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ICT PROCUREMENT PROCESS: DEVELOPING A MODEL FOR THE PRE-TENDER PROCESS

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ABSTRACT

This research seeks to develop an anticipatory model that can help address the knowledge challenges arising from ICT procurement processes. It also examines at the Pre-Tender stage on how the insufficiency in requirement engineering can cause procurement errors during procurement process and eventually leading to challenged ICT projects. These requirements are sometimes impacted by various processes within and external to the government agencies advertising them. There are 4 groups of respondents identified that represents the relationship chain in a process of procuring ICT systems for government agencies. The domain of knowledge can be identified as a gap impacting efficient purchasing processes of ICT systems. Therefore, the aim of this study is to develop an anticipatory model that can help address the knowledge and communicating challenges arising from an ICT procurement processes.

Keywords: ICT projects; ICT procurement; ICT user requirement study; ICT requirement elicitations; ICT functional specifications; dialectical theory.

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1. INTRODUCTION

Effective knowledge and efficient communications represents essential variable in ICT procurement arrangements. As closed systems, these arrangements demand cooperation and unambiguous language between private specialist vendors and the public government agencies recruiting them to fulfill a contract. Contracts also help negotiate conceptual differences between experts and non-experts, and between differing government agencies. Accordingly, disruptive factors that impede clear understanding among the varying parties can result in negative outcomes in other aspects of the agreement. These predicaments are especially problematic in the business and technical requirement listings within ICT procurement agreements. They represent the most basic and elemental factors within a contractual agreement. However, they are also beset by multiple external and internal factors that can potentially complicate clear communications between various parties. Given their role in terms of communicating agency needs and in precisely identifying the core requirements needed by the vendor applicants, these complexities can be viewed as especially challenging.

During the initial Pre-Tender phase, the purchaser identifies core requirements that would address their business needs for systems, processes, projects, etc. Once completed, this would be followed by tender advertisements designed for 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 quote fees. 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 and from these evaluates, and 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. 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 general framework for their agreement. During the implementation period of this final phase, complexities begins to uncover that associates to ambiguities during the Pre-Tender phase, with potentials for it to become significantly challenged.

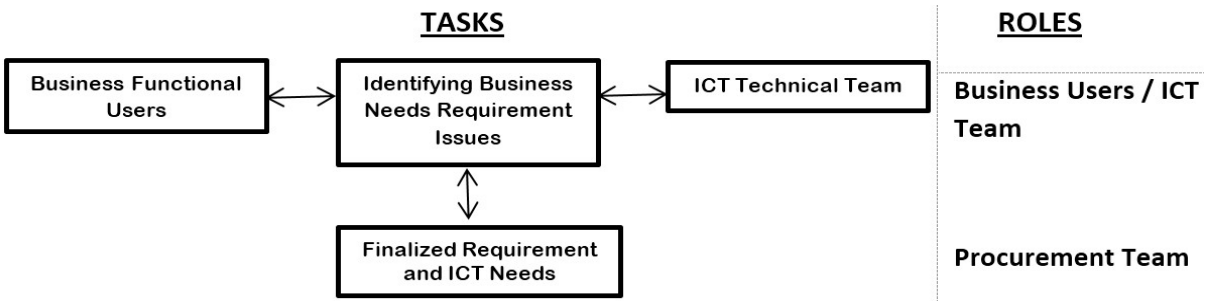

Fig.1. Illustration of existing task and roles in the ICT pre-tender stage

This study examines knowledge in ICT procurement agreements from two main perspectives. First, it approaches the issue from an anticipatory model: a methodology that seeks to identify ways of preemptively identifying the factors that could potentially result in key knowledge challenges or gaps between the respective parties. Secondly, it also relies upon a dialectical theoretical framework in its assessment of knowledge challenges. This approach seeks to review the perspectives held by respective parties within a specialized agreement or arrangement [1].

The larger idea explores existing task and roles in the ICT pre-tender phase as in Fig. 1 and these works can be subdivided into four major points. First, the unique nature of procurement as a closed system produces many potential and incipient problems for both agencies and vendors. This is particularly the case within ICT contexts involving complex terminology, tasks and problem solving operations. Secondly, since the challenges emerging from these contexts are often impossible to anticipate, it becomes increasingly important to develop an approach that can address challenges as they arise within a specific context. Thirdly,

dialectical organizational theory is uniquely suited to addressing these incipient challenges. The approach is designed to analyze two divisional forces within the same agency and to identify hidden solutions that emerge within the synthesis of the two perspectives. This approach would thus work effectively in addressing communications challenges in ICT procurement scenarios. Fourthly, the dialectical model can be applied within diverse scenarios, as way of generating integrated-based solutions from the specific variables involved in a given situation.

