CHANGING THE PARADIGM

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ABSTRACT. Arizona State University has been studying a new procurement system paradigm. It utilizes deductive logic and the alignment of expertise rather than the traditional management, direction, and control. The best value Performance Information Procurement System (PIPS) has been under intensive testing for the past 18 years, with over 975 tests delivering over $4.7B of services. The results include 98% customer satisfaction, minimal project deviation due to vendors, minimized buyer transactions (up to 90%), increased value, reduced cost, and increased vendor profits (as much as 100%.) The process has shown to be very successful in protests, holds all parties accountable due to its transparency, and minimizes buyer contract administration by up to 90%.

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INTRODUCTION

The procurement and delivery of construction, IT, and professional services has proven to be challenging to the procurement community (Adrian, 2001; Peppard, 2006; Masing, 2009; Skulmoski and Hartman, 2010; Sullivan and Ngwenyama, 2005; Department of Defense, 2006; Hutton et. al., 2009; Christoff, 2005). It has resulted in transactions, project deviations, and customer dissatisfaction. Another result of the traditional procurement strategies is the formation of a new vendor silo: the sales and marketing silo. The respondents from vendors are now marketing and sales people who have very little technical expertise, which has negatively affected vendor pricing and performance (Kashiwagi et. al., 2009; Kashiwagi and Savicky, 2002; Sullivan, 2008; Kashiwagi, et. al., 2004; Goodridge, et. al., 2007).

The traditional procurement model has the following features:

1. The buyer uses the contract to control the vendor (Acumen, 2007; Arditi, 2005; Abi-Karam, 2006; Kashiwagi, 2007).
2. Buyer directing a vendor on the how, when, what, and where to deliver a service.
3. The buyer who has less expertise than an expert vendor offers a contract to a vendor who becomes the acceptor of the offer.
4. The buyer negotiates the price of the vendor down, thereby increasing everyone's risk (AGC 2005; ENR 1999; Emery 1995; Abi-Karam 2006; Murray 1993; ENR 2005; Hoff 2003)
5. The buyer uses subjective minimums standards to identify if the vendor meets the requirements of the contract (Acumen, 2007; Arditi, 2005; Abi-Karam, 2006; Kashiwagi, 2007).

The practices of management, control, and directing the vendor through a contract is the core of the traditional procurement system. This is troublesome because common sense and logic identify the following (Kashiwagi, 2009):

1. No entity has been able to control another entity to improve quality (White, 2010; Greer, 2009; Szalavitz, 2009; Langan & Levin, 2002). In many situations, vendors cannot even control their own personnel.
2. A non-expert buyer directing an expert always results in the expert becoming more reactive and forcing the non-expert buyer to mitigate the risk (Kashiwagi, 2012).
3. Once there is confusion over contractual terms, lawyers take over, and the researchers have not identified an instance where a buyer enforced the intent and expectation of the contract at no additional cost.

Once a contract must be read, the contracting agent and the project manager know they are in trouble. Even with their own lawyers being involved, contracting and project managers become very uncomfortable. Sooner or later, the lawyers will identify that the buyer did something that shouldn't have been done. Lawyers are not needed to identify that the buyer should not be directing a vendor on what to do. The results are never a "win-win." The best contract is one that never is read. Everyone will quickly realize that it is a "lose-lose" venture when the following has to be done:

1. Tell the expert what to do using subjective instructions.
2. Hire a non-expert who knows less than the buyer.
3. Give a vendor "incomplete" directions.
4. Assume that the buyer is the expert and is supposed to manage, direct and control the vendor (Egbu et. al., 2009 Goldratt and Cox, 1980).

PROBLEM

The use of a contract to manage, control, and direct a vendor is inefficient, illogical and time consuming. It has led to lawyers controlling the process, subjective standards, project deviations, and customer dissatisfaction. When a buyer acquires the services of a vendor, the buyer has the expectation that the vendor will be an expert.

PROPOSAL

The authors propose that the current procurement model is totally broken. The authors also propose that attempting to modify the current system is not an option. The procurement system must be rebuilt based on common sense and logic. The new system must be tested and refined.

