

## THE ROLE OF TRAINING IN DISMANTLING BARRIERS TO SME PARTICIPATION IN PUBLIC PROCUREMENT

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**ABSTRACT.** This paper examines entry barriers to involvement in public procurement of small and medium-sized enterprises and the role of training in dismantling those barriers. We find that firms' perceptions of barriers are of five main types. Regression analysis shows that a lack of ongoing training is associated with SMEs' perceptions of resource constraints and practical skills that hinder their participation in public procurement. We also observe a positive connection between a positive attitude toward training and SMEs' participation rates in public procurement. As a managerial implication, the value of training should be appraised at the firm level, and organizing training and providing information concerning public procurement could be a recommended policy to improve the SME participation rate in public procurement.

### INTRODUCTION

Small and medium-sized enterprises (SMEs) are generally under-represented in public procurement (GHK, 2010; Nicholas & Fruhmann, 2014; Pwc, 2014). To tackle the issue, the European Union (EU) has made efforts to better accommodate the requirements of SMEs in public sector tendering (e.g. Commission of the European Communities, 2008b) based on experiences of the

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performance of public procurement and SME surveys (KMU 2004; GHK, 2010). Currently, however, barriers that impede SMEs' involvement in public procurement are not adequately understood (Pickernell, Kay, Packham, & Miller, 2011). While an extensive approach to the barriers SMEs encounter is lacking, there are some studies that have addressed the SME barrier problem in public procurement. Loader (2005) discloses several barriers to SME participation, such as a lack of awareness of procurement opportunities and difficulties getting approved as a supplier. Peck and Cabras (2011) find that SMEs perceive bureaucracy and the time-consuming procurement process as key disadvantages in public procurement. Flynn, McKevitt, and Davis (2015) show that in comparison to small and medium-sized firms, micro-enterprises in particular face resource constraints in public sector tendering. Based on a survey of suppliers involved in public procurement of innovations, Uyarra et al. (2014) argue that barriers are related to the procurement process, such as contract size, a lack of feedback and communication.

As a direction for research, Flynn, McKevitt, and Davis (2015) call for more refined research on SME characteristics and how they influence tendering. On this front, recent empirical studies emphasize the importance of the strategic behavior of SMEs in public procurement participation. Tammi, Saastamoinen, and Reijonen (2014) argue that market-oriented SMEs are more likely to become suppliers to the public sector. In a similar manner, Reijonen, Tammi, and Saastamoinen, (2016) show that entrepreneurial orientation could play an important role in an SME's decision to find business opportunities in public procurement. While identifying entrepreneurial capabilities as an important factor in securing business with large public and private purchasing organizations, Woldesenbet, Ram, and Jones (2012) also highlight the need to develop human capital with respect to skills and competences.

This paper proposes that one explanation for the observed low participation rate may lie in difficulties and barriers linked to the characteristics of public procurement and to participating in procurement itself. The former group consists of difficulties and barriers such as inadequate exchange of information and biased selection criteria, whereas the latter category refers to barriers such

as a lack of resources and skills required in the tendering process. As a remedy, we propose that training could play a pivotal role in overcoming these barriers. Thus, the research questions addressed in this paper are: Do firms perceive the barriers found in previous studies uniformly? Does training have any role in dismantling the difficulties and barriers?

These questions are addressed by studying a sample of Finnish SMEs using an exploratory approach. We survey how active SMEs are in tendering for public sector contracts, their perceptions of barriers to public procurement, and the role of training in their organizations. Using principal component analysis (PCA), we find that firms perceive five main varieties of barriers. A related methodology has been applied in Hasselbach, Costa, and Blecken (2014), who analyze the procurer's perception of barriers in sustainable procurement. Our results suggest that a lack of on-going training is associated with perceptions of resource constraints and practical skills that hinder participation in public procurement. In addition, we find that training may increase SMEs' participation rate in public procurement.

The rest of the paper proceeds as follows. The next section provides a literature review that covers the role of SMEs in public procurement, the influence of training on SMEs, and research on difficulties and barriers to participating in public procurement tendering. After this, we introduce the data and methods employed in the statistical analysis. This is followed by the results, and finally a conclusion.

## LITERATURE REVIEW

### SMEs and Public Procurement

In most economies, the public sector is an important buyer of goods and services from the private sector. In the EU, for example, public procurement accounts for one-sixth of the total GDP (Arrowsmith, 2009). The extent of public procurement alone shows that it provides ample business opportunities for the private sector.

Several reasons exist why involvement in public procurement could be profitable for firms: First, the public sector typically has buyers that may commit to long-term contracts, such as framework agreements that span several years. Second, prompt, timely payments may reduce the volatility of cash flows and risks related to

it (ACCA, 2009). In the SME context, this is important due to their limited financial resources, and for this reason, some countries have introduced legislation that the public sector pay their contractors within a prescribed timeframe (Pwc, 2014). Third, being a supplier to the public sector may also serve as a shield toward recessionary periods typical in private sector economic activity (Procurement Group, 2012). Fourth, many SMEs that are subcontractors of large firms in public procurement might receive greater financial rewards when contracting directly with the public sector (ACCA 2009). Finally, by increasing its performance in public procurement markets, an SME may obtain prestigious references from the public sector (Procurement Innovation Group, 2009).

Public procurement statistics indicate, however, that SMEs are severely under-represented in public procurement compared to their contribution to the economy (Pwc, 2014). Micro- and small enterprises are particularly disadvantaged in the acquisition of public sector customers because medium-sized firms do not differ from large corporations in their ability to secure procurement contracts (GHK, 2010). There is a considerable difference in SMEs' share of contracts depending on the contract value. SMEs secure 56% of contracts above the EU threshold versus 73% of contracts below the threshold (Pwc, 2014). The proportion of contracts above the threshold awarded to SMEs has slightly decreased in recent years (GHK 2010). According to Pwc (2014), however, these changes are modest and can be attributed either to the methodology regarding the verification of procurement records or random fluctuations in the relative shares of awarded contracts. Measured by contract value, SMEs have less than 30% of contracts above the threshold versus 61% of contracts below the threshold (Pwc, 2014). In addition, when contract values increase beyond 100,000 euros, the share of micro-enterprises diminishes, and similar pivot values can be found at 300,000 euros for small enterprises and at 5 million euros for medium-sized companies (Pwc, 2014).

