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Engaging the economic facts and valuations underlying VfM in public procurement

Anni Lindholm, Tuomas Korhonen, Teemu Laine and Petri Suomala

Abstract

This paper focuses on the possibilities and limitations in pursuing value for money (VfM) in public procurement. There is ambiguity about the VfM concept and the methods that public procurers should be using, respectively. It is difficult for decision-makers to thoroughly understand the economic facts and valuations underlying VfM. The paper examines the conceptual VfM challenges and presents a path to overcoming these with a life-cycle costing (LCC) approach in an in-depth case study in the Finnish waste management context.

Keywords: Public procurement; value for money; life-cycle costing, waste management

Impact

Policymakers and managers should be aware that different stakeholders could have different interpretations of what value for money (VfM) is. The use of the criterion of the most economically advantageous tendering (MEAT) may cause complexity because of non-quantifiable and subjective evaluation criteria. Thus, depending on the procurement object, it is worth considering whether it is necessary to use qualitative contract award criteria or pursuing VfM by simply using appropriate quality requirements in tendering. This study suggests means of overcoming VfM challenges in practice and demonstrates that life-cycle costing (LCC) provides clear benefits for public procurers to assess the potential for VfM in the pre-tendering phase—although LCC applications cannot comprehensively overcome the fundamental difficulties of valuing incommensurate matters.

Introduction

To serve the common good, the objective of public procurement should support the idea of the purchasing of goods and services that generate the greatest value for money (VfM) (McKevitt and Davis, 2016). In practice, this means awarding a public contract to the tenderer offering the best price–quality ratio, as opposed to awards based on the lowest price (Kiiver and Kodym, 2015; Dimitri, 2013). Because value has many dimensions beyond the conventional economic perspective including social and environmental objectives plus intangible deliverables, there is a lack of consistency in the definition of VfM (McKevitt, 2015; MacDonald *et al.*, 2012). In addition, the perception of VfM for the same product or service may change over time due to, for example, new innovative technologies or changes in environmental values. In the legal context of public procurement, to achieve the best VfM the award of public contracts should be based on the principle of the most economically advantageous tender (MEAT) (Directive 2014/24/EU). Thus, in addition to price, contracting authorities can take into account criteria that reflect qualitative, environmental, and societal aspects when reaching an award decision.

Current academic knowledge does not yet adequately cover the practice of VfM management, although several studies have addressed the ambiguity of the VfM concept (Prowle *et al.*, 2016; McKevitt and Davis, 2016). It has been widely recognized that combining qualitative, social, and environmental aspects in economic evaluations is not simple and may be a politically sensitive issue (McKevitt and

Davis, 2016; Barrett, 2016). Consequently, economic facts and subjective valuations can be contradictory, misaligned, and problematic (e.g., Khadaroo, 2008; Lahdenperä, 2013). In turn, there is substantial research on tender evaluation models (Dimitri, 2013; Kiiver and Kodym, 2015; Bergman and Lundberg, 2013). However, little attention has been given to the methods supporting the early stages of the procurement process even though the pre-tendering phase offers the maximum potential for VfM (McKevitt and Davis, 2016). Actually, cost management approaches such as LCC may help decision-makers to assess VfM. Overall, there is a need for a more solid understanding about how LCC and quality aspects can be integrated into public procurement procedures to actually gain VfM.

To address the above practical challenges in the public procurement practice and knowledge gaps in the academic research, this paper seeks to respond to the following research question: How can public procurement procedures engage economic facts and subjective valuations in order to achieve the best VfM? The paper takes advantage of an in-depth case study (Yin, 1981; Eisenhardt and Graebner, 2007) at a Finnish company providing waste containers, pseudonymously “WasteCo.” The researchers were actively involved in the development activities aiming at enhancing public procurers’ understanding of qualitative issues and a life-cycle perspective. The in-depth data based on this case was then supported by wider public tendering data available in Finland (the “HILMA” portal). Altogether five tender calls in the particular case study industry and 40 tenders across industries were analyzed.