METHODOLOGY

The methodology of this research is deductive in nature. Deductive logic will identify in the simplest terms, the requirements for delivering expert services in a competitive marketplace. Instead of having the objective of designing a perfect system to eliminate all the issues of the traditional procurement system, the methodology is to design the simplest system and identify if the problems with the traditional systems are still there. The system will be tested, and then modifications will be made. Based on deductive logic and common sense, most of the problems of the traditional procurement system are caused by the client making unreasonable requests (Hamel, 2007; Shugan, 2007; Einstein, 1919).

DEDUCTIVE LOGIC

The proposed assumptions defining the new procurement system include:

1. Decision making increases risk. Decision making will be minimized. Buyers making decisions is the biggest risk (Snijders, Tazelaar and Batenburg, 2003).
2. Using direction and control to minimize risk is not an efficient or accurate concept. Buyers directing and controlling vendors will be minimized (Kashiwagi and Kashiwagi, 2009; Egbu et. al., 2009 Goldratt and Cox, 1980).
3. The best value is the best value at the lowest cost. The best value is a "win-win." The buyer gets best value for the lowest cost, and the expert vendor makes a profit and pays their experts top salary (Deming, 1982).
4. Competing vendors must minimize their effort to win the project. An expert vendor in a competitive marketplace can deliver a higher quality service at a lower cost (Sullivan and Guo, 2009; Porter, 1985; Drucker, 2001).
5. The delivery environment has to be transparent, so that the identification of the best value and vendors incapable of performing becomes obvious (Feynman, 1994).
6. An expert vendor has no risk. An expert vendor can identify what to do and how to do it.
7. An expert vendor can identify their capability using dominant performance information.
8. An expert vendor should identify what is the project scope, cost, time and quality.
9. An expert vendor will identify ahead of time what is out of the scope of the project (risk) and how the risk that they do not

control will be mitigated so as to allow the expert vendor to perform (Porter, 1985; Drucker, 2001).

The biggest risk in the entire process is the buyer's procurement system. If the buyer could direct and control the vendor, all problems would have already disappeared. By observation, we identify that the problems are still there. The new process will do the following (Meyer, et. Al., 2010; Kashiwagi, 2010; Kashiwagi, 2012):

1. The buyer will identify what they think they want.
2. The vendors will compete to provide services to meet the buyer's intent.
3. The vendor's transactions will be minimized.
4. The decision making of the buyer will be minimized. The client is looking for the best value for the lowest cost. If the vendors do not have dominant or easy to recognize higher value, the buyer will pick the lowest cost vendor.
5. The vendor will have to identify why they can deliver the service, what service they will deliver and the risk that they cannot control that will impede their performance and how they will mitigate the risk.
6. The vendors will be prioritized.
7. The buyer will assure that that the vendor is not overpaid (causing political risk) or hired at an extremely low price causing project risk.
8. The best value will have to provide a detailed schedule which identifies the risk activities and how they will mitigate the risk as a part of the contract conditions. Only one vendor will be requested to do the detailed planning.
9. If the prioritized best value cannot see the project from beginning to end, the next best value will be given the opportunity, until a best value is identified.

10. The vendor will write the contract based on their delivery and service. The vendor is the offeror and the buyer accepts the offer.
11. The vendor will track and measure their performance.

PROPOSED PROCUREMENT SOLUTION

The proposed procurement system has three phases (Figure 1). The phases are selection, clarification of proposal, and the award of contract and risk mitigation. The selection phase has multiple competing offerors. The clarification phase handles one vendor at a time, starting with the highest performing vendor. All vendors except the best value vendor are released at contract award.

