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Antecedents and Consequences of Sourcing Strategy Appropriateness in Public Procurement

Timothy G. Hawkins, Ph.D. —is an Associate Professor of Logistics at G. Brint Ryan College of Business. [timothy.hawkins@unt.edu]

Sean McConville—is a Ph.D. Candidate at the G. Brint Ryan College of Business. He is a graduate of the USAF Weapons School and holds a MS in Operations Management from the Air Force Institute of Technology. His research interests include goal and incentive alignment in distribution channels. [sean.mcconville@unt.edu]

Jamie Porchia—is a doctoral student in the Department of Logistics and Operations Management at the University of North Texas. She is also a Federal contracting professional. Her research interests include government procurement, supply chain mapping, supply chain transparency, and technology impacts on the supply chain. [jamie.porchia@unt.edu]

Suman Niranjani, Ph.D. —is an Assistant Professor of Logistics at G. Brint Ryan College of Business. Dr. Niranjani's research interests lie in multi-echelon inventory optimization, additive manufacturing's role in supply chain, supply chain collaboration, process improvement, peer-2-peer asset sharing, distracted driving, and field services. [suman.niranjani@unt.edu]

Lieutenant Colonel Daniel Finkenstadt, USAF—is an active duty contracting officer with over 20 years' experience in federal contracting. He graduated from the University of North Carolina at Chapel Hill with a PhD in marketing and has been an Assistant Professor in the Graduate School of Defense Management at the Naval Postgraduate School since 2020. [daniel.finkenstadt@nps.edu]

Abstract

Based on a sample of 350 sourcing professionals, this study examines the antecedents and consequences of sourcing strategy appropriateness in public procurement using structural equation modeling. Requirement criticality, the severity of a bid protest, sufficiency of procurement administrative lead time, and contracting officer authority affect sourcing strategy appropriateness, which, in turn, affects supplier performance and compromised technical evaluation of an offeror's proposal. This research is the first to explore the appropriateness of sourcing strategy and its impact on public management objectives such as value for money. Based on the findings, theoretical and managerial implications are offered.

Keywords: sourcing strategy; public procurement; bid protest

Introduction

Public procurement is growing in importance, practically and theoretically (Flynn & Davis, 2014; Patrucco et al., 2017). Yet, despite being such a large portion of government expenditure (OECD, 2021) with enormous economic importance (Boland & Godsell, 2021; Patrucco et al., 2021), public procurement remains an understudied sector of spending (Josephson et al., 2019). Research attention is needed to understand “the effect of features of the procurement officers' operating environment on contracting outcomes” (Boland & Godsell, 2021).

The sourcing strategy is a means of connecting the operating environment to contracting outcomes (Patrucco et al., 2021). The concept of sourcing strategy is synonymous to acquisition planning (Nash et al., 2021), which is “the process by which the efforts of all personnel responsible for an acquisition are coordinated and integrated through a comprehensive plan for fulfilling the agency need in a timely manner and at a reasonable cost” (Nash et al., 2021, p. 8).



Sourcing strategies include objectives, constraints, plans, and goals; they align supply market opportunities and resources with organizational objectives (Trent, 2007).

Sourcing strategy decisions are numerous and complex. They can include: sourcing goals, single versus multiple sourcing (competition), number of suppliers, type of contract, duration of contract, negotiation techniques, source selection method (e.g., trade-off versus lowest price), price or cost analysis, evaluation criteria, financial and term incentives, intellectual property rights, inspection and acceptance methods, supplier performance management methods, payment terms, global versus local sourcing, socio-economic goals, procurement milestones, and source selection team size and composition, to name a few. Given this complexity, sometimes sourcing strategies do not result in the intended outcome (Trent, 2007). For example, the U.S. Air Force's procurement to replace its aging tanker fleet exemplifies a misaligned sourcing strategy. This acquisition suffered numerous errors including: an attempted lease (versus buy), the mis-categorization of the tanker as a "commercial product," the failure to obtain cost and pricing data, and awarding the highly uncertain development work as a firm-fixed price contract as opposed to a fixed-price incentive, or cost-based contract (DoD IG, 2004).

Despite failed sourcing strategies, the issue of sourcing strategy appropriateness has not been empirically examined. Thus, we don't know which factors render a strategy more or less appropriate to the buying situation (Bunn, 1993), and thus, more or less likely to attain desired sourcing outcomes. In the public purchasing setting, we do not know how sourcing teams, through strategy decisions, are able to satisfy objectives such as value for money, fairness and accountability, and efficiency and effectiveness, nor do we know the factors that facilitate or hinder those desired outcomes.

The purpose of this research, therefore, is to explore the antecedents and consequences of sourcing strategy appropriateness pertaining to public procurement. The following research questions are investigated:

1. What factors peculiar to public procurement affect the perceived appropriateness of the sourcing strategy?
2. What are the consequences of sourcing strategy appropriateness?