The contribution of the paper lies in the identification of the possibilities and limitations in pursuing VfM in public procurement procedures. More particularly, the paper presents a detailed description of VfM challenges and a path toward overcoming these challenges in one real-life case. These contributions are important to advancing the practice of and academic understanding about VfM.

Literature review

The supportive role of cost management in seeking VfM

Within the field of cost management, several approaches can support the achievement of VfM. Pursuing VfM requires careful procurement planning, tender designing, and contract awarding (Dimitri, 2013). There is also a need for managers to ensure VfM realization in the post-tender phase through long-term evaluation of the actual and anticipated results (Khadaroo, 2008). In all of these stages, accounting information could support managerial work in decision-making and developing an understanding of the operational environment (Hall, 2010). As highlighted by Van den Abbeele *et al.* (2009), it is relevant for purchasers to identify the management accounting tools that might contribute to their organization’s success.

In the absence of conceptual clarity, the meaning of VfM can be described with reference to other concepts such as total cost of ownership (TCO) (McKevitt and Davis, 2016). TCO as well as LCC are approaches focusing on total costs rather than simply on price (Woodward, 1997). In this context, MacDonald *et al.* (2012) pointed out that the more sophisticated approaches to VfM look at the whole lifecycle and do not focus only on the initial acquisition costs. Methods such as LCC and TCO quantify the costs of the activities involved in acquiring and using purchased goods or services (Asiedu and Gu, 1998; Van den Abbeele *et al.*, 2009). Further, Morssinkhof *et al.* (2011) emphasized that those kinds of methods can support purchasing decision-makers through the monetary quantification and aggregation of non-financial attributes that are not initially expressed as financial units of measure.

The main idea behind LCC is to encourage a long-term outlook to the investment decision-making rather than attempting to save money in the short term by procuring assets simply with a lower initial purchase cost (Woodward, 1997). Typical cost elements considered in LCC are related to the acquisition, usage, maintenance, and disposal of an item (Asiedu and Gu, 1998). However, it is also possible to include factors related to environmental and societal aspects that are not objectively measurable (Martinez-Sanchez *et al.*, 2015). In all, LCC can be seen more as a way of thinking than merely as a costing tool, and it can support decision-makers in different stages of public procurement processes.

First, it is possible to utilize LCC when making decisions on what and how to procure. Ally and Pryor (2016) found that LCC is an ideal tool to make cost scenarios for competing technologies and can provide decision-makers with a comprehensive set of economic information. According to McKeivitt and Davis (2016), potential for VfM to emerge begins with a goal, deciding on the trade-off between quality versus cost and then communicating these criteria to suppliers in concrete terms. In this context, Tarantini *et al.* (2011) noted that a life-cycle approach could support the development and definition of environmental criteria used within procurement procedures.

Evaluating VfM in the legal context

The difference between private purchases and public procurement is that while private customers can make their choices intuitively, public authorities must seek to objectivize their assessment in order to justify their award decision (Kiiver and Kodym, 2015). In the legal context, VfM is evaluated by relying on MEAT. It has been stated in the EU directive on public procurement (Directive 2014/24/EU) that:

MEAT from the point of view of the contracting authority shall be identified on the basis of the price or cost, using a cost-effectiveness approach, such as life-cycle costing and may include the best price-quality ratio, which shall be assessed on the basis of criteria, including qualitative, environmental and/or social aspects, linked to the subject-matter of the public contract in question.

To determine which tender offers the best VfM, formulae that combine both price and quality criteria are used (Bergman and Lundberg, 2013; Kiiver and Kodym, 2015). Usually, there is a need to assign points to different monetary and non-monetary criteria that are expressed in different units of measurement (Dimitri, 2013). Actually, some of the quality criteria may be non-quantifiable and assigning points for those could be contentious. Bröchner *et al.* (2016) indicated that, for example, tenderers in the health care sector have to describe how they are going to achieve “meaningful everyday experience” or similar vague concepts, on the basis of which officials or expert readers will grade the texts. This example illustrates that considering non-quantifiable award criteria in an objective and reproducible way is inevitably a challenge for contracting authorities.

