Considering Small and Medium-Sized Suppliers in Public Procurement—The Case of the German Defence Sector

Michael Eßig and Andreas H. Glas

Abstract The consideration of Small and Medium-Sized Enterprises (SMEs) in tender processes is an important goal of public procurement regulation. Public procurement law sets the rule to divide contracts in smaller lots as SMEs are expected to have better chances for a lot than for the whole task. This assumption is questioned with data from the German defence sector. This investigation determines the percentages of SMEs participating in and winning public tenders as well as the specific factors that influence award decisions. Key finding is that an increase in lot-wise calls will normally not lead to an increase in successful SME participation in public procurement processes. This is unexpected because lot-wise tenders are considered to be the main tool available to public procurement agents to increase the ability of SMEs to participate in and win public tenders.

1 Introduction

Small and Medium-Sized Enterprises (SMEs) are considered to be an important economic factor, for example, as employers and innovators (Zheng et al. 2006; Denes 1997). SMEs are of strategic importance for the economy as they together employ the majority of work force (up to 70 %) (Mudambi and Schründer 1996). Therefore, the promotion of SMEs is one of the social aspects attached to the procurement task of public institutions (Kidalov and Snider 2011; Carter 2004). This becomes even more important as an increasing volume of public tenders can be witnessed and the opening of the European market increased public procurement competition (Perlo-Freeman et al. 2009). However, further research on SME participation in public tendering is required, because academic discussions of this topic are rather rare and often rudimentary (Karjalainen and Kemppainen 2008;

M. Eßig · A.H. Glas (✉)
Research Center for Law and Management of Public Procurement,
Bundeswehr University Munich, 85577 Neubiberg, Germany
e-mail: andreas.glas@unibw.de

D. Mattfeld et al. (eds.), *Logistics Management*, Lecture Notes in Logistics,
DOI 10.1007/978-3-319-20863-3_2

Zheng et al. 2006). This is surprising as SME promotion is a stated goal of both the European Committee and the German Federal Government (Van der Horst et al. 2000). It is the aim of this article to investigate to what extent public procurement regulation really promotes SMEs.

SMEs are defined in contrast to other, larger corporations. Most definitions refer to the number of employees, the annual turnover or the annual balance sheet total (Ellegaard 2006; Arend and Wisner 2005; Park and Krishnan 2001). Besides these quantitative definitions, independence from larger corporations is demanded, and only a small percentage of shares are allowed to be owned by one or more large enterprises (European Commission (EC) 2006). For the purpose of this study, both quantitative and qualitative considerations are taken into account when defining SME: An SME must employ fewer than 250 people and have an annual turnover of less than 50 million Euro and/or a balance sheet total of less than 43 million Euro (Van der Horst et al. 2000; EC 2006).

The guiding question of this article is, if public procurement legislation, in particular the award of contract through lots, really supports successful SME participation. To answer that question, public sector procurement is considered with an empirical data base of 387 awards of contract. The analysis follows a three-step approach. Firstly, a number of research hypothesis are derived from the literature considering the current state of SME participation in public procurement. Second, the peculiarities of the public procurement law are analyzed. Third, the empirical research is described and the results of the investigation are discussed. A summary of the findings with possible areas of future research conclude this article.

2 Literature Review

2.1 SME and Competing Objectives of Public Procurement

Public procurement has received increasing interest from the scientific community in recent years (Snider and Rendon 2008; Erridge 2005; Thai 2005; Harland et al. 2000). At present, public procurement accounts for roughly 13.5 % of the EU Gross Domestic Product (GDP) (Bovis 2007). For its management, Schapper et al. (2006) proposed a framework that shows the different considerations that must be regarded when making a sourcing decision (Fig. 1).

According to that framework, public procurement is supposed to achieve three main objectives: (1) the realization of a political agenda and business outcomes; (2) the accountability to the stakeholders (politicians and the public) in regard to conforming to public procurement rules; and (3) the efficient and effective management, trying to get the best value for the money spent. The framework illustrates that public procurement must satisfy a number of competing objectives. The primary goal is to satisfy specified public demands for goods or services while taking temporal, quantitative and financial constraints into consideration.