This research contributes to public procurement literature by offering an empirical investigation of sourcing strategy appropriateness. In doing so, it addresses three strategic objectives of public management: achieving value for money (Wang & Li, 2014), providing accountability and integrity (Bauhr et al., 2020), and contracting efficiently and effectively (Alonso et al., 2015). Often these are competing goals (Wang & Li, 2014), and this research explores factors that can balance this tension while attaining desired sourcing outcomes. From a practical perspective, this research provides public buyers with a framework for understanding the effects of protests and rushed source selections on sourcing strategy appropriateness, and more fully understanding the consequences of sourcing strategies.

The remainder of this research is organized as follows: First, building on agency theory, the relevant literature is reviewed and synthesized into a conceptual model. Secondly, the research design and methodology are explained. Finally, we discuss these research implications and provide suggestions for future research.

Literature Review and Hypothesis Development

Sourcing Strategy Appropriateness

Sourcing strategy appropriateness represents the extent to which a sourcing strategy matches the objectives of the source selection and the buying situation. The FAR asserts that



the best-value sourcing strategy “exists on a continuum between cost and non-cost factors” (Part 15-1). Two types of source selection methods, lowest-price technically acceptable (LPTA) and full tradeoff, correspond to the cost and non-cost portions of this continuum, respectively. An LPTA source selection requires the contract be awarded to the offeror that meets minimum technical specifications stated in the request for proposal (RFP) while offering the lowest reasonable price. LPTA selections are appropriate when the procurement is simple and its requirements are well defined (Rumbaugh, 2010). The tradeoff approach allows the buyer to assign value to non-price factors such as specifications and past performance which surpass the minimum requirements and thus, award a contract to an offeror that did not submit the lowest price. The tradeoff method is appropriate when the buyer’s requirements have low repeatability, are difficult to define, are complex, or when the services required demand a high level of skill (Rumbaugh, 2010).

In addition to generally being cheaper and faster than a full-tradeoff source selection (Cibinic et al., 2011), LPTA selections are less likely to invite a bid protest (Hawkins et al., 2022). (A bid protest is an objection to the source selection process, which results in the interruption of the sourcing process). There are two reasons for this. First, the complexity of the full tradeoff source selection—and the tedious documentation which accompanies it—leaves more opportunity for error (Hawkins et al., 2016). Secondly, the transparency of the LPTA process facilitates defending against an offeror’s protest. These aspects of LPTA, when coupled with the monetary and non-monetary costs associated with bid protests, create incentives for its misuse (Arena et al., 2018; Hawkins et al., 2016).

Manipulating the source selection method isn’t the only way that agencies might select a suboptimal sourcing strategy to mitigate the possibility of a bid protest. Awarding a task order only to a firm with an existing contract, leveraging a small business set aside program to award a sole-source contract to a small business, or modifying an existing contract are all avenues for an agency to circumvent a “full and open competition” while obliging the letter of the law, but not its intent. Limiting or avoiding a competition expedites the acquisition but decreases the number of parties involved in it. Since each additional seller represents an opportunity for a misstep (and thus, a protestable error), by limiting or avoiding a competition, the buyer decreases its process risk. It pays a price for doing this, however, as such decisions can render a sourcing strategy less appropriate—that is, less able to connect the buying situation to the sourcing objectives.

Another way in which sourcing strategies may be inappropriate concerns the type of contract selected. Contract type essentially is the means to allocate risk between buyer and seller. For example, The U.S. Air Force awarded a firm-fixed price (FFP) contract for its KC-46 refueling tanker aircraft—a platform that while based on an existing, mature Boeing 767, required a significant amount of development and modification to add a refueling capability. Although a FFP contract helps the buyer mitigate cost growth, the risk associated with the uncertain developmental work was absorbed by Boeing, who substantially underestimated the additional development and testing. Consequently, Boeing lost money on the contract and the Air Force has a tanker that does not meet mission requirements (CRS, 2020).

With sourcing strategy appropriateness as the centerpiece of this research, we present the following conceptual model (Figure 1). We next present an in-depth discussion on the antecedents and consequences of sourcing strategy appropriateness, as well as hypotheses regarding the relationships between these constructs.