One of the novelties of EU procurement regulations is the concept of LCC and the possibility of using the result of LCC as an award criteria (Directive 2014/24/EU). It is reasonable to award the contract based on life-cycle costs, for example, if the products or services differ in terms of energy consumption and maintenance costs (Ally and Pryor, 2016). In turn, the monetary value of environmental externalities linked to the product can be determined with the help of LCC (Reich, 2005). Martinez-Sanchez *et al.* (2015) argued that by relying on LCC, contracting authorities have more flexibility to consider qualitative, environmental, and social aspects. It has been suggested that LCC can be used to justify the often higher purchase price of sustainable products by embedding appropriate elements into the cost assessment (Erridge and McIlroy, 2002). An interesting statement in the preliminary notes of Directive 2014/24/EU (89) is that:

The notion of award criteria is central to this Directive. It is therefore important that the relevant provisions be presented in as simple and streamlined a way as possible. This can be obtained by using the terminology “most economically advantageous tender” as the over-riding concept, since all winning tenders should finally be chosen in accordance with what the individual contracting authority considers to be the economically best solution among those offered.

For example, Watt *et al.* (2009) point out that the choice of one contractor over another is largely dependent on the purchaser’s preferences in terms of the evaluation criteria and weightings used, and the trade-offs they are willing to make. So even though the principles for tender selection are strictly regulated, they give the contracting authorities substantial freedom in choosing what qualifications and award criteria to use.

Challenges in engaging facts and subjective valuations in decision-making

Complying with a non-quantifiable and subjective MEAT criterion may lead to a complicated set-up in VfM evaluations. According to Lahdenperä (2013), it is surely a challenge when the public bodies are obligated to treat tenderers equally and act in a transparent way. For example, Falagario *et al.* (2012) stated that the definition of weights without any subjective setting by the public authorities might be difficult. According to Bergman and Lundberg (2013), the most common method, price-to-quality scoring, is non-transparent and makes accurate representation of the procurer's preferences difficult. In this context, Khadaroo (2008) pointed out that changes in the subjective and arbitrary weightings of non-financial qualitative criteria used to evaluate VfM may easily change the choice of the preferred bidder. Thus it is arguable that VfM evaluations are subjective and can be manipulated to show whatever its users require it to show (Grimsey and Lewis, 2005).

To tackle the abovementioned problems, the criteria and weights to be applied to a multi-criteria decision context can be derived by deduction from existing policy goals and objectives, or by a procedure that leads to consensus among a group of individuals (Waara and Bröchner, 2006). To reach such a consensus, e.g. by constructing accounting facts is a collective effort (Laine *et al.*, 2016). However, the greater the number of stakeholders who are involved with different agendas, the more likely that there will be different views about how to interpret VfM (Barrett, 2016). With regard to this, in debates about controversial projects, politicians may be inclined to use accounting information to accommodate their political preferences (van Helden, 2016). Moreover, different competing priorities can confuse final goals in the public procurement context (Erridge and McIlroy, 2002).

Managerial work in public procurement needs to be built upon financial facts and valuations but these are person dependent (e.g., Nørreklit *et al.*, 2016). According to Butler and Ghosh (2015), individual differences in the cognitive abilities to use accounting information can lead to systematic differences in judgments. Further, Crowder (2015) studied the process of decision-making in a public procurement context and figured out that the key decisions were made using cognitive heuristics, meaning that there is a place for emotions and opinion rather than rational decision-making models. According to Morssinkhof *et al.* (2011), deciding which alternative purchasing option to choose involves multi-attribute decision-making, which is cognitively challenging for human decision-makers. Clearly, the fact that decision-makers will bring to the decision-making process emotions that are both conscious and (sub)conscious can make using public money problematic.

