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Information systems procurement process risk and control: Insights from a public sector organization

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ABSTRACT

This case highlights the specific risks and issues that may be encountered in the information systems (IS) procurement process in a country where bribery and corruption are more common. PSO is a large Indian public sector organization involved in energy-related business. Being financially deprived, PSO relied on government funding to build its infrastructures. Besides the funding support, PSO also inherited the bureaucratic structure and the corruption practices. Lately, PSO was involved in several IS infrastructure and applications upgrading projects and wanted to review its IS procurement process. Does PSO understand the process risks in public IS procurement? Does PSO have the maturity to implement control mechanisms in order to mitigate its IS procurement process risks?

Keywords: IS procurement, risk, control, public sector.

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INTRODUCTION

This case of a public sector organization (PSO) in India highlights the specific risks and issues that may be encountered in the information systems (IS) procurement process in a country where bribery and corruption are more common. India's corruption is no different from other developing countries. Initially when the British ruled India, there were rampant corruption practices among the British Government officials in India (Rose-Ackerman, 1999). When India gained independence, she faced the challenge of creating a brand new nation. Companies are increasingly alarmed about corruption practices in India. According to a recent report on outsourcing (MacIver, 2008): "The Indian outsourcing industry, struggling with geopolitical threats, decreased global spending and protectionist pressures, has been hit with severe credibility issues and scandal. Outsourcing buyers are now keenly aware they can no longer justify offshore cost savings."

PSO is a large India public sector organization involved in energy-related business and relied on government funding to build its infrastructures. Besides the funding support, PSO also inherited the bureaucratic structure and the corruption practices. IS procurement risks are acute for public sector organizations mainly because of extensive red tape (Braa et al., 2004) and widespread corruption (Walsham and Sahay, 1999) in the public procurement process. Lately, PSO was involved in several IS infrastructure and applications upgrading projects and wanted to review its IS procurement process. Does PSO understand the process risks in public IS procurement? What are the control mechanisms that are present or missing in PSO's IS procurement process? Does PSO have the maturity to implement control mechanisms in order to mitigate its IS procurement process risks?

IS PROCUREMENT PROCESS RISKS IN PUBLIC SECTOR ORGANIZATIONS

> *"State of California Department of Motor Vehicles (DMV)'s project in the mid-1990s to switch nearly 70 million vehicle, license, and identification records from a legacy system to a new sophisticated database system was both behind schedule and over budget. One of the main reasons why the DMV project failed is due to the procurement restrictions of the organization's commitment to a specific hardware platform and overlooking all other available platforms. As a result of the failure, California State Department's information technology procurement process has since adopted greater control and oversight.*

> *In general, public sector organizations are considered large consumers of information technology. As such information technology procurement becomes critical in these organizations. However, as the California DMV failure amply demonstrates, conducting information technology procurement in public sector is not easy and the risks are daunting"*[2].

One of the main challenges that public information technology (IT) managers face today is procurement of IS, i.e. hardware and software. In general, IS procurement is said to be more challenging than the procurement of other goods and services due mainly to IS's complex requirements (Saarinen and Vepsäläinen, 1994) and the limited availability of IT suppliers (Press, 1996).

An IS procurement process encompasses several activities: forming the procurement committee, specifying hardware/software requirement, identifying the vendor, launching a competitive tender program, issuing a purchase order, and receiving the IS products and services. Figure 1 summarizes these IS procurement activities in public sector and their prevalent risks. An IS procurement process usually begins with user departments identifying their needs for information systems. The purchase requisitions are routed by workflow for procuring by authorized purchasing personnel. Once approved, IS procurement activities are carried out by a *procurement committee* which is made up of IT specialists, procurement personnel and representatives of the users. Potential risks at this initial phase may include: a lack of common goals among procurement committee members (Pan et al., 2006), committee members are inadequately equipped with skills and experiences in IS procurement and contracting, and obscure authorization structure. For example, unclear authorization structure may pose a problem since decision structure may determine who the decision makers are. In a centralized organizational structure, the IT or procurement department may be the decision makers. In contrast, in a de-centralized structure, user departments are authorized to decide over the choice and source of information systems.