2. REVIEW OF RELATED LITERATURE

Studies examining procurement from a broader perspective provide two essential services. They outline the specific issues currently impacting these processes in various governmental scenarios across the globe. They also help illustrate many of the key problems affecting various situations. In [2] analysis of procurement, serves to highlight many of the issues impacting these processes where he exhibits the potential internal and external variables that can impact, even, debilitate, the process. Notably, the author identifies knowledge as a hybrid concern that impacts both external (vendor/agency) 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 [3] 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 [4] utilizes a similar approach in his assessment of the issue where this author, identifies how one approach, agile-based approaches to acquisition, can be useful as a practical innovation.

Other analyses focus specifically on the issues pertaining to specific personnel within a procurement process. In [5] examines the issue from a government`s perspective and offers strategic insight for agency planners. The organization [6] provides a report with a similar focus and orientation. In contrast, in [7] focus their analysis on providing key insights to tenders engaged within the broader process. Their findings function effectively alongside

analyses with a government focus, as these approaches collectively help us identify many of 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 agencies and vendors. Other analyses explicitly explore the issue of knowledge as a stand-alone concern. In [8] explore communication`s impact on technical and ICT-related procurement processing. Their 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 detrimental impact on operations. Similarly, in [9] also 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 needs between personnel and/or departments, can sometimes result in various types of disruption. Both analyses also indicate that communication failures due to insufficient knowledge can result in financial loss, project failure or system integrity compromises. In [10] operate from a similar approach. Their work however also functions as an in-depth case study that examines how tender (mis)understandings often disrupt procurement processes specifically. The value of this study is that it focuses on the specific qualitative issues stemming from real-world cases.

3. METHODOLOGY

This analysis seeks to develop an anticipatory model that can help address the knowledge challenges arising from ICT procurement processes. It also specifically seeks to utilize this model as a means for addressing specific knowledge challenges relating to requirement listings: an element fraught with potential miss-communications and conflicts. It will develop its model through three primary strategies. First, it will construct a workable model that applies dialectical organizational concepts. Rather focusing on problem solving within specific scenarios, it will instead begin by outlining a theoretical model that can be adapted and applied in multiple contexts. This model will highlight the broader principles pertinent to dialectical concepts and illustrate how they can be useful in analyzing and deconstructing operative terms within a specific situation and how this operation can also identify potential

solutions. Secondly, the model will also derive from a focused analysis of key episodes: specific cases involving challenged ICT procurement processes. This function does not intend to provide an exhaustive list of all possible variables that might be involved in future conflicts. Instead, it serves to identify some of the key themes that drive earlier cases. This approach helps decision makers anticipate possible variables that may lead to communications difficulties. Finally, it will provide a possible model that can be utilized in future cases. This model will be built on a combination of underlying dialectical theories, as well as a set of relevant findings that collectively illustrate the possible elements impacting knowledge at the requirements listing stage.

3.1. Dialectical Principles

Dialectical thinking derives from the broader philosophical concept of dialectics. In [11] note that this concept first derived from Greek philosophy, the teachings of Plato and Aristotle specifically. Aristotle`s model defined dialecticism as the philosophical and dialogic interchange between differing terms and arguments. In this model, a central idea or thesis is understood within its unique arguments and key postulations and in context of oppositional ideas: anti-thesis. A thesis posits an argument; an anti-thesis posits an oppositional, contrasting idea. The two collectively also inform the emergence of a third variable, the synthesis. In [11] note that a synthesis is more than a compromise or hybrid deriving from the previous contentions. Instead, it represents a separate postulation; however, it is nevertheless informed by the contrast generated by the thesis and anti-thesis. The same authors also point out that this model has been applied in other scenarios. For example, Hegel utilized the same model when constructing his model of historical change. Marx, in his critique of Hegel also borrowed from the same constructs. Organizational theorists however have also relied upon dialectical paradigms to explore conflicts within or among business entities. The authors in their analysis specifically illustrate how a dialectical model can be used in framing and diagraming the various parties involved in a dispute. This process help to identify, defamiliarize, and reframe the representative perspectives of both parties which in turn also enables to critically evaluate and critique them. In [12] also contends that arriving at a relevant synthesis through this approach can often present innovative solutions that are not

apparent prior to dialectical analysis.