Even though the legislation allows taking into account subjective criteria and life-cycle impacts, the purchase price is often a very important criterion in decision-making (see e.g., Tagesson *et al.*, 2015; Tysseland, 2008). A study by Navarro-Galera and Maturana (2011) revealed that one of the shortcomings in the employment of the LCC approach concerns the difficulties of estimating costs using objective economic criteria. Furthermore, Higham (2015) noted that one of the inhibitors to using LCC is the procurers' need to budget on short-term horizons. According to Prowle *et al.* (2016), the pressures of austerity and funding cuts mean that sometimes the focus is on short-term cost savings at the expense of long-term VfM improvements. It may also be that the decision-makers are short-sighted because the links between the actual procurement and all the related outcomes are not sufficiently understood and results are often apparent only many years later (Barrett, 2016). Based on our empirical study, we claim that some of these links actually cannot be sufficiently understood.

Empirical study

Case overview and research methods

The empirical part of this paper represents the outcomes of an in-depth case study (Yin, 1981; Eisenhardt and Graebner, 2007) conducted in close cooperation with a Finnish company, "WasteCo," which provides waste containers to both private and public customers around the world. The management of the company was concerned about the abilities of public authorities to use MEAT and to compare the

life-cycle costs of alternative waste collection methods in the pre-tendering phase. Thus, the study was prompted by the need to create tools and materials that can be used in enhancing public procurers' understanding of qualitative issues and life-cycle perspective:

It is extremely important that when making a decision regarding waste collection methods, people would be aware that a decision made today will affect the costs incurring during the next twenty years. (Management 5/2015)

Typically, case studies attempt to examine particular instances of a phenomenon in its real-life context (Yin, 1981) and take advantage of the rich empirical data (Eisenhardt and Graebner, 2007). This study is characterized by active researcher participation in a real-life development project, which provided a good opportunity to examine how VfM issues can be incorporated in public procurement procedures. In all, longitudinal data collection and analysis were used in order to best facilitate both the practical progress at WasteCo and the theoretical inquiry.

The process of data collection

Ten project meetings were conducted during the study at WasteCo (Table 1). First, to get an overview of the business and recent tendering practices there were discussions and semi-structured interview sessions with the company personnel. Two key informants were the founder of the company and the managing director. Additionally, a controller, a development engineer, a sales assistant, and a managing director of the subsidiary were involved. The meetings with the management played a key role in this study, providing knowledge regarding the applicability of VfM.

Table 1. Data collection at WasteCo.

Date	Theme	Functions present	Data type
01/2015	Project overview	Management	Written notes
02/2015	Project planning	Management	Written notes
03/2015	Business overview	Management, Finance, Development	Written notes & recordings
03/2015	Life-cycle costing	Management, Development	Written notes & recordings
05/2015	Tendering procedures	Management, Sales support	Written notes & recordings
11/2015	Tendering procedures	Management, Sales support	Written notes
12/2015	Ideal tender call	Management, Development	Written notes
01/2016	Ideal tender call	Management, Development	Written notes
03/2016	Ideal tender call	Management	Written notes
03/2016	Communication	Management	Written notes

To develop an understanding of the characteristics of public tender calls, a sample of five actual tendering cases in WasteCo's industry was analyzed. In the research project, an outline of the ideal tender call and a brochure for public procurers were developed in close cooperation with the management. After the case study, further reflections on the tendering processes were attained by collecting data from the Finnish "HILMA" portal.

Understanding and analyzing the tendering practices in WasteCo's industry

According to WasteCo's management, reliance on the lowest price as a winning criterion may be due to difficulties in assessing the factors that cannot be objectively measured. In addition, they have experienced that subjective measures as award criteria may lead to legal processes. The current situation was described as follows:

Six to seven years ago, we had tenders based on scoring. That is, the price was one part, there was quality, warranty issues and scoring was used without fear. However, it led to weird situations here in Finland in such a way that all tendering procedures ended up in the market court. (Management, 5/2015)

The company representatives indicated that public procurers might face challenges in tender preparation. Especially, the use of the quality-related award criteria was seen as problematic:

The municipalities and the cities are afraid to use scoring [. . .] Often, the problem is that the purchasing authority does not know exactly what is wanted and is not able to make accurate technical specifications [. . .] The purchasing authorities may lack expertise. (Management 5/2015)

To develop an understanding of the characteristics of public tender calls in WasteCo’s industry, the researchers analyzed a sample of five actual cases (results summarized in Table 2). The public works department of one big city (with annual purchases of a few hundred million euros) released tenders 1 and 2. In turn, tenders 3–5 were from solid waste management companies owned by several municipalities.

