Case Study: Best Value Procurement/Performance Information Procurement System Development

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Abstract

Paper Topic: Best Value Procurement/Performance Information Procurement System (BVP/PIPS) Development

Best Value Procurement/Performance Information Procurement System (BVP/PIPS) has been developed by Dean Kashiwagi and the Performance Based Studies Research Group (PBSRG) from 1991 - 2010. BVP/PIPS is a licensed technology from Arizona State University that includes a deductive logic called Information Measurement Theory (IMT), an industry structure model which shapes the PIPS functions, and a process and structure that transfers risk and control to expert vendors. The BVP/PIPS has gone through numerous stages: the performance information centered PIPS (1994-2001); the PIPS testing phase (2001-2005); and the implementation stage (2005-2009); and the theoretical refinement and standardization of BVP/PIPS technology (2010). BVP/PIPS was introduced into the Netherlands in 2005 by a large general contractor Heijmans, the Rijkeswaterstaat, and aggressively proliferated by Scenter and others. BVP/PIPS usage in the Netherlands is modified to fit within the European procurement law. However, the main advantage of PIPS is the IMT based philosophy of minimized management, direction, and control of expert vendors.

Introduction

Best Value Procurement/Performance Information Procurement System (BVP/PIPS) was developed and refined by Dean Kashiwagi and his staff at the Performance Based Studies Research Group (PBSRG) at Arizona State University (ASU) (Kashiwagi, 1991; Kashiwagi, 2010) Best value procurement is a process where both price and performance are considered instead of just price (CFMA's, 2006; Chan, 2004; Egan, 1998; PBSRG, 2010; Kashiwagi, 2010). BVP/PIPS is different from other best value processes due to the following:

1. Measures and documents the performance and project deviations.
2. Minimizes the client/buyer's management, direction, and control of the vendor/contractor.
3. Does not use the contract to manage, direct, and control the vendor.
4. Does not use negotiation of price.
5. Covers the supply chain delivery from the requirement stage to delivery of the service.
6. Does not require the buyer to identify what is being procured at the beginning of the procurement.
7. Requires the vendor to minimize risk that they do not control.
8. Requires the best value vendor to write the final contract and define the delivered product.
9. Vendors administer their own contract by the minimization of project cost and time deviations.
10. Forces the best value vendor to understand that they have full control of the project, and by so doing will manage and minimize the risk and project deviation that is outside of their control, even if caused by the client, or un-foreseen events in the environment.
11. Minimizes the need for technical decision making and expertise of the client's technical representatives.
12. Increases the importance of vendors to show dominant value using performance measurements of their key personnel and processes.
13. Does not require the selection committee to have technical expertise. All submittals are non-technical in nature, and technical questions are not asked or discussed until after the best value prioritization.
14. Minimizes the time and cost for vendors to prepare for the procurement process.
15. Minimizes the exchange of information and communications between the client and vendors during the selection phase.
16. Forces the client's project manager (PM) to be a quality assurance based PM, with non-technical duties.
17. Defines quality assurance as ensuring that the contractor/vendor is running their quality control/risk management system.
18. Transfers the technical risk and control to the best value vendor by using a process structure that forces the vendor to be an expert.
19. Forces the expert vendor to communicate to everyone in a simple, dominant, non-technical, language, using performance measurements that can easily be understood by a non-expert.
20. Measures the performance of the other entities in the supply chain that interface with the contractor.

BVP/PIPS has been tested over 700 times, delivering construction and other services worth over $2.3B (1994-2010.) The results of the BVP/PIPS tests have been (PBSRG, 2010; Kashiwagi, J., 2009):

1. 98% client satisfaction and no vendor caused cost deviation.
2. Minimized up to 90% of the client's risk and project management.
3. Vendors increased profits up to 100% without increasing the cost to the client.

BVP/PIPS is now being used to successfully deliver commodities, professional services, non-construction services, and Information Technology (IT) services (Sullivan, et. al., 2010; Adeyemi, et. al., 2009; Kashiwagi, J., et. al., 2009; Sullivan and Michael, 2008; Kashiwagi, et. al., 2008; Sullivan and Michael, 2008; Goodridge, et. al., 2007; Kruus, et. al., 2006; Kashiwagi and Savicky, 2004; Kashiwagi, et. al., 2003;).