In an ICT procurement process, a dialectical model would help trace and reconstruct the conflicting variables involved in a situation. This might include the obvious gap between vendors and contractors; however, the same model can also be utilized in framing the communicative gaps between internal departments.

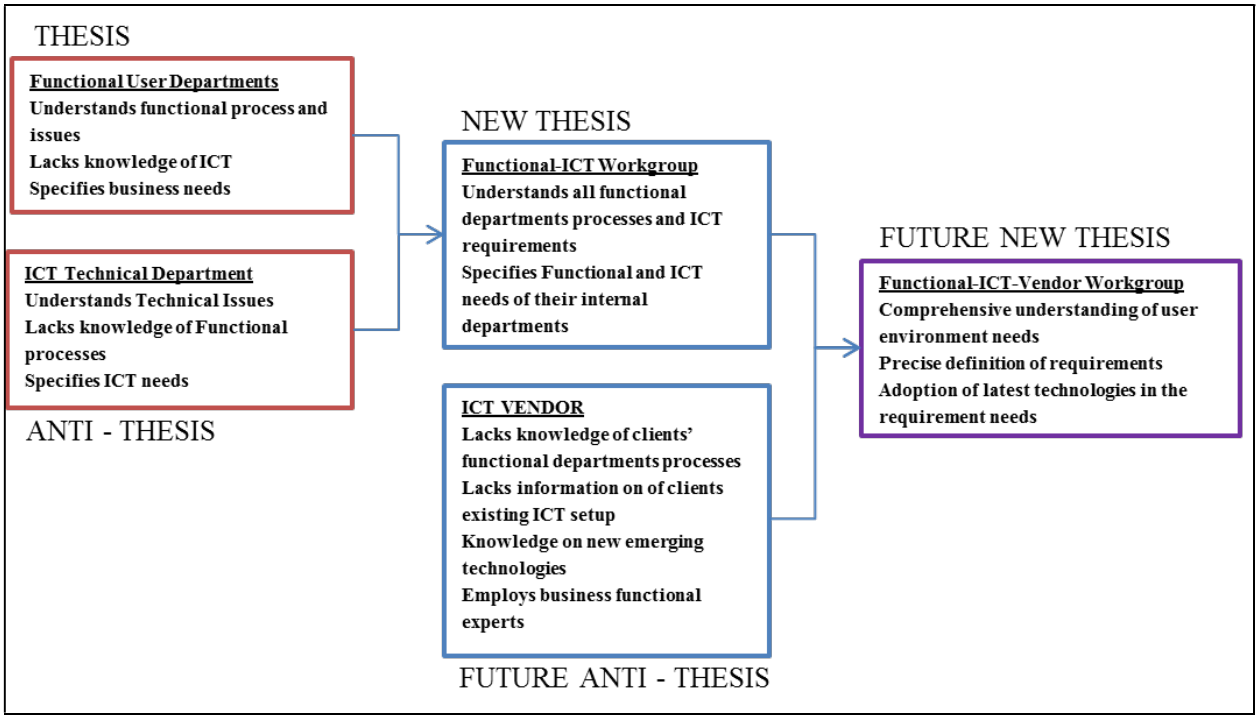

Fig.2. Application of a theoretical model for the inter-departmental dialectic process

This approach would also allow to carefully review the respective parties and to critically evaluate their guiding assumptions. The final process, after establishing a tentative frame including variable thesis and anti-thesis elements would then be articulated a working hypothesis functioning as a tentative synthesis as depicted in Fig. 2. In [1, 13] stress the need for ensuring that both perspectives have been thoroughly analyzed and diagramed before attempting to formulate a synthesis. This is because effective, integrative, solutions require attention to each critical element.

3.2. Developing an Applied Dialectical Model

Constructing an applied model, addressing the concerns would depend on two primary factors. First, it would require a structure deriving from dialectical theory. This would include a mapping of the first two primary elements, the thesis and anti-thesis. This formulation would

in turn depend on various components, including the actual two groups involved in the scenario and their broader relationship. This variable feature would also mean that the model is scalable in its focus, meaning that it could be calibrated to address intra-organizational conflicts or conflicts between vendors and contractors [7]. Regardless of the variables involved, the dialectical model would be utilized to frame, analyze, and assess the factors associated with both parties in order to arrive at an integrated solution: i.e. synthesis [12].