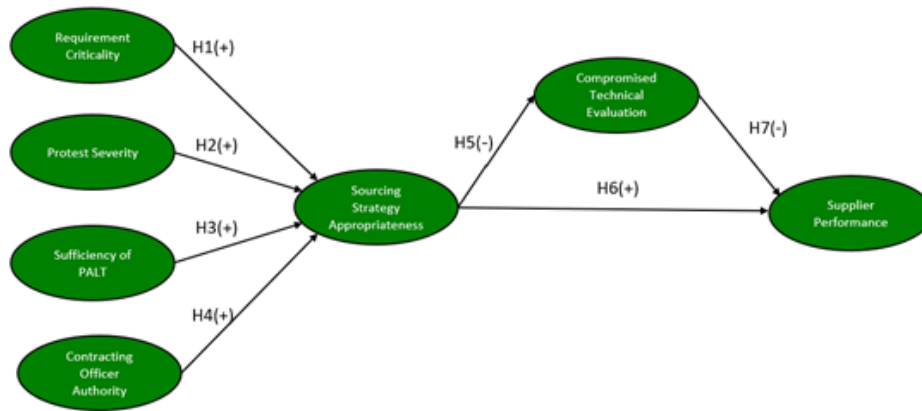


Figure 1. Conceptual Model

Requirement Criticality (RCL)

Kraljic's (1983) seminal purchasing taxonomy evaluates the strategic importance of a purchase along with the market position of the buyer and supplier. It prescribes a decision authority and purchasing strategy as a function of these factors. This framework relegates purchasing decisions pertaining to strategic items (i.e., those items and services critical to function or profitability) to the highest level of an organization. Item availability, substitutability, and the risk of non-delivery are other factors that contribute to the strategic importance of a purchase (Kraljic, 1983). Hence, an item or service that would not otherwise be "critical" takes on a strategic importance when its lack of on-time availability impedes organizational function (e.g., medical gowns during a pandemic, etc.).

While Kraljic (1983) recommends using defensive measures such as in-house investments in R&D to protect the supply of strategic purchases, such measures are not often viable in the public sector. However, the buyer may still protect itself by using an appropriate source selection strategy. Additional defensive measures such as oral presentations, more procurement administrative lead time (PALT), larger and more experienced contracting teams, considerations to the seller's past performance, and full tradeoff vs. LPTA selections may be implemented as part of this strategy.

Rigorous defensive measures are not necessary for non-critical acquisitions. For these items "a defensive posture would be overconservative and costly" (Kraljic, 1983, p. 114). Furthermore, given that the acquisition workforce is strained from decades of underinvestment, inadequate training, and inadequate staffing (Arena et al., 2018; GAO, 2018; Wong et al., 2022), it is unlikely that it will invest its limited resources in acquisitions that do not represent as much of a strategic risk. This yields:

H1: There is a positive relationship between requirement criticality and sourcing strategy appropriateness.

Protest Severity

If the FAR represents a set of behavioral controls designed to promote fairness and transparency in the public purchasing domain, then the bid protest mechanism is the primary means of enforcing these controls. This enforcement mechanism serves several purposes. First, it signals to potential sellers that the government is willing to acknowledge its powerful role in the economy and conduct business as an equitable partner. Additionally, it stands as tacit acknowledgment while the incentives for government purchasing officials are different than they are for purchasing officials in the private sector, the government is willing to ensure that its



agents adhere to a process that maximizes the public's interests (Arena et al., 2018; Gordon, 2013; Kovacic, 1995).

Bid protests are costly to the government. If a protest is sustained, an agency may be forced to stop work, reevaluate the proposal, resolicit the contract, and/or reimburse the protestor's legal fees (Rumbaugh, 2010). Between FY 2017 and FY 2021, more than 2,200 protests were filed annually. While only 15% of these protests were sustained, more than 40% of the cases resulted in a corrective action or settlement prior to a formal decision on the claim. This "effectiveness rate" grew as high as 51% in 2020 (Perez, 2021).

A protest need not be filed to result in costs to the buyer. The mere fear of a bid protest increases transaction costs. To guard against potential missteps that might invite a bid protest, agencies assemble larger acquisition teams comprised of more cost analysts, technical evaluators, legal counsel, and consultants. Yet, they do so at the expense of the resource costs associated with these individuals (Hawkins et al., 2022). Organizations establish entire centers of excellence for managing source selections to—in part—reduce protest risks. This corresponds with the agent theoretic view of behavioral control; while monitoring a low-programmable task is expensive (Eisenhardt, 1985; Mitnick, 1975), by installing a monitoring apparatus on the agent (in this case, the larger and more specialized acquisition team) the buyer gains additional information about its agent's activities and can more deftly exercise its control.

Previous research has examined the relationship between the perceived risk of a protest and sourcing strategy from the perspective of Protection Motivation Theory (PMT; Hawkins et al., 2022). PMT postulates that an individual's motivation to respond to a threat is, in part, a function of the probability of the threat taking place and its severity (Floyd et al., 2000). In this framework, the risk of a protest represents the product of the probability of a protest taking place and the severity of that protest. The study did not find a significant relationship between protest risk and source selection method appropriateness (Hawkins et al., 2022).