Table 2. Summary of the analysis of tender calls (MEAT stands for most economically advantageous tender).

		Tender calls					
		1	2	3	4	5	
Contract award criteria	MEAT						Lowest price
Technical specification	Comprehensive						Narrow
Warranty period	> 3 years						< 3 years
Spare part availability	Requirements						No requirements
References	Needed						Not needed
The organization’s size	Large						Small

As illustrated in Table 2, the lowest price contract award criteria are commonly used in WasteCo’s industry. The MEAT criterion was used in two tenders: in both cases, the quality scores were calculated on the basis of the carbon dioxide equivalent emissions of the product. In particular, the focus was on the emissions from manufacturing the product and not from waste management operations. The weightings of quality criteria versus price criteria were 10%/90% and 20%/80%.

The analysis reinforced the idea that instead of taking non-price factors into account as award criteria, it could be possible to ensure VfM by including different kinds of requirements in tender calls. One way to pursue VfM is to define sufficient technical specifications. It is important to pay attention to warranty requirements and to references from previous contracts as well. Regarding life-cycle aspects, the analysis underlined that a tender could include an obligation to ensure the availability of spare parts and maintenance for a certain time. In all, the tenders published by the large organization were much more comprehensive than the tenders from the smaller organizations.

Increasing public procurers’ awareness of the qualitative aspects and life-cycle perspective

WasteCo’s personnel believed that there is a lack of knowledge about how to gain VfM, especially by relying on the MEAT concept. Thus, an outline of the ideal tender call and a brochure named “Quality criteria and qualitative aspects in public procurement” was developed for communication. The aim was to provide guidelines for the procurement of waste containers and to increase the awareness of procurers about the quality issues and life-cycle thinking.

Regarding the contract award criteria, WasteCo now proposed that suitable non-price indicators for waste containers could be, for example, the applicability for use, the quality of the references, and the warranty issues. Subjective scoring could rely, for example, on evaluations given by a committee dedicated to the well-being of the urban environment. A similar committee could evaluate the applicability of tendered products as well. Then scores could be given based, e.g., on the applicability

to the urban environment, expectable end-user experience, and the modifiability of the waste containers' visual appearance.

According to WasteCo's management, technical standards are very useful in defining proper thresholds for product characteristics. Thus, the contracting authorities may require that each tenderer provide a test report or a certificate as a proof of their compliance with the standards' requirements. To ensure the supplier's technical and professional capabilities, contracting authorities may indicate, for example, that evidence of similar deliveries is a prerequisite, or past experience should be demonstrated by a detailed list of references. It is also possible to request that the suppliers prove that their operations comply with certain quality standards. Overall, WasteCo's brochure highlighted that creating sufficient contractual agreements, covering, e.g., warranty issues and availability of spare parts and maintenance, could ensure the quality and required service level over the life cycle of a product.

One of WasteCo's main concerns was that public authorities should be able to compare the life cycle costs of alternative waste collection methods more thoroughly in the pre-tendering phase.

We have realized that the investment cost is negligible compared to life cycle costs [. . .] However, the price is so much negotiated even though it does not matter a whole lot. The [total] cost is somewhere completely elsewhere than at the negotiating table. (Management 5/2015)

However, the problem in the field of waste management was that there were different stakeholders with conflicting interests. For example, the companies responsible for emptying and transport of waste could get more income the more often the containers needed to be emptied. In turn, its long emptying intervals are one of the main advantages of WasteCo's container over other types of containers. As concluded by the management, the individual decisions may not lead to the optimal solution from the municipal or the societal point of view.

Overall, WasteCo's longitudinal case study strengthened the understanding that achieving VfM in public procurement is difficult. At the same time, it gave valuable insights about how economic facts (price vs. LCC) and subjective valuations entangle.