At the same time, applied dialectic approaches as stated in Fig. 2 would also need to be grounded in the specific variables deriving from their unique scenarios. This would require a list of variables specific to the circumstances involved: between vendor/agency and public intra-departments. Once again, these variables would serve to map the approach in an anticipatory fashion; it would not be utilized to predict the factors that might lead to communications difficulties. Nevertheless, a viable collection of pertinent factors would nevertheless be useful in precipitously addressing the concerns that might result in knowledge difficulties [3].

3.3. Data Gathering Procedure

The data gathered for this study is in the form of surveyed from respondent, addressing ongoing research gaps in the area of ICT procurement. The survey sought to gather information from 250 respondents within the procurement process stakeholders working in various government procurement agencies and vendors. It was done by administering 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 [14]. 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 also served three vital functions. This included the task of providing an in-depth glimpse of how industry professionals viewed the domains of the

internal processes involved within specific ICT procuring 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 ICT procurement processes tend to present higher rates of failure, deriving in-depth information in these key areas represents a crucial process [15].

4. RESULTS AND DISCUSSION

Participant responses for the questions relating to pre-tender process with reference to Table 1, relative to ICT government procurement processes present a series of salient points and potential implications, both of which derive from aggregate findings among the 95 total respondents. Initial observation entails the responders` specialist knowledge and background helps inform their broader-level perspective of governmental ICT procurement processes, as well as the specific components necessitated within these broader processes. One of the interesting aspects of the data collected throughout the questionnaire relates to key distinctions between respondents with higher levels of career experience and role responsibility within their organizations, and those with less. The most notable example in this respect relates to the minor disparities that exist in question 18. This question sought to determine if vendors were ever allowed internal access into a company`s operation. The respondents who stated that their company did allow this access tended to feature both lower levels of career experience and role responsibilities.

Table 1. Validated survey 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 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
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 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 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

Secondly, as these preceding observations imply, the findings among aggregate respondents tend to be relatively homogenous in terms of their scope and observations. At the same time,

the presence of minor disparities within the findings also illustrate that ICT procurement specialists, working in diverse settings and contexts, may derive slightly different impressions of the same essential processes and features. As expected these disparities appear in the questions with a more subjective focus: in question 9, 11, 12 and 15 for example, in which the participants are asked to provide their assessment of their ICT technical teams` skills and capabilities. More intriguing, however, these gaps also appear in areas where more uniform responses. This would include question 12 and 14, where respondents were asked to state their opinion about the types of knowledge required by business functional and ICT technical units, reflects the apparent breach in the process.

Finally, the findings generated by the data illustrates that surveyed respondents provided impressions and observations that roughly support the research literature. This included their observations relative to best practices in ICT procurement practices, their emphasis on the paradoxical role of knowledge within organizations and across departments during procurement processes, and their brief assessment of the internal paradoxes associated with pre-tender processes. Their responses to the questions delineating these areas roughly conform too many of the observations noted in research literature. The broader significance of this point may illustrate the fact that while governmental ICT procurement processes function in unique ways depending on specific departments that they also tend to entail many of the same issues.

The three thematic points previously illustrated also address the essential findings deriving from the responses. Feedback in the area of best practices outlines many of the same recommendations located in industry and ICT-related research. The respondents` statements regarding the importance of establishing a clear view of business functional needs, of developing in-depth business study requirements and prospective ICT technical needs documents and of ensuring clarity within these documents all correspond to research findings. The near unanimity of respondent feedback in these specified areas also illustrates their broader importance, both thematically across governmental entities and within the context of real-world scenarios. At the same time, however, later questions also reveal that ICT procurement processes may also be potentially impeded by negative internal structural features. Responses to question 12, 14 and 17 illustrate those organizations are not typically

able to produce guiding documents with the types of clarity and comprehensiveness that the analysts recommend elsewhere.