Problems in the Delivery of Services

The successful delivery of construction and other services has been an issue for the last 20 years (Cahill and Puybaraud, 1994; Egan, 1998; Post, 1998; Adrian, 2001; Chan, and Chan, 2004; Flores, and Chase, 2005; CFMA's, 2006; Simonson, 2006; Lepatner, 2007). Despite technical advancements such as Building Information Management (BIM), LEAN practices, forward thinking scheduling/costing software, and design enhancements, the construction industry has continued to have performance issues. Interestingly, the performance issues are even worse in the IT industry, which is one of the most high tech industries (Brown, 2001; Natovich, 2003; Connolly, 2006; Kappelman, et. al., 2006; Lesca and Caron, 2008; Schneider, Lane and Bruton, 2009; Al-Ahmad, Al-Fagih, et. al., 2009; Computer Weekly, 2010).

Another area of service delivery, hospital services, also has performance issues, as one out of every four patients is infected by hospital personnel or unclean equipment (Grady, 2010).

The development of BVP/PIPS identified the delivery system of services as the problem and not the lack of technically qualified personnel (Meyer, Witt, Kashiwagi, J. 2010, Kashiwagi, D., 2010) Using a simple industry structure diagram (Figure 1), the following deductive observations were made:

1. Price based has lower performance because the party (client or client's representative) who knows less is giving directions to the party who is supposed to be an expert (vendor).
2. When minimum requirements (are subjectively created and requires interpretation to apply) are used in combination with low price awards, the quality will continually degrade and an adversarial relationship between the client and the vendor will be formed. The client wants low price and high value, and the vendor wants minimum performing systems.
3. When prices and quality decrease, client's management, direction, and control must increase.
4. When the client's management, direction, and control increases, performance and value will decrease, and cost will increase.

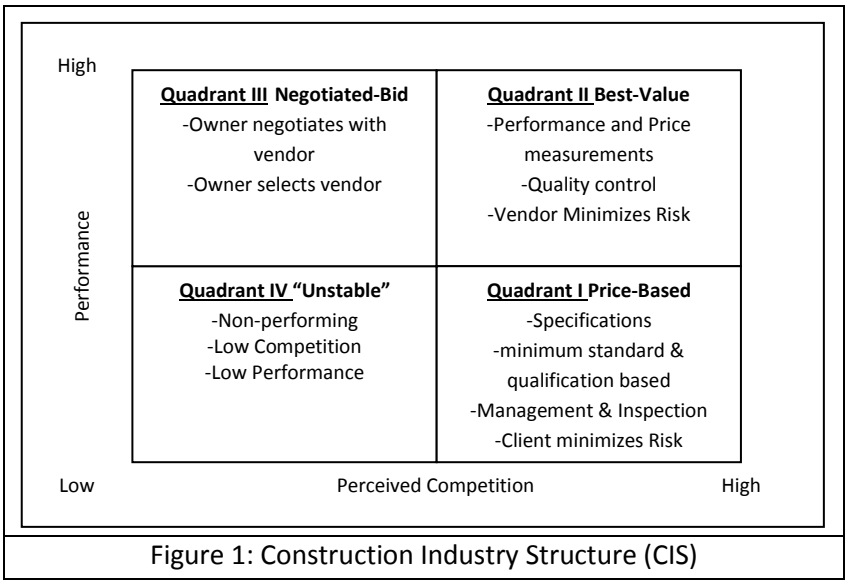

Figure 1: Construction Industry Structure (CIS)

Price based awards, which does not recognize or give credit to differences in vendor quality, value, and performance will motivate contractors to be more reactive, offer lower quality, not preplan nor utilize expertise. The price based system is nontransparent, requires more decision making which increases risk of deviations and expectations. To move from low performance to higher performance, efficiency must increase, and the following factors must be minimized: cost, management, direction, and control from the client. The level of vendor expertise must increase. An increase in performance will only come with increased vendor accountability, preplanning, measurement of performance, and quality and risk management. The best value environment identifies the contractor as an expert, and assigns quality control and risk management to the contractor. In the best value environment, the client's representative has a nontechnical quality assurance role of ensuring that the contractor has a quality control/risk management system that is being used to minimize deviations.

The above description of the best value quadrant is a deductive argument that is dominant and utilizes common sense. The design of the BVP/PIPS structure is based on the following deductive logic:

1. Expert vendors have less risk and can deliver quality at a lower price.
2. It is impossible to control a vendor, and any attempt to do so will lead to additional transactions, decision making, increased risk and cost, and less value and quality.
3. Expert vendors have very little technical risk and the risk that they do not control is their only risk.
4. Expert vendors attempt to manage and minimize the risk that they do not control, because it maximizes their profit.
5. Expert vendors preplan, and have proactive risk management systems that manage their risk before it happens.
6. The best value is the best value for the lowest price.

