Emerald Insight

Industrial Management & Data Systems

Article information:

Users who downloaded this article also downloaded:

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

How does performance history impact supplier selection in public sector?

Olivier Mamavi and Haithem Nagati
ICD Paris, Laboratoire de Recherche Appliquée (LARA), Groupe IGS, Paris, France

Gilles Pache
Centre de Recherche sur le Transport et la Logistique (CRET-LOG), Aix-Marseille University, Aix-en-Provence, France, and

Frederick T. Wehrle
Laboratoire de Recherche Appliquée, ICD Business School, Paris, France and Pôle de Recherche Interdisciplinaire en Sciences du Management, Paris Sorbonne University, Paris, France

Abstract

Purpose – The purpose of this paper is to study if the performance history impacts supplier selection in the French public sector context. While French public procurement legislation forbids consideration of the past contract wins in supplier selection, public contractors may still rely on contract win history for highly complex transactions.

Design/methodology/approach – Using French Official Journals (BOAMP), the authors collected all public procurement transactions of 976 suppliers that had at least one transaction per year, over a period of six years (between 2006 and 2011). The authors conducted a two-level hierarchical linear auto-regression analysis and a feature evaluation analysis for all transactions.

Findings – The paper finds significant variation between the transactions of different markets, as well as in the overall positive impact of past wins and in the detailed impact patterns and thresholds of each market. The findings may allow refinement of existing contract awarding strategies and of current legislation.

Originality/value – The paper aims at empirically testing whether a supplier's degree of success in any given year, measured by the number of public contracts won, may have an impact on the likelihood that the same supplier is awarded a public contract the following year. The authors conclude that suppliers retained for public contracts could benefit from building public buyers' loyalty using a key account selling approach rather than systematically seeking to acquire new contracts.

Keywords Public procurement, France, Supplier selection, Performance history

Paper type Research paper

1. Introduction

Supplier selection is an important dimension of procurement management (Cebi and Bayraktar, 2003; Huang and Keskar, 2007; Gosling *et al.*, 2010; Khorramshahgol, 2012). In a context that is prompting manufacturing and retailing firms to increasingly concentrate on a few key competencies (new product design, marketing and communication policies, etc.), the use of external resources owned by effective suppliers directly influences the likelihood of gaining a sustainable competitive advantage. Although some may

consider this question to pertain uniquely to private companies operating in sectors sensitive to outsourcing strategies, such as automotive, microcomputers or aeronautics construction, there is strong evidence to the contrary.

The profitability and efficiency imperatives that increasingly surface in the public sector also intensify the need to select the best suppliers. In a context of deep public spending cuts and efforts to improve services for taxpayers, specifically regarding hospitals, public education and aid for people in difficulty, the importance of choosing the best suppliers can no longer be ignored. Suppliers are actively participating in applying the lean approach, for instance at British hospitals (Radnor *et al.*, 2012). Hawkins *et al.* (2011) argue that the difference in procurement strategy (how suppliers are treated) between private and public sectors is not great. A number of works explicitly assert that strategies for managing supplier relationships can be borrowed from the private sector to enhance the performance of public sector procurement (Boyne, 2002; Loader, 2010).

Numerous examples illustrate how the supplier selection process has become an essential element of the governance of many components of the public sector, one which fuels the dissemination of many innovations (Hommen and Rolfstam, 2009; Rolfstam *et al.*, 2011). For several years, the French Air Force has outsourced security control at the entry to its bases, for several years. The choice of companies providing this control has clearly generated a long and costly process to choose the company that is best qualified to protect the bases from terrorist attacks; as Glas *et al.* (2013) underline, supply selection needs to satisfy military demand in terms of required effectiveness (robustness) and efficiency (supply risk).

Supplier selection is a crucial element of supplier relationship management. The more rigorous and structured the selection phase, the stronger the suppliers' performance. Company profitability and competitiveness depend on effective supplier selection. To help companies make decisions, the literature has proposed several supplier selection criteria and evaluation methods. Within the literature, consensus has emerged regarding four classic criteria: price, quality, lead times and service. Research has also identified criteria that can affect supplier performance throughout the contractual relationship. Notably, past performance is instrumental to selecting a supplier; it indicates the supplier's ability to meet the contractual requirements (Sarkar and Mohapatra, 2006; Watt *et al.*, 2010).

In this context, our research question is:

RQ1. How does performance history impact supplier selection in the public sector? Specifically, we want to determine whether the public buyer considers past performance when selecting the best supplier. If the literature considers that a supplier's past performance impacts the choice of a public buyer, to our knowledge no econometric studies have rigorously measured this phenomenon on a large sample of public procurement transactions. This gap is notably linked to the difficulty of compiling exhaustive information on public procurement transactions over several years. This paper attempts to partly fill this gap based on an analysis of the French context.

In this paper, we analyze the supplier selection process in French public markets. The case of France is particularly interesting because for decades the public sector has been a central player in the organization of inter-company exchanges. This is evidently the historical result of the famous Colbert doctrine, which asserted that state intervention

was needed to secure the largest part of limited resources (de Mazan, 1990). While the economic impact of public markets is thought to be most efficient when contracts are signed with as many suppliers as possible, public buyers tend to select suppliers based on their prior performance rather than on their current offer (Mori and Doni, 2010). While this practice may allow public buyers to minimize their risks, it may also ultimately lead to the monopolization of public markets by a few privileged suppliers. Consequently, French legislation (PPCC, 2012) imposes standardized criteria for supplier selection, all of which are related only to the current offer. The aim of this legislation is to distribute the economic impetus evenly by giving all suppliers an equal opportunity to win public procurement contracts.

Considering the differences in complexity of the three French public procurement markets (works, service and goods), public buyers are likely to face various degrees of risk and consequently to differ in supplier choice strategies. To assess if supplier choice is influenced by suppliers' past performances in French public procurement markets, we analyze the impact of suppliers' performance history on their ability to win contracts. To answer the research question, we first present the current theoretical and legal framework of French public procurement. The methods and results are then explained and discussed in detail. Finally, implications of the findings for the current public procurement system will be put forth as avenues of future research.

2. Literature review
Few empirical studies have looked at public procurement from the supplier selection perspective (Quayle, 1998; Murray, 2001a; Shahadat, 2003; Walker *et al.*, 2008; Arlbjørn and Freytag, 2012; Juntunen *et al.*, 2012; Oruezabala and Rico, 2012). This is especially surprising given that public markets are major economic players. This is especially surprising given that public markets are major economic players. The government purchasing market constitutes the largest business sector in the world (Hawkins *et al.*, 2011). Depending on the country, public expenditures represent between 8 and 25 percent of gross domestic product (GDP); this market represents about 16 percent of European Union GDP (Brammer and Walker, 2011).

Public procurement is defined as acquisition of goods and services by government or public sector organizations (Uyarra and Flanagan, 2010). Public sector organizations comprise a wide range of organizations of varying scale and with diverse cultures, needs and organizational structures. They include municipalities, states, territorial or functional subdivisions, and hospitals (Loader, 2010). Public market organizations currently face many challenges, including devising a regulatory framework to guarantee competition and optimize resource allocation (Erridge, 2007). Several studies show that public procurement can also support socio-economic objectives for both local and regional authorities (Murray, 2001a), and for the State (Murray, 2009). For instance, Walker and Brammer (2009) explain how public purchases in the UK influence the propensity to engage in sustainable procurement practices. Edquist and Zabala-Iturriagagoitia (2012) present six cases that demonstrate that public markets in innovation can also contribute to satisfying previously unmet needs, solving societal problems and stimulating R&D. McCrudden (2004) describes how public procurement can be used as a tool of social regulation by supporting the domestic market.

Contrary to the private sector, public markets are bound by important legal constraints (Rainey *et al.*, 1976; Johnson *et al.*, 2003; Caldwell *et al.*, 2005; Arlbjørn and Freytag, 2012; Piga and Treumer, 2013), and they are strongly affected by the socio-economic context and organization's mission (Wernz *et al.*, 2014). In France, the public

market code (PPCC, 2012), inspired by the European Union Directive on Public Procurement and Compulsory Competitive Tendering (Gelderman *et al.*, 2006), sets the legal framework. This code defines a public market as a contract concluded, in return for payment, between a public buyer and a private economic operator (e.g. SME, multinational, association or business alliance). The purpose of the contract is to satisfy needs in works (construction of buildings or civil engineering), goods (furniture, materials, consumable goods) or service (cleaning, security, garden maintenance, garbage removal, etc.).