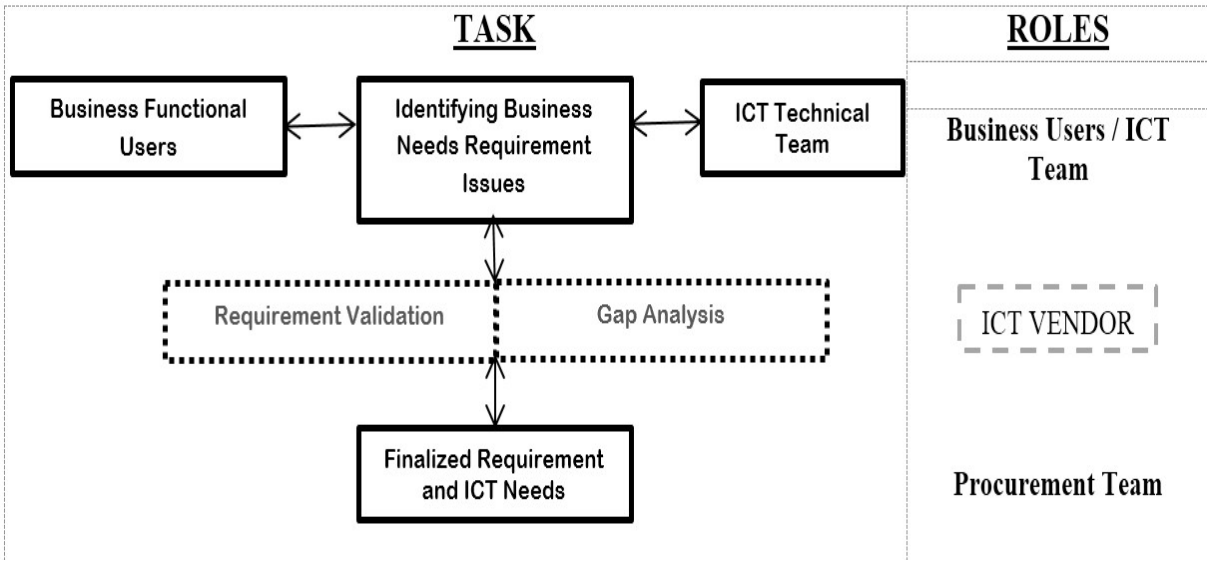

Fig.3. Proposed model for future cases in the ICT pre-tender stage

Respondent feedback in the area of knowledge also presents observations that correlate with external research findings. Broadly speaking, responses appear to indicate that the participants view knowledge across units and departments as essential. However, responses to more narrowed questions also indicate key points of ambiguity in terms of the value that the participants ascribe to specific types of knowledge in specified domains. The feedback indicates that respondents view knowledge of business functional requirements as important for ICT technical staff, but do not necessarily contend that ICT technical staff should possess comprehensive knowledge of the organization`s processes or that business functional units should possess working knowledge of technical processes. Collectively, these responses indicate the types of complex paradoxes that are often associated with the pre-tender stage within ICT procurement operations.

Findings also illustrate a gap between theoretical recommendations and actual practices within governmental procurement systems. Responses pertaining to pre-tender practices among organizations specifically indicate the key internal problems that may be impeding quality outcomes within broader procurement processes. Feedback related to questions 10, 16, 17 and 18 specifically illustrate how policies such as not allowing vendors to participate in

pre-tender planning stages or that deny vendors access to organizational systems for reporting purposes might delimit an agency`s ability to produce compressive and coherent business and technical ICT systems purchasing guidelines. When contrasted with earlier statements indicating the respondents` awareness of the need for coherent and comprehensive guidelines, these outcomes can be viewed as especially problematic. Ultimately, this data reveals that while decision makers operating within governmental organizations may understand the factors that can improve ICT procurement processes that internal impediments within the same organization might severely limit the organization`s ability to improve its processing in this respect. In this sense, purchasing flaws within governmental ICT procurement processes can be viewed as systemic.

5. CONCLUSION AND RECOMMENDATIONS

This study identifies how system organizational processes tend to prevent meaningful engagement on the part of ICT vendors: the very parties who might be able to alleviate some of the ambiguity by inspecting system operations and by making directed, and narrow, forms of recommendation. Ultimately, these responses identify one of the ongoing paradoxes identified in established research. Even while ICT procurement decision makers exhibit awareness of the very characteristics that could optimize their processes, they are delimited by systems that prevent the types of innovation that could help improve current processes. In this study, future research direction is proposed, to test this model as illustrated in Fig. 3, which would reassess the needs of current ICT procurement process with a comprehensive business and technical user requirement for an ICT tender with the agencies and vendors. This proposed model would aid the agencies to develop a comprehensive requirements and available technologies at the pre-tender stage that would alleviate future challenges in implementations of ICT projects in Government agencies.

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