Recently, the importance of increasing the participation rate of SMEs in public procurement markets has been recognized by EU policymakers and specialists. The core idea is to identify and share good practices among the EU member countries (European Commission, 2011). European Commission (2008a) believes that more active involvement of SMEs would increase competition in

public procurement and, consequently, increase value for money in public sector purchases and contribute positively to job creation, economic growth and innovation. Furthermore, there are other obvious and important benefits from the increased participation rate, such as improved efficiency, better access to market knowledge, more extensive creation of added value and an increase in the number of innovative solutions (van Ham & Koppenjan, 2002). Finally, it has also been argued that since SMEs are usually local by nature, they are capable of adapting to local circumstances and to the needs of the local contracting authorities (Fee, Erridge, & Hennigan, 2002). This local nature of SMEs also provides an opportunity for public purchasers to realize a wider responsibility to the local economy and society (Preuss, 2011).

### **Barriers to Public Procurement**

SMEs face numerous difficulties and barriers that hinder their access to public procurement. These barriers can be both perceived and real, as Loader (2005) found in her study that a majority of those who saw the barriers as existing were, in fact, currently suppliers to the public sector. Whether perceived or real, they restrict SME involvement in public procurement because perceptions generally influence the behavior of firms. Studies have shown, for example, that entrepreneurs' perceptions of their firms' resources can affect their operations and performance (Karjalainen & Kempainen, 2008). Although many of the perceived obstacles do not depend on the size of the firm, some of them comprise greater challenges, especially for micro-firms (GHK, 2010; Karjalainen & Kempainen, 2008).

Loader (2011) divides the impediments to SMEs' participation in public procurement into two categories. In the *first category*, there are imperfections in the public sector environment and procurement processes, which are related to matters such as policy, procurement organization and culture, contract requirements and the tendering process. In the *second category*, there are problems stemming from capacity constraints, lack of skills and attitudes toward public procurement. Evidence shows, for example, that SMEs (1) seldom plan and use a formal customer acquisition process (Wang, Walker & Redmond, 2007), (2) encounter difficulties in using resources in new ways (Ambrosini, Bowman & Collier, 2009), (3) have problems in

acquiring financial and human resources, and (4) lack legal and administrative resources (Karjalainen & Kemppainen, 2008).

A closer look at the barriers to public procurement reveals that one of the largest is a lack of information. Several researchers have pointed out that small firms are not well aware of the opportunities to supply to the public sector, or that they have difficulties in finding the information or the right contact person (e.g. Loader, 2005; ACCA, 2009; Procurement Innovation Group, 2009). In addition, small firms often have a lack of knowledge about the tendering process and the correct bidding procedures (Loader, 2005; ACCA, 2009). This can partly result from the wording used in tender forms and instructions, which may be written using complex specialist jargon (ACCA, 2009). There is a lack of knowledge also on the part of the public sector. Commissioners and procurement professionals may possess limited knowledge, experience and expertise regarding small firms and how they operate (ACCA, 2009).

Another significant group of barriers is related to SME resources. Many calls for tenders are too large for SMEs because they have a limited supply capacity (Fee, Erridge, & Hennigan, 2002; Karjalainen & Kemppainen, 2008). It has been even argued that a contract value has the greatest impact on the extent to how SMEs can access them (GHK, 2010). Very often, the ability of a small firm to bid for a contract decreases as its value increases (Pwc, 2014). Moreover, small firms may feel that the public sector prefers large contracts and thus favors large companies (ACCA, 2009). Sometimes, pre-qualifications can also form a barrier as, for example, a certain amount of financial reserves are required (ACCA, 2009).

Another barrier often mentioned is the administrative burden, which involves both enterprise resources and the tendering process. Many small firms believe that the bidding process is unnecessarily complex and costly (Procurement Innovation Group 2009). The time and other resource costs required for preparation and the actual tendering process are often regarded as disproportionate to the scale and value of the contract (Loader, 2005). The documentation can seem bureaucratic by nature, and the fact that it has to be rewritten for each application causes irritation (Fee, Erridge, & Hennigan, 2002). In addition to these, the deadline for submitting a bid can be too tight (ACCA, 2009).

The procedures and selection criteria can also form a barrier. The evaluation criteria can be seen as ambiguous (GHK, 2010) or overly restrictive (Procurement Innovation Group, 2009). As a decision criterion, price is often over-emphasized, which results in smaller numbers of suppliers being awarded contracts (ACCA, 2009). Public buyers also seem to be reluctant to consider new suppliers (ACCA, 2009) and prefer only those firms with strong track records (Loader, 2005). One of the problems raised in the report by GHK (2010) is that sometimes a contract is prepared to be given to a supplier that has participated in the previous phases of the project, but this is not communicated clearly, so new bidders do not know that they are working in vain. These kinds of problems contribute to the negative perceptions that SMEs sometimes have of the selection criteria and the tendering practices.

In order to lower these barriers, several recommendations have been given. It has been suggested, for example, that the provision of information should be improved, more dialogue between public bodies and small firms generated, and bureaucracy reduced (Loader, 2005). Moreover, training could present itself as a tool to dismantle the barriers, and the next section discusses this possibility in more detail.

### **Training within SMEs**

Some of the barriers recognized by SMEs that hinder their involvement in public tendering could be lowered by training. Issues regarding lack of information and knowledge could be addressed through training where, for example, the procurement process could be explained and the information sources pertaining to tendering identified. Through training, the perceptions SMEs hold about tendering, its practices and processes could also be shaped. At the same time, however, Loader (2005) points out that SMEs feel that not enough training is provided for efficient and effective procurement.

SMEs are seen to utilize training to a varying extent and with varying results (Thassanabanjong, Miller & Marchant, 2009). It is said that SME training reflects the characteristics of the firms themselves, being often informal, reactive in nature and short-term in outlook (Hill & Stewart, 2000). Matlay (2000) notes that only a minority of small firms manage learning and knowledge in a proactive and strategic

way to sustain and develop the firm's competitive advantage. Because they are often focused on short-term survival, small firms tend not to be interested in training as it is a long-term strategic choice (Fuller-Love, 2006). It has also been found that the frequency of formal learning increases along with the size of the firm (Matlay, 2000). This means that small firms do not train employees as actively as larger ones do (Bryan, 2006). There are several reasons for this; for example, small firms have higher employee turnover, higher failure rates and more limited long-term career prospects than their larger counterparts (Bryan, 2006).