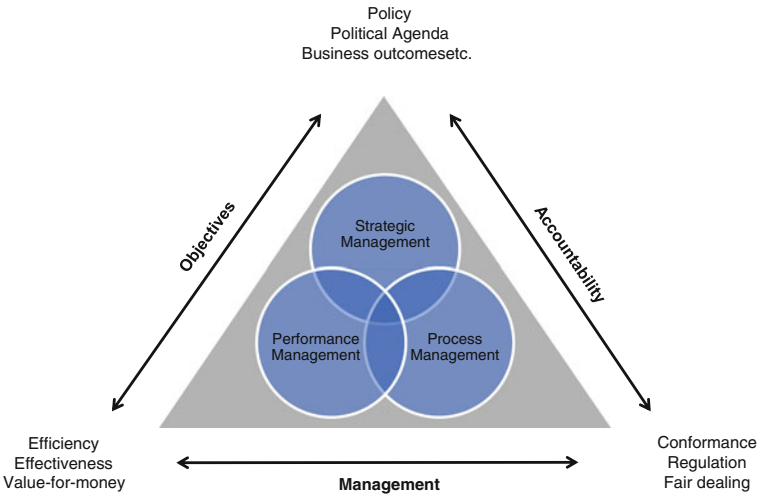

Fig. 1 Public procurement management framework, adapted from Schapper et al. (2006)

Besides, public procurement is characterized by a number of policy goals. Examples of these are environmental protection, the support of national enterprises or the promotion of SMEs (Reed et al. 2005; Erridge 2005). Distinct conflicts arise from trying to promote competition to ensure efficient procurement on one hand and to promote and support other aspects—here SMEs—on the other hand. Research regarding the consideration of SMEs in public procurement is rather limited (Karjalainen and Kemppainen 2008; Reed et al. 2005; Knight et al. 2003). The absence of qualitative and quantitative data is as much a challenge as the non-existence of factors influencing the procurement process from the perspectives of both the seller and the buyer (Zheng et al. 2006). This is in particular the case when looking at SME participation in individual sectors such as defence or health care. However, some studies already demonstrated that the consideration of SMEs can lead to a number of economic advantages, e.g. higher innovation rate, and that it is advisable to consider them (Carter et al. 1999; Erridge et al. 1998).

Studies of the EC (2004b, c) reveal that SMEs participate in 78 % of all award processes. In addition, results of Reichardt (2002) and NERA (2005) indicate that the percentage of successful SMEs is larger if the awarding institutions have a centralised procurement organisation structure. According to Piga and Zanza (2005), SME consideration in public procurement processes is primarily accomplished by dividing tenders into lots that can be bid for separately. SMEs are further considered by giving them awards as sub-contractors (Piga and Zanza 2005; EC 2004a).

The mentioned findings serve as the foundation of the two research hypotheses. H1 considers the specifics of the used data set, as it is expected that fewer SMEs successfully participate in public tenders in the defence sector. H2 generally refers to the observation that there is a positive relation between the number of

Table 1 Overview of main research hypotheses and research sources

Hypothesis		Source
H1	The percentage of participating and successful SMEs in defence is smaller than the percentage of 78 % for all public tenders in Europe	NERA (2005), EC (2004b, p. 31f), EC (2004c, p. 20), Reichardt (2002, p. 30f)
H2	Bidding success of SMEs is influenced by different company- and tender-specific factors. SME bidding success decreases with rising tender volumes, increases with the division of the tender into smaller lots (i.e., a lot number increase) and is influenced by the procurement procedure	Karjalainen and Kemppainen (2008, p. 231f). Bovis (2007, p. 228), EC (2006, p. 38f), Pfohl (2006, p. 20f), Piga and Zanza (2005, p. 187f), EC (2004b, p. 31 f), EC (2004c, p. 20), Reichardt (2002, p. 30f), Lee et al. (1999, p. 299f)

participating companies in an award process and the intensity of competition in the respective sectors of industry. Thus, H2 looks at the number of SMEs participating in and winning of the award processes (Table 1). It is expected that a number of aspects such as the selection of the award process, the use/non-use of lots, or the competitive situation have an impact (Bovis 2007). We further speculate that limited human and financial resources, meaning the number of employees as well as the total revenues, also influence the award decision (Karjalainen and Kemppainen 2008; Pfohl 2006; Lee et al. 1999). In the methodology section, H2 is further specified through sub-hypotheses.

2.2 *Specifics of German and European Law Regarding Public Procurement*

In German law, the consideration of the basic principles of competition, anti-discrimination, efficiency and transparency is based on European Public Procurement Directives 2004/17/EU, 2004/18/EU and lastly 2014/24/EU (2014). What cannot be found in public procurement guidelines is a rule giving preferential treatment to SMEs (Zheng et al. 2006). However, German regulation contains statements about SME participation, e.g. in the norms for award and contract General Services, Construction and Contractor Services (VOL/VOB/VOF), in the law against the restriction of free trade (GWB), and in defence security regulations (VSVgV).