[2] Center for Technology in Government, University at Albany, State University of New York, *Making Smart IT Choices: Understanding Value and Risk in Government IT Investments*, http://www.ctg.albany.edu/publications/guides/smartit2?chapter=3. Last accessed 19th December 2010.

Figure 1: IS Procurement Process Activities and their Respective Process Risks

IS Procurement Process Activity					
Formation of Procurement Committee	**Specify Hardware/ software Requirement**	**Identify Vendor**	**Launch Competitive Tender Program**	**Issue Order**	**Receive Goods and Services**
Process Risk					
-Lack of mutual trust and common goal -Committee members inadequately equipped with skills or experiences in IS procurement and contracting -Obscure authorization structure	-Specifying unnecessary/inadequate requirements -Purchasing software of inferior quality -Misfit between the client's requirements and the system's features	-Cultural misfit between client and vendor -Client's inability to monitor and control the vendor -Vendors with inadequate implementation experience -Vendor's inability to provide post implementation support	-Political manipulation of tender outcome -Uncompetitive vendor bid -Bribery and kickbacks -Loss, alteration, or unauthorized disclosure of bidding price data	-Delays in contract offering	-Acceptance of unordered/unacceptable /damaged products and services -Errors in counting products

At the ‘specify hardware/software requirement’ phase, the main issue surrounds conflicts among the IS procurement committee members over system design and requirements. Conflicts may arise owing to frequent system design change requests that may become unmanageable. Potential risks at this phase may include specifying unnecessary/inadequate requirements, purchasing software of inferior quality, and the presence of a misfit between the client’s requirements and the system’s features (Mamghani, 2000). The next phase of the IS procurement process involves *identifying a set of appropriate vendors*. This can be accomplished by publicly advertising for vendors or approaching selected vendors privately. The potential risks in this phase include a cultural misfit between clients and vendor (Kern et al., 2002), a client’s inability to monitor and control the vendor’s progress, having vendors that lack adequate implementation experience (Mamghani, 2000), and finally, the vendor’s inability to provide support after the implementation.

Once the decisions concerning which IS products or services to acquire are made, other than the occasional direct negotiations with preferred vendors, typically the purchasing contract is awarded through a *competitive tender program*. A competitive tender program is the process of selecting and contracting a preferred provider from a range of potential contractors by seeking tenders for the provision of specified outcomes and evaluating these on the basis of a set of agreed criteria (Adams and Reader, 2000). A competitive tender program is widely adopted in IS procurement within the public sector whereas it is less common in private sector organizations. Competitive tender program is preferred to direct negotiations because of the belief that it ensures fair and open competition. While the lowest cost appears to be the main decision criterion, some organizations do not necessary select the lowest cost vendor (Cross, 1995). Other criteria such as product or software quality are often preferred over price. At this phase the potential risks include political manipulation of tender outcome (Choi, 1999), uncompetitive vendor bid (Chaudhary et al., 1995), bribery

and kickbacks, and loss, alteration, or unauthorized disclosure of bidding price data.

The next step in the IS procurement process is to *issue the purchase order* for IS products and services. The main risk we identified here is delays in the contract offering owing to extensive details such as technical, commercial and economic terms, and disagreement among related parties on stated contract terms (Mani et al., 2006). A contract usually contains key technical, commercial and economic understandings related to the purchase transaction that allocates obligations and associated risks to the parties in a legally enforceable manner. A contract is useful where there is an absence of mutual trust between the client and suppliers. Simply defined, trust entails that a client is confident that a vendor will deliver what has been stipulated in a contract, deal with problems, and be fair and honest in its charges (Kern and Willcocks, 2000). Sometimes due to insufficient trust, delays may arise out of differences among procurement committee members, and also between the committee and the shortlisted vendor in understanding and agreeing to the obligations stated in the contract. For example, disagreements may arise over (a) compensation paid by the responsible party in the event it does not manage the assigned risk as required; and (b) effective mechanisms established to resolve disputes fairly, within a reasonable time period, and at a reasonable cost (Khan and Parra, 2003). The last phase in the IS procurement process is to *receive IS goods and services*. Products received are inspected for quality and counted for quantity. The aim here is to ensure right products in the correct amount are received in acceptable conditions. The potential risks include acceptance of unordered/unacceptable/damaged products and services, and errors in counting products.

