

# Information And Communication Technology (Ict) Procurement Process: Knowledge Gaps In The Pre-Tender Process

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## Abstract

Analyses of unsuccessful purchases of ICT systems, from challenged implementations are contributed to multiple parties in the equation—the groups in government agencies and the private vendors, inevitably view this process from their respective angles and perspectives. The government as a contractor seeks to hire the most effective vendor that a given budget will allow, while the vendor seeks to secure the best price possible for the delivered services. The vendor will be versed in technical concepts and lingo that may not be clear to a governmental agency negotiating a contract. Likewise, the agency groups in this setting would likely not have knowledge of ICT technical procedures and concepts that might be equally new to certain groups within the agencies. As a result, the gap in the field of knowledge within these groups are discovered and can be understood as a vital component in these procedures, but one that is frequently beset by multiple potential barriers. This study discloses that ICT vendors' participation in pre-tender planning phases would unravel the inadequacy of most business and technical reports and provide accurate assessments of organizational adequate needs. Hence, significantly reducing challenged ICT implementations.

**Keywords:** ICT Projects; ICT Procurement; ICT User Requirement Study; ICT Requirement Elicitations; ICT Functional Specifications; Dialectical Theory.

## 1. INTRODUCTION

Information and Communication Technology (ICT) systems purchasing by government agencies represents an essential and frequently multifaceted process. These activities are important as government agencies increasingly rely upon selected private ICT vendors to acquire specialized systems and services. The processes are complex because they involve a set of variables within their transactions: business processes, emerging technologies and the intricate interaction between private vendors and public agencies. These activities also increasingly constitute a significant percentage of governmental endeavor and expenditure. A recent report from [1] indicates that public procurement activities accounted for approximately 12% of the nations' GDP and nearly 29% of government spending. While reflective of governmental processes within the studied nations, these figures also reflect spending and activity related to successful procurement. Analysts indicate that figures reflective of unsuccessful procedures, conceptualized in terms of wasted money, time or resources; are more difficult to acquire. However, as [2] contends, government waste relative to ineffectual procurement activities represent a growing concern both within developing and developed nations.

Categorically, an ICT procurement process as in Figure 1 would be broken into 3 keys processes i.e. the Pre-Tender, Post-Tender and Post-Award phases. During the initial Pre-Tender phase, the purchasers identifies core requirements that would address their business needs for systems, processes, projects, etc. Once completed, this would be followed by tender advertisements designed to appeal to potential vendors: parties or persons qualified or eligible to fulfill the specified requests. Subsequent to this

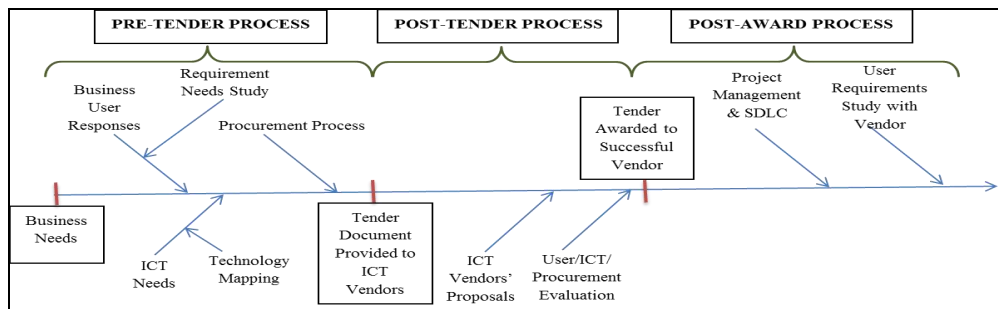
process, vendors submit proposals which would include their credentials, their specific approach to fulfilling the business and technical request and their commercial quotes. At the same time, vendors also provide services by mapping their methodology and technology that they will employ. Eventually, the government agencies accept the proposals and then moves on to the secondary, Post-Tender process.