According to German law, SMEs are considered as follows: "*The interests of small and medium-sized undertakings shall primarily be taken into account in an award procedure. Contracts shall be subdivided into partial lots and awarded separately according to the type or area of specialization (trade-specific lots) […].*" (§ 97 (3) GWB). It is expected that SMEs fit better for tenders divided into partial lots, while SMEs' degree of specialization is expected to fit better to tenders divided into trade-specific lots. However, the real effects of these regulations are doubted by

the scientific literature (Schramm 2008; Blankart 2008). Recently, the use of micro lots in the United Kingdom was questioned (Loader 2014).

The defence sector is part of the public sector and is also bound to public procurement guidelines and law. Through the constitutional law of Art 296 EC as well as the secondary common law of the European procurement guidelines, deviations from these rules are permissible for the procurement of military goods and services for reasons of national security or confidentiality (EC 2009). Generally, the promotion of SMEs is equally an objective in the defence sector, as it is in other public sectors such as health care.

3 Method

3.1 Empirical Test of Hypotheses and Findings

The total number of public tenders in Germany cumulates to around 7.2 million contract awards per year (Kröber et al. 2008). Of these, the defence procurement agency since 2012 called BAAINBw is responsible for the central procurement of all significant requirements of the armed forces with a total volume of about Euro 8.74 billion today (Trybus 2005; BMVg 2015). According to Reichardt (2002), the percentage of award-winning SMEs in defence is smaller than in the overall public sector (EC 2004b, c).

To ensure that this is not a methodological problem, a sample was chosen that also includes the procurement of "off the shelf" civilian goods in addition to defence specific, military goods. The sample was based on the awards for the years 2006–2008. In the database tender and award data of a specific department, E4, were sampled. This department is responsible for the procurement of military specific goods and services as well as for commercial goods and services. Specifically, the procurement of spare parts for weapons systems of the armed forces is conducted there. E4 is responsible for roughly 8000 annual tenders with a yearly award volume of about Euro 360 million (Hoos 2009; BWB 2008; Petry 2008).

Statistical sampling was used for the investigation (Fig. 2). A complete and numbered list of all award procedures and contracts was obtained. Overall, 18,512 awards were retrieved in the three-year timeframe. The random sampling method allowed the determination of the minimum number of data sets required. The minimum size is 376 of randomly sampled awards. To achieve that size, SPSS statistics software was used and 420 completed awards were randomly selected. Of these 420 awards, 387 were suitable (completeness of data).

For the sample, the number of participating SMEs and if a SME succeeded in winning the award are assessed. Then, it is possible to estimate numbers for the total population by utilising point estimation procedures. For the determination of sample and population, random variables PA (participant) and SU (success) were