Overall, IS procurement in the public sector may face several process risks and if not managed properly, organizations may face severe consequences. The next section describes PSO’s IS procurement process.

PSO'S IS PROCUREMENT PROCESS

PSO is a large India public sector organization involved in energy-related business. Given that this is a critical industry, the India Government set up a Vigilance Committee (VC) to monitor PSO's business operation. VC was an external entity that served as a process auditor. PSO's business would require the use of advanced technology such as supercomputers and software platforms. Lately, PSO was involved in several IT infrastructure (e.g., Storage Area Networks) and applications (e.g., Virtual Reality) upgrading projects. These changes provided the opportunity to explore PSO's IS procurement process.

The purchasing process would usually involve a call for tender. In total, there are three types of tender: open, limited and nomination. All vendors could participate in open tenders but only a selected group would be involved in limited tenders. As for nomination tenders, PSO would issue 'Request for Proposal' to a single vendor. The third option was rarely used as it would appear difficult to justify to the VC why only one vendor was shortlisted in the selection process. For open and limited tenders, vendors had to attend pre-bid meetings to discuss PSO's tender specifications. A Tender Committee (TC) that consisted of the Finance Department, the Procurement Department, IS Department and the User Departments would usually be set up to evaluate vendors' specifications and ensure they were consistent with PSO's requirements. PSO's IS procurement process is summarized in Figure 2.