In streams of research spanning health and behavior (Weinstein, 2000), information technology (Johnston & Warkentin, 2010; Sommestad et al., 2016), and supply chain management (Bode et al., 2022), more modern conceptualizations of PMT either completely discount the role that the probability of a threat plays in driving a behavioral response (Johnston & Warkentin, 2010), or acknowledge a complex interaction between threat probability and threat severity (Bode et al., 2022; Sommestad et al., 2016; Weinstein, 2000). In studying motivation to respond to health hazards, Weinstein (2000) found that a model comprised of only the severity of a threat closely approximated a much more complex, stepwise function that considered additive and multiplicative components of each variable. For this reason, we consider *only the severity of a potential protest* as a motivating factor for an adjustment to the sourcing strategy.

Not all procurements are subject to the same potential protest severity; a delay to a \$5 billion, decade-long acquisition of a major weapon system will not bring equal consequence as a delay to a \$200,000 facility services contract. From this standpoint, a bid protest represents an interruption to supply, and the perceived severity of that protest is proportional to the strategic impact of that interruption. Furthermore, public purchasing agents must contend with a resource constrained environment. The increasing complexity of acquisitions, coupled with training, recruiting, and staffing shortfalls have resulted in a significant strain on the acquisitions workforce (Arena et al., 2018; GAO, 2018). Consequently, we expect savvy purchasing agents to prioritize the allocation of their limited resources against supply interruptions that represent a greater threat to their principal's interests (Kraljic, 1983). Thus, we propose:

H2: There is a positive relationship between protest severity and sourcing strategy appropriateness.



Procurement Administrative Lead Time (PALT)

Public procurement is wrought with idiosyncrasies that impact the planning timelines for acquisitions. Purchases are planned on an annual budget cycle, but urgent operational needs, delayed budgets, and expiring funds necessitate obtaining financial resources outside of this cycle. Since Congress controls organizational budgets, doing this is difficult (Anton et al., 2020). Additionally, leaders are pressured to show results toward public objectives. Together, these peculiarities often result in an inordinate emphasis on PALT.

Contracting officers need sufficient PALT to properly define and communicate requirements, conduct market research, document evaluation criteria, estimate costs, formulate the sourcing strategy, conduct negotiations, evaluate proposals, and determine tradeoffs among price and non-price factors (Hawkins & Muir, 2014; Hawkins et al., 2016). In the absence of this time, buyers might resort to less appropriate, albeit more expedient sourcing strategies (e.g., LPTA). From an agency-theory perspective, this is akin to the buyer relaxing its behavioral control on the buyer's agent to meet a perceived need for urgency in the acquisition. Notably, while the buyer may have relaxed its behavioral controls on the agent, offerors who seek equity in the sourcing process likely have not. They may, therefore, choose to hold the buyer accountable. This in line with extant research which links decreased sufficiency of planned PALT to an increased fear of bid protests (Hawkins et al., 2016). Thus, we propose:

H3: There is a positive relationship between sufficiency of planned PALT and source selection method appropriateness.

Contracting Officer Authority

Agency theory offers conflicting perspectives on agent autonomy and performance. On one hand, we might expect the performance of an organization to increase as a function of the agent autonomy; more autonomy enables the agent to better act in its principal's interests. Alternatively, since agents are self-interested utility-maximizers, more agent autonomy should coincide with more comprehensive control mechanisms to ensure that agents use their increased autonomy to the principal's benefit. Previous research into agent autonomy and performance yields mixed results that are heavily dependent on the agents and their setting (Yu, 2021).

In the context of this research, "autonomy" represents the ability of the buyer's agent to work towards maximizing the buyer's value, while obliging the FAR's constraints for fairness and transparency. Empowering the contracting officer to conduct negotiations, evaluate proposals, make tradeoff decisions, and frame requirements fosters competition between offerors. However, as other acquisition team members get involved, they exert influence on the process and weaken the authority of the contracting officer. For instance, previous research has anecdotally suggested that legal teams prefer LPTA type source selections (Arena et al., 2018; Hawkins et al., 2016), presumably due to the perception that they are less likely to result in a bid protest and that they are easier to defend should one take place. Institutional pressures to meet timelines might also result in a contracting officer compromising his or her decisions to placate high-level advisors.

Contracting officers' knowledge of the FAR, the market, and the seller provides them with a unique vantage point from which they can leverage the needs of the user with the market environment to determine the most appropriate sourcing strategy. Therefore, we posit that:

H4: There is a positive relationship between contracting officer authority and sourcing strategy appropriateness.