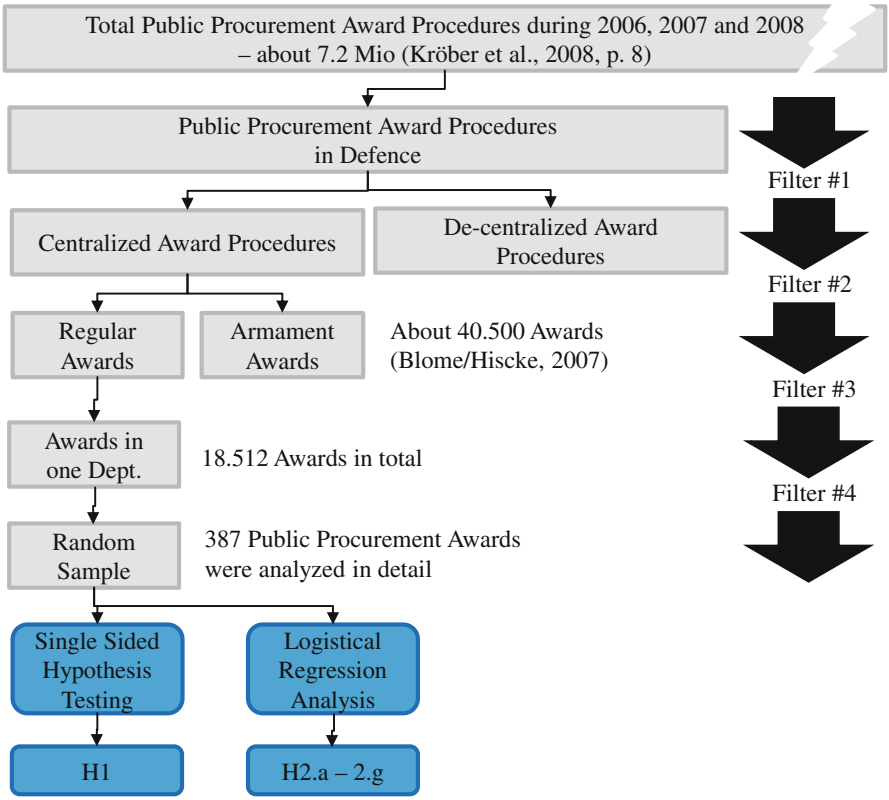

Fig. 2 Sampling method

selected (PA = 1 for SME participated in the tender and SU = 1 for SME received the award; PA and SU = 0 in other cases).

The necessary statistical values for the examined arithmetic mean μ based on hypothesis 1 are: $H1_{PA}: \mu < 0.78$ and $H1_{SU}: \mu < 0.78$. The null hypotheses are: $H0_{PA}: \mu \geq 0.78$ and $H0_{SU}: \mu \geq 0.78$. Through a determination of the *p*-value based on the sample, it was determined that the null hypothesis can be retained if it holds true that it is of a larger magnitude than the level of significance α of 0.05.

Hypothesis 2 is investigated by utilising the method of multivariate analysis. The selection of the most useful method will be carried out through the determination of the different variables (Backhaus et al. 2006; Hosmer and Lemeshow 2000; Menard 1995). The following factors were retrieved: The total number of participating SMEs (TSME), the number of employees (EM) and the annual turnover (TO) of the successful company, the award volume (VOL), the type of award (KIND), the type of the procured service or material (TYPE) and the number of lots (NLOTS). The following sub-hypotheses are derived:

H2.a. The more SMEs take part in the tender, the higher the likelihood of SMEs' bidding success
H2.b. The more employees an SME has, the higher the likelihood of SME's bidding success
H2.c. The higher the annual turnover of the SME, the higher the likelihood of SME's bidding success
H2.d. The higher the award volume of the contract, the lower the likelihood of SMEs' bidding success
H2.e. The more competitive the award procedure, the higher the likelihood of SMEs' bidding success
H2.f. The more commercial standard the good or service to be awarded, the higher the likelihood of SMEs' bidding success
H2.g. With increasing division of the award into smaller lots, the likelihood of SMEs' bidding success increases

The seven parameters are to be considered as independent variables that are scaled metrically, respectively nominally. To test for structure, it is necessary to determine an appropriate independent variable (here: SU, bidding success). On that basis, the method of logistic regression was executed. This method allows determining the likelihood that the event "an SME wins an award during a public tender" will occur. On the other hand, it gives the chance to indicate which factors, represented by the regression coefficient, influence the occurrence of this event. The resulting logistical regression equation for the observed event is k $(k = 1 \ldots n)$ when using the logistical function for the calculation of the probability P of the occurrence of SU = 1 and considering the defined parameters:

$$P_k(SU = 1) = \frac{1}{1 + e^{-z_k}} \text{ with} \tag{1}$$

$$\begin{aligned} z_k = {} & \beta_0 + \beta_1 TSME_k + \beta_2 EM_k + \beta_3 TO_k + \beta_4 VOL_k + \beta_5 KIND1_k \\ & + \beta_6 KIND2_k + \beta_7 KIND3_k + \beta_8 KIND4_k + \beta_9 KIND5_k \\ & + \beta_{10} KIND6_k + \beta_{11} TYPE_k + \beta_{12} NLOTS_k \end{aligned}$$

After formulating the research model, it is necessary to estimate the logistical regression function to be able to interpret the regression coefficients and to test the whole model as well as the characteristic variables. In this investigation, the estimation will be accomplished using the statistics software SPSS. SPSS calculates the necessary parameters by maximising the likelihood of the event SU = 1. The variable KIND stands for the type of award and was coded as follows: (1) Limited tender/not public tender with public participation competition; (2) Limited tender without public participation competition; (3) Negotiation procedure; (4) Single tender action; (5) Single tender action in competition/with public participation competition; and (6) Competitive dialogue.