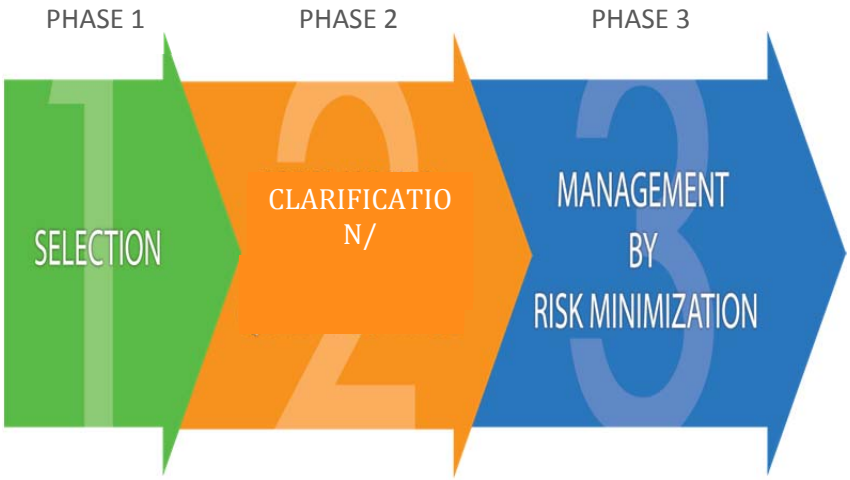

Figure 1: Performance Information Procurement System (PIPS) Phases (Kashiwagi, 2012; Kashiwagi, et. al., 2009)

Vendors are assumed to be experts and are at risk until they are identified and their offer is accepted by the buyer. Vendors can be eliminated before the selection starts due to being non-responsive to the process requirements or at the shortlisting where due to multiple vendors proposing, interviewing all the vendors may not be logical, especially if some are non-competitive after the first few submittals. Vendors can also be eliminated if they are not in the competitive range (too high a price or too low a price), or if a vendor's submittal contains inaccurate material. If a client or buyer has to make a decision, the vendor is probably not the best value vendor.

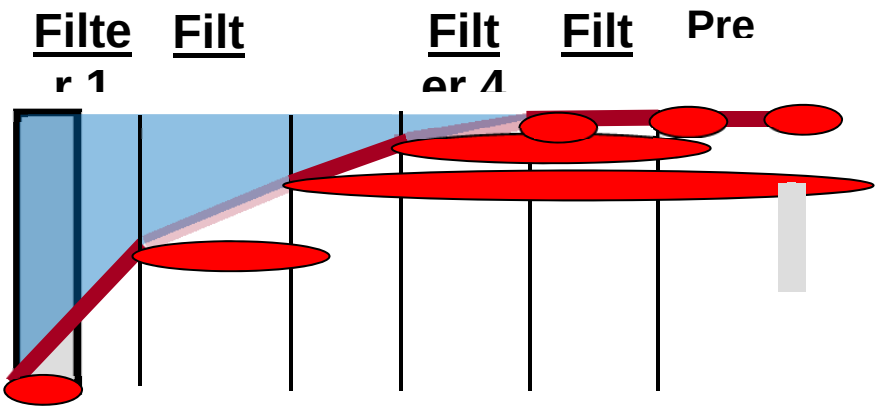

Figure 2: Selection Phase Filters (Kashiwagi, 2012)

The selection phase criteria are (weights in parenthesis showing potential importance):

1. Past performance information that is required on the vendor and the individual (10).

2. Project capability (20).
3. Risk assessment (15).
4. Value added (10).
5. Price (20).
6. Interview (25).

The price is already controlled by the budget and the competition. If the best value is over 5% over the next best value, it is deleted unless there is dominant information to show otherwise. If the best value is lower than 10% below the average price, the vendor is eliminated unless dominant information is in the proposal. Dominant information is when the information is simple, easy to understand, and motivates the buyer to act without extra justification.

The Selection Phase filters (Figure 2) work in unison to mitigate the chance of a non-performer getting the award. The key components of the best value approach are:

1. Project capability, risk assessment, and value added submittals are short (2 pages maximum) and contain claims and verifiable measurements to support the claims.
2. The rating system is "10", "5", and "1." If a decision has to be made, the rating is a "5." If the claim is high performance, and the verifiable performance metrics are submitted, the rating is a "10."
3. The vendor's key personnel must go through an interview and identify what they are going to do before they do it, how it is different and how they will mitigate risk that they do not control. The vendor's project manager's answers will be concise, short and clear.