Compromised Technical Evaluation

If the source selection is a means of aligning the buyer's goals with those of the offeror, the technical evaluation is how the buyer judges that fit. Evaluation factors represent key areas of importance to be considered in the source selection decision and must support a meaningful comparison between competing proposals (FAR Part 15-304; Rumbaugh, 2010). Examples include quality, delivery lead time, technical approach, performance risk, key personnel qualifications, and past performance. Evaluators' ability to distinguish between proposals is legally constrained by the evaluation criteria. However, the evaluators that assess a proposal are not always the ones who defined the factors upon which that proposal is being evaluated (Hawkins et al., 2016). Ambiguity in the evaluation criteria leaves room for these evaluators to bring their own interpretation or agenda. For this reason, contracting officers, attorneys, and advisors try to be as meticulous as possible in spelling out that criteria. Frequently, this requires numerous changes to the wording of RFPs, and the need for revision is not apparent until proposals are evaluated. If the buyer is not willing to delay the source selection process to revise the evaluation criteria, then the proposal is advanced with the sub-optimal criteria (Hawkins et al., 2016). Essentially, the technical evaluators are not allowed to appropriately discriminate between proposals; rather, they are constrained by the (sometimes faulty) definitions of evaluation factors in the RFP. Therefore, we posit that:

H5: There is a negative relationship between sourcing strategy appropriateness and compromised technical evaluation.

Supplier Performance

The FAR defines "best value" as "the expected outcome of an acquisition that, in the Government's estimation, provides the greatest overall benefit in response to the requirement" (Part 2-101), while emphasizing that best value "is achieved by balancing the many competing interests in the system. The result is a system which works better and costs less" (Part 1-102). Returning to the conceptualization of the sourcing strategy as the mechanism for connecting the buying environment to contracting outcomes (Patrucco et al., 2021), we recognize the sourcing strategy as the primary means for balancing the competing interests in the public purchasing environment (i.e., the seller's interest in maximizing its utility, the need for fairness, transparency, and judicious use of the public's resources) with the buyer's best value outcomes. More appropriate sourcing strategies will maintain equity in the public purchasing system while allowing the buyer's agent to identify the most competitive sellers. Therefore, we expect to see more appropriate sourcing strategies associated with higher supplier performance:

H6: There is a positive relationship between sourcing strategy appropriateness and supplier performance.

The technical evaluation is an important part of the value creation process. With it, the buyer assesses how well the seller understands the buyer's desired objectives (Rumbaugh, 2010). It allows the buyer to identify the strengths, weaknesses, and deficiencies of each offer. The sourcing strategy could, hypothetically, motivate supplier performance on its own. However, the buyer's inability to make meaningful distinctions between proposals would leave it to the mercy of the operating environment. Therefore, we propose:

H7: There is a negative relationship between compromised technical evaluation and supplier performance.



Methodology

Survey Design

Structural equation modeling was used in conjunction with cross-sectional survey data to test the hypotheses. Data was reused from that of a prior study (Calandruccio et al., 2014; Hawkins et al., 2016). Existing scales were used exclusively. All scales which measured latent constructs were 7-point Likert-type scales, except for protest severity. The items for this scale were scored between -5 (completely undesirable) and +5 (completely desirable) and converted to an 11-point Likert-type scale. Scales for sourcing strategy appropriateness, requirement criticality, protest severity, contracting officer authority, compromised technical evaluation, and supplier performance were taken from Hawkins et al. (2016). Scales for sufficiency of planned PALT were taken from Hawkins and Muir (2014).

Sourcing strategy appropriateness measured the extent to which the survey respondents perceived that the sourcing strategy matched the objectives of the source selection and the contracting environment. Protest severity measured the perceived impact that would accompany a (pre or post-award) bid protest, in terms of time, cost, and workload. Compromised technical evaluation measured the degree to which technical evaluators felt inhibited by the language of their own technical evaluation. Supplier performance measured the level to which a purchased good or service matched the contractual requirements. Sufficiency of planned PALT was a 3-measure scale which assessed whether a contracting officer felt that he or she had sufficient time to conduct the source selection.

Sample

Data was collected via an online survey. The unit of analysis was a government source selection. We maximized response rate by using Dillman's (2000) internet survey design methodology. The population for this study was 3,882 U.S. civilian and military contracting officers who had executed a FAR Part 15-based formal source selection for one military department. A military sourcing context offers a large pool of potential respondents, a large quantity of contracts covering a variety of goods and services, and a wide range of contract scope (e.g., dollars). Participation was solicited via email. There were 661 responses received. Yet, 311 of these contained missing or invalid data and were deleted. This left 350 usable responses, with a total response rate of 17% and final complete response rate of 9%. While this complete response rate is low, it is consistent with other supply chain and public procurement research (Finkenstadt, 2020; Gimenez & Sierra, 2013). Additionally, given the difficulties of accessing the public procurement population (Finkenstadt, 2020; Saastamoinen et al., 2017) a low response rate is not surprising. Usable responses covered contracts over 113 product and service codes, and spanned a breadth of contracting experience, qualification, and contract type, lending evidence of generalizability.