Much of the research conducted on SME training has concentrated on examining these obstacles to participation. Hill and Stewart (2000) found that there are generally two factors that affect the likelihood and nature of training in SMEs: the attitude and motivation of the owner-manager, and the perceived impact of training on the firm's performance. Lange, Ottens, and Taylor (2000) listed four kinds of obstacles: cultural, financial, access and provision as well as awareness. According to them, cultural barriers form one of the biggest hurdles, as they reflect the attitudes of owner-managers, who might, for example, resent the idea of their employees being more skillful than them. With regards to financial barriers in small firms, training is often seen as an expense rather than an investment (Fuller-Love 2006). Moreover, additional reservations may arise from the fact that the money spent in training may be lost if a trained employee decides to go to work in another firm (Bryan 2006). Access and provision might also prove to be challenging to small firms, as training, for example, might not be conveniently located (Fuller-Love 2006) or they may feel that the training offered does not meet their specific requirements (Lange, Ottens, & Taylor, 2000). Sometimes, SMEs are not aware of the training possibilities available to them (Lange, Ottens, & Taylor, 2000). In addition to these barriers, time is also something that has to be taken into account. In small firms, employees may be so indispensable that they cannot be spared even for a one day of training (Fuller-Love. 2006).

Identifying these obstacles is the basis for finding ways to encourage and support SMEs in becoming more involved in training, as it is seen to enhance firms' productivity, competitiveness and performance (Bryan, 2006; Fuller-Love, 2006; O'Regan, Stainer, & Sims, 2010). It is thought that in order for firms to cope in today's



markets, which are often characterized as rapidly changing and intensively competitive, it is essential that firms strengthen the knowledge, skills and abilities of their employees so that they can grow, innovate and keep on developing (Truitt, 2011).

All in all, training can help form a clearer overall picture of the firm's strategy and every person's role in implementing it (e.g. O'Regan, Stainer, & Sims, 2010). Training can also enhance the formation of favorable attitudes towards the strategy, through learning and adapting to new things (e.g. Lange, Ottens, & Taylor, 2000). It also increases knowledge and improves the technical and other skills required to perform work tasks (e.g. Bryan, 2006). Thus, training can play an important role in overcoming the hurdles that SMEs feel hinder their involvement in public sector tendering. Through training, they can acquire knowledge that provides them with tools to better assess the public procurement process and its requirements, and also skills that help them to participate in the process. In this study, we examine how having a positive stance toward training or seeing obstacles that hinder the training affect SMEs' activity in participating in public procurement and also their perceptions of its barriers.

## **QUESTIONNAIRE DEVELOPMENT, DATA AND DESCRIPTIVE STATISTICS**

### **Data Collection and Questionnaire Development**

To test our hypotheses, we collected data from SMEs using a questionnaire. In addition to measuring SMEs' activity in public procurement, perceptions of difficulties and barriers related to public procurement, and training orientation, we gathered information on several background factors. Of these, the size and age of the firm, the respondent's gender and education and the firm's main industry were used as control variables in our analysis. The online questionnaire was sent to firms located in North Karelia, Finland, in September 2012. The local regional development company, JOSEK Ltd (Joensuu Regional Development Company) provided contact information. Enterprises or for-profit organizations that employed up to 249 persons were selected for the study resulting in 3,305 recipients, of whom 240 responded (a response rate of 7.2%). From this sample, 217 responses were eligible for our study. The potential nonresponse bias (Armstrong and Overton 1977) was evaluated by comparing the first and second wave respondents, and the second and third wave

respondents (after the first reminder), but no statistically significant differences in the distributions of age, turnover and personnel were found.

Attitudes towards training were measured using eight items that were adopted from the scale used by Conduit and Mavondo (2001). Three items from the original scale of eleven were dropped and the wording was slightly changed in places so that the scale would better fit the context of Finnish SMEs and the aim of this study. The measures were on a five-point Likert scale, from (1) “strongly disagree” to (5) “strongly agree”. The questions are presented in the context of the principal component analysis (Table 6).

Perceived barriers to public procurement participation were surveyed with 32 statements measured on the five-point Likert scale. Respondents were presented with the following instructions: “The following statements describe factors that may impede participation in public procurement. Please, evaluate these from your firm’s perspective.” The results of the questionnaire are reported in Table 1. In over two-thirds of the answers received, the mean was statistically different from the neutral choice. The three highest barriers were seen to be *Over-emphasis on price in the selection of suppliers* (3.99), *Evaluation criteria favor large companies* (3.85), and *Lack of dialogue with the customer* (3.43). The three lowest barriers were considered to be *Lack of technological capacity* (2.41), *Lack of staff with expertise on public procurement* (2.42), and *Lack of financial guarantees* (2.45).

**TABLE 1**  
**Survey Questionnaire Regarding Barriers to Public Procurement**

Statement	1	2	3	4	5	$\bar{x}$	T
The channel where public sector tenders are announced is unknown (Loader, 2005; ACCA, 2009)	29.1	24.2	18.5	15.9	12.3	2.59	<b>-4.36<sup>a</sup></b>
Lack of legal expertise (Karjalainen & Kempainen, 2008; Procurement Research Group, 2012)	11.1	20.9	32.0	22.2	13.8	3.07	.90
Tendering opportunities for our line of business are rare or non-existent (GHK, 2010)	12.4	17.7	20.8	30.5	18.6	3.24	<b>2.72<sup>a</sup></b>
The channel where public sector tenders are announced is unknown (Loader, 2005; ACCA, 2009)	29.1	24.2	18.5	15.9	12.3	2.59	<b>-4.36<sup>a</sup></b>

TABLE 1 (Continued)