Table 2 Impact of positive and negative regression coefficients regarding the likelihood that the event SU = 1 will occur

Regression coefficient	Odds	Likelihood of SU = 1
$\beta_i > 0$	Increases by e^{β_i}	Increases
$\beta_i < 0$	Decreases by e^{β_i}	Decreases

A logistical regression allows the interpretation of the results in the sense that a negative regression coefficient implies a decreasing likelihood, and vice versa. The variables are used to compare the reference categories, meaning that a negative prefix implies that the likelihood of an event occurring is decreasing in relation to the reference category. On the other hand, an increasing value for the independent variable implies that the odds (relation of the likelihood of the events to each other, SU = 1 to SU = 0) change by the factor e^{β_i} ($i \in \{1...12\}$). The same is true of the odds of the categories changing in relation to the variables in the reference categories (Table 2).

4 Empirical Results

The 387 sampled award documents indicated that a total of 1308 companies participated in the bidding processes, and in total 787 lot-wise or whole contracts were awarded. Based on the documents, it was possible to identify all relevant information: Company-specific key data were collected either based on the award documents or from the software tools available. The award-specific characteristics were extracted from the award documents.

For hypothesis 1, the means of the random sample $\overline{X}$ with regard to the random variables PA and SU were determined to be 56.8 %, respectively 56.5 % (Table 3), when conducting a t-test of a sample with a division value of 0.78.

The tests show a high degree of significance because the p-value α_1 is smaller than 0.001 and therefore smaller than the level of significance of $\alpha = 0.05$. The medium difference between the test value and the average sample value comes to PA of 21.2 % and SU of 21.5 %, taking an error tolerance of 5 % into account. The Kolmogorov-Smirnov adjustment test showed that variables had normal distributions (Table 4).

Table 3 Test results of the random variables PA and SU

Variable	N	Mean	Standard deviation	Standard error of mean
PA	1308	0.57	0.496	0.014
SU	787	0.57	0.496	0.018

Table 4 Test results of the random variables PA and SU

Variable	Test value = 0.78					
	T	df	Significance (two-sided)	Mean difference	95 % confidence interval for the difference	
					Lower	Upper
PA	−15.469	1307	0.000	−0.212	−0.24	−0.19
SU	−12.135	786	0.000	−0.215	−0.25	−0.18

The application of the logistical regression to the collected data to test hypothesis 2 shows the following results:

$$P_k(SU = 1) = \frac{1}{1 + e^{-z_k}} \text{ with} \tag{2}$$

$$\begin{aligned} z_k = {} & 2.338 + 0.075 * TSME_k - 0.004 * EM_k + 0.002 * TO_k - 4.24 \\ & * VOL_k - 1.127 * KIND1_k + 0.338 * KIND2_k - 1.348 \\ & * KIND3_k - 1.136 * KIND4_k + 4.273 * KIND5_k \\ & + 0.02 * TYPE_k - 0.002 * NLOTS_k \end{aligned}$$

The interpretation of the specific regression coefficients (Table 5) reveals the following: The probability that an awarded contract is given to an SME rises if more SMEs take part in a tender or the annual turnover increases. Concerning the type of the procured good or service, the probability and the odds ratio rise if the good or service is military specific. Also, the influencing factors KIND2 and KIND5 have higher odds, what implies that the selection of a restricted call for tenders without public contest or a negotiated award with public contest will raise the odds of an award for SMEs in comparison to a public call for tenders or an open procedure. The competitive dialogue was not applied and thus not considered. In contrast, the odds ratio decreases to a minimal level if the number of employees and the number of awarded lots and positions rise. A negative odds ratio or, rather, a worse influence will result from realising a restricted call for tenders, a restricted procedure with competition among participants, a negotiated procedure or a freely negotiated award in comparison to the reference category. The same is for the award volume; i.e., if the volume increases, the odd ratio decreases.

To assess the quality of the model, the above-defined criteria for the adaptation and pattern quality will be interpreted (Table 6). First, the value of the deviance, which is smaller than the χ^2 distribution, suggests good model fit. Similarly, the values of the Cox and Snell R^2 and Nagelkerke R^2 methods indicate good to very good model accuracy. The assessment of the classification results, i.e., the comparison of observed and calculated values, showed that 23 cases were misclassified. Thus, it appears that the values of the correctly stated cases amounted to 94.1 % and proportional chance probabilities of 54.52 and 50.41 %, respectively. The Press's

Table 5 Interpretation of regression coefficients

Influence factor	Regression coefficient	Regression coefficient	Odds	Probability ef = 1
TSME	0.075	>0	Increase by 1.078	Increases
TO	0.002	>0	Increase by 1.002	Increases
EM	−0.004	<0	Decrease by 0.996	Decreases
NLOTS	−0.002	<0	Decrease by 0.998	Decreases
TYPE	0.02	>0	Increase by 1.02	Increases
KIND1	−1.127	<0	Decrease by 0.324	Decreases
KIND2	0.338	>0	Increase by 1.402	Increases
KIND3	−1.348	<0	Decrease by 0.26	Decreases
KIND4	−1.136	<0	Decrease by 0.321	Decreases
KIND5	4.273	>0	Increase by 71.736	Increases
KIND6	Not occurred			
VOL	−4.24	<0	Decrease by 0.014	Decreases