Analyzing the tender award criteria in other industries

In order to gain deeper insight into the tender award criteria, a sample of public tender calls was also analyzed to reflect upon WasteCo's dataset. This data was gathered via the HILMA portal, which is an electronic marketplace for public contracts in Finland. The sample consisted of forty tender calls of devices and equipment belonging to four different categories. These devices and equipment ranged from kitchen machines to trucks. None of the analyzed tenders involved waste containers which means that these tenders represent a comparison group covering different types of procurement objects. From each category in this comparison group, the latest ten tender calls were selected for analysis. The results presented in Table 3 indicate that public authorities rely on MEAT more often than the lowest price when they are purchasing devices and equipment. This is noteworthy when the ambiguity of MEAT is taken into consideration.

Table 3. The percentage of cases in which the criteria was used in tender awarding (n=number of studied cases).

	Total (n=40)	Laboratory (n=10)	Industry (n=10)	Electricity (n=10)	Transportation (n=10)
Lowest price	25%	10%	20%	30%	40%
MEAT	75%	90%	80%	70%	60%
Quality criteria	13%	0%	10%	40%	0%
Technical features	38%	70%	40%	20%	20%
After-sales services	33%	40%	30%	20%	40%
Functionality	25%	40%	10%	10%	40%
Delivery time	18%	30%	10%	30%	0%

Performance	15%	30%	0%	10%	20%
Warranty issues	15%	20%	0%	30%	10%
Other	15%	0%	10%	0%	50%

The most commonly used criteria were related to technical features and after-sales services. In several cases, scores were awarded if a particular technical requirement was met. Regarding after-sales, for example, the service response time and availability of services for a certain period of time were used as the basis for awarding scores. In turn, functionality was scored, for example, based on user experience information. Only in one case the scoring was based on energy consumption of the equipment that can be thought to reflect most clearly the life cycle cost aspect. In all, the results show that the practitioners are already relying on same kind of criteria that was presented as being suitable for the procurement of waste containers.

It is possible to define unambiguous and quantifiable quality criteria such as the results of test measurements of laboratory devices. However, regarding most of the used quality criteria, there exists subjectivity first in defining the parameters and later when assessing them. One could claim that such ambiguity is an insurmountable problem for pure analytical decisions. In one case of MEAT, for example, the tenderers were asked to estimate based on the given scale how much the offered solution would affect workload and ergonomics. Clearly, evaluating ergonomics, in particular, is susceptible to subjective opinions and is hardly valued in monetary terms in practice. Therefore, when it comes to non-quantifiable criteria, a great deal of ambiguity is unavoidable. However, LCC, among other approaches, could help in providing structure and a common basis for an assessment discussion regarding multifaceted procurement objects.

Discussion and conclusions

Based on our literature review, longitudinal case study, and public data, it is evident that there are different views among different stakeholders concerning what VfM is and how it is interpreted. In addition, numerous possibilities to evaluate VfM based on substantive quality criteria exist. Thus, besides the potential benefits that pursuing VfM with the help of MEAT could generate, there are several barriers and drawbacks that can limit its use in practice. This paper sheds light on the possibilities and challenges in engaging economic facts and subjective valuations when considering and assessing VfM in public procurement procedures.

The study suggests that when using MEAT the procurement of even such simple products as waste containers is a complex task, and it is extremely hard to figure out objective and measurable quality criteria. Our findings from WasteCo's experience elaborate on the finding of previous literature (Tagesson *et al.*, 2015) that in order to avoid subjective assessments and reduce the risk of appeals, price is often the predominant factor in public procurement. In turn, the analysis of the award criteria used in other industries revealed that contracting authorities are more and more relying on MEAT. This may be the result of recent public procurement legislation encouraging the use of qualitative criteria in tender awarding. However, we reckon that using MEAT will lead to using ambiguous decision criteria. Because of this, we propose that MEAT will be used with care.