The environment is transparent. Decisions will not be made. Time will not be spent to make decisions. Vendors who do not perform will be easily identified. After the selection phase, the clarification phase will ensure the vendor can perform.

CLARIFICATION PHASE

The highest prioritized best value that has made it through the selection phase and dominance check will enter the clarification phase. The vendor will clarify their proposal. The rationale is that only the vendor who is going to do the job should be required to do detail planning. The vendor will clarify their proposal with more details. The clarification will include:

1. What is in and what is out of the scope.
2. A detailed schedule that will include activities where there is not enough information or elements that are outside the control of the vendor.
3. How the risk will be mitigated.
4. How the vendor's performance of risk mitigation will be tracked.
5. A weekly risk report that will include a milestone schedule, documentation of all project deviations, the source of the deviations, and the solutions, a tracking of the cost deviations and a risk management plan to mitigate risk.
6. Answer any technical questions the buyer's subject matter experts (SME) may have.

The vendor will then put together the above information, the client's requirements, the client's legal contract requirements and any other documentation, and submit it as the vendor's offer. Once the buyer accepts the offer, the vendor must perform according to their contract, reporting weekly to the buyer. The vendor is responsible for

quality control and risk management, and the client is responsible for quality assurance (ensuring that the vendor has their risk management program and the project requirements are being met.)

TESTING OF THE NEW BEST VALUE PROCUREMENT

The new procurement system has been modified and perfected for 18 years (1994- present) on over 900 tests and delivering $4.7B of services, and has had 98% customer satisfaction and no vendor caused project deviations. The major test results were in the State of Hawaii, United Airlines, University of Minnesota, State of Oklahoma, the Netherlands and Malaysia. The results of the testing include the following (PBSRG, 2012; Kashiwagi, J., 2009):

1. The major source of project deviation is the buyer.
2. High performing vendors deliver services at a lower cost.
3. When decision making of the client is minimized, performance increases.
4. The amount of waste that is eliminated by minimized buyer decision making dwarfs the vendor's profit margin.

The transparency and measurement of project performance and deviation identify the client as the biggest source of risk and project deviations. It proposes that the buyer's delivery system was the problem and not the vendors.

ARIZONA STATE UNIVERSITY TEST RESULTS

Arizona State University started testing the best value PIPS in 2007 on a 10 year $400M food services purchase for Arizona State University. The winning vendor submitted an offer which was $32M more than the normal offer in the last 20 years. The university

followed up the test with procuring a sports marketing purchase, a purchase of IT networking services, long distance education, help desk services, document control services, and book store services. Off of the first three procurements, the savings to the university in cost reduction or cash payments was $100M over the first ten years. The cost savings was increased by the reduction of the number of university employees. The university learned the following lessons (Michael, et. al., 2008; Sullivan et. al, 2008; Kashiwagi, 2012):

1. They did not have to know what their exact requirements were when procuring. The vendors were the experts and identified the final scope of work.
2. The high performance vendors when given an opportunity, offered the university more value at a lower cost.
3. The need to manage, direct, and control the vendors was drastically minimized.
4. The major source of project deviations was the university.

Arizona State University procurement visionaries overcame their own bureaucracy by using the new best value procurement approach developed by professor Dean Kashiwagi, an engineering professor in the school of construction. They trusted in Kashiwagi and the best value approach even though he had no previous experience running the process in services outside of procuring construction services. Kashiwagi and his engineering group ran the procurements with no expertise in any of the service areas.

UNIVERSITY OF MINNESOTA AND OTHER MINNESOTA TEST RESULTS

Table 1 shows the results of the tests run by the University of Minnesota (UMN) and other clients in Minnesota (City of Rochester, Rochester Public Schools, Hennepin County, and Intermediate School

District 287). The tests showed the following (PBSRG, 2012; Sullivan, 2008):

1. The source of project deviations was due to the owner and designers.
2. 9.7 out of 10 customer satisfaction with the PIPS process
3. Construction contractors took time to transform themselves to the new paradigm of being proactive, measuring their performance, and mitigating risk that they did not control.
4. Traditional client engineering project managers were not used to minimize decision making.
5. Vendors doubled their profit margins.
6. Over 50% of the time, the project went to the lowest cost vendor.
7. Client project managers had their effort reduced by as much as 90%.