Control Variables

Two control variables were used to account for expected significant effects on source selection method appropriateness: contract value and the contracting officer's source selection experience. Documentation, team size, and evaluation rigor increases with dollar value, which should help to fit an appropriate sourcing strategy (Hawkins et al., 2016). The more experience a contracting officer has, the less of a concern there should be for an inappropriate source selection method due to a lack of knowledge; this individual has accumulated more formal techniques for managing and mitigating bid protests, and thus, should be less inclined to adjust the appropriateness of the sourcing strategy to do so. Furthermore, contracting officer experience is shown to have an empirical, positive relationship with compliance to contracting policy (Hawkins & Muir, 2014).



Reliability and Validity

We used Armstrong and Overton's (1977) approach to test for non-response bias. First, we categorized surveys into three groups, based on their time of receipt. We tested for differences in means of three of the latent constructs and two of the demographic variables. These tests failed to yield any statistically significant differences, thereby indicating a lack of response bias. To mitigate selection bias, respondents were instructed to answer the survey with respect to their most recently completed formal source selection. ProMax Kaiser rotation was used during exploratory factor analysis to reduce 38 survey items to 30 items on seven latent factors. Composite reliabilities were used to assess the reliability of these constructs (Fornell & Larcker, 1981). These values may be observed in Table 1. All scales exceeded Nunnally's (1994) prescribed threshold of 0.7. Construct validity was assessed using average variance extracted (AVE). All constructs exceeded the 0.50 threshold, demonstrating convergent validity (Hair et al., 2010). No covariance approached the square root of AVE for any construct, indicating discriminant validity (Fornell & Larcker, 1981).

Table 1. Construct Validity

Items	Mean	SD	Factor Loadings	AVE	CR	Items	Mean	SD	Factor Loadings	AVE	CR
RCL2	5.903	1.191	0.912			COATH1	5.274	2.382	0.891		
RCL3	5.791	1.285	0.901	0.777	.913	COATH2	5.431	2.102	0.942		
RCL4	5.766	1.299	0.829			COATH3	5.6	1.794	0.848	0.624	0.889
PSEV1	8.56	8.155	0.789			COATH4	3.843	2.892	0.587		
PSEV2	9.466	5.249	0.832	0.627	0.834	COATH6	4.897	3.087	0.611		
PSEV4	8.491	8.216	0.752			QEF1	5.334	2.503	0.534		
PALT1	3.623	2.03	0.809			QEF2	3.497	2.93	0.843		
PALT2	3.357	1.79	0.831	0.706	0.878	QEF3	3.366	2.643	0.85	0.539	0.819
PALT3	3.831	1.99	0.879			QEF6	3.474	3.032	0.661		
SSA1	5.509	1.724	0.861			SP1	4.686	1.878	0.909		
SSA2	5.606	1.542	0.828			SP2	4.737	1.737	0.926		
SSA3	5.169	2.34	0.781	0.667	0.923	SP3	4.737	1.737	0.925		
SSA4	5.757	1.664	0.789			SP4	4.757	1.692	0.88	0.822	0.970
SSA5	5.517	1.787	0.803			SP5	4.574	1.585	0.929		
SSA6	5.506	1.941	0.836			SP6	4.529	1.466	0.833		

	RCL	PSEV	PALT	SSA	COATH	QEF	SP
RCL	0.88						
PSEV	0.20**	0.79					
PALT	-0.04	-0.18**	0.84				
SSA	0.28***	0.14*	0.26***	0.82			
COATH	0.23***	0.06	0.24***	0.40***	0.79		
QEF	-0.03	-0.06	-0.31***	-0.20***	-0.27***	0.73	
SP	0.18**	-0.02	0.2***	0.28***	0.21†***	-0.23***	0.91

Notes: RCL= requirement criticality, PSEV=protest severity, PALT= procurement administrative lead time, SSA=sourcing strategy appropriateness, COATH=contracting officer authority, QEF=compromised technical evaluation, SP=supplier performance

(1) Diagonal entries represent the square root of average variance extracted (AVE). (2) Off-diagonal entries represent correlations. (3) ***Significant at $p < 0.001$; **Significant at $p < 0.01$; *Significant at $p < 0.05$.

We performed confirmatory factor analysis in MPlus, version 8.8. All latent factors were allowed to covary freely. In the measurement model, all loadings were significant at ($p \leq 0.05$). No Heywood cases were observed. No standardized loadings exceeded 1.0. The measurement model demonstrated acceptable fit (Table 2).