Statement	1	2	3	4	5	$\bar{x}$	T
Lack of legal expertise (Karjalainen & Kempainen, 2008; Procurement Research Group, 2012)	11.1	20.9	32.0	22.2	13.8	3.07	.90
Tendering opportunities for our line of business are rare or non-existent (GHK, 2010)	12.4	17.7	20.8	30.5	18.6	3.24	<b>2.72<sup>a</sup></b>
Difficulties in operating information systems/ electronic procurement system (Karjalainen & Kempainen, 2008; GHK, 2010)	18.8	25	25.4	17.4	13.4	2.84	<b>-1.84<sup>c</sup></b>
Tendering requires too much administrative resources and/or expertise (Fee, Erridge, & Hennigan, 2002; Loader, 2005; Karjalainen & Kempainen, 2008; GHK, 2010; Procurement Research Group, 2012)	13.0	19.7	28.3	24.2	14.8	3.08	.92
Human or production resources are insufficient to become a supplier for the public sector (Loader, 2007; GHK, 2010)	24.3	21.2	26.1	14.4	14.0	2.73	<b>-2.89<sup>a</sup></b>
Lack of information on tenders (Loader 2005; Karjalainen & Kempainen, 2008; GHK, 2010)	10.8	18.8	30.0	27.4	13.0	3.14	<b>1.71<sup>c</sup></b>
Payment schedule is too long (GHK 2010)	12.1	26.5	35.9	14.3	11.2	2.88	-1.53
Tendering requires too much paperwork (Loader, 2005, 2007; Peck & Cabras, 2011; Procurement Research Group, 2012)	8.1	16.2	30.6	27	18.0	3.31	<b>3.82<sup>a</sup></b>
Insufficient time to prepare tenders (Fee, Erridge, & Hennigan, 2002; Loader, 2005; GHK, 2010)	13.5	21.6	36	17.6	11.3	2.93	-.87
Lack of a dialogue with the customer (Loader, 2005; Karjalainen & Kempainen, 2008)	3.6	16.6	35.9	22	22.0	3.43	<b>5.68<sup>a</sup></b>
Suppliers must meet disproportionate financial requirements (GHK, 2010; Procurement Research Group, 2012)	8.0	19.6	35.7	18.3	18.3	3.18	<b>2.25<sup>b</sup></b>
Financing is difficult to obtain (Rasheed 2004; GHK 2010)	24.8	24.3	33.8	9.0	8.1	2.51	<b>-5.94<sup>a</sup></b>
Lack of financial guarantees (GHK, 2010)	27.7	21.9	35.7	7.6	7.1	2.45	<b>-6.82<sup>a</sup></b>

TABLE 1 (Continued)

Statement	1	2	3	4	5	$\bar{x}$	T
It is difficult to obtain additional information on tenders (GHK, 2010; Procurement Research Group, 2012)	10.8	18.8	40.8	17.5	12.1	3.02	.30
Suppliers must meet disproportionate technical requirements (GHK, 2010)	9.0	20.2	43.9	13.0	13.9	3.00	.06
Invitations to tender are incoherent (Fee, Erridge, & Hennigan, 2002; GHK, 2010)	8.1	18.1	33.9	22.6	17.2	3.22	<b>2.81<sup>a</sup></b>
Over-emphasis on price in supplier selection (Loader, 2005, 2011)	2.7	7.1	24.4	23.6	42.2	3.99	<b>13.67<sup>a</sup></b>
Insufficient feedback is provided (Procurement Research Group, 2012)	3.2	10.8	45.0	26.1	14.9	3.39	<b>5.91<sup>a</sup></b>
Supplier selection is carried out unfairly (Fee, Erridge, & Hennigan, 2002; GHK, 2010)	4.5	12.6	45.7	22.0	15.2	3.31	<b>4.44<sup>a</sup></b>
Evaluation criteria favor large companies (Loader, 2007; GHK, 2010)	4.5	7.1	24.6	27.2	36.6	3.85	<b>11.06<sup>a</sup></b>
Contract values are too large (Loader, 2005; GHK, 2010; Peck & Cabras, 2011)	15.8	16.7	38.7	16.2	12.6	2.94	-.72
Framework contracts are used (Fee, Erridge, & Hennigan, 2002; GHK, 2010)	8.6	10.9	60.9	10.5	9.1	3.00	-.07
Joint tendering is not allowed (Loader, 2005; GHK, 2010)	16.4	14.6	43.4	9.6	16.0	2.94	-.72
Our ability to compete with price is not sufficient for public sector tenders (Loader, 2007; GHK, 2010)	24.6	15.6	35.7	14.3	9.8	2.70	<b>-3.45<sup>a</sup></b>
Our product range is too narrow (GHK, 2010).	27.9	18.9	31.5	14.4	7.2	2.53	<b>-5.51<sup>a</sup></b>
Lack of sufficient references (Loader, 2005; GHK, 2010; Procurement Research Group, 2012)	25.2	22.1	36.5	9.9	6.3	2.49	<b>-6.46<sup>a</sup></b>
Lack of technological capacity (GHK, 2010)	24.3	26.6	36.9	7.7	4.5	2.41	<b>-7.89<sup>a</sup></b>
Being a supplier is constrained by the geography (GHK, 2010)	27.6	20.8	35.7	10.0	5.9	2.46	<b>-6.82<sup>a</sup></b>
Lack of staff with expertise on public procurement (Loader, 2005; ACCA, 2009)	27.0	23.0	36.0	9.5	4.5	2.42	<b>-7.56<sup>a</sup></b>
Consortium partners are unavailable (ACCA, 2009).	22.0	27.8	37.7	7.2	5.4	2.46	<b>-7.29<sup>a</sup></b>

**TABLE 1** (Continued)

Statement	1	2	3	4	5	$\bar{x}$	T
Requirements for environmental responsibility, equality, and sustainability are too stringent (Loader, 2005; GHK, 2010; Procurement Research Group, 2012)	20.0	22.7	40.9	8.6	7.7	2.61	-4.99 <sup>a</sup>

Notes: Statistical significance (two-tailed): a p-value < 0.01; b p-value < 0.05; c p-value < 0.1. 1 = Strongly disagree; 2 = Disagree; 3 = Neither disagree nor agree; 4 = Agree; 5 = Strongly agree.  $\bar{x}$  = mean. T indicates whether or not the mean is statistically different from 3.