During this phase, the agencies acquire various proposals, evaluates and subsequently selects the most optimal vendor. While this decision process can vary, public agencies tend to base their selection criteria on factors such as vendor credentials and proven track record; the time identified for project completion and the estimated cost stipulated. Cost-oriented selections are always the most optimal approach, by not taking into account hidden variables that can sometimes result in hidden costs or unexpected events. No matter what criteria the agencies employ, the post-tender process marks the phase during which the contracting agency awards the project to the selected vendor. Finally, during the Post-Award process, the vendor and the agency agree on the various components related to their agreed arrangements: cost, deadline, stipulated business and technical needs. Ultimately, the post-award phase can be viewed as the norming process: the phase during which both parties come to a mutually-understood framework for their agreement.

# Information And Communication Technology (Ict) Procurement Process: Knowledge Gaps In The Pre-Tender Process

This study operates as an in-depth investigation on one of the key processes; the Pre-Tender phase, where it examines variables impacting this initial process within governmental ICT procurement. It specifically examines how communications and knowledge gaps in the area of user

results in problems within three main stages during an ICT procurement processes. This includes processes at the pre-tender, post-tender, and post-award processes as in Figure 1. The fact that multidimensional flaws and difficulties often stem from singular communication gaps illustrates [3]



requirement definitions as they are understood. The respective groups' knowledge to communicate specifics also

contention that this issue can be vital, impactful and debilitating for an ICT procurement processes.

**Figure 1.** Key milestones of a typical ICT procurement process in a government agency

These descriptions are broadly prescriptive: that is, they identify the general trends that typically occur within ICT procurement processes. However, these trends are themselves intersected by multiple variables, all of which can complicate or impact procurement outcomes in a given setting. In [2] notes that procurement involves the interaction of separate complex entities that attempt to develop an agreement. Both parties in this equation, the government procurer and the private vendor, inevitably view this process from their respective angles and perspectives. The contractor seeks to hire the most effective vendor that a given budget will allow, while the vendor seeks to secure the best price possible for the delivered service. However, these superficial distinctions also belie other, deeper contrasts. In [4] point out that the opposite parties operating in the boundaries of a procurement contract negotiate through the terms and concepts familiar to their operations and purview. Thus, an ICT vendor will be versed in technical concepts and lingo that may not be clear to a governmental agency negotiating a contract. Equally, the ICT team in this setting would likely have knowledge of ICT bureaucratic procedures and concepts that might be similarly new to the business units. Knowledge, in brief can be understood as a vital component in these arrangements and one that is frequently beset by multiple potential barriers.

Given these preceding observations, we can define the underlying research problem as relating to knowledge in ICT-based government procurement and contractual arrangements. From the observation, this problem may stem from the formalized structures and restrictions typically worded in governmental procedures. The issue is also impacted by the fact that varying parties tend to view the terms of the contract from their respective point of view. This discrepancy can impact governmental agencies internally as separate departments' attempt to conceptualize and word varying aspects of a project's requirement set. However, gaps can also materialize in the interaction between private vendors (ICT professionals, agencies specializing in specific concentrations and others) and the public-oriented customers. These gaps are also unpredictable that they typically cannot be anticipated, resist empirical analysis or theoretical modeling. Different situations in brief will likely generate differing types of knowledge difficulties, which in turn may also generate different problems within varying scenarios. At the same time, it is essential to establish basic parameters in addressing this issue, since it tends to be impactful, even debilitating, on ICT procurement agreements.

From the underlying issues, the research questions are:

1. What are the groups involved in defining business user needs and new ICT requirement at the Pre-Tender phase for Government agencies?
2. What knowledge do these groups require in making the decision in purchase of a new ICT Systems at the Pre-Tender phase for Government agencies?
3. Does inadequacy in field of knowledge arise among these groups during this Pre-Tender phase?