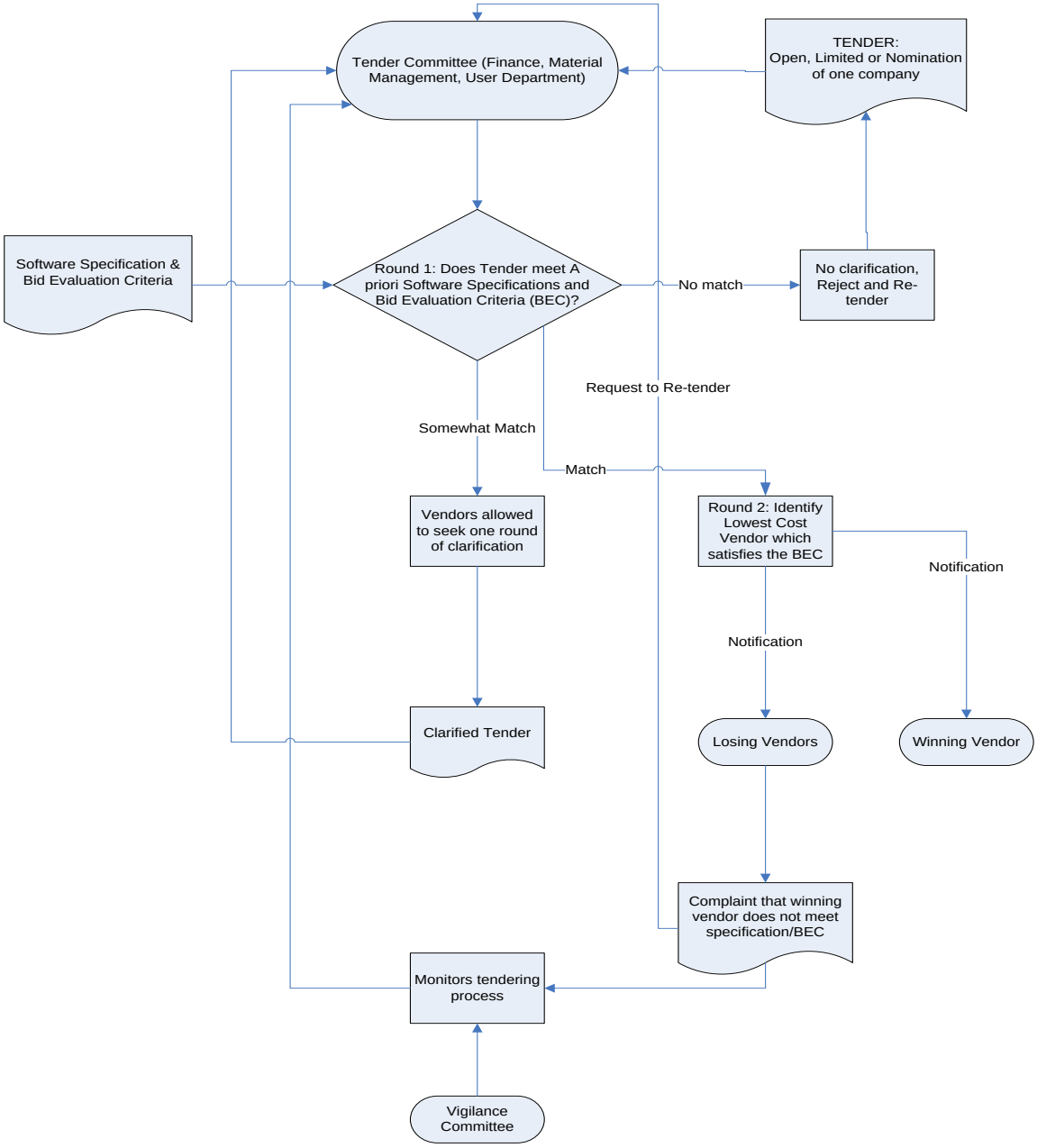

Figure 2: PSO's IS Procurement Process

The bidding process involved two phases. The first phase aimed at addressing the technical specifications of the IT solution. In this round, vendors were allowed only a single opportunity to seek technical clarification. After which, successful vendors would advance to the next phase. In the second phase, all vendors' quotations were made transparent. Those who did not succeed in the prior stage

became eye-witnesses in this phase. A constant challenge in the procurement process was the users' inability to produce precise *a priori* software specifications. As a result, they had to artificially produce the specifications based on vendors' specifications to create competition. According to a PSO's operational manager:

> "The problem is it has to be satisfied in totality…they have to match verbatim. But users don't always know what the exact system specifications are going to look like. So users would take 3 vendors' specifications and artificially create requirements by marrying all 3 specifications. These artificial requirements create enough competition for those three vendors, and then these specifications have to match exactly in order to select the vendor…Suppose you are procuring RISC workstation which has a smaller frequency than your regular Intel. Suppose IBM has 100 MHz, vendor A has 90 and vendor B has 80. So in my specs I would write 90 MHZ, - in which case I won't get the best product (i.e., IBM with frequency 100 MHz). If I had written 100 in my specs, I would have got only one quotation - from IBM, which will look as if I am favoring the vendor. Then they will make me re-tender because they want competition! This whole re-tender causes substantial delay."

Another operational manager also explained:

> "PSO makes a fundamental assumption that to buy something you have to know exactly what you want. And when you write the specifications, they become 'holy'. This requires a priori knowledge of what we really need, which can be rather impossible. It's a strange paradox. Developed economies usually use 'Front End Engineering Design' where they provide broad guidelines and requirements, and vendors do the exact specifications to fit the broader needs."

One consequence that might arise from the current practice is the danger of seeing the product price as more important than the product quality (i.e., quality of technology). For example, when all competing vendors (e.g., A, B and IBM) met the technical criteria (i.e., frequency of RISC processor) given by PSO, they would be evaluated solely on price. In this particular scenario, vendor A turned out to be the lowest price bidder who put in a frequency of 90 MHz as compared

with IBM's 100 MHz. Given the more attractive pricing, vendor A was selected even though its technology quality was inferior to IBM's.