### Descriptive Statistics: Respondents and Variables in Analyses

Table 2 shows the distribution of the respondents' occupational positions. In all, 79.3% of the respondents are full-time entrepreneurs and owners, 6.5% are part-time entrepreneurs and owners, but only 4.1% are hired CEOs and 9.7% are experts, clerical workers or workers. It is therefore reasonable to assume that the respondents were well-acquainted with their firms' operations.

**TABLE 2**  
**Respondents' Background Information**

Respondent's position	(%)	Sales turnover (in euros)	(%)
Full-time entrepreneur, owner	79.3	Less than 100 000	35.0
Part-time entrepreneur, owner	6.5	100 000 - 199 999	16.6
CEO	4.1	200 000 - 399 999	12.0
Expert	2.3	400 000 - 999 999	13.8
Clerical worker	6.0	1 000 000 - 1 999 999	11.5
Worker	1.4	2 000 000 - 19 999 999	9.7
Missing	0.5	More than 20 million	0.9
		Missing	0.5
Number of employees	(%)	Industry*	(%)
Sole entrepreneur (full/part-time)	34.1	IND_1	21.7
2 - 4	30.4	IND_2	14.7
5 - 9	15.2	IND_3	13.4
10 - 14	6.0	IND_4	8.8
15 - 19	2.3	IND_5	33.6
20 - 49	6.9	Missing	7.8
50 or more	1.0		
Missing	4.1		

TABLE 2 (Continued)

Gender	(%)	Education	(%)
Female	27.6	Primary	42.4
Male	71.0	Secondary	31.8
Missing	1.4	Tertiary	25.3
		Missing	0.5

Notes: IND\_1: Manufacturing, electricity, gas, steam and air conditioning supply, water supply; sewerage, waste management and remediation activities, construction; IND\_2: Wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage; IND\_3: Information and communication, real estate activities, professional, scientific and technical services, administrative and support service activities, education, arts, entertainment and recreation; IND\_4: Human health and social work activities; IND\_5: Others (including accommodation and food services, agriculture, forestry and fishing).

Almost all firms in the sample are SMEs: more than half of the responding firms report an annual sales turnover of less than 400,000 euros. Concerning the number of employees, 79.7% of the firms are micro-size (less than ten employees) and 15.2% of them are small size (10–49 employees). A typical firm's physical operating area is provincial and its main customers are other firms. Only 16.1% of the firms report a public sector organization as their main customer.

Table 3 shows firms' activity in public procurement. 23% of the firms are *passive* in public procurement, i.e. they do not look for invitations to tender nor participate in tendering. Approximately 20% of firms are *interested* in public procurement such that they search for tendering opportunities in the public sector. *Active* firms are the largest group, with a 57% share. These firms both scan for calls for bids and participate in the tendering process. A variable constructed from this information (*ACTIVITY*) is used as a dependent variable in the regression analysis.

TABLE 3  
Activity in Public Procurement

Group	Frequency	(%)
Passive	49	23.2
Interested	42	19.9
Active	120	56.9

Descriptive statistics of the variables entered in regression analyses are reported in Table 4. The firm's size (*SIZE*) is measured by the number of employees in the firm (with zero as the minimum, meaning a part-time sole entrepreneur). The mean size is 5.8 employees. The firm's age (*AGE*) is measured in years, and the average age is 18.5 years. We use a five-class industry categorization. The largest class (except for 'others', *IND\_5*) is production industries (23.5%) followed by knowledge-based service industries (14.5%), trade and related industries (16.0%) and finally, human health and social work activities (9.5%). The industry dummy variables are referred to as *IND\_1* to *IND\_4*, respectively. The correlation matrix indicates that these variables do not correlate strongly with each other, which, in turn, suggests that multicollinearity is not a serious issue in the applied regression models.

## RESULTS

### Principal Component Analysis

Principal component analysis (PCA) was applied to extract the respondents' perceptions of barriers to public procurement and their attitudes toward training. The analysis of the perceived barriers utilizes the item bank introduced in Table 1. Extracted components are reported in Tables 5 and 6. Since the study of perceived barriers is exploratory, assumptions cannot be made about correlations between resulting components. Thus, we apply oblique (Promax) rotation with Kaiser's normalization in the solution reported in Table 5. Loadings and communalities in excess of 0.5 were retained in the final solution (see Hair et al., 2006). Nine original items (*Lack of legal expertise*, *Lack of information on tenders*, *Payment schedule is too long*, *Tendering requires too much paperwork*, *Insufficient time to prepare tenders*, *Suppliers must meet disproportionate financial requirements*, *Framework contracts are used*, *Joint tendering is not allowed*, and *Being a supplier is constrained by geography*) were dropped from the final solution. Since the training survey applied in Conduit and Mavondo (2001) is well-established in the literature, orthogonal (Varimax) rotation with Kaiser normalization is applied in Table 6. A single original item (*My company reimburses employees for training they undertake*) was dropped from the final solution.

**TABLE 4**  
**Descriptive Statistics and Correlations**

Variable	Descriptive statistics		Correlations																		
	Mean	S.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
ACTIVITY (1)	1.34	0.83	211	1																	
TRAIN (2)	.00	1.00	213	.15	1																
LACK* (3)	.00	1.00	216	.04	.00	1															
AGE (4)	18.52	15.69	206	.12	.02	.04	1														
SIZE (5)	5.82	9.47	208	.27	.04	.03	.43	1													
IND_1 (6)	.22	.41	217	.04	-.31	.06	.02	.10	1												
IND_2 (7)	.22	.42	217	-.07	-.07	-.01	.13	.07	-.28	1											
IND_3 (8)	.12	.32	217	.06	.12	.01	-.08	-.06	-.20	-.20	1										
IND_4 (9)	.35	1.13	217	.04	.27	-.15	-.14	.03	-.16	-.17	-.12	1									
IND_5 (10)	.36	.48	217	-.04	.08	.03	.01	-.13	-.39	-.39	-.23	-.23	1								
EDUC (11)	1.17	.56	216	.09	.15	-.06	-.13	-.05	-.02	-.14	.17	.10	-.04	1							
FML (12)	.28	.49	217	-.08	.28	-.07	-.19	-.13	-.23	.08	.00	.22	.00	.19	1						
NOENT (13)	.14	.35	217	.17	.09	.21	.32	.19	.01	.00	.08	-.14	.01	.14	.05	1					
PASSIVE (14)	.23	.42	217	-.88	-.21	-.02	-.08	-.20	-.07	.06	-.07	-.07	.10	-.09	-.02	-.12	1				
RESO (15)	.00	1.00	199	-.34	-.13	.07	-.21	-.29	.01	.01	-.03	.00	.01	-.14	.15	-.18	.25	1			
PROCESS (16)	.00	1.00	199	.20	.05	.02	.05	.01	.02	-.05	.13	.00	-.06	.01	.15	.04	-.18	.24	1		
PRACTICAL (17)	.00	1.00	199	.01	.02	.11	-.05	-.07	-.01	-.16	.01	-.24	.00	-.12	.06	-.06	.02	.30	.41	1	
SKILL(18)	.00	1.00	199	-.21	-.13	.06	.09	-.13	-.11	.02	-.04	.07	.07	-.05	.06	-.02	.18	.30	.08	.27	1