2.1 Supplier selection in public markets
In the French context, suppliers are selected following a competition designed to identify the most economically advantageous offer. Call for tenders procedures are part of a logic intended to maximally reduce collusion between the public sector and private businesses, and to deter preferential treatment of certain candidates. The public market code rests on three main organizing principles for the awarding of public contracts (PPCC, 2012). First, freedom of access to public procurement is guaranteed by the public buyer, to allow all candidates to participate. Second, all candidates must be treated equally, to avoid impeding competition among firms replying to a call for tenders. This equality of treatment is reinforced by procedures related to consultation of the contents of tenders and the makeup of the selection committee. Third, the transparency of procedures should favor fair treatment and healthy competition among participants.

As in the private sector, public buyers also fundamentally seek the best conditions for procurement costs (Kulmala *et al.*, 2006; Loader, 2010; Arlbjørn *et al.*, 2011). Competition among suppliers has long been a mechanism used to reduce costs, notably through calls for tenders, in search of the most economically advantageous offer (Domberger and Jensen, 1997; Parikka-Alhola *et al.*, 2007; Arlbjørn and Freytag, 2012). The choice of a good allocation mechanism to satisfy the community's objectives must be transparent, allow the most efficient candidate to be retained, oblige candidates to disclose pertinent information on their efficiency and improve public expense management (Murray, 2001b). Public contracts are awarded to candidates that offer the most economically advantageous conditions (Naegelen and Mougeot, 1998). As stated in the French public procurement contracts code, to make the best choice, the public buyer typically uses the following criteria: quality, price, technical value, aesthetic and functional characteristics, performance in environmental protection, performance in professional integration of populations in difficulty, global usage cost, profitability, innovativeness, after-sale service and technical assistance, delivery date and delivery or execution time (PPCC, 2012).

Of course, these criteria are not of equal importance. They may be weighted or prioritized according to the particular context. For instance, aesthetic characteristics take precedence in tourism zones whose natural features could be irrevocably damaged if a supplier does not abide by environmental constraints. By comparison, in disadvantaged suburban neighborhoods the criteria of integration of populations in difficulty might weigh more heavily in the choice of supplier. To carry out its mission effectively, the public buyer specifically defines the balance among the criteria and their respective value, by applying a percentage or a coefficient. Processes used here issue from the planning programming budget system, intended to optimize public sector budget choices through better evaluation and control of the results of administrative actions, using cost-effectiveness assessments

(Hooper, 1968). If weighting is not possible, the public buyer will create a hierarchy of criteria. Specifically, it will draw up a list in which the criteria are presented in decreasing order of importance.

2.2 Public buyer's behavior

Public market organizations currently face many challenges, including devising a regulatory framework to guarantee competition and optimize resource allocation (Erridge and Mcllroy, 2002). As Erridge (2007) maintains, public procurers face a dilemma: either adopt a purchasing logic that favors the most economically advantageous offers or prioritize the public interest, which may run counter to commercial objectives. The analysis of public markets shows that decisions are subject not only to divergent political, administrative and regulatory objectives, but also that key performance measures associated with these objectives may introduce conflicts of interest within government agencies (Schapper *et al.*, 2006). More generally, potential conflicts may arise when the public buyer wants to attain all objectives simultaneously. For instance, how can it develop preferred relationships with a particular supplier while guaranteeing the necessary transparency and equity toward all suppliers?

In the private sector, research has long demonstrated the importance of cooperation between customers and suppliers to improve the performance of the dyad (Ford, 2002). This cooperation reinforces long-term relationships with a limited number of suppliers. Exchanges are based on continuous interaction between the parties, as part of an informal process of dialogue and exchange. This relational approach thus favors the matching of supply and demand while reducing transaction costs (Carr and Pearson, 1999; Ploetner and Ehret, 2006; Huang *et al.*, 2014). Contrary to the private sector, public procurement rests on very formal contracts dictated by imposing administrative and ethical constraints (Pratt *et al.*, 2011; Adam *et al.*, 2012; Arlbjørn and Freytag, 2012). Principals and suppliers generally use contractual arrangements to govern their relationships.

2.3 Impact of performance history

In an uncertain environment, public decision makers have incomplete information. They also have a limited cognitive capacity that obliges them to restrict their vision of possible choices. The concept of bounded rationality states that decision makers do not have sufficient cognitive capacity to optimize all the available alternatives (Simon, 1987). This explains why public buyers opt for a satisfactory solution: the cost of searching for an alternative supplier may surpass the expected gain. Seeking an alternative supplier obliges businesses to dedicate time and financial resources to identify the most interesting offers, and ensure that suppliers are reliable and that they are unlikely to develop opportunistic behavior once the contract is signed. Such behavior could include concealing information on the actual cost of the service provided (Maskin and Tirole, 1999).

As in the private sector, the public buyer seeks to minimize uncertainty related to the procurement process by controlling perceived risks. In the procurement process, the buying company faces a risk related to suppliers, which it must mitigate. This risk is mainly linked to the supplier's performance once the procurement contract has been signed. To limit this risk, the buyer must deal with suppliers that are most likely to meet its performance objectives (Choi and Krause, 2006). The supplier selection process is thus an important a priori control measure of risks related to suppliers. It leads the buyer to stabilize the choice of suppliers over time (Tang, 2006).

Supplier selection implies a multidimensional evaluation of offers submitted. Beyond price, technical capabilities, qualifications of key personnel, successful delivery of innovative goods and service to the private sector, and past performance records must be considered (Qiao and Cummings, 2003; Banaitiene and Banaitis, 2006; Uyarra *et al.*, 2014). As Doni (2006) asserts, selection of a contractor should be based not only on bids, but also on bidders' specific characteristics. Public buyers may require that potential suppliers submit information or documents that let them evaluate bidders' experience, and professional, technical or financial capacities. This explains the importance of dialogue and continuous exchange between the supplier and public buyer, which will be simpler to carry out if the supplier is already known to the public buyer from previous contracts executed. For instance, in the Swedish municipalities, bidder behavior for contractor selection is clearly affected by the likelihood of repeated contracts (Waara and Bröchner, 2006).

The consideration of potential supplier's past performance when awarding contracts is an important criterion to identify the best supplier in both the private sector (Wong *et al.*, 2000; Albano *et al.*, 2006; Van de Rijt *et al.*, 2010; Watt *et al.*, 2010), and the public sector (Mills, 2005; Shugart, 2005; Snider and Walkner, 2009; Spagnolo, 2012). Several works underline the growing importance of past performance in government contracts, which is a reliable indicator of quality of future performance (Kelman, 1990; Guerrero and Kirkpatrick, 2001; Doni, 2006; Bradshaw and Chang, 2013). The USA federal government strongly emphasized the use of past performance information to select contractors in federal procurements (Causey, 2000; Manuel, 2013). For instance, the empirical study Coggburn (2003) conducted on 49 state chief procurement officers in the USA found that past performance is a primordial evaluation factor when awarding contracts. As the Federal Acquisition Regulation underlines, "past performance information is relevant information, for future source selection purposes, regarding a contractor's actions under previously awarded contracts" (Snider and Walkner (2009), p. 614). Therefore, we posit our first conjecture:

> Past performance based on the number of contracts won in a given year positively impacts the supplier's ability to win contracts in the following year.

2.4 Differences in markets

Public procurement markets vary in complexity. It is thus hard to compare the choice of supplier for the construction of bleachers at a football stadium in a small outlying town with the choice of a supplier to operate a central kitchen for several schools. The expertise used, the technological constraints that affect the execution of the market and the legal framework governing provision of the service create major differences that impact the supplier selection process. According to the incomplete contract theory (Maskin and Tirole, 1999; Hart and Moore, 1999), market complexity is assessed according to two specific features. First, the indescribability of future contingencies, i.e. to what extent future contingencies cannot be described a priori; typically, the longer the period covered by the contract, the less precise the predictions of possible contingencies. Second, the unverifiability constraint, i.e. to what extent transparency of procedures is constrained due to asymmetric information between the contracting parties. Generally, the more asymmetric the information, the harder it is to control the procedures.