No	Performance Metrics	UMN	Rochester Public Schools	City of Rochester	ISD 287	Hennepin County
1	Total number of completed and in progress projects	253	18	4	3	1
2	Total awarded cost	$191.4	$18.03M	$29.1M	$29.5M	$0.53M
3	Average number of proposals per project	4	4	7	7	3
4	Percentage of awards where Best Value was the lowest price	55%	65%	50%	33%	0%

5	Average Contractor Change Order Rate	0%	0%	0%	0%	0%
6	Average Contractor Delay Rate	3%	0%	1.4%	0%	0%
7	Average Customer Satisfaction Rating (1-10)	9.5	10	N/A	N/A	N/A

Table 1: Minnesota Best Value Consortium Performance

Based on the results at the University of Minnesota, the State of Minnesota changed their procurement laws in 2007 to allow the use of best value as an alternative construction procurement methodology. One fact learned by the contractors in Minnesota was that when a visionary in a government organization retires, the substantiality of a best value effort within that bureaucracy is uncertain. The University's new management was not as open to the simplicity of best value PIPS, and the shift back to more owner control was not beneficial for the contractors' profit, professionalism, and performance. Contractors learned that they must take the best value system and make it their system, instead of depending on the government owners to understand the system. The contractors learned that owner control of projects led to a price based system which was detrimental to their future.

STATE OF OKLAHOMA TEST RESULTS

The state of Oklahoma started running best value PIPS in 2009. Unlike other agencies they ran tests in both construction and services. Their results are shown in Table 2. One of their strong points was that they used on technical experts on the government side. They depended solely on the vendors to identify the final scope, mitigate risk, and high performance. The state of Oklahoma became the most successful of the state and federal agencies due to the number of visionaries and their acceptance of the simplicity of the solution. The state of Oklahoma also changed their procurement law

for the delivery of construction based on the best value PIPS approach (PBSRG, 2012; Kashiwagi, 2011; Kashiwagi, 2012).

Oklahoma Best Value Project Information	
# of Best-Value Procurements	20
Esimated Value of Best-Value Procurements	$100M
Protest Success Rate (# of protest won/# of protests)	3/3
# of Different Services	13
% Where Identified Best-Value was Lowest Cost	71%
Construction Law Changed to allow Best Value PIPS	
Project Performance	
# of Competed Projects	8
Average Customer Satisfaction	9.5 (out of 10)
Cost Savings	$15M
% On-time	100%
% On-budget	100%

Table 2: State of Oklahoma Results

NETHERLAND TEST RESULTS

The Dutch were introduced to best value PIPS in 2004. It wasn't until 2006 that they first implemented. However, the Rijkswaterstaat, had the biggest impact when in 2009 they started a 16 project, 4 package, $B fast track project effort. The best value PIPS process was modified to fit European law. The results were outstanding as the projects were procured in half the time, the cost by both the client and vendors was 50% the normal, and the time for project completion was almost a year earlier than expected. The Rijkswaterstaat success led to the proliferation of best value PIPS. In 2011, NEVI, the professional industry contracting organization took on the task of educating and certifying practitioners of best value PIPS capability. The problem with the effort is that best value PIPS is a paradigm shift, and many of the practitioners were using the "buzzwords" but did not

change the paradigm (PBSRG, 2012, Kashiwagi, et. al., 2009; Kashiwagi, 2012).

CONCLUSIONS

Deductive logic and common sense identifies the traditional procurement system contains flaws that cannot be overcome. They include non-expert buyers directing expert vendors, attempting to control vendors through the use of a contract, client decision making and the use of subjective standards and requirements and not ensuring that the vendor knows what to do before being hired. A new best value Performance Information Procurement System (PIPS) has been developed that utilizes transparency, measurements, vendor submitted performance information, and vendor clarification before the award of the contract. Tests in the Netherlands, Malaysia, Arizona State University, and Minnesota show the new system is efficient, delivers a better value, allows higher profit margins but results in lower project cost.

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