In particular, by building on Bröchner *et al.* (2016), this paper suggests that it is worth considering whether it is necessary to use qualitative award criteria or pursue VfM by simply relying on appropriate quality requirements. More particularly, one approach to the problem of valuing quality is to enter all necessary requirements in the specifications and then award the tender based on price alone. In turn, it is possible to proceed with looser criteria and select the tender with the best price-quality ratio. This approach requires scoring the qualitative aspects but may allow more suppliers to participate in the tender competition. However, pursuing VfM by relying on quality requirements alone may not always ensure VfM from the perspective of LCC. Thus an ideal solution could be to include sufficient quality criterion in the specifications and use MEAT in contract awarding.

The paper proposes that LCC enables highly relevant cost scenarios of alternative technical solutions. In the waste management sector, for example, different collection methods differ significantly in terms of life-cycle costs and environmental effects (Teerioja *et al.*, 2012). As suggested in the literature (Tarantini *et al.*, 2011), this paper strengthens the idea that a life-cycle approach is not only a comprehensive criterion in tender evaluation, but it is an approach to analyzing economic and environmental issues within tendering procedures. In line with observations by McKeivitt and Davis (2016), this study suggests that the potential of VfM should be assessed already in the pre-tendering phase, for example, with the help of LCC.

However, LCC might be difficult to implement in practice, because it requires new skills from people who are working with tenders—on both sides of the table. Regarding this, Erridge and Hennigan (2012) suggest that shared practices are likely to be effective in building the confidence needed to use complex tender evaluation criteria. Actually, general level guidance and shared understanding regarding good practices for MEAT, LCC, and transparency exist (e.g., Directive 2014/24/EU). However, because every procurement is different in its nature, it may not be possible to identify commonly agreed upon scoring rules and calculation methods that practitioners should use. As VfM can be achieved in many ways, a certain level of ambiguity needs to be tolerated and accepted while focusing on transparency in the procurement process.

As described in the literature (Falagario *et al.*, 2012), awarding of public tenders may become a time-consuming and expensive process when both prices and qualitative issues are to be considered. Hence, the cost/benefit trade-off of obtaining the additional information needed for comprehensive cost analysis should be recognized (Van den Abbeele *et al.*, 2009). In that sense, it is reasonable that contracting authorities are qualified to choose and execute the appropriate method and award criteria for each different case. For example, organizing test measurements for laboratory devices might be laborious, but could enable objective and unbiased comparison of alternatives. We do not, however, suggest any bloating of contracting authorities' personnel, but rather focusing knowledge on VfM/MEAT/LCC in the most critical and long-term purchases.

Finally, the key contribution of this paper is that defining the absolute VfM may be a difficult, even impossible task because of the multi-dimensional and complex nature of public procurement. Therefore, LCC and other approaches would be needed to at least give structure to the expected impacts of the complex procurement case, and thus partly overcome ambiguities related to them. Waste management, for example, has several society-level effects: economical effects through waste collection costs and environmental effects through emissions; but also more diffuse social effects through the design of the collection system (Reich, 2005; Teerioja *et al.*, 2012). In line with earlier observations (Karmperis *et al.*, 2013), this study suggests that a challenge in supporting decision-making in the field of waste management is that there are various groups of stakeholders with conflicting interests. This paper indicates that within the context of public sector fragmentation, the affordability of a project to a particular purchaser may differ from VfM for the public sector taken as a whole (cf., Heald, 2003).

Limitations and further research

The research was limited to one in-depth case environment in the Finnish waste management context. Further studies could enhance the generalizability of the findings by gaining evidence from more cases across different sectors. As illustrated by a larger sample from the Finnish HILMA database, the difficulties of defining objective and measurable quality criteria might be the case more broadly as well. Indeed, we have little reason to believe that other context would be different in this sense. However, in order to get a comprehensive understanding of the topic, an in-depth involvement with one case company was required.

In terms of future research, it would be necessary to further analyze the approach of using representative committees in evaluating subjective and non-quantifiable tender award criteria. In turn, to achieve

generalized findings and to establish correlations between variables such as procurement approaches, organizational capacity, and legal complaints, more quantitative research based on large datasets is needed. Moreover, further research could consider how to exploit LCC in tender selection: by whom in practice and through which kinds of processes?

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