Consequently, public buyers on highly complex markets are thought to minimize economic risks by choosing suppliers they can trust. Closer relationships between a supplier and public buyer, together with long-term partnerships, can facilitate construction of real "social capital" (Erridge and Greer, 2002). Social capital, in the sense of Nahapiet and Ghoshal (1998), is based mainly on trust and enduring commitment of the partners in a relationship, by reducing their transaction costs and improving supply chain integration, which in turn has a significant effect on firm performance (Yim and Leem, 2013). Social capital refers here to a powerful cognitive dimension, operationalized by social interaction ties, which facilitates mutual adjustments to potential difficulties during contract execution (Carey *et al.*, 2011). Essig and Batran (2005) demonstrate this principle in their research on public-private partnerships in Germany. They underline the crucial importance of the development of long-term relationships in public procurement practices to collectively improve performance outcomes.

When assessing trustworthiness, contractors traditionally rely on suppliers' past performance (Mori and Doni, 2010), but also on their reputation. Generally, the requirements and the rules of calls for tenders based on the principles of transparency, fairness, objectivity and nondiscrimination among suppliers have heightened public buyers' risk aversion. Correia *et al.* (2013) have notably observed this result on the carbon market. It would be interesting to determine the extent that the public buyer's decisions are influenced by the supplier's performance history, when both maintain sustainable relationships. In other words, we want to examine whether public procurement is sensitive to phenomena of inertia, as can be seen in private companies, where a supplier can easily partner with a manufacturer for several decades, as the industrial marketing and purchasing group has known since the 1980s (Ford, 2002). Therefore, we posit our second conjecture:

The positive impact of performance history on ability to win contracts differs between the markets.

3. Methodology

To assess the impact of suppliers' performance history on their current win performance, we have chosen to study the case of France. In 2006, France implemented a new public procurement code prohibiting the use of performance history as a criterion of supplier choice for public contractors. Consequently, any effects of suppliers' performance history are unlikely to be caused by common practice, but rather result from a conscious choice. All transactions by French public buyers regarding contracts that exceed €4.000 before taxes are published in French Official Journals (www.boamp.fr). We collected all transactions of suppliers that won a minimum of one public procurement contract per year between 2006 and 2011. The final data set contained all transactions for 976 suppliers over six years.

Given that market complexity has been predicted to influence the effect of past supplier performance on contract wins, we retained the market on which each contract took place. In the French public procurement code, there are three main markets: works, service and goods. These markets vary in complexity and level of competition. The works market has few suppliers that acquire more than one contract per year, and the maximum number of contracts per year is fairly low (31) (see Figure 1). The service market also has few suppliers that acquire more than one contract per year; however, some suppliers obtain up to 45 contracts per year. The goods market is by far the most
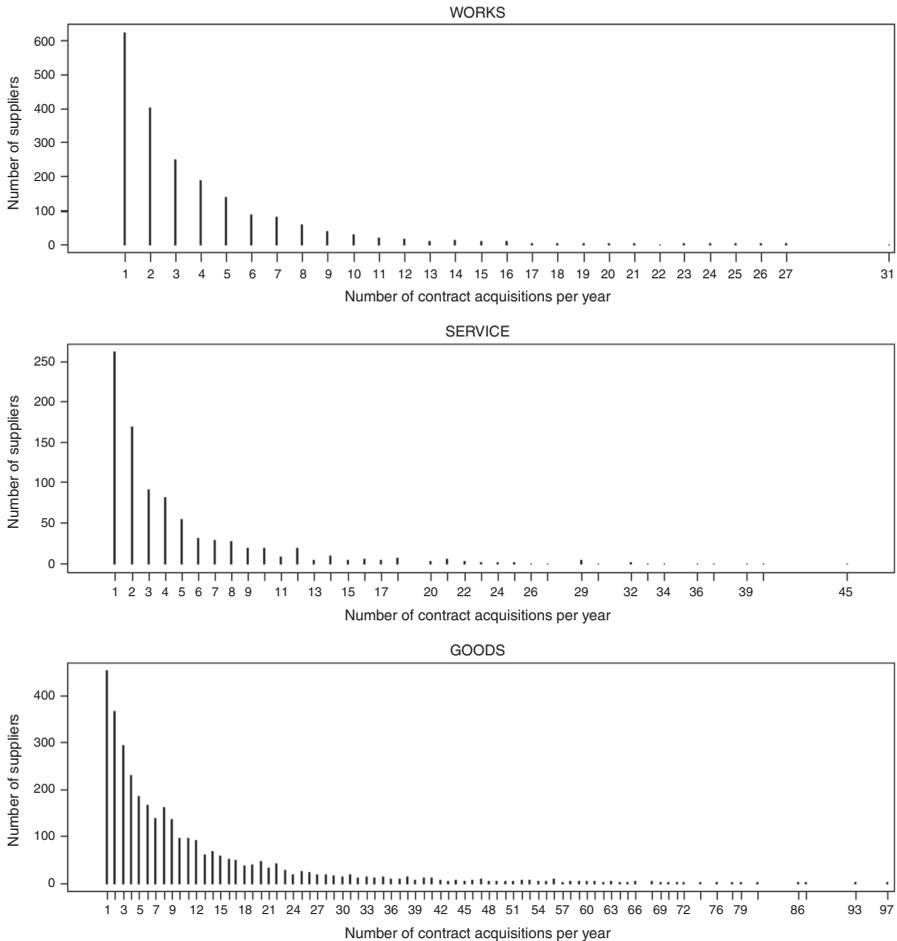
Figure 1.
Histograms for the
three French public
procurement markets
(works, service,
goods)

active, and while most suppliers win very few contracts per year, several suppliers obtain more than 50 contracts per year.

3.1 Influence of past supplier performance on new contract wins

To assess the effect of a supplier's performance on the number of future contract wins, we used the amount of contract wins in a given year as a measure of supplier performance. We performed a regression analysis of the number of contract wins of all suppliers in a given year and the number of contract wins in the following year. Our data set contains information over a six-year period, so we performed a regression analysis of the numbers of contract wins of all suppliers in the years 2006 to 2010 and the corresponding number of contract wins in the years 2007 to 2011. However, the regression method had to account for variations in the number of contract wins between the three different markets: works, service and goods.

To test for an overall effect despite the variations between markets, the regression analysis had to be performed using hierarchical modeling for nested data. Hierarchical

models analyze the data nested into different groups on two levels: one where each group is analyzed separately, and one where all groups are taken together. In our case, we performed a two-level hierarchical linear auto-regression analysis of the influence of the contract wins of all 976 suppliers (i) of the years ($t-1$) from 2006 to 2010 (CW_i^{t-1}) on the number of contracts won by all suppliers from 2007 to 2011 (CW_i^t) on the first level, while including the grouping into markets (j) on the second level, as shown in the following Equation (1):

$$CW_{ij}^t = \gamma_{00} + \gamma_{10}CW_{ij}^{t-1} + \left(u_{0j} + u_{1j}CW_{ij}^{t-1}\varepsilon_{ij}\right) \tag{1}$$

with γ_{00} being the average intersection, γ_{10} average slope and $u_{0j} + u_{1j}P_{1j}\varepsilon_{ij}$ total residue.

This two-level hierarchical linear auto-regression analysis allows correlation of the number of contracts won by all suppliers in a given year with the number of contracts won by the same suppliers one year prior. In a single model we can thus analyze the impact of the number of contract wins in 2006 on that of wins in 2007; of 2007 on 2008; 2008 on 2009; 2009 on 2010; and 2010 on 2011. The model also differentiates between markets and lets us test whether the influence of past supplier performance on current wins is independent of the type of market.

3.2 Influence of past supplier performance on new contract wins

To assess if there are specific differences between each market, we conducted an ordered feature evaluation analysis of all contract wins of all 976 suppliers (i) from 2007 to 2011 ($C^w ijt$) for each market (j) against the number of contracts won by all 976 suppliers from 2006 to 2010 ($C^{Wij}t-1$). To perform this analysis we used the OrdEval algorithm developed by Robnik-Sikonja and Vanhoof (2007). The calculations were done using the CORElearn package for R (Robnik-Sikonja and Savicky, 2012). Using the OrdEval algorithm, we calculated the probability that a given number of contracts won by a supplier in one year will lead to an increase in the number of contracts won in the following year. The OrdEval algorithm uses a machine-learning process to assess this probability in four steps:

- In the first step, the algorithm calculates the probability that a given number of current contract wins (CW_{ij}^t) is larger than its closest similar number. For instance, in the sample of contract wins [4; 4; 5; 5], the probability of [5] being larger than its closest similar number [4] is $P(CW_{ij}^t) = 0.67$, in the series [4; 5; 5; 5], $P(CW_{ij}^t) = 0.33$.