According to PSO's tender regulation, vendors can lodge an appeal if they deemed the vendor selection partial. Unfortunately, some vendors abused this privilege by lobbying against PSO's vendor of choice, using software specifications as a rhetorical tool; they argued that corruption was rampant and had played a major role in biasing PSO's vendor selection decision process:

> "Since the bidding system is open, everyone knows what the bids are – Vendor A will complain that B doesn't match the specifications in order to force a re-tender and B will complain that A doesn't match the specifications too. This is all done to get the contract – neither A nor B actually care whether specifications match or don't. One vendor told me "Sir, how does this affect us? We just have to write a letter". These complaints are particularly launched against vendors who are expected to bid a very low price" (Group General Manager, PSO).

The delays from the appeal process can be very costly to all parties:

> "As a vendor, I have been making a lot of effort to meet everything on the specifications - then some minor obscure items are not on the specifications, and the other [losing] vendor starts to write the letter……
> 7 years ago PSO decided to acquire some systems. It was approved by the board. The competitor decided to write a letter to fight the process. It's been 7 years and it's not been procured to date. Basically PSO had lost all values from IT" (Regional IT Manager, Vendor B).

On many occasions, PSO faced a dilemma of whether it ought to address vendors' complaints by allowing a re-tender or refuse vendors' appeals and be subject to possible investigation by VC. The predicament proved to be a thorny issue because re-tender would lengthen and possibly delay the IS procurement process. But by disallowing re-tendering, PSO had to face the VC's investigation which could potentially affect its reputation:

> "We want to go with that particular vendor even though there is no competing vendor. We believe that vendor provides the best product and best value for money" – however nobody dares to take this stand – because you can be seen as favoring that vendor – and then "vigilance case ban jayega" [it will become a vigilance case (translated from Hindi)]. In fact, for that IT solution, which involved a 50 [million Rupees] [1 million Rupees = 22391 USD] contract, the argument was over a component, that cost only [100,000 rupees]! (Head of Information Processing Group, PSO).

According to another operational manager:

> "We followed the rules and regulations very closely. All of us have phobia towards the VC. They identify slight deviation from the normal tender rules as a case of corruption, in that we might be favoring a particular vendor. The VC pays great attention to the rules, because they believe 'checks and balances' are necessary to prevent common corrupt practices where a vendor could indeed give bribes to PSO to ensure that (a) it will be selected to supply the solution or (b) once selected its product shipment would rapidly pass the quality assurance checks."

Nevertheless, by carrying out re-tenders regularly this might affect the long term vendor-client relationship. According to the CEO of Vendor B:

> "For transparency, PSO has a process in place but it wants the best product at the cheapest price. That's a flawed logic. We do not have a good relationship with them. PSO is like our 'adversary'. Any client-vendor relationship has to be a win-win relationship."

Despite its potential shortcoming, re-tender (and dealing with consequential delays) was often viewed as the lesser of the two evils. In fact, a transparent tender process was seen as more important than procuring better quality applications simply to ward off VC's possible intervention and investigation. According to PSO's Group General Manager:

> "There is a perfect example of how accepting B's bid made sense on both technical and economic grounds, but since the Tender Committee was under surveillance by the VC, they followed the rules to the letter and re-tendered. A 1-man enquiry was set up, and the retired gentleman acquitted these people (who wrote the specs). But this took a very long time, during which they went through so much trauma and public humiliation. Worse still, the CEO refused the recommendations of this 1-man enquiry claiming that one of the defendants turned emotional while being interrogated, so the enquiry is not legitimate."

Vendors' appeals often caused the IS procurement process to be delayed by a long time and as a consequence, IT solutions became outdated when they were eventually procured. According to PSO's Group General Manager:

> "For example, we hired Vendor C to offer us a storage [networking] solution. After the order was placed, a networking switch went out of production. A replacement for this switch would require side stepping the normal tendering process, resulting in possible investigation by the VC. Vendor C has to prove that another solution exists, which will pass the technical level and which won't be more expensive than the previous solution. If it is at a lower price, then the savings have to be passed to us. However, if the new solution turns out to be better than the previous one, the vendor gets no credit for it."