To address the issues, the objectives of this study are:

1. To ascertain the groups involved in defining business user needs and new ICT requirement at the Pre-Tender phase for Government agencies
2. To identify the field of knowledge of these participating groups during the definition of these needs and requirements at the Pre-Tender phase for Government agencies
3. To uncover the variances in the field of knowledge among these groups responsibilities during the pre-tender requirement needs processes

## 2. REVIEW OF RELATED LITERATURE

The literature pertinent to this project stems from sources with three primary focuses. This includes analyzing a broader and thematic overview of government procurement; examining the impact of knowledge gaps on the process and applying dialectical organizational theory within specific professional contexts. The first approach provides a generalized assessment of the issues impacting government procurement processes generally. The second addresses the various ways in which knowledge gaps disrupt procurement processes and impact both contracting agencies and vendors. The final body of literature explores the general applicability of dialectical theory as a method of examining organizational conflicts and problems. The findings apply directly to the problem selected for this analysis: knowledge gaps stemming from requirement lists in ICT procurement scenarios.

Studies examining procurement from a broader perspective provide two essential services namely the specific issues currently impacting these processes in various governmental scenarios across the globe and illustrate many of the key problems affecting various situations. In [2] analysis of procurement highlight many of the issues impacting these processes. Through compendium-based approach allows us to see the potential internal and external variables that can impact even debilitate the process identifies knowledge as a hybrid concern that impacts both external (vendor/contractor) and internal (intra-department) arrangements. The same author's analysis of procurement in international context

expands upon this earlier research and also serves to highlight the role that a given nation's cultural variables can have on processes. The work of [5] also serves to highlight emerging trends within the specific domain of public-oriented procurement. Their analysis, specifically, identifies many of the key innovations being introduced: models that help improve process efficiency and functioning. They identify various theoretical models as one practical approach that can potentially address multiple issues. In [6] utilizes a similar approach also identifies agile-based approaches to acquisition approach can be useful as a practical innovation. In [7] focus specifically on the issues pertaining to specific actors within a procurement process, examines the issue from a government's perspective and offers strategic insight for agency planners. The organization [8] provides a report with a similar focus and orientation. In contrast, in [4] focus on providing key insights to tenders engaged within the broader process. The findings function effectively alongside analyses with a government focus, as these approaches collectively help us identify the essential trends important to both parties. These broader analyses identify knowledge as an important issue: one that influences the quality of procurement outcomes and that also impacts both customers and vendors. Other analyses explicitly explore the issue of knowledge as a stand-alone concern. In [9] explore communication's impact on technical and ICT-related procurement processing. On broader contention notes that the complex nature of process management in these scenarios means that knowledge gaps and failures often have a unique and uniquely deleterious impact on operations. Similarly, in [3] examine how singular knowledge gaps can result in widespread and systemic forms of error and potential failure in software development contexts. Collectively, both studies provide a detailed examination of how superficially simple processes, communicating ideas between actors and/or departments can sometimes result in various types of disruption. Both analyses also indicate that communication failures can result in financial loss, project failure or system integrity compromise. In [10] operate from a similar approach functions as an in-depth case study that examines how tender (mis)understandings often disrupt procurement processes specifically.

Works that emphasis on dialectical theory in organizational contexts illustrate the validity of the theory as an approach to problem solving and decision making, while they also identify the theory's broad applicability. In [11] study can be understood as a classic work where the analysis introduced dialectical theory and related concepts to U.S. businesses during a period when business theory was beginning to adopt diverse approaches. The study functions as a primer as it illustrates the model's core theoretical concepts and illustrates the variety of ways that it can be applied. Other works are more practically and scenario focused. In [12] illustrates how organizations can adopt this model to address underlying problems and their associative root causes. In [13] similarly apply a variation of their theory in their exploration of how Brazilian firms acclimate themselves to a heavily regulated marketplace by relying upon projective-based dialectical analyses of governmental and bureaucratic institutions. Their findings illustrate that dialectical theory can be useful in modeling and diagraming complex external forces and in terms of helping an organization navigate its relationship to these variables.