Table 1. Measurement and Structural Models

Model	χ^2 (dof)	TLI	CFI	RMSEA	SRMR
Measurement	829.7 (414)	0.933	0.941	0.054	0.075
Structural	959.0 (483)	0.926	0.932	0.053	0.067

Path	β	Supported? (Y/N)
H1(+) RCL → SSA	0.284**	Y
H2(+) PSEV → SSA	0.086*	Y
H3(+) PALT → SSA	0.221**	Y
H4(+) COAUTH → SSA	0.289**	Y
H5(-) SSA → QEF	-0.089*	Y
H6(+) SSA → SP	0.264**	Y
H7(-) QEF → SP	-0.483*	Y

Notes: RCL= requirement criticality, PSEV=protest severity, PALT= procurement administrative lead time, SSA=sourcing strategy appropriateness, COATH=contracting officer authority, QEF=compromised technical evaluation, SP=supplier performance

* significant at $p < 0.05$

** significant at $p < 0.01$

Results

A structural equation model (SEM) was fit to the data (Table 2). Our model shows reasonable fit. CFI and TLI are well above the recommended standard of 0.90 (Bagozzi & Yi, 1988), RMSEA meets the target cutoff value of less than 0.06, and SRMR is well below the recommended maximum threshold of 0.09 (Hu & Bentler, 1999). Table 2 shows the results of the hypotheses tested from the structural model. All seven hypotheses tested significant at $p < 0.05$.

Discussion

Public procurement is a rapidly expanding, albeit understudied field (Flynn & Davis, 2014; Josephson et al., 2019; Patrucco et al., 2017). The scope of its magnitude, complexity, stakeholders, and its prevalence of relatively recent high-profile shortcomings emphasize the importance of understanding how aspects of this domain coalesce into desired outcomes. The objective of this research was to explore how factors peculiar to public procurement affect the appropriateness of the sourcing strategy, and to examine the consequences of sourcing strategy appropriateness. Agency theory was a useful theoretical lens for exploring these issues. To examine sourcing strategy more closely, we developed a structural equation model of environmental factors, antecedents, and consequences pertinent to public procurement. This model was tested and found to exhibit good fit. Our findings have several theoretical and managerial implications.

Managerial Implications

Acquisition teams need sufficient authority, time, and risk acceptance from their organizations to develop an appropriate sourcing strategy. These teams must understand the importance of well-defined evaluation criteria and best-value determination criteria prior to the buying decision. Once a source selection decision is made, the strengths and shortcomings in these antecedents are manifest in the delivered product or service and the buyer must bear the consequences.



An obvious implication is that buying teams should not assume that their chosen sourcing strategies are entirely appropriate. They could document limitations, accepted risks, and assumptions in the acquisition plans and source selection plans, and document the reasons. Then, document the potential effects on key outcomes such as the mission, efficiency, supplier performance (public value), and transparency and fairness. This would yield data on sourcing strategies that could be analyzed over time to improve the buying organization's performance.

Of the four antecedents to sourcing strategy appropriateness, contracting officer authority was the strongest predictor. While this is comparable to the influence of requirement criticality, it is important to recognize that the buyer has little say in whether it needs to purchase strategically important requirements, but it does have the option of empowering the contracting officer in its doctrinal role as the lead of its purchasing teams. While this individual should entertain inputs from advisors, the contracting officer's judgement should not be subservient to this counsel. One means to increase contracting officer authority is to raise the dollar thresholds that invoke additional oversight.

As the sufficiency of PALT is a strong predictor of sourcing strategy appropriateness, sourcing teams should avoid rushing source selection timelines. Doing so may not only adversely affect fairness and transparency in the source selection process but could diminish public value by hindering supplier performance. Realistic milestones should be set and procurements should commence far enough in advance to allow adequate time.

Requirement criticality is more than three times as strong of a predictor than protest severity is on sourcing strategy appropriateness. This implies that, to obtain the "best value" contract, the buyer should focus more resources on appropriately sourcing critical requirements than it should on defending against bid protests.

While sourcing strategy appropriateness had a strong positive effect on supplier performance, this effect was eclipsed by the negative effect of a compromised technical evaluation. Since appropriate sourcing strategies are negatively associated with compromised technical evaluations, the effect of an inappropriate sourcing strategy is twofold; not only does it preclude the buyer from obtaining the best performance level, but it inhibits the buyer from being able to assess the value of the offer.

Limitations and Future Research

While this study provided several unique insights, it is not without limitations. Given that this sample came solely from one military department, additional research is needed to assess the generalizability of our findings. Additionally, the response rate for this survey was low. It is nevertheless consistent with extant trends in business literature (Melnyk et al., 2010) and may be attributable to the survey length. For the sake of parsimony, this research examined only two key outcome of sourcing strategy appropriateness—public value and contracting effectively (as indicated by supplier performance). We incorporated another key aspect—fairness and transparency—but only indirectly via the bid protest mechanism. Future research should expand on this by measuring procedural and distributive justice constructs from the perspectives of the buyer's and the offeror's agents. This would enable researchers to examine the alignment between statutory mechanisms for fairness in public purchasing strategy setting, and ex-post perceptions of the efficacy of that strategy.