Q-test showed a value of 301.057, which is higher than the tabulated χ^2 value. The Hosmer-Lemeshow test result leads to the conclusion that the null hypothesis is rejected, and it must be assumed that the difference between the empirical and calculated values is not equal to zero. It can be assumed that the results differ significantly from a random assignment. The method of standardised residuals substantiates the above-mentioned 23 outliers, whose values are between −3.343 and 137,318.788. These are special cases in which, for example, the number of employees corresponds to the average number of an SME, but the annual turnover was greater than 50 million Euro.

The attribute variables, TSME, TO, NLOTS, TYPE, KIND1, KIND2 and KIND3 indicate a lower value of the Wald statistic as the tabulated χ^2 value. Due to the addition of these high levels of significance between 25.3 and 96.4 %, it must be assumed that the factors have no significant effect. It can be assumed that the variable VOL has a significant effect if the level of significance is accepted at 6.6 %. Finally, it can be considered that the influence factors EM and KIND4 have a significant effect, as their significance is below 5 % (Table 7).

Table 6 Examination of the overall model

Quality criterion	Accepted range of values	Value from the analysis	Interpretation
Deviance (−2LL value)	−2LL value < χ^2 value	192.2 < 420.094	Good fit of the model
Cox and Snell R^2	Acceptable starting values >0.2; good starting values >0.4	0.586 > 0.4	Good fit of the model
Nagelkerke R^2	Acceptable starting values >0.2; good starting values >0.4; very good starting values >0.5	0.783 > 0.5	Very good fit of the model
Analysis of classification results	Higher than maximum and proportional random probability	0.941 > 0.5452 0.941 > 0.5041	Higher hit rate than random
Press's Q-Test	Highest possible χ^2 value; level of significance <5 %	301.057 > 3.84	significant difference from random assignment
Hosmer-Lemeshow test	Smallest possible χ^2 value; level of significance >70 %	1421.058 > 15.51 Level of significance: 0 %	Difference between the calculated and actual values not equal to 0

Table 7 Significance tests of variables

Influencing factors	Degrees of freedom	χ^2 value	Wald statistics	Significance	Interpretation
TSME	1	3.84	1.158	0.282	No significance
TO	1	3.84	1.206	0.272	No significance
EM	1	3.84	15.525	0.000	Significant
NLOTS	1	3.84	0.018	0.892	No significance
TYPE	1	3.84	0.002	0.964	No significance
KIND1	1	3.84	1.305	0.253	No significance
KIND2	1	3.84	0.161	0.688	No significance
KIND3	1	3.84	0.969	0.325	No significance
KIND4	1	3.84	6.984	0.008	Significance
KIND5 and KIND6					Without result
VOL	1	3.84	3.37	0.066	No significance

5 Discussion and Conclusion

H2.a is accepted what means that an increasing number of participating SME's positively effects the bidding success. This seems obvious, as at least one SME must award for a contract, and the more SME apply the higher is the likelihood.

The results also show that the shares of participating SMEs in the defence sector is less than 78 % and thus lower than in the overall public sector. This is not surprising and in line with H2.d, which describes the influence of the increasing award volume. In other words, the higher the overall award volume, the lower is the success likelihood of SMEs. As some defense systems (aircrafts, tanks etc.) are complex and expensive, companies able to produce them must have far higher turnover or balance sums than SMEs are per definition allowed to have. This can be connected with H2.c, which indicates that a higher level of the annual turnover have a positive effect on the bidding success of SMEs. Overall: Company-size matters in defence business.

H2.e shows that an increased competitiveness of the awarding procedure has a positive effect on the SME bidding success. While a restricted call for tenders without public competition reduces SMEs' success likelihood, a negotiated award or a competitive procedure increases the chances for SMEs. The more competition in the procedure, the higher is the success likelihood of SMEs. This result is also not unexpected as SMEs are praised for their high innovativeness and flexibility.