Furthermore, vendors were expected to strictly adhere to the procurement procedures:

> "PSO's procedures are cast in stone. Vendors have to live with them. Chances of process changing based on vendors' recommendations are low" (CEO, Vendor A).

> "We would like to change the rules, but who is going to bell the cat (i.e., government)? It's all about vigilance. PSO is scared of VC. Why can't they take a stand? The leaders are so scared to stand up to their principles. In fact, there was one exception: PSO bought ERP for 10 million Rupees (220,000 USD, approximately) - they didn't conduct a tender - they negotiated directly with the vendor. The Chairman spearheaded the project. So it's not like it can't be done." (Regional Manager, Vendor B).

Nevertheless, PSO's expectations incurred negative consequences. One very good example was that PSO would always opt for pricing over quality which had impacts on PSO's long term technological performance:

> "This is the height of being so subservient to the process. Last year we had given them a choice to use Sun or SGI. It so happened that SGI was priced lower than Sun. The platform of choice in that industry is Sun. I had made them the offer to negotiate Sun's price on their behalf and bring it down to what SGI was offering! I would have brought Sun's price down. But they didn't agree – they bought SGI! That's the height of not applying your mind to it - you are so subservient to the process. The thought of buying technology [Sun] for the sake of the organization doesn't occur to them" (Regional IT Manager, Vendor B).

In addition, shipped orders had to be verified and certified by several PSO's departments before sending to users who procure the orders. The verification was necessary to uphold 'checks and balances' within the procurement process. Nevertheless with the involvement of several departments, the likelihood of corruption was also increased:

> "Now several people become very powerful - Quality Assurance (QA), finance etc – since everything has to be verified and certified by them. For example, the QA group could deliberately delay the shipment on 'trivial' grounds such as the shipment label did not match the customer order information specified in the tender specifications. QA inspectors are either genuinely worried about the paperwork not matching the tender or getting caught by VC. Vendors may have to bribe QA to obtain approval. However this is not all. Bribes may also have to be offered to the Finance group to speed up the payment process" (Operational manager, PSO).

Overall, PSO's IS procurement process can be said to involve several key stakeholders such as the VC, Indian Government, vendors, auditors, and even the legal profession and the media. Figure 3 describes the stakeholders who would play an influential role in PSO's process governance and control activities.

Figure 3: PSO's Circle of Governance and Control

Acknowledging its shortcomings in the IS procurement process, PSO conducted a review exercise to identify process risks, control weaknesses and examine what controls could be enacted to improve its IS procurement process:

> "Several improvements were needed to shore up PSO's existing IS procurement process and they were introduced one-by-one. For example, PSO allowed regular direct negotiations with vendors in some key transactions; granted more authority to user groups; minimized the involvement of the Finance and Procurement Departments during the bidding process; included broader specifications in tenders and allowed more rounds of clarifications from vendors; and ranked vendors based on 'value-for-money' rather than 'lowest-cost' criterion" (Operational Manager, PSO).

> "In addition, PSO initiated several communications with VC to understand the monitoring and auditing policies better and at the same time, allowed VC to understand PSO's business nature and

> practices. It is hoped that with more communication and understanding, the fear may be reduced. Furthermore, the company also drafted a new set of guidelines on accepting business gifts – stating clearly what are considered acceptable business gifts and what are considered bribes" (Group General Manager, PSO).
>
> "Like some developed economies, we should not have a binary evaluation of the vendor – we should rank them in absolute value in terms of the benefits they provide. You can have an expert group performing these evaluations, or a 3rd party consulting group. The emphasis should be on value-add, not on lowest-cost bidder. I suggest a parameter called Value for Money, where you divide the absolute value in terms of the benefit they provide/ Price of bid. You can ask the highest value vendor to match the vendor that provides the best value for money – that way you might get the best quality at the lowest price! If the highest value vendor does not match the offer, you select the vendor that provides good value for money" (Head of Information Processing Group, PSO).