Critics of agency theory assail its foundational assumption that agents are self-interested utility maximizers (Davis et al., 1997; Hernandez, 2012; Jensen & Meckling, 1994; Shapiro, 2005). Specifically, they point to its inability to explain circumstances in which the goals of the agent and principal are inherently aligned (Davis et al., 1997). Stewardship theory is a natural counterpoint to agency theory, as a steward's interests are inherently aligned with those of its



principal (Davis et al., 1997; Hernandez, 2012). Recent research into agent-principal relationships presents agency and stewardship as opposing ends across a spectrum of behaviors (Bjurstrøm, 2021; Caers et al., 2006; Grøn et al., 2022; Mills et al., 2021; Schillemans, 2013; Schillemans & Bjurstrøm, 2020; Van Puyvelde et al., 2016; Yu, 2021). An interesting avenue for further study would be examining stewardship behaviors in contracting officers as a transposable mechanism for the (costly) behavior-based controls in public contracting system. For instance, could prospective contracting officers be screened in advance for stewardship behaviors? What would this cost? Might we expect these agents to use more appropriate sourcing strategies than their low stewardship counterparts? Would it be reasonable to expect these agents to use more appropriate sourcing strategies in resource constrained environments?

Declaration of Interest Statement

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Appendix A: Measurement Scales

Label	Item
Contracting Officer Authority	
CoAUTH 1	I was empowered to make required decisions throughout the source selection.
CoAUTH 2	I was trusted that the decisions I made throughout the source selection would be appropriate
CoAUTH 3	My management supported me on the decisions that I made during the source selection
CoAUTH 4	If I disagreed to an aspect of a legal opinion/review, I had the latitude to deviate from it
CoAUTH 5*#	I had to change documents generated during the source selection to correspond with reviewers
CoAUTH 6*	I might as well not have a warrant since my decisions were overridden by reviewers
Sufficiency of PALT	
PALT 1*	The milestones for awarding this contract were too aggressive
PALT 2	I was not rushed to award this contract
PALT 3	I had sufficient time to get this contract awarded
Compromised Technical Evaluation	
QEF 1	At least once, a technical evaluator was required to change the wording of his or her technical evaluations
QEF 2	At least one technical evaluator expressed concern about not being able to say what needs to be said during a technical evaluation
QEF 3	At least one technical evaluator was concerned that the constraints imposed on his or her evaluations impeded the evaluator’s ability to write a meaningful evaluation
QEF 4#	The technical evaluators believed that the quality of their evaluations could not have been better
QEF 5#	If there were no federal acquisition regulations, no source selection policy, and no threat of a bid protest, the quality of the technical evaluations would have been the same
QEF 6	Upon evaluation of proposals, at least one technical evaluation expressed a need to change at least one evaluation criterion or its definition
Supplier Performance	



CP 1	Product/service quality per specifications
CP 2	Delivery performance per specifications
CP 3	Product/service consistently meets customer expectations
CP 4	Responsiveness to requests for changes
CP 5	Required service and/or technical support
CP 6	Non-conformance rate
CP 7	Overall performance

**Protest
Severity†**

PR 1	Increased costs to settle a terminated contract(s)
PR 2	Time delay to the mission
PR 3#	Embarrassment/shame
PR 4	Increase in workload to resolve the protest
PR 5#	Career repercussions for making a mistake or omission that caused a bid protest

Sourcing Strategy Appropriateness

SSA 1	Our acquisition strategy was the best means to source our requirement
SSA 2	Our acquisition strategy was the best means to achieve our acquisition objectives
SSA 3	It would have been difficult to achieve our goals without the use of our acquisition strategy
SSA 4	The selection method we used (e. g., LPTA, full-tradeoff, or PPT) was the most appropriate for this requirement
SSA 5	Our acquisition strategy ensured we selected the best offeror
SSA 6	Our acquisition strategy provided the best fit to the buying situation (e.g., complexity, dollar value, acquisition objectives, contract length, performance risk, criticality to the mission, availability of supply, time available to award a contract, etc.).

Requirement Criticality

RCI 1#	This requirement was important for the good operation of our customer's organization
RCI 2	This requirement supported a core competency of our customer's organization
RCI 3	Compared to other purchases from our customer, this requirement was important
RCI 4*	An unsuccessful outcome of the RFP would have had only minor consequences to our customer
RCI 5#	As a portion of the customer's total annual spending amount, the dollar value of this requirement was high.

All scales 7 point Likert except where noted

#item was discarded during Exploratory Factor analysis

*item was reverse coded

† Initially coded -5 (completely undesirable) to +5 (completely desirable). Recoded to 12 point Likert





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