**TABLE 5**  
**Perceived Barriers to Public Procurement**

	Alpha	SB	Initial eigen-value	% of variance explained	Factor loading
<b>Lack of resources (RESO)</b>	.902		7.920	.344	
Human or production resources are insufficient to become a supplier for the public sector.					.638
Financing is difficult to obtain.					.587
Lack of financial guarantees.					.747
Contract values are too large.					.776
Our ability to compete with price is not sufficient for public sector tenders.					.722
Our product range is too narrow.					.749
Lack of sufficient references.					.782
Lack of technological capacity.					.738
Requirements for environmental responsibility, equality, and sustainability are too stringent.					.604
<b>Problematic procurement process (PROCESS)</b>	.870		3.477	.151	
Lack of a dialogue with the customer.					.680
Suppliers must meet disproportionate financial requirements.					.621
It is difficult to obtain additional information on tenders.					.636
Invitations to tender are incoherent.					.777
Over-emphasis on price in supplier selection.					.713
Insufficient feedback is provided.					.807
Supplier selection is carried out unfairly.					.788
Evaluation criteria favor large companies.					.684
<b>Lack of practical skills (PRACTICAL)</b>		.757	1.234	.054	
Difficulties in operating information systems/electronic procurement system.					.824
Tendering requires too much administrative resources and/or expertise.					.770
<b>Lack of skilled employees and partners (SKILL)</b>		.861	1.193	.052	
Lack of staff with expertise on public procurement.					.851
Consortium partners are unavailable.					.810
<b>Lack of awareness of public procurement (AWARENESS)</b>		.439	1.094	.048	
The channel where public sector tenders are announced is unknown.		.592			

TABLE 5 (Continued)

	Alpha	SB	Initial eigen-value	% of variance explained	Factor loading
Tendering opportunities for our line of business are rare or non-existent.					.906

Notes: N = 199; Rotation: Promax; Normalization: Kaiser; Bartlett's test of sphericity:  $\chi^2 = 2417.29$  ( $p$ -value < 0.001); Kaiser-Meyer-Olkin measure of sampling adequacy: 0.882; Alpha: Cronbach's Alpha; SB: Spearman-Brown statistic; A Bartlett scale label in parentheses.

TABLE 6  
Attitudes toward Training

	Alpha	SB	Initial eigen-value	Percentage of variance explained	Factor loading
<i>Training-oriented (TRAIN)</i>	.877		3.652	.461	
My company encourages me to actively undertake training.					.725
My company provides opportunities for me to undertake on-going training.					.687
My company considers formal training to be very valuable.					.827
My company believes all employees should be trained in customer awareness.					.866
My company places high importance on broad employee training.					.847
<i>Training-negative (LACK)</i>		0.435	1.173	.228	
There is not enough on-going training <sup>x</sup>					.832
In my company, most formal training is seen as a waste of time and money <sup>x</sup>					.679

Notes: <sup>x</sup>Item scale reversed; N = 207; Rotation: Varimax; Normalization: Kaiser; Bartlett's test of sphericity:  $\chi^2 = 675.536$  ( $p$ -value < 0.001); Kaiser-Meyer-Olkin measure of sampling adequacy: 0.806; Alpha: Cronbach's Alpha; SB: Spearman-Brown statistic; A Bartlett scale label in parentheses.

### Perception of Barriers to Public Procurement

A principal components solution for the perception of barriers to participating in public procurement produces five distinct components. Bartlett scores, which are used as dependent variables in regression analysis (the variable label in parenthesis follows the construct label), are computed from the extracted components. The reliability of multi-item constructs is assessed with Cronbach's alpha. In general, the acceptable lower limit for the alpha is 0.7, although 0.6 can be considered acceptable in exploratory work (Hair et al., 2006). Since the use of Cronbach's alpha is not recommended for two-item scales, a Spearman-Brown statistic is reported as a more appropriate alternative to it (Hulin, 2001; Eisinga, te Grotenhus, & Pelzer, 2013).

Two components explain the bulk of the shared variance. The first component, referred to as *Lack of resources (RESO)*, passes the reliability test (alpha = 0.902) and explains over a third of the shared variance. It reflects a perception that SMEs are disadvantaged in public procurement because they lack sufficient production resources that provide them means to compete with larger firms for public sector contracts. The second component, referred to as *Problematic Procurement Process (PROCESS)*, has an alpha of 0.870 and explains 15% of the shared variance. According to this view, obstacles stem from difficulties in obtaining helpful information in the tendering process and from the applied selection criteria, which are perceived to be more favorable toward large firms.

The remaining three components explain less shared variance and consist of two-item scales. The third component, referred to as *Lack of practical skills (PRACTICAL)*, has a Spearman-Brown statistic of 0.757 and explains 5% of the shared variance. This component perceives the obstacles originating from the difficulties in using electronic procurement systems or information systems in general, and as a related factor, from a lack of administrative/expert resources required to participate in public procurement. The fourth component, referred to as *Lack of skilled employees and partners (SKILL)*, has a Spearman-Brown statistic of 0.861 and explains 5% of the shared variance. This line of thought perceives obstacles arising from a lack of workers with expertise on public procurement and a lack of suitable consortium partners. The fifth component, referred to as *Lack of awareness of public procurement (AWARENESS)*, has a

low Spearman-Brown statistic (0.439) and explains approximately 5% of the shared variance. For this reason, this construct is dropped from the further analysis.