PSO's vendors drew comparisons between their public sector clients in India and overseas:

> "In India, the corruption is centered on financial/legal and not technical. In other countries… the US trusts the technical people more. They are more empowered. They are able to justify their decision with far less paperwork and less time. But the large difference is that they have more trust and faith in the technical personnel than the Indian Government in PSO's technical experts. Generally vendors do not get in touch with Procurement/Finance departments. Everything is based on a single point of contact. Unlike in PSO, the Procurement guys are very much involved in the entire procurement process" (Regional Manager, Vendor A).

The next section proposes a IS procurement process control maturity model to assist in assessing the level of control maturity in PSO's IS procurement process.

IS PROCUREMENT PROCESS CONTROL MATURITY

The alarming frequency of process failures has raised organizations' awareness in enacting process control as they become more responsible and mature towards governing business processes (Weill, 2004). Furthermore the current financial turmoil and uncertain business environment is pushing organizations to

improve firm-wide risk management, cultivate a risk-aware culture and instill stronger process governance. Despite the urgency, implementing control is neither easy nor intuitive (Kettinger et al., 1997). On the one hand, a lack of control may raise the level of threats within the IS procurement process. On the other hand, excessive control may lead to control redundancy and a decline in operational efficiency. Furthermore, even if public sector organizations are willing to implement control, they may still lack the preparedness and maturity to implement control mechanisms. A control maturity model is useful to provide a roadmap for organizations who may want to implement control mechanisms in their IS procurement processes. Figure 4 describes a control maturity model which captures the progressive levels of preparedness needed to implement and manage IS procurement process control.