The most striking result of this study is the rejection of H2.g. The analysis revealed that a division of the award into lots does not lead to a higher success of participating SMEs. This is strictly in contrast to the legal regulations, which postulate lots as the driving force for SME promotion. The empirical data indicate that a further strengthening of lot-wise tenders is not likely to increase the chances of SMEs' success. Instead, other aspects should be improved if a higher rate of SME bidding success is desired. According to Loader (2013, 2014), the most common barriers reported are overly prescriptive qualification criteria, poorly written tender specifications and prohibitive resource requirements. On the other hand also SMEs struggle with the public tender participation and their competence in matters of procedure for participation in public tenders should be improved. SMEs face a lack of appropriate resources to engage in public biddings and their skills to complete a bid in the required standards are low. Overall, this is the cause that SMEs perceive public procurement procedures to be unfair and so they are reluctant to engage (Loader 2013, 2014; Pickernell et al. 2011).

In parts the results of this study reaffirms previous findings (e.g. Karlajainen and Kemppainen 2008). On the other hand they offer new insight into the effectiveness of public procurement regulation. SMEs (or their associations) call to unbundle contracts and to provide smaller tender opportunities. Responding, governments take actions to increase the use of lots (Loader 2014). The findings of this study stand in fundamental contrast to these public procurement practices. Even if this study is limited, as its scope only comprised defence, the key observation is

striking: The division of larger tenders into smaller lot sizes and the lot wise award of contracts do not have an impact on SME public bidding success rates.

Acknowledgments The Authors specially thank the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) for their active support.

References

Arend RJ, Wisner JD (2005) Small business and supply chain management: is there a fit? J Bus Ventur 20:403–436

Backhaus K, Erichson B, Plinke W, Weiber R (2006) Multivariate analysemethoden: eine anwendungsorientierte Einführung, 11th edn. Springer, Berlin

Blankart CB (2008) Öffentliche Finanzen in der Demokratie: eine Einführung in die Finanzwissenschaft, 7th edn. München

BMVg (2015) Bericht des Bundesministeriums der Verteidigung zu Rüstungsangelegenheiten. März, Berlin

Bovis C (2007) EU Public Procurement Law. Cheltenham 2007

BWB (2008) Auftraggeber Bundeswehr: organisation, Auftragsvergabe und Vertragsgestaltung. http://www.bwb.org/fileserving/PortalFiles/02DB022000000001/W26DVFZP486INFODE/AGBw_de.pdf?yw_repository=youatweb. Accessed on 24 Apr 2008

Carter CR (2004) Purchasing and social responsibility: a replication and extension. J Supply Chain Manage 40(4):4–16

Carter CR, Auskalnis RJ, Ketchum CL (1999) Purchasing from minority business enterprises: key success factors. J Supply Chain Manage 35(1):28–32

Denes TA (1997) Do small-business set-asides increase the cost of government contracting? Public Adm Rev 57(5):441–444

Ellegaard C (2006) Small company purchasing: a research agenda. J Purchasing Supply Manage 12:272–283

Erridge A, Fee R, McIlroy J (1998) Involvement of SMEs in public procurement. Public Procurement Law Rev 7(2):37–51

Erridge A (2005) UK public procurement policy and the delivery of public value. In: Thai KV et al (eds) Challenges in public procurement. Boca Raton, USA, pp 335–352

European Commission (2004a) Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts. Off J Eur Union, L 134, pp 114–240

European Commission (2004b) The access of SMEs to public procurement contracts: final report. http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=3687&userservice_id=1&request.id=0. Accessed on 4 Nov 2009

European Commission (2004c) A report on the functioning of public procurement markets in the EU: benefits from the application of EU directives and challenges for the future. http://ec.europa.eu/internal_market/publicprocurement/docs/public-proc-market-final-report_en.pdf. Accessed on 4 Nov 2009

European Commission (2006) The new SME definition: user guide and model declaration. http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf. Accessed on 4 Nov 2009

European Commission (2009) Directive 2009/81/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security, and amending Directives 2004/17/EC and 2004/18/EC