The BVP/PIPS process has been refined over the last 16 years. The method of refinement has been (Kashiwagi, D., Savicky et. al., 2003; Kashiwagi, D., Sullivan, et. al., 2008; Sullivan and Michael, 2008; Sullivan and Michael, 2008; Goodridge, Sullivan, et. al., 2007; Adeyemi, Kashiwagi, D., et. al., 2009; Kashiwagi, D., 2010; Sullivan, Kashiwagi, et. al., 2010):

1. To identify an owner/buyer who wants to increase their value and decrease their risk, cost and transactions on a delivered service.
2. Use the hypothesis of the deductive logic described in the previous paragraph. The goal of the tests are to minimize client management and transactions, to help the client do more with less, measure vendor performance and cost and deviations, and identify the source of any deviations.
3. Run a procurement test, using the "latest" BVP/PIPS structure.
4. Document the source of all project deviations.
5. Analyze the test results. Identify problems that could be further minimized improvements to the PIPS structure.
6. Make the modifications in the BVP/PIPS system, and run another test.

What differentiates the research philosophy of PBSRG and the BVP/PIPS from traditional construction management research are the following factors:

1. PBSRG runs tests on PIPS. Buyers of construction and other services fund PBSRG to run the tests to deliver their required services. Over 16 years, PBSRG has run over 700 tests delivering over $2.5B of services.
2. PBSRG is using deductive logic (observations,) common sense, and dominant information, instead of inductive logic (exploratory work and the heavy dependency/use of industry expert opinion.)
3. The peer review for validity of research comes from dominant test results (no vendor caused deviations and client satisfaction) and continuing industry demand for the research (more interested owners/clients who want higher service performance,) instead of subjective peer review of other academic researchers. If the developed concepts are wrong, and if the hypothetical proposal to minimize transactions, lower cost, and increase vendor profits is not dominantly proven, the industry will discontinue their funding of the best value PIPS research. The funding of this research is always provided by an industry partners who are at risk, who are funding the research test through their own operational budget that places the industry partner at risk if PIPS does not work.
4. PBSRG runs simultaneous basic theoretical research, prototype testing, and implementation testing, minimizing the time to see results, and having quick access to hypothesis and test results.
5. The testing is run in a synergistic method, where multiple research clients are given access to each other's results.
6. Although the system is being refined, changes are not encouraged unless there is dominant improvement to the service value or increased sustainability of the visionary's position.
7. Value is measured in terms of customer satisfaction, project deviations, and the project management/risk management effort.

Traditional construction management academic research funding does not have access to owners/buyers who are willing to turn over their delivery of services to academic researchers. PBSRG uses the deductive and dominant logic of PIPS to convince owners/buyers to adopt the PIPS system, and to become partners in the development of the process. PBSRG and their research partners continually review the theoretical basic concepts, the unique project, and implementation and sustainability of the system.

Major Components of the PIPS Research

The BVP/PIPS structural development and refinement has had five major components:

1. Information Measurement Theory (IMT) The deductive logic that defines why things can happen only one way, why they are predictable, and how that can be used to predict the capability of experts. Major components of IMT include the concepts of the explanation of variation, chance, randomness, management vs. leadership, influence, control, and the issue of nature vs. nurture.
2. Kashiwagi Solution Model (KSM.) The KSM is a part of IMT, but because it is plays such a major part of PIPS, it is being highlighted as a major component. The KSM is a deductive representation of the extreme opposite of a "Type A" or visionary person and a "Type C" or management based person. The deductive extremes are “dominant” observations (simple and easy to observe, which minimizes the need for different individuals to make decisions.) Based on the results of KSM analysis, the following concepts were developed: experts are able to simplify seemingly complex technical issues and processes by using simple, non-technical explanations, and use dominant information which is easily understood by other less expert people. This led to minimized need of client/buyer decision making, and minimized flow of information.
3. Construction Industry Structure (CIS) Analysis (Figure 1) The CIS explanation of why PIPS has dominant value, and why the majority of project/risk management concepts are not accurate or efficient.
4. Performance Information Procurement System (PIPS.) The actual delivery structure for optimization of the supply chain and the alignment of resources to minimize management, direction and control, and increase accountability, transparency, and value.
5. Performance Information Risk Management System (PIRMS.) When the selection/award phase of PIPS is not used, and only the last risk management phase is utilized, the system is called PIRMS. It includes the weekly risk report (WRR), the risk management plan (RMP), and the Director’s Report (DR) which integrates and simplifies multiple project risk information into a dominant risk report.

The IMT concepts have changed the least. From its inception, the concepts have maintained their essence. PBSRG is continually researching potential flaws in the IMT by looking at current events and analyzing them for inconsistency with IMT. This includes the areas