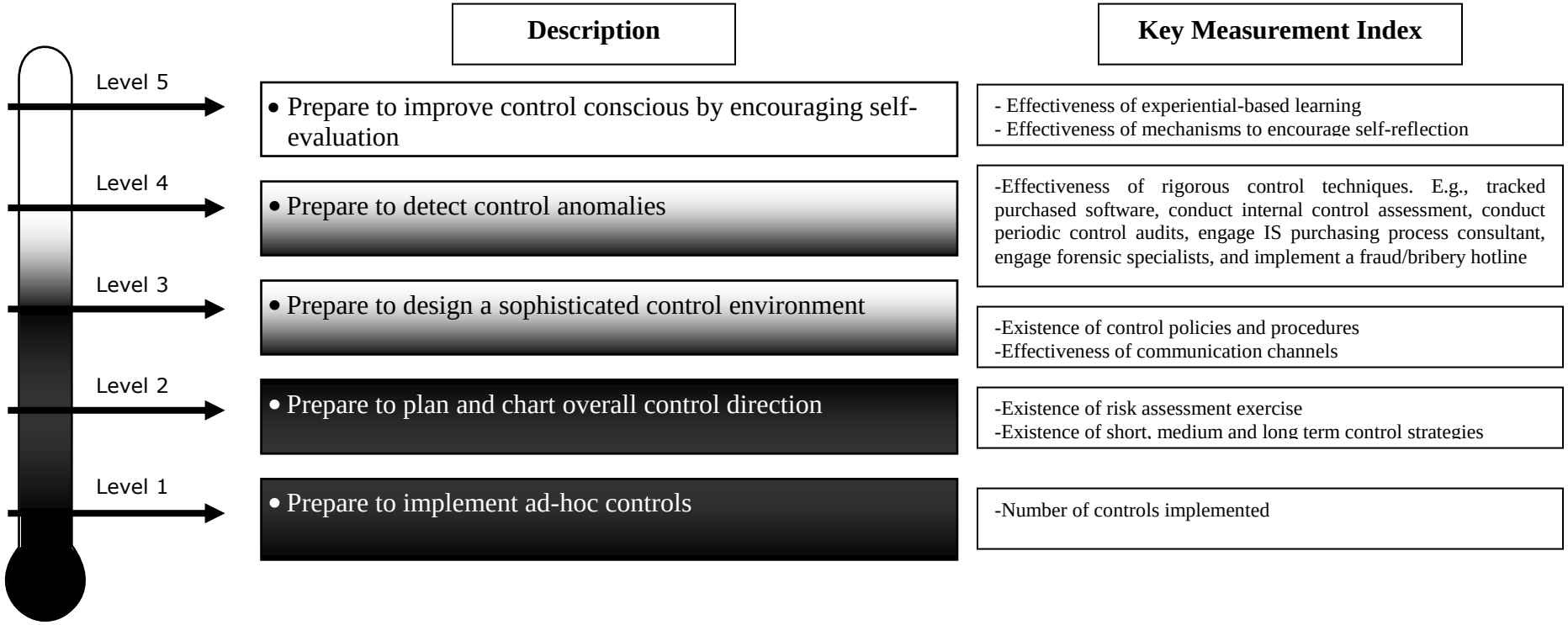

Figure 4: IS Procurement Process Control Maturity Model[3]

[3] The model is inspired by the work of Capability Maturity Model for Software (Humphrey, 1989) and de-escalation management maturity model by Flynn et al. (in press).

Control redundancy and inadequacy are common features for organizations in level 1 of the CM model. These organizations lack planning and do not have proper coordination implementing controls. Often, their implementation of controls tends to be on an ad-hoc basis.

Organizations must set up a IS procurement process control implementation strategy and chart overall control direction to help IS procurement process to achieve objectives. Here details about short, medium and long term process control strategy should be clearly spelled out. For example in the long run, 'very damaging' category of risk should be completely eliminated. Or the organization may specify residual risks (i.e., risks that remain after controls have been implemented) to be set at 30%, 20% and 10% for short term, medium term and long term scenarios. Organizations that plan and chart overall process control direction reached level 2 of the CM model.

Organizations should design overall IS procurement control policies and procedures that demonstrate an organization's commitment to the importance of control. Organizations must design a sophisticated process control environment that encourages open communication which relates to process weakness. For example creating a feedback forum or even regular workshops to inform about key changes in the IS procurement policies and procedures. Organizations that lack a sophisticated control environment have not yet reached level 3 of the CM model.

Organizations must embrace process control management tools and techniques that allow for detection of anomalies from the desired state of control. For example, tracked purchased software (copyright licenses), conduct internal control assessment (control matrix), conduct periodic control audits, engage IS purchasing process consultant, engage forensic specialists, and implement a fraud/bribery hotline. Rigorous detection of process flaws is the hallmark of level 4 organizations. Organizations that do not employ rigorous control techniques have not yet reached level 4 of the CM model.

Organizations must improve overall control conscious by placing a value on self-evaluation and developing mechanisms to encourage self-reflection. Experiential-based learning needs to be encouraged and facilitated so as to ensure learning from past

experiences takes place. Only in this way will organizations be able to learn from past experiences and prevent potential cases of control oversight from occurring. Organizations that have not diligently improved control conscious and embraced honest self-evaluations have not reached level 5 of the CM model.

Based on the above IS procurement process control maturity model, what is the control maturity level of PSO's IS procurement process? How high does PSO rate in its level of control maturity? What are the control mechanisms that are present or missing in PSO's IS procurement process? Is PSO prepared to minimize risks in it's IS procurement process?

SUMMARY

The potential disruption of IS procurement process due to the presence of process risks coupled with inadequate controls has negative impacts on organizations' operations and may even affect organizational objectives. This case highlights the specific risks that may be encountered in a public IS procurement process. There are many key issues to consider as PSO reviewed its IT procurement process. Does PSO understand the process risks in public IS procurement? Does PSO have the maturity to implement control mechanisms in order to mitigate its IS procurement process risks?

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