### **3. METHODOLOGY**

This is a non-hypothetical study and involve filling up questionnaire by the respondent. The respondent must be able to inform important facets and perspectives related to the phenomenon being studied. Hence, one of the most

important tasks in the study design phase is to identify appropriate respondent to participate. Respondents who are the ICT and procurement professionals would be considered by role, perspective and experience level. There are 4 groups of participants identified as the subject of this study that represents the relationship chain in a process of procuring ICT systems in government agencies. The respondent represents agencies and party such as Agency Functional Business Users, Agency ICT Technical Team members, Agency ICT Procurement Officers and ICT Vendor Implementation Team members. Decisions regarding selection are based on the research questions, theoretical perspectives and evidence informing the study and to remove the potential influence of external variables and ensure generalizability of results.

Despite continuing research, government procurement systems continue to present multiple types of ambiguity and uncertainty for the researcher. The closed nature of procurement system processes, coupled with the continuing need for developing first-hand forms of internal information, continues to occlude information pertaining to the types of internal knowledge and systems-related competencies required by procurement specialists [14]. This in turn often frustrates the ability of researchers to effectively identify the issues that impact such negative procurement systems outcomes as ambiguity, uncertainty and improper planning or allocation on the part of the governmental agencies [15].

The data gathered are in the form of surveyed participant responses represents one addressing effort in addressing ongoing research gaps in the area of ICT procurement. The survey sought to gather information from 250 respondents within the procurement process. Identified respondent were from various government agencies and ICT vendors. This survey administered a validated instrument tool of an 18-question assessment asking the participants to rate their responses though a sliding numeric scale with only 95 responded. This approach enabled the researcher to identify respondent attitudes towards specific issues, while also identifying broader thematic trends as they appeared across the responses [16]. The primary justification for this approach was two-fold. First, the research methodology served to derive a vast amount of data through a coherent and measurable approach. Secondly, it sought to both compile and contrast responses from varied participants in order to identify points of agreement and variance on the part of the respondents. While, these responses represented a select microcosm of potential attitudes among individuals with the same position and background, they nevertheless served three vital function. This included the task of providing an in-depth glimpse of how industry professionals viewed the domains of the internal processes involved within specific procurement processes, that of identifying how various internal determinates act as mitigating factors and the ways in which the domain of theoretical and practical knowledge for various parties involved in specific operations impacts procurement outcomes. Since government procurement processes tend to present higher rates of failure, deriving in-depth information in these key areas represents a crucial process [17].

### **4. RESULTS AND DISCUSSION**

Identifying the key issues impacting these outcomes requires a combination of real-world data deriving from the specialists involved in these processes as well as an ability on the part of analysts to provide an effectual theoretical framework that can contextualize these findings. These needs are often pronounced in contexts of ICT procurement: a field particularly noted for its associative uncertainty, risks, and challenges in terms of balancing procurement requirements

with budgetary concerns [18].

The general structure of the questions asked tended to follow three key patterns. First, they followed a formula that guided data from specific details—i.e. the respondents' background and specific role in an organization—to generalized observations. Secondly, the data deriving from the information also sought to combine empirical statements with the respondent's speculation. Finally, the questions also sought to frame these latter subjective responses as markers indicative of industry-level conditions. While individual responses could not provide an exhaustive summary towards debated issues such as the vendors' need for detailed technical requirement from their customers in ICT procurement scenarios—they nevertheless could provide a glimpse of how specialists viewed the issue from their perspective [17].

Thematically, the questions addressed the following broader-level categories. First, respondents were asked to provide basic information that helped frame their role within their organization. They were also asked to provide basic details about the nature of procurement processes within those firms. Secondly, the questions queried respondents to provide information that provided basic descriptors of the types of procedures used during procurement processes. After being questioned about the role of specialized knowledge vis-a-vis Business Functional Users-related demands and other specified areas of consideration, they were then asked to provide insights about the need for internal systems processes knowledge among varied parties within a procurement process. Finally, the participants were asked to describe various aspects of the tender process within their organization. The results are summarized as in Table 1.

