Fee	0,398	***	10,587	0	1,235					
Attraction of competition	-0,080	***	-2,687	0,008	1,106					
Operational Excellence						0,193	***	2,999	0,003	1,729
Client Intimacy						0,415	***	5,135	0,000	2,709
Service Leadership						-0,006		-0,082	0,935	2,467
Overall Customer Satisfaction	0,092	**	1,940	0,054	2,176	0,307	***	4,182	0,000	2,176
Dummy_growth	-0,011		-0,323	0,747		0,073		1,406	0,161	
Dummy_retention	0,013		0,362	0,717		-0,009		-0,181	0,857	
Adj. R^2				0,817	***				0,598	***
Number of Firms					178					178

***: statistic significant at 1% level
**: statistic significant at 5% level
*: statistic significant at 10% level

Table III.

OLS REGRESSION STATISTICS

APPENDIX

Factors	Questions	
Background questions (B)	B1: How long does your company exist? B2: How many employees does your company have? B3: To what figure does your total portfolio with this audit firm amount in monetary units (= a thousand, euros not including VAT)? B4: What is your position within your organisation?	
Competence (COM)	COM1: The auditor is highly competent. Fully disagree (1)-fully agree (7)	
Quick response (QR)	QR1: How satisfied are you with the time it takes to audit an installation? Fully dissatisfied (1) and fully satisfied (7). QR2: How satisfied are you with the auditor's flexibility? Fully dissatisfied (1) and fully satisfied (7). QR3: How satisfied are you with the on-time service accuracy of the audit service? Fully dissatisfied (1) and fully satisfied (7).	0.825
Attraction of alternatives (AOA)	AOA1: I think there are significant differences in the rendered audit service between this audit company and other audit companies. Fully disagree (1)-fully agree (7) AOA2: Apart from this audit firm there are other controlling bodies that would give me the same satisfaction. Fully disagree (1)-fully agree (7) AOA3: If our organization were to decide to cease to collaborate with this audit firm, there still are a number of suitable, alternative audit firms to choose from. Fully disagree (1)-fully agree (7)	0.683
Client loyalty (CL)	CL1: I am very satisfied with the decision to appoint this audit firm. Fully disagree (1)-fully agree (7) CL2: I would recommend the firm's audit service to my business partners and colleagues in my sector of industry. Fully disagree (1)-fully agree (7) CL3: Generally speaking, I have a good feeling about this audit firm. Fully disagree (1)-fully agree (7)	0.927
Audit fee (FEE)	FEE1: Please indicate how satisfied you are with the audit fee. Fully disagree (1)-fully agree (7)	
Switching cost (SWC)	SWC1: It would take a lot of time and effort to switch to another audit firm.	

(continued)

Factors	Questions	
Operational excellence (OE)	OE1. Please indicate which competitive strategy the audit firm has followed in the last three years: continuous attention to the lowest cost. Fully disagree (1)-fully agree (7)	
Client intimacy (CI)	CL1: This audit firm helps me to achieve my targets. Fully disagree (1)-fully agree (7) CL2: This audit firm tries to achieve the company goals by client satisfaction. Fully disagree (1)-fully agree (7)	0.841
Service leadership (SL)	SL1: Please indicate which competitive strategy the audit firm has followed in the last three years: research and development of new audit products. Fully disagree (1)-fully agree (7) SL2: Please indicate which competitive strategy the audit firm has followed in the last three years: innovation of audit production processes. Fully disagree (1)-fully agree (7) SL3: Please indicate which competitive strategy the audit firm has followed in the last three years: research and development of current audit products. Fully disagree (1)-fully agree (7)	0.912
Overall customer satisfaction (OCS)	OCS1: Taken everything into account, what do you think of the audit service of this company? Low level of service (1) – high level of service (7) OCS2: Taken everything into account, what do you think of the audit service of this company? Bad (1) – Excellent (7) OCS3: Taken everything into account, what do you think of the audit service of this company? Limited (1) – Large (7)	0.844