### **Attitudes toward Training**

A principal components solution for the training survey produced two distinct components: The first construct, referred to as *Training-oriented*, has a good Cronbach's alpha (0.877) and explains almost 46% of the shared variance. It reflects a positive, proactive attitude toward training and its benefits to the firm. A Bartlett score variable, *TRAIN*, represents this construct in regression analyses. The second construct, referred to as *Training-negative (TRAIN)*, accounts for 23% of the shared variance. Due to the low Spearman-Brown statistic (0.435), which implies unsatisfactory reliability, it cannot be considered to be a valid construct. As a result, the surrogate variable method, where the item with the highest loading is a surrogate variable for the factor it represents, will be used to obtain variables for regression analysis (see Hair et al. 2006). In this case, "*There is not enough on-going training*" represents the passive stance and is referred to as *LACK* in the regression analyses.

### **Training and Perception of Barriers to Public Procurement**

The perceived barriers to public procurement are analyzed with the seemingly unrelated regressions (SUR) model, which allows for correlated errors in a set of regression equations (e.g. Fiebig, 2003). Estimated coefficients are reported in Table 7. The dependent variables in regressions are the component scores from PCA on the survey of obstacles. As a result, we estimate four separate regressions, i.e., one for each component that passes the reliability test. The variables of interest are the variables for training, *TRAIN* and *LACK*.

A set of control variables removes the influence of background factors that could affect the attitude toward training, especially in the SME context where resource constraints are prevalent. They include logarithmic transformations from firm size ( $\ln(\text{SIZE})$ ) and age ( $\ln(\text{AGE})$ ), industry dummy variables (*IND\_1* to *IND\_4*, *IND\_5* is used as the reference category), the activity group in public procurement (*PASSIVE*), and the respondent's position in a firm (*NOENT*, which controls for respondents that are not entrepreneurs or firm owners),

gender (*FML*) and level of education (*EDUC*). Except for the size, age and level of education described in Section 3.2, the control variables are dummy variables. *NOENT* equals one if a respondent is not a full-time or part-time entrepreneur and zero otherwise. *FML* equals one if a respondent is female and zero otherwise. *PASSIVE* equals one if a respondent belongs to the group of firms that do not look for tendering opportunities or participate in tendering and zero otherwise.

Table 7 reports the results from the SUR model. The Breusch-Pagan test is statistically significant ( $p < 0.01$ ) and indicates that the error terms in the proposed model of four regression equations are correlated. Subsequently, the SUR model is appropriate. Two regression equations are jointly statistically significant (The  $p$ -value of the Chi2-statistic is less than 0.05), and two models are not jointly statistically significant.

**TABLE 7**  
**Seemingly Unrelated Regression Estimates for Perceived Barriers**

	<i>RESO</i>		<i>PROCESS</i>		<i>PRACTICAL</i>		<i>SKILL</i>	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
<i>TRAIN</i>	-.045	.075	-.021	.084	-.020	.083	-.125	.083
<i>LACK</i> <sup>z</sup>	<b>.132<sup>b</sup></b>	.065	.023	.073	<b>.161<sup>b</sup></b>	.072	.106	.072
Ln( <i>AGE</i> )	-.100	.100	.054	.112	.013	.111	-.159	.111
Ln( <i>SIZE</i> )	<b>-.319<sup>a</sup></b>	.085	.064	.095	-.114	.094	-.051	.094
<i>IND_1</i>	.174	.186	.071	.209	-.053	.208	-.367	.207
<i>IND_2</i>	.007	.174	-.087	.195	-.313	.194	<b>-.059<sup>c</sup></b>	.193
<i>IND_3</i>	.038	.214	.383	.240	.075	.239	-.158	.238
<i>IND_4</i>	.069	.254	-.089	.285	<b>.852<sup>a</sup></b>	.283	.254	.282
<i>EDUC</i>	<b>-.258<sup>b</sup></b>	.128	-.077	.144	<b>-.274<sup>c</sup></b>	.143	-.079	.143
<i>FML</i>	<b>.346<sup>b</sup></b>	.159	<b>.419<sup>b</sup></b>	.179	.081	.177	.046	.177
<i>NOENT</i>	-.115	.198	-.072	.222	-.034	.221	.121	.220
<i>PASSIVE</i>	<b>.323<sup>b</sup></b>	.164	<b>-.358<sup>b</sup></b>	.184	-.018	.183	.270	.182
<i>CONST.</i>	<b>.819<sup>b</sup></b>	.334	-.231	.375	.439	.372	.533	.371
Obs.	174		174		174		174	
Chi <sup>2</sup>	<b>54.31<sup>a</sup></b>		14.55		<b>24.59<sup>b</sup></b>		17.73	
R <sup>2</sup>	.238		.077		.124		.093	
Breusch-Pagan Test of independence (Chi <sup>2</sup> ) = <b>91.64<sup>a</sup></b>								

Notes: Statistical significance (two-tailed): <sup>a</sup>  $p$ -value  $< 0.01$ ; <sup>b</sup>  $p$ -value  $< 0.05$ ; <sup>c</sup>  $p$ -value  $< 0.1$ . <sup>z</sup> Standardized scale.

In the case of *RESO*, high values of *LACK* are associated ( $p < 0.05$ ) with a lack of resources. Unsurprisingly, this obstacle diminishes with firm size ( $p < 0.01$ ). Interestingly, there are indications that female respondents ( $p < 0.05$ ) are more prone to seeing resource constraints. Furthermore, passive firms ( $p < 0.05$ ) observe the resource barrier more often. However, in the case of *PROCESS*, the model is not jointly statistically significant. However, female respondents ( $p < 0.05$ ) perceive the procurement process as problematic. On the other hand, the estimate for passive firms ( $p < 0.05$ ) is negative. The barrier formed by the lack of practical skills regarding tendering (*PRACTICAL*) is again perceived as an obstacle by the firms that report lack of on-going training ( $p < 0.05$ ). There are no statistically meaningful results for *SKILL*.