- In the second step, the algorithm calculates the probability that a given number of *past* contract wins (CW_{ij}^{t-1}) is larger than its closest similar number $P(CW_{ij}^{t-1})$.

- In the third step, the algorithm calculates the probability that both the given number of current (CW_{ij}^t) and past (CW_{ij}^{t-1}) contract wins are larger than their closest similar number $P(CW_{ij}^t Cw_{ij}^{t-1})$.

- In the fourth step, the algorithm calculates the probability that a given number of current contract wins (CW_{ij}^t) is larger than its closest similar number, given that the corresponding number of *past* contract wins (CW_{ij}^{t-1}) is larger than its closest similar number $P(CW_{ij}^t | CW_{ij}^{t-1})$.

Robnik-Sikonja and Vanhoof (2007) refer to the probability calculated in the fourth step as the upward or positive reinforcement. In our case, it is equal to the probability that

for a single supplier, a given number of contract wins in one year will lead to an increase in the number of contracts won in the following year. This gives Equation (2):

$$PR_i = P\left(CW_{ij}^t \Big| CW_{ij}^{t-1}\right) = \frac{P\left(CW_{ij}^t CW_{ij}^{t-1}\right)}{P\left(CW_{ij}^t\right)} \tag{2}$$

To assess the significance of the impact of past on current contract wins, we used the permutation test procedure implemented in the ordEval function of the CORElearn package (Robnik-Sikonja and Savicky, 2012). This function assesses the significance of positive reinforcement by testing the 0-hypothesis that the positive reinforcement found for the original data equals the positive reinforcement found for random permutations of the data, against the alternative conjecture, that the positive reinforcement found for the original data does not equal the positive reinforcement found for random permutations of the data. To assess the significance in our analysis we calculated 1,000 random permutations.

4. Results
The algorithm used in the paper is well-suited for predicting the probability that a single firm gets a new contract given the same firm's success score in the recent past. Our results illustrate the impact of performance history in the supplier selection process and the positive reinforcement on number of contracts won from 2007 to 2011 as a function of the number of contracts won from 2006 to 2010. In other words, we can conclude that there is a reinforcement logic whereby past contracts awarding increase the likelihood of future awards.

4.1 Impact of performance history
The French public procurement code prohibits the use of supplier selection criteria that indicate a supplier's past performance. The reasoning behind this legislation is that this selection indicator is common practice. Consequently the number of contracts won is predicted to influence current contract win performance. Table I presents the summary of the results of the two level hierarchical linear auto-regression analysis of the number of contracts wins from the years 2006 to 2010 on the number of contracts wins from 2007 to 2011, for the three markets (works, service, goods). The data of suppliers shows the overall positive impact of the number of past contracts won in all three markets. However, the markets themselves have an effect as well, which means that the impact of the number of contracts won is different for each market.

4.2 Differences in markets
The influence of the number of contracts won on contract win performance is expected to differ depending on the market. A two-level hierarchical linear auto-regression

Table I.
Summary of the results of the two-level hierarchical linear auto-regression

|	Value	SE	df	t-value	p-value
Market	2.6468019	0.9784906	5,211	2.704985	0.007**
Past contract wins	0.6362979	0.0796457	5,211	7.989103	< 0.001***

Notes: **,***Significant at < 0.01 and < 0.001 levels, respectively

analysis of contract win data of suppliers of all three French public procurement markets affirmed this prediction. An ordered feature evaluation analysis of the contract win data of suppliers of all three French public procurement markets demonstrates that the positive impacts of the number of contract wins found for each market do not follow regular patterns (see Figure 2). Figure 2 provides a graphical representation of positive reinforcement on number of contracts won from 2007 to 2011 as a function of the number of contracts won from 2006 to 2010, for the three French public procurement markets (works, service, goods).

The positive reinforcement is statistically significant at the 95 percent interval when reaching or exceeding the significance threshold. The goods and service markets show random positive reinforcement effects, i.e. there is no distinctive pattern of number of past contract wins that would imply a consistent positive reinforcement effect. Instead, the positive reinforcement effects are scattered randomly over the whole spectrum of quantities of past contract wins. In contrast, the works market shows a constant positive reinforcement effect for the number {5, 6, 8, 9, 10, 11, 12} of past contract wins (see Table II). Within the range of 5 to 12, the number of 7 past contracts won does not show a positive reinforcement effect.

4.3 Plateau of positive reinforcement
The results of the two-level hierarchical linear auto-regression analysis support the conjecture that the number of past contracts won influences future supplier contract win performance, while showing that the impact varies with the market. A detailed
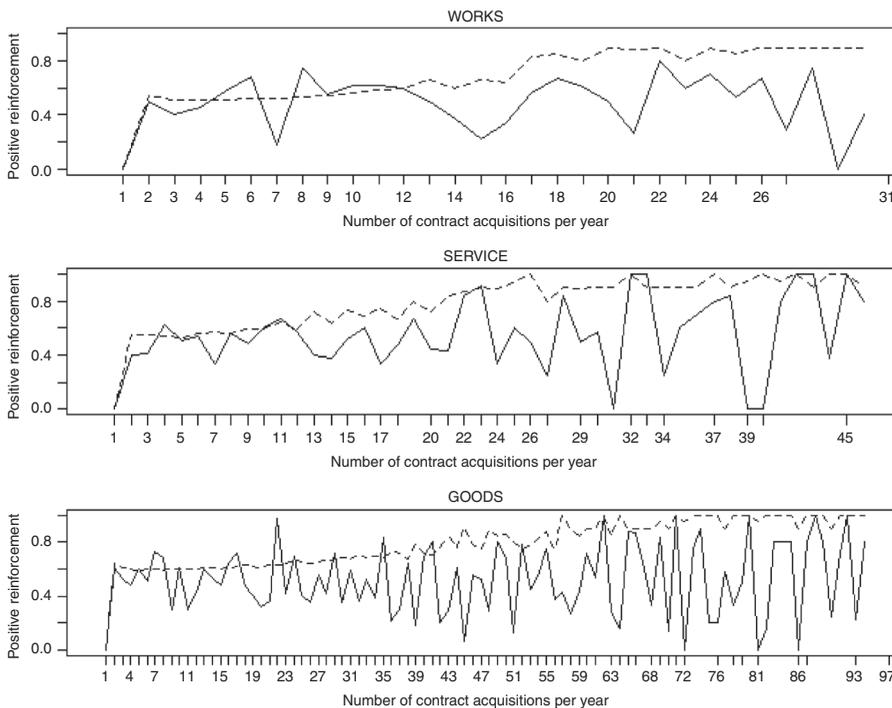
Notes: ----Threshold; —— positive reinforcement

Figure 2.
Positive impacts of
the number of
contract wins

ordered feature evaluation analysis shows that the overall effects found via the auto-regression analysis are not as linear as the regression analysis naturally suggests. Analyzing the positive impact of each single number of past contracts won using an ordered feature evaluation analysis shows that the effect is randomly scattered over the whole range of number of past wins.

For the works market alone, the feature evaluation analysis exhibits a plateau of constant positive reinforcement between 5 and 12 past contract wins. The reinforcements have a strength of $PR = 0.56$ to $PR = 0.75$. This means that as soon as a supplier has won at least five contracts in a given year, its probability of winning six contracts in the following year is 58 percent. Once the supplier has won six contracts in a given year, its probability of winning seven in the following year is 68 percent, and so forth. This positive reinforcement thus drives suppliers to win more contracts year by year until they reach the threshold of 12 contracts. Thereafter, any additional contracts will not have a positive reinforcement effect, i.e. more wins will not help the supplier acquire more contracts in the following year. There appears to be a particularly efficient implicit selection mechanism that prevents public buyers from choosing inefficient suppliers. Performance history thus acts as a public reputational selection mechanism.

The plateau of positive reinforcement is in line with the incomplete contract theory in that the works market is thought to show high uncertainty due to incomplete contracts, allowing for only limited transparency. Consequently, one would expect contractors to emphasize suppliers' past performance to minimize risks. The fact that the positive reinforcement plateau begins only at five contract wins in a given year can be interpreted as an informal entry barrier, i.e. suppliers that have not won at least five contracts are not efficient enough to benefit from a positive reinforcement effect. Further, contractors appear to positively select suppliers that have won between five and 12 contracts in a single year. However, the positive reinforcement vanishes after 12 contracts, which might be interpreted as an upper threshold beyond which further contract wins are no longer a selection criterion for contractors. Contractors appear to take this important result into account.

On this plateau, however, there is one exception, which is the number of seven past contract wins. Having won seven contracts does not show positive reinforcement that would lead to a higher probability of winning eight contracts in the following year. This finding is consistent with the fact that the number of suppliers that have

CW^{t-1}	1	2	3	4	5	6	7	8	9	10
PR	0.00	0.50	0.41	0.46	0.58	0.68	0.18	0.74	0.56	0.62
95%	0.00	0.54	0.52	0.51	0.51	0.52	0.52	0.53	0.56	0.57
p-value	0.999	0.177	0.849	0.365	0.002**	< 0.001***	1.000	< 0.001***	0.05 *	0.005**
CW^{t-1}	11	12	13	14	15	16	17	18	19	20
PR	0.61	0.59	0.50	0.37	0.22	0.34	0.56	0.67	0.61	0.50
95%	0.58	0.61	0.67	0.62	0.66	0.63	0.80	0.85	0.90	0.90
p-value	0.027**	0.068	0.336	0.820	0.966	0.827	0.257	0.172	0.236	0.383
CW^{t-1}	21	22	23	24	25	26	27	28	29	30
PR	0.27	0.80	0.60	0.70	0.53	0.67	0.29	0.75	0.00	0.40
95%	0.89	0.90	0.83	0.90	0.85	0.90	0.90	0.90	0.90	0.90
p-value	0.754	0.138	0.240	0.188	0.350	0.196	0.735	0.152	0.999	0.403

Notes: *,**,***Significant at < 0.05, < 0.01 and < 0.001 levels, respectively

Table II.
Positive reinforcement for each single number of past contract wins (CW^{t-1}), significance threshold (95 percent) and p-value

won seven contracts over the whole period from 2006 to 2011 is slightly larger than predicted by the exponential decrease in the number of suppliers observed (see Figure 1). However, to our knowledge, there are no empirical studies that could explain why contractors today should select fewer suppliers that had won seven contracts, or why suppliers that had seven contract wins do not win more than seven contracts in the following year.

5. Implications and research avenues

The French public procurement code aims to maximize the economic impact of public contracts by regulating supplier selection by public buyers. The code forbids French contractors from selecting suppliers based on their past performance. Our results show that the number of contract wins in a given year is correlated with the number of contracts won in the following year. This overall effect appears to corroborate previous studies and support the first conjecture, namely that the number of contracts won in a given year positively influences the supplier's contract performance in the following year. In parallel, we observed positive reinforcement effects that differ statistically by market, which supports the second conjecture. The findings can be explained by a supplier selection strategy that takes the number of contracts won by a supplier as an indicator of the supplier's past performance.

Our findings inform an analysis of the future transformations of the public sector. In this context, we have targeted the supplier selection process, which is an important dimension of procurement management. Like other works, our results demonstrate that differences between public and private procurement have tended to fade. With the appearance of new public management (Mathiasen, 1999; Hood, 2000; Gruening, 2001; McLaughlin *et al.*, 2005; Levy, 2010), the public sector has adopted management methods traditionally reserved for the private sector. Many researchers have argued that business best practices from the private sector can be transferred to the public sector (Boyne, 2002; Burnes and Anastasiadis, 2003; Hawkins *et al.*, 2011; Tadelis, 2012). These best practices concern both dimensions specific to the organization (creating common and standardized work methods, improving employee satisfaction, creating a learning organization, etc.) and dimensions linked to relationships with suppliers.

5.1 Managerial implications

The ordered feature evaluation analysis shows that the positive effects on the goods and the service market are not linear. Consequently, suppliers cannot expect to have a constant positive effect of the number of past contract wins. Positive effects may occur only randomly for only specific number of past contract wins. However, we are not aware of any empirical study that could explain why only certain quantities of past contract wins show a positive reinforcement. In the works market, the ordered feature evaluation analysis shows a plateau of positive reinforcement between 5 and 12 contract wins, with the exception of the specific number of seven past contract wins. Hence, suppliers cannot expect to benefit from having won fewer than five contracts in a year. The threshold of five past contract wins may represent an informal barrier to entry that contractors impose upon suppliers in the works market. Consequently, suppliers in this market should aim at winning at least five contracts in any given year. Further, as positive reinforcement drives the number a wins up each year toward 13 per year, investing in winning at least five contracts will ultimately lead to a constant increase in contract wins per year. However, once the upper threshold

of 12 contract wins per year is passed, suppliers will not be able to win more contracts based on the number of past wins. To win more than 13 contracts per year, suppliers will have to outperform their competitors in other, yet to be empirically assessed, selection criteria.

Another result of our research concerns the learning effect. It seems that the more contracts a firm gets in any given period, the more that firm will learn about the buyer's characteristics during the execution of the contracts. In other words, the current contractor becomes the incumbent firm in a privileged position to better understand what the buyer will require in future contacts. Specifically, the incumbent firm will have valuable information that will be used in drafting its technical proposal in the next round of competition; moreover, executing a contract today allows the contractor to measure the discrepancies between the estimated production costs (that were used for submitting the financial proposal) and the actual production costs (that are realized at the execution stage). This could presumably reduce the risk of suffering from the winner's curse in tomorrow's contacts. Consequently, the buyers' "preferences" for previous contractors might endogenously arise because of relevant information that is accessible only after the contractor is selected.

In terms of managerial recommendations for suppliers, our results suggest that it is important for suppliers to concentrate on public markets on which they have won contracts in the past rather than try to submit multiple new calls for tenders, which would require substantial financial resources with very uncertain chances of success. On the contrary, suppliers would benefit from reinforcing a series of relationships by identifying the specific expectations of public buyers and how to best satisfy them. It is certainly not original to suggest that a supplier would aim to win more contracts, just as marketing managers give their sales force the objective of increasing sales. However, an essential question remains: how can a supplier enter the market and how can it get contracts? Market entry is undoubtedly facilitated by the supplier's reputational effect (Spagnolo, 2012). Suppliers that can highlight the fact that they obtained several contracts from other public contractors have an advantage. Once a new contract is won, the supplier must then maintain a preferred relationship with the public buyer to meet its needs and invest in building new capacity, if applicable. As Albano *et al.* (2006, p. 113) underline, "reputation on past performance may become a barrier to entry because newcomers arrive with no reputation and are thus ill favored."

Creating a preferred relationship with public buyers may seem surprising in a context of serial calls for tenders. However, it is a strategy worth exploring in light of the key account management approaches developed by manufacturers (Homburg *et al.*, 2002; Pardo *et al.*, 2006; Guesalaga and Johnston, 2010; Tzempelikos and Gounaris, 2013). We consequently suggest that suppliers promote key account selling founded on a systematic set of processes for identifying and profiling public buyers, along with designing and adapting information-based and value-added selling strategies, which can foster sustainable rooting in public markets in which they are established. This rooting would be facilitated by the supplier's performance history, and particularly by its capacity to improve the quick resolution of concerns and issues. As Rackham (1989) noted, this latter point is essential to implement effective key account selling that sustainably builds a professional buyer's loyalty. This approach is highly applicable to the public sector, notably because public buyers have adopted new buying skills in market management, specification, competitive process and negotiation (Roodhooft and Van den Abbeele, 2006).

5.2 Legal implications

Lastly, our findings only partly support the French legislative restrictions on contractors. According to the results of our ordered feature evaluation analysis, using the number of past contract wins as a performance indicator is not common practice on the goods or the service market. However, the restrictions are likely to impact current practice on the works market, where the number of contracts previously won appears to be taken into account for suppliers with fewer than 13 wins per year. Considering the differences observed in the three markets, one may question whether a general restriction policy is the most efficient solution to maximize the positive economic effect of public procurement contracts. Mori and Doni (2010) have even suggested that a supplier selection system be based specifically on performance to avoid choosing inefficient suppliers, which in turn negatively impacts the economy. As underlined above, the complexity of the works market might justify the use of a public reputational selection mechanism, such as that used by the Office for Federal Procurement Policy, for this specific market.

However, we must add that for the public buyer, performance cannot be judged by on history alone. Offers should be compared to choose the best performing supplier, based on quality, price, service, etc. If a supplier performed well one year, it does not mean it will necessarily be as efficient one year later. Conversely, just because a firm is a newcomer, this does not mean that its offering is less worthwhile. Performance history is therefore one of several elements that public buyers should consider when forming their portfolio of suppliers. They can then decide among existing suppliers, on the one hand, and among existing suppliers and newcomers on the other. If selection is based on last year's decision exclusively, this could lead to potential inefficiencies because more competitive offers might be made in the next year.

It is also indispensable for the public buyer to adopt a segmentation policy by market type (works, service, goods). The performance history criterion comes into play here. Because of higher indescribability and unverifiability, services are more complex than works and goods. Consequently, performance history on the service market can be viewed as an important positive signal for the public buyer, which can use past wins to indirectly evaluate the quality of services suppliers offer. In contrast, on the works and goods markets, standardization of production lets contractors easily compare different offers year by year. The performance history is a useful indicator not only for the public buyer; it can also let former suppliers compete with new suppliers. The performance of new suppliers can be analyzed based on precise indicators, and it is easy to verify the quality of the offer of works or goods during the call for tenders.

5.3 Limitations and research avenues

Like any research, our work has a number of limitations. First, the study hypotheses rest on a starting premise: the decision to award a public contract, that is supplier selection, is based on constant rationality by the decision maker. We consider that a decision maker is rational if it acts consistently from year-to-year relative to information held. In addition, its decisions must be aimed at optimizing the expected utility associated with the decision. The quest for maximum utility can have two consequences on the public decision maker's behavior: one on its attitude toward risk (avoidance) and one on its attitude toward incomplete information (asymmetry).

Second, as mentioned above, we have focussed on a single criterion in the supplier selection process in public markets: performance history. Third, a longitudinal study does not consider endogenous factors to explain performance evolution. These include

the context of economic growth, specific features of demand and the supplier's capacity to respond to an increase in volume. Lastly, the model proposed does not integrate a control variable to conclusively determine the impact of the number of past contract wins. Such a variable could avoid a bias in the estimation of the correlation between performance history and supplier selection. For instance, geographical proximity between the public buyer and supplier might play an important role in supplier selection (Mamavi *et al.*, 2014).

All of these limitations represent new research avenues to add to knowledge of the supplier selection process and criteria in public markets. For instance, qualitative interviews with suppliers and public buyers could explain the differential effect of number of contracts and area of performance, and clarify the positive reinforcement effect for a certain number of contracts {5, 7, 12}. Interviews could also shed light on the effects of the economic context on the decision-making process. Intuitively, we can posit that in periods of high growth, suppliers are likely to win more contracts over the years, whereas the opposite would be true in a recession. The difficult financial situation prevailing in France for several years, and the political will to reduce public spending could thus strongly impact public market management and the supplier selection process.

6. Conclusion

This study aims to examine how the supplier selection process in public procurement can be influenced by the supplier's performance history. The research was conducted in France, a country whose economy includes important public markets. Using French Official Journals (BOAMP), we collected all of the public procurement transactions of 976 suppliers, which we analyzed to perform an econometric study. The results appear to be very specific to each market and apply only to particular cases. Accordingly, suppliers are most likely selected using other criteria of primary importance in public procurement contracts. Beyond past performance and legally imposed selection criteria, the way contractors select suppliers using pragmatic cost-related criteria such as contract value, geographical proximity and strategic networks, as well as individual personality-related criteria such as regionalism or personal networks, remains to be empirically assessed. In short, although the French public procurement regulation prohibits the explicit use of contractors' past performance as a selection criterion, public buyers nonetheless seem to favor firms that have been awarded contracts in the (recent) past.

From a methodological point of view, the discrepancies in the detailed results between the regression analysis and the ordered feature evaluation analysis underline the importance of the statistical methods and let us draw interesting managerial implications. The two-level hierarchical linear auto-regression analysis would suggest that the number of contracts previously won has a linear positive effect on future win performance. Further, the analysis suggests that the effect is particularly important for the service market. Consequently, suppliers would always profit from increasing the number of contracts won. In contrast, the feature evaluation analysis shows the non-linearity of the positive reinforcement effects, along with patterns that are specific to each market. The results obtained in the French context thus corroborate the changes noted in the North American context, where government offices have used past performance information extensively to select contractors. In Europe, "competitive dialogue" also implies interaction between public buyers and suppliers for complex contracts, which directly incorporates past performance information. If these trends intensify, they would profoundly transform the relationship between public buyers and suppliers by encouraging the development of mutual learning to improve the public procurement process.

References

Adam, F., Csaki, C., Prier, E. and Bufacchi, V. (2012), "Ethical decision making and decision support systems in public procurement–a theoretical discussion", *Supply Chain Forum: An International Journal*, Vol. 13 No. 3, pp. 70-81.

Albano, G.-L., Calzolari, G., Dini, F., Iossa, E. and Spagnolo, G. (2006), "Procurement contracting strategies", in Dimitri, N., Piga, G. and Spagnolo, G. (Eds), *Handbook of Procurement*, Cambridge University Press, Cambridge, pp. 82-120.

Arlbjørn, J. and Freytag, P. (2012), "Public procurement vs private purchasing: is there any foundation for comparing and learning across the sectors?", *International Journal of Public Sector Management*, Vol. 25 No. 3, pp. 203-220.

Arlbjørn, J., Freytag, P. and de Haas, H. (2011), "Service supply chain management: a survey of lean application in the municipal sector", *International Journal of Physical Distribution & Logistics Management*, Vol. 41 No. 3, pp. 277-295.

Banaitiene, N. and Banaitis, A. (2006), "Analysis of criteria for contractors' qualification evaluation", *Technological & Economic Development of Economy*, Vol. 7 No. 4, pp. 276-282.

Boyne, G. (2002), "Public and private management: what's the difference?", *Journal of Management Studies*, Vol. 39 No. 1, pp. 97-122.

Bradshaw, J. and Chang, S. (2013), "Past performance as an indicator of future performance: selecting an industry partner to maximize the probability of program success", *Defense Acquisition Research Journal*, Vol. 20 No. 1, pp. 49-69.

Brammer, S. and Walker, H. (2011), "Sustainable procurement in the public sector: an international comparative study", *International Journal of Operations & Production Management*, Vol. 31 No. 4, pp. 452-476.

Burnes, B. and Anastasiadis, A. (2003), "Outsourcing: a public-private sector comparison", *Supply Chain Management: An International Journal*, Vol. 8 No. 4, pp. 355-366.

Caldwell, N., Walker, H., Harland, C., Knight, L., Zheng, J. and Wakeley, T. (2005), "Promoting competitive markets: the role of public procurement", *Journal of Purchasing & Supply Management*, Vol. 11 Nos 5/6, pp. 242-251.

Carey, S., Lawson, B. and Krause, D. (2011), "Social capital configuration, legal bonds and performance in buyer-seller relationships", *Journal of Operations Management*, Vol. 29 No. 4, pp. 277-288.

Carr, A. and Pearson, J. (1999), "Strategically managed buyer-supplier relationships and performance outcomes", *Journal of Operations Management*, Vol. 17 No. 5, pp. 497-519.

Causey, N. (2000), "Past performance information, 'de facto' debarments, and due process: debunking the myth of Pandora's box", *Public Contract Law Journal*, Vol. 29 No. 4, pp. 637-691.

Cebi, F. and Bayraktar, D. (2003), "An integrated approach for supplier selection", *Logistics Information Management*, Vol. 16 No. 6, pp. 395-400.

Choi, T.-Y. and Krause, D. (2006), "The supply base and its complexity: implications for transaction costs, risks, responsiveness, and innovation", *Journal of Operations Management*, Vol. 24 No. 5, pp. 637-652.

Coggburn, J. (2003), "The differences in the American states' procurement practices", *Journal of Public Procurement*, Vol. 3 No. 1, pp. 3-28.

Correia, F., Howard, M., Hawkins, B., Pye, A. and Lamming, R. (2013), "Low carbon procurement: an emerging agenda", *Journal of Purchasing & Supply Management*, Vol. 19 No. 1, pp. 58-64.

de Mazan, J. (1990), "*Les doctrines économiques de Colbert*", unpublished doctoral dissertation, Aix-Marseille University.

Domberger, S. and Jensen, P. (1997), "Contracting out by the public sector: theory, evidence, prospects", *Oxford Review of Economic Policy*, Vol. 13 No. 4, pp. 67-78.

Doni, N. (2006), "The importance of reputation in awarding public contractors", *Annals of Public & Cooperative Economics*, Vol. 77 No. 4, pp. 401-429.

Edquist, C. and Zabala-Iturriagagoitia, J.-M. (2012), "Public procurement for innovation as mission-oriented innovation policy", *Research Policy*, Vol. 41 No. 10, pp. 1757-1769.

Erridge, A. (2007), "Public procurement, public value and the Northern Ireland unemployment pilot project", *Public Administration*, Vol. 85 No. 4, pp. 1023-1043.

Erridge, A. and Greer, J. (2002), "Partnerships and public procurement: building social capital through supply relations", *Public Administration*, Vol. 80 No. 2, pp. 503-522.

Erridge, A. and Mcllroy, J. (2002), "Public procurement and supply chain management strategies", *Public Policy & Administration*, Vol. 17 No. 1, pp. 52-71.

Essig, M. and Batran, A. (2005), "Public-private partnership – development of long-term relationships in public procurement in Germany", *Journal of Purchasing & Supply Management*, Vol. 11 No. 5, pp. 221-231.

Ford, D. (Ed.) (2002), *Understanding Business Marketing and Purchasing: An Interaction Approach*, 3rd ed., Thomson Learning, London.

Gelderman, C., Ghijsen, P. and Brugman, M. (2006), "Public procurement and EU tendering directives – explaining non-compliance", *International Journal of Public Sector Management*, Vol. 19 No. 7, pp. 702-714.

Glas, A., Hofmann, E. and Essig, M. (2013), "Performance-based logistics: a portfolio for contracting military supply", *International Journal of Physical Distribution & Logistics Management*, Vol. 43 No. 2, pp. 97-115.

Gosling, J., Purvis, L. and Naim, M. (2010), "Supply chain flexibility as a determinant of supplier selection", *International Journal of Production Economics*, Vol. 128 No. 1, pp. 11-21.

Gruening, G. (2001), "Origin and theoretical basis of new public management", *International Public Management Journal*, Vol. 4 No. 1, pp. 1-25.

Guerrero, J. and Kirkpatrick, C. (2001), "Evaluating contractor past performance in the United States", *Public Procurement Law Review*, Vol. 10, pp. 243-259.

Guesalaga, R. and Johnston, W. (2010), "What's next in key account management research? Building the bridge between the academic literature and the practitioners' priorities", *Industrial Marketing Management*, Vol. 39 No. 7, pp. 1063-1068.

Hart, O. and Moore, J. (1999), "Foundations of incomplete contracts", *Review of Economic Studies*, Vol. 66 No. 1, pp. 115-138.

Hawkins, G., Gravier, J. and Powley, H. (2011), "Public versus private sector procurement ethics and strategy: what each sector can learn from the other", *Journal of Business Ethics*, Vol. 103 No. 4, pp. 567-586.

Homburg, C., Workman, J. Jr and Jensen, O. (2002), "A configurational perspective on key account management", *Journal of Marketing*, Vol. 66 No. 2, pp. 38-60.

Hommen, L. and Rolfstam, M. (2009), "Public procurement and innovation: towards a taxonomy", *Journal of Public Procurement*, Vol. 9 No. 1, pp. 17-56.

Hood, C. (2000), "Paradoxes of public-sector managerialism, old public management and public service bargains", *International Public Management Journal*, Vol. 3 No. 1, pp. 1-22.

Hooper, J. (1968), "Planning, programming, budgeting system", *Journal of Range Management*, Vol. 21 No. 3, pp. 123-125.

Huang, M.-C., Chang, H.-L. and Tseng, C.-Y. (2014), "Reexamining the direct and interactive effects of governance mechanisms upon buyer-supplier cooperative performance", *Industrial Marketing Management*, Vol. 43 No. 4, pp. 704-716.

Huang, S. and Keskar, H. (2007), "Comprehensive and configurable metrics for supplier selection", *International Journal of Production Economics*, Vol. 105 No. 2, pp. 510-523.

Johnson, P., Leenders, M. and McCue, C. (2003), "A comparison of purchasing's organizational role and responsibilities in the public and private sector", *Journal of Public Procurement*, Vol. 3 No. 1, pp. 57-74.

Juntunen, J., Juntunen, M. and Autere, V. (2012), "Outsourcing strategies of the security sector through acquisition procedures", *International Journal of Physical Distribution & Logistics Management*, Vol. 42 No. 10, pp. 931-947.

Kelman, S. (1990), *Procurement and Public Management: the Fear of Discretion and the Quality of Government Performance*, American Enterprise Institute, Washington, DC.

Khorramshahgol, R. (2012), "An integrated strategic approach to supplier evaluation and selection", *International Journal of Information Technology & Decision Making*, Vol. 11 No. 1, pp. 55-76.

Kulmala, H., Ojala, M., Ahoniemi, L. and Uusi-Rauva, E. (2006), "Unit cost behaviour in public sector outsourcing", *International Journal of Public Sector Management*, Vol. 19 No. 2, pp. 130-149.

Levy, R. (2010), "New public management: end of an era?", *Public Policy & Administration*, Vol. 25 No. 2, pp. 234-240.

Loader, K. (2010), "Is local authority procurement 'lean'? An exploration to determine if 'lean' can provide a useful explanation of practice", *Journal of Purchasing & Supply Management*, Vol. 16 No. 1, pp. 41-50.

McCrudden, C. (2004), "Using public procurement to achieve social outcomes", *Natural Resources Forum*, Vol. 28 No. 4, pp. 257-267.

McLaughlin, K., Osborne, S. and Ferlie, E. (Eds) (2005), *New Public Management: Current Trends and Future Prospects*, Routledge, London.

Mamavi, O., Nagati, H., Wehrle, F. and Paché, G. (2014), "Out of sight, out of mind? Supplier spatial proximity in French public procurement", *International Journal of Public Sector Management*, Vol. 27 No. 6, pp. 486-500.

Manuel, K. (2013), *Evaluating the "Past Performance" of Federal Contractors: Legal Requirements and Issues*, Congressional Research Service, Washington, DC.

Maskin, E. and Tirole, J. (1999), "Unforeseen contingencies and incomplete contracts", *Review of Economic Studies*, Vol. 66 No. 1, pp. 83-114.

Mathiasen, D. (1999), "The new public management and its critics", *International Public Management Journal*, Vol. 2 No. 1, pp. 90-111.

Mills, A. (2005), "Client and contractor attitudes to prequalification", *Proceedings of the 49th Annual Meeting of the American Association of Cost Engineers*, New Orleans, LA, pp. 8.1-8.9.

Mori, P. and Doni, N. (2010), "The economics of procurement contract awarding: problems and solutions in theory and practice", *Journal of Public Procurement*, Vol. 10 No. 1, pp. 93-120.

Murray, J. (2001a), "Improving purchasing's contribution: the purchasing strategy of buying council", *International Journal of Public Sector Management*, Vol. 14 No. 5, pp. 391-410.

Murray, J. (2001b), "Local government and private sector purchasing strategy: a comparative study", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 2, pp. 91-100.

Murray, J. (2009), "Public procurement strategy for accelerating the economic recovery", *Supply Chain Management: An International Journal*, Vol. 14 No. 6, pp. 429-434.

Naegelen, F. and Mougeot, M. (1998), "Discriminatory public procurement policy and cost reduction incentives", *Journal of Public Economics*, Vol. 67 No. 3, pp. 349-367.

Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital and the organisational advantage", *Academy of Management Review*, Vol. 23 No. 2, pp. 242-267.

Oruezabala, G. and Rico, J.-C. (2012), "The impact of sustainable public procurement on supplier management: the case of French public hospitals", *Industrial Marketing Management*, Vol. 41 No. 4, pp. 573-580.

Pardo, C., Henneberg, S., Mouzas, S. and Naudé, P. (2006), "Unpicking the meaning of value in key account management", *European Journal of Marketing*, Vol. 40 Nos 11/12, pp. 1360-1374.

Parikka-Alhola, K., Nissinen, A. and Ekroos, A. (2007), "Green award criteria in the most economically advantageous tender in public purchasing", in Piga, G. and Thai, K. (Eds), *Advancing Public Procurement*, PrAcademics Press, Boca Raton, FL, pp. 257-279.

Piga, G. and Treumer, S. (Eds) (2013), *The Applied law And Economics of Public Procurement*, Routledge, London.

Ploetner, O. and Ehret, M. (2006), "From relationships to partnerships – new forms of cooperation between buyer and seller", *Industrial Marketing Management*, Vol. 35 No. 1, pp. 4-9.

PPCC (2012), *Public Procurement Contracts Code*, Paris, available at: www.legifrance.gouv.fr/ (accessed March 11, 2014).

Pratt, A., Rendon, R. and Snider, K. (2011), "Public procurement and corporate social responsibility: a comparison of private firms and US defense contractors", *Proceedings of the 5th International Public Procurement Conference, Boca Raton, FL*, pp. 3750-3772.

Qiao, Y. and Cummings, G. (2003), "The use of qualifications-based selection in public procurement: a survey research", *Journal of Public Procurement*, Vol. 3 No. 2, pp. 215-249.

Quayle, M. (1998), "The impact of strategic procurement in the UK government sector", *International Journal of Public Sector Management*, Vol. 11 No. 5, pp. 397-413.

Rackham, N. (1989), *Major Account Sales Strategy*, McGraw-Hill, New York, NY.

Radnor, Z., Holweg, M. and Waring, J. (2012), "Lean in healthcare: the unfilled promise?", *Social Science & Medicine*, Vol. 74 No. 3, pp. 364-371.

Rainey, H., Backoff, R. and Levine, C. (1976), "Comparing public and private organizations", *Public Administration Review*, Vol. 36 No. 2, pp. 233-244.

Robnik-Sikonja, M. and Savicky, P. (2012), "CORElearn: classification, regression, feature evaluation and ordinal evaluation", R package version 0.9.40, available at: http://lkm.fri. uni-lj.si/rmarko/software/ (accessed May 26, 2014).

Robnik-Sikonja, M. and Vanhoof, K. (2007), "Evaluation of ordinal attributes at value level", *Data Mining & Knowledge Discovery*, Vol. 14 No. 2, pp. 225-243.

Rolfstam, M., Phillips, W. and Bakker, E. (2011), "Public procurement of innovations, diffusion and endogenous institutions", *International Journal of Public Sector Management*, Vol. 24 No. 5, pp. 452-468.

Roodhooft, F. and Van den Abbeele, A. (2006), "Public procurement of consulting services: evidence and comparison with private companies", *International Journal of Public Sector Management*, Vol. 19 No. 5, pp. 490-512.

Sarkar, A. and Mohapatra, P. (2006), "Evaluation of supplier capability and performance: a method for supply base reduction", *Journal of Purchasing & Supply Management*, Vol. 12 No. 3, pp. 148-163.

Schapper, P., Veiga Malta, J. and Gilbert, D. (2006), "An analytical framework for the management and reform of public procurement", *Journal of Public Procurement*, Vol. 6 Nos 1/3, pp. 1-26.

Shahadat, K. (2003), "Supplier choice criteria of executing agencies in developing countries", *International Journal of Public Sector Management*, Vol. 16 No. 4, pp. 261-285.

Shugart, C. (2005), "The selection of concessionaires in the urban water sector: does the standard procurement paradigm fit?", *Proceedings of the European Workshop on Auctions and Public Service Procurement, Paris*, pp. 1-24.

Simon, H.-A. (1987), "Bounded rationality", in Eatwell, J., Millgate, M. and Newman, P. (Eds), *The new Palgrave: a Dictionary of Economics*, McMillan, London, pp. 267-268.

Snider, K. and Walkner, M. (2009), "Enhancing use of past performance as a source selection criterion", in Thai, K. (Ed.), *International Handbook of Public Procurement*, CRC Press, Boca Raton, FL, pp. 613-630.

Spagnolo, G. (2012), "Reputation, competition, and entry in procurement", *International Journal of Industrial Organization*, Vol. 30 No. 3, pp. 291-296.

Tadelis, S. (2012), "Public procurement design: lessons from the private sector", *International Journal of Industrial Organization*, Vol. 30 No. 3, pp. 297-302.

Tang, C.-S. (2006), "Perspectives in supply chain risk management", *International Journal of Production Economics*, Vol. 103 No. 2, pp. 451-488.

Tzempelikos, N. and Gounaris, S. (2013), "Approaching key account management from a long-term perspective", *Journal of Strategic Marketing*, Vol. 21 No. 2, pp. 179-198.

Uyarra, E. and Flanagan, K. (2010), "Understanding the innovation impacts of public procurement", *European Planning Studies*, Vol. 18 No. 1, pp. 123-143.

Uyarra, E., Edler, J., Garcia-Estevez, J., Georghiou, L. and Yeow, J. (2014), "Barriers to innovation through public procurement: a supplier perspective", *Technovation*, forthcoming.

Van de Rijt, J., Hompes, M. and Santema, S. (2010), "The Dutch construction industry: an overview and its use of performance information", *Journal for the Advancement of Performance Information & Value*, Vol. 2 No. 1, pp. 33-56.

Waara, F. and Bröchner, J. (2006), "Price and non-price criteria for contractor selection", *Journal of Construction Engineering & Management*, Vol. 132 No. 8, pp. 797-804.

Walker, H. and Brammer, S. (2009), "Sustainable procurement in the United Kingdom public sector", *Supply Chain Management: An International Journal*, Vol. 14 No. 2, pp. 128-137.

Walker, H., Di Sisto, L. and McBain, D. (2008), "Drivers and barriers to environmental supply chain management practices: lessons from the public and private sectors", *Journal of Purchasing & Supply Management*, Vol. 14 No. 1, pp. 69-85.

Watt, D., Kayis, B. and Willey, K. (2010), "The relative importance of tender evaluation and contractor selection criteria", *International Journal of Project Management*, Vol. 28 No. 13, pp. 51-60.

Wernz, C., Zhang, H. and Phusavat, K. (2014), "International study of technology investment decisions at hospitals", *Industrial Management & Data Systems*, Vol. 114 No. 4, pp. 568-582.

Wong, H., Holt, G. and Cooper, P. (2000), "Lowest price or value? Investigation of UK construction clients' tender selection process", *Construction Management & Economics*, Vol. 18 No. 7, pp. 767-774.

Yim, B. and Leem, B. (2013), "The effect of the supply chain social capital", *Industrial Management & Data Systems*, Vol. 113 No. 3, pp. 324-348.

Further reading

R Development Core Team (2011), *R: A Language and Environment for Statistical Computing*, R Foundation for Statistical Computing, Vienna.

Thai, K. (2001), "Public procurement re-examined", *Journal of Public Procurement*, Vol. 1 No. 1, pp. 9-50.

About the authors

Olivier Mamavi, PhD, is an Assistant Professor at the ICD Business School (IGS Group), and a member of the Laboratoire de Recherche Appliquée (LARA) in Paris, France.

Haithem Nagati, PhD, is a Professor at the ICD Business School (IGS Group), and a member of the Laboratoire de Recherche Appliquée (LARA) in Paris, France.

Gilles Pache, PhD, is a Professor at the Aix-Marseille University, and Deputy Director of the Centre de Recherche sur le Transport et la Logistique (CRET-LOG) in Aix-en-Provence, France. Professor Gilles Pache is the corresponding author and can be contacted at: gilles.pache@univ-amu.fr

Frederick T. Wehrle, PhD student at the Paris Sorbonne University (PRISM), is an Assistant Professor at the ICD Business School (IGS Group), and a member of the Laboratoire de Recherche Appliquée (LARA) in Paris, France.