European Commission (2014) Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement
Harland CM, Gibbs J, Sutton RY (2000) Supply strategy for the public sector: framing the issues. In: Proceedings of the 9th annual IPSERA conference and 3rd annual North American research symposium of purchasing and supply chain management, Toronto, Canada, pp 342–352
Hoos S (2009) In: Eßig M, Witt M (eds) Beitrag des Strategischen Einkaufs zur Optimierung der logistischen Leistungstiefe am Beispiel des Verteidigungsressorts, pp 97–124
Hosmer DW, Lemeshow S (2000) Applied logistics regression, 2nd edn. New York 2000
Karjalainen K, Kemppainen K (2008) The involvement of small- and medium-sized enterprises in public procurement: impact of resource perceptions, electronic systems and enterprise size. J Purchasing Supply Manage 14:230–240
Kidalov MV, Snider KF (2011) US and European public procurement policies for small and medium-sized enterprises (SME): a comparative perspective. Bus Politics 13(4)
Knight L, Caldwell N, Harland C, Telgen J (2003) Government reform and public procurement: academic report. University of Bath, UK
Kröber R, Fielseler J, Kirch T (2008) Kostenmessung öffentlicher Liefer-, Dienstleistungs- und Bauaufträge aus Sicht der Wirtschaft und der öffentlichen Auftraggeber. Berlin
Lee K, Lim G, Tan S (1999) Dealing with resource disadvantage: generic strategies for SMEs. Small Bus Econ 12(4):299–311
Loader K (2013) Is public procurement a successful small business support policy? A review of the evidence. Environ Plann C: Gov Policy 31(1):39–55
Loader K (2014) SME suppliers and the challenge of public procurement: evidence revealed by a UK government online feedback facility. J Purchasing Supply Manage 1–10. doi:10.1016/j.pursup.2014.12.003
Menard S (1995) Applied logistics regression analysis. Thousand Oaks, CA, Sage
Mudambi R, Schründer CP (1996) Progress towards buyer-supplier partnerships: evidence from small and medium-sized manufacturing firms. Eur J Purchasing Supply Manage 2(2/3): 119–127
NERA (2005) A study of the benefits of public sector procurement from small businesses. London
Park D, Krishnan HA (2001) Supplier selection practices among small firms in the United States: testing three models. J Small Bus Manage 39(3):259–271
Perlo-Freeman S, Perdomo C, Sköns E, Stalenheim P (2009) In: SIPRI (ed) Military expenditure, pp 179–211
Petry D (2008) Die Modernisierung der Beschaffung. Strat Tech 51:95–97
Pfohl HC (2006) Betriebswirtschaftslehre der Mittel- und Kleinbetriebe: Größenspezifische Probleme und Möglichkeiten zu ihrer Lösung, 4th edn. Berlin
Pickernell D, Kay A, Packham G, Miller C (2011) Competing agendas in public procurement: an empirical analysis of opportunities and limits in the UK for SMEs. Environ Plann C: Gov Policy 29(4):641–658
Piga G, Zanza M (2005) An exploratory analysis of public procurement practices in Europe. In: Thai KV et al (eds) Challenges in public procurement: an international perspective. Boca Raton, Florida, pp 179–206
Reed T, Luna P, Pike W (2005) Balancing socioeconomic and public procurement reform goals: effective metrics for measuring small business participation in public procurement. In: Thai KV et al (eds) Challenges in public procurement: an international perspective, Boca Raton, Florida, pp 81–100
Reichardt KD (2002) Wehrtechnischen Mittelstand konsequent fördern. Lage der Wehrtechnischen Industrie zu Beginn der 15. Legislaturperiode, Bonn, pp 115–120
Schapper P, Veiga Malta JN, Gilbert DL (2006) An analytical framework for the management and reform of public procurement. J Public Procurement 6(1):1–26
Schramm J (2008) Auftragsgegenstand und Leistungsbeschreibung. In: Müller-Wrede M (ed) Kompendium des Vergaberechts: Systematische Darstellung unter Berücksichtigung des EU-Vergaberechts, Köln, pp 307–328

Snider KF, Rendon RG (2008) Public procurement policy: implications for theory and practice. J Public Procurement 8(3):310–333

Thai KV (2005) Challenges in public procurement. In: Thai KV et al (eds) Challenges in public procurement: an international perspective. Boca Raton, USA, pp 1–19

Trybus M (2005) European Union law and defence integration. Bloomsbury Publishing, Oxford

Van der Horst R, Nijsen A, Gulhan S (2000) Regulatory policies and their impact on SMEs in Europe: the case of administrative burdens. In: Sexton DL, Landström H (eds) Handbook of entrepreneurship. Malden, pp 128–149

Zheng J, Walker H, Harland C (2006) The role of SMEs in public procurement: a review of literature and research agenda. In: Proceedings of the 15th annual IPSERA conference. Paper ID#57

http://www.springer.com/978-3-319-20862-6

Logistics Management
Contributions of the Section Logistics of the German Academic Association for Business Research, 2015, Braunschweig, Germany
Mattfeld, D.C.; Spengler, Th.S.; Brinkmann, J.; Grunewald, M. (Eds.)
2016, XIII, 284 p. 40 illus., 7 illus. in color., Hardcover
ISBN: 978-3-319-20862-6