Altogether, these results indicate that training, or more precisely a lack of training, raises perceived barriers to participation in public procurement. Furthermore, experience of public procurement may have a significant impact on the barriers firms perceive, as suggested by Loader (2005). An interesting finding is that female respondents perceive larger resource constraints and difficulties in the procurement process. This cannot be explained by industry differences, that is, some industries being male-dominated and others female-dominated, because industry effects have been controlled for in the analysis.

### **Training and Activity in Public Procurement**

The impact of attitude toward training on activity in public procurement was analyzed with multinomial logistic regression. The dependent variable is *ACTIVITY*, which comprises of three groups of firms: passive, interested and active. The explanatory variables in the analysis are the same as in the OLS analysis, except for the dummy variable for passive firms, which is now the base category for the dependent variable.

Table 8 below displays the results of the multinomial logit model. The model is jointly statistically significant and has a reasonable (pseudo-) coefficient of determination. The results show that being training-oriented ( $p < 0.05$ ) considerably increases the probability of belonging to the group of interested firms. In fact, apart from the dummy variable for industrials and construction, it is the only statistically significant variable. The positive influence of being

**TABLE 8**  
**Multinomial Logistic Regression Estimates for Activity in Public Procurement**

	Activity = Interested		Activity = Active	
	Coef.	S.E.	Coef.	S.E.
<i>TRAIN</i>	<b>.664**</b>	.280	<b>.452*</b>	.233
<i>LACK<sup>z</sup></i>	-.111	.249	-.052	.209
Ln( <i>AGE</i> )	.083	.372	-.145	.328
Ln( <i>SIZE</i> )	.241	.426	<b>1.299***</b>	.362
<i>IND_1</i>	<b>1.846**</b>	.741	.534	.637
<i>IND_2</i>	.405	.649	-.063	.530
<i>IND_3</i>	.615	.832	.374	.692
<i>IND_4</i>	.498	1.030	.680	.901
<i>EDUC</i>	-.047	.521	.257	.423
<i>FML</i>	.568	.588	-.753	.513
<i>NOENT</i>	-.621	.913	-.088	.700
<i>CONST.</i>	-1.254	1.297	-.553	1.136
Obs.	182			
Chi <sup>2</sup>	<b>53.80***</b>			
Pseudo-R <sup>2</sup>	0.152			

Notes: Statistical significance (two-tailed): \*\*\*  $p$ -value < 0.01; \*\*  $p$ -value < 0.05;  $p$ -value < 0.1. Standard errors in parentheses. The dependent variable's base category is the group of passive firms in public procurement. <sup>z</sup>Standardized scale.

training-oriented ( $p < 0.1$ ) is also visible in the group of active firms. Also worth noting is a strong size effect ( $p < 0.01$ ). Altogether, these findings show that a firm's orientation toward training strongly predicts activity in public procurement after controlling for influential factors such as size and industry.

### CONCLUSION

This paper provides an analysis of the barriers SMEs perceive to their participation in public procurement and of the importance of SME training in dismantling these barriers. We found evidence that SMEs' perceptions of the barriers are not uniform and that training may have an important role in determining the heterogeneity of the

perceptions. Furthermore, a positive attitude towards training also explains the activity of SMEs in public procurement.

Our analysis identified five main variants of barriers to participation in public procurement. These are: a lack of firm resources, the problematic procurement process, a lack of practical skills, a lack of awareness of public procurement, and a lack of skilled workers and partners. Our main result is that a lack of on-going training raises the perceived barriers in the cases of a perceived lack of firm resources and practical skills. In addition, experience of public procurement appears to influence firms' perception of the barriers. Compared to active firms, inexperienced firms seem to perceive the procurement process as less problematic, but by contrast, a lack of firm resources is a barrier to inexperienced firms. These results provide some empirical support to Loader's (2005) arguments that (i) the firms that perceive barriers to public procurement are, indeed, the firms who are already supplying to the public sector, and that (ii) firms generally feel that not enough training is provided for participating in public procurement.

In addition, our analysis also shows that training-orientation is a good predictor of a firm's activity in public procurement. This is in line with the general ideas emerging from the literature on the influence of training on SMEs' level of activity, especially by generating favorable attitudes toward a firm's strategy, learning and adapting to new things. Moreover, this association between training and activity in public procurement supports the main result reported above.

There are also two additional remarks concerning our analyses that are worth mentioning. First, our analysis suggests that gender may influence the perception of the barriers to participation in public procurement. It seems that female entrepreneurs tend to perceive the barriers of insufficient enterprise resources and problematic procurement process as more severe than male entrepreneurs do. This corresponds with Rasheed (2004), who reports females having difficulties in accessing public sector markets. Second, our analysis indicates that, as expected, a smaller firm size is associated with the perception of limited firm resources.

#### **LIMITATIONS, FUTURE RESEARCH AND MANAGERIAL IMPLICATIONS**

There are some limitations in the analysis that should be taken into account in future research into this topic. The survey data was



collected in a limited geographical area in one country. Although EU directives are the same in all the EU member states, and consequently, the wider institutional setting of public procurement is similar across the EU countries, future research should pay attention to country-level differences, both in public procurement practices and in SMEs' behavioral culture.

There may also be some other interesting nuances in perceptions of barriers to participation in public procurement that could be addressed in future research. Our finding of the role of gender suggests that female respondents are more prone to perceive barriers even when effects such as size, age and education are controlled for. Thus, a more thorough study of female entrepreneurs in the context of public procurement is warranted.

Our analysis provides some managerial and policy implications. First, firms lacking experience of participating in public procurement may often have biased perceptions of the difficulties in and barriers to participating in public procurement. Therefore, firms could benefit from actively collecting information on public procurement and reassessing their attitudes toward it. Related to this activity, these firms should also consider reappraising their attitudes toward training and, if applicable, also seek training opportunities to support their chosen strategy toward public procurement. Second, public sector developers as well as experts in public procurement should also recognize that training could increase SMEs' participation in public sector tendering, and that training should be targeted at firms that have been passive in respect to public procurement. No doubt, these remarks do not override the need for developing practices and processes of public procurement to enable better access for SMEs. Third, it could prove also beneficial to target female entrepreneurs with training and information concerning public procurement.

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