## **5. CONCLUSION**

The preceding data helps inform specific observations and conclusions about the nature of ICT procurement processes within government operations. In general, the respondents tended to depict their understanding of the responsibility of groups that defines business processes and ICT requirements in the procurement of ICT systems, subsequently portray internal conditions that might require efforts for reforms and streamlining current procurement operations. At the same time, however, the respondents also revealed personal insights that identified their own awareness of the inefficiencies inherent in current procurement structures. Responses of this type can indicate that decision makers and purchasers understand the value of reforming their organization's system, even as they are delimited in their role due to the same system-level structures and inherent drawbacks.

The structure of the questions asked, and their emphasis on key areas of focus, also helped derive specific types of information in knowing the business users, technical decision makers and procurement specialists' engagement within this Pre-Tender process. Questions 1-2 identify the participants as being heavily involved in their organization's procurement processes. Questions 3-4 helped identify the fact that the participants' respective organizations also operated under the same structures, particularly by establishing their procurement processes on the needs of their business functional units. Thus, while the organizations might differ, structurally they featured many of the same functional concerns and processes. Responses to question 5-6 indicated that the responders viewed structural reports as vital to their processes, and also identified the fact that they also viewed the role of mixed reporting as equally vital. The responses for questions 7-8 also succeeded in assessing decision maker attitudes about the structuring principles information that is not readily present in existing research. While detailed and

narrow in their emphasis, the responses helped explain more intricate assessments on the part of the respondents, particularly in their view of the need of clarity and comprehension.

While internally diverse, questions 10-15 helped identify respondent attitudes towards various forms in field of knowledge of groups within agencies' procurement processes and more particularly, their view of which parties should be aware of their sub-processes. Broader emphasis on these points identified view that knowledge of business functional processes is important for the ICT technical team. This corresponding technical knowledge on the part of business functional units was seen less important, as indicated that view the individual units of business functional or ICT technical teams, should focus on their area of expertise. This view tends to predominate in much of the research literature, while it is also regarded as internal gaps that are impactful upon procurement systems. What goes unstated within these observations is the participants own view of how divided and unequal forms in their field of knowledge on the part of various respondents can sometimes produce points of ambiguity, confusion or inefficiency in broader-level system. However, responses to question 18 about the lack of access to organizational systems on the part of prospective vendors might implicitly identify their awareness about the nature of current system inefficiencies; theme that is also echoed in much of the associative research literature.

Questions 16 through 18, emphasis on tender processes confirmed that many of the observations identified throughout established research. In particular, they indicate the variance in field of knowledge within the groups in agency involved in the process. It would invite vendors to participate in pre-tender planning phases; they identify the inadequacy of most technical reports in providing assessments of organizational needs; they also explicitly identify the lack of access on the part of vendors that might allow them to examine organizational systems and to make specific recommendations during the pre-tender phase. In some respects, this feedback undercuts some of the potentially positive observations identified by the respondents elsewhere. The vendors indicated the need for coherence and clarification during pre-procurement stages of planning. In the latter responses, they however identified the varying system processes that might prevent an organization's capacity for providing comprehensive reporting. Similarly, the final questions also implicitly identify how lack of knowledge on the part of various participants can lead to inefficiencies in the area of pre-procurement reporting; whether this relates to the area of business requirement or technical system-based assessments. Responses to Question 18 further highlight the structural features that likely contribute to inefficiencies in planning and procurement allocation, whilst Vendors early engagement at the Pre-Tender phase would contribute in narrowing the gaps within their internal processes.

## **6. RECOMMENDATIONS**

In this study, future research direction is proposed, to develop on a mechanism that would re-evaluate the current ICT procurement process with a comprehensive business and technical user requirement for an ICT tender with the customer and vendors to fully understand the requirements and available technologies at the pre-tender stage that would alleviate future challenges in implementations of ICT projects in Government agencies. It is recommended to develop an anticipatory model and framework that can help address the knowledge challenges arising from ICT procurement processes. It also specifically seeks to utilize a



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model as a means for addressing specific knowledge challenges relating to business and technical requirement listings; an element fraught with potential miscommunications, knowledge and conflicts.

### 7. ACKNOWLEDGEMENTS

The authors would like to thank Faculty of Technology Management and Technopreneurship, Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka for providing facilities to conduct this research work.

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### Tables

**Table 1.** Result of instrument and response

	Least				Most		
	1.0	2.0	3.0	4.0	5.0	M	SD.
Question 1: Would your role involve in recommending the need to procure ICT 0.0% Systems and Services for the Government agency/organization?	0.0%	7.6%	0.0%	55.4%	37.0%	4.22	0.80
Question 2: How often would you recommend the procurement of an ICT Systems and Services for your Government agency/organization?	0.0%	7.6%	0.0%	55.4%	37.0%	4.22	0.80
Question 3: In your opinion, how is the role of a Business Functional departments' relevance to the procurement of an ICT Systems and Services in the Government agency/organization?	0.0%	0.0%	0.0%	56.5%	43.5%	4.43	0.50
Question 4: Are Business Functional Users' responses helpful for such procurements for this Government agency?	0.0%	0.0%	0.0%	16.3%	83.7%	4.84	0.37
Question 5: Are there any Business Requirement Studies (BRS) required to understand requirement needs at this level?	0.0%	0.0%	0.0%	15.2%	84.8%	4.85	0.36
Question 6: How essential do you think are the BRS feedback and the ICT technology needs for the purpose of procuring an ICT Systems and Services for the Users'?	0.0%	0.0%	0.0%	3.3%	96.7%	4.97	0.18
Question 7: From the BRS and the ICT needs documents, what do you think about the clarity in producing a Technical Specifications before procuring the ICT Systems and Services?	0.0%	0.0%	2.2%	6.5%	91.3%	4.89	0.38
Question 8: How vital do you think the BRS and the ICT needs documents are when producing the Technical Specification needs to be understood by the ICT vendors' comprehensively?	0.0%	0.0%	2.2%	15.2%	82.6%	4.80	0.45

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Question 9: Do you think the relevant agency/organization teams' ICT Systems and Services knowledge and skills very important for them to implement an ICT project successfully?	0.0%	0.0%	0.0%	3.3%	96.7%	4.97	0.18
Question 10: Do you think the Vendors' ICT Systems and Services knowledge and skills very important to implement the ICT system for a Government agency/organization?	0.0%	0.0%	0.0%	15.2%	84.8%	4.85	0.36
Question 11: Do you think the skills and knowledge of the ICT Systems and Services among the Business Functional 0.0% Users' in a Government agency/organization, are recommended?	0.0%	56.5%	10.9%	20.7%	12.0%	2.88	1.12
Question 12: Is it required for the members of the ICT Team to have a comprehensive knowledge of each of the 13.0% 66.3% agency/organization Business Functional departments operate?	13.0%	66.3%	4.3%	10.9%	5.4%	2.29	1.01
Question 13: Do you think there is a need to have higher ICT technical capabilities for an ICT department of a Government agency/organization?	0.0%	0.0%	0.0%	21.7%	78.3%	4.78	0.41
Question 14: Is it required for the members of the Business Functional departments to have knowledge and capabilities of the ICT technologies?	15.2%	72.8%	12.0%	0.0%	0.0%	1.97	0.52
Question 15: Generally, at what level do you think are the skills and knowledge of the ICT Systems and Services among the ICT team in your agency/organization currently?	0.0%	10.9%	4.3%	57.6%	27.2%	4.01	0.87
Question 16: At this Pre-Tender stage would ICT Vendors' invited to be part of the team in determining the Business Requirements and the needed ICT Technologies' together with the Business Users and your agencies ICT Department members?	42.4%	55.4%	2.2%	0.0%	0.0%	1.60	0.54
Question 17: In procuring through a Tender, do you think the tender's Business and Technical Specification requirement are comprehensive enough for the understanding of the ICT Vendors' to propose a solution?	4.3%	55.4%	3.3%	21.7%	15.2%	2.88	1.25
Question 18: Are there any access given to the participating ICT vendors during the pre-tendering stage, for them to conduct a study of the business issues in the environment of the requirement needs for the Government agency/organization?	84.8%	5.4%	2.2%	0.0%	7.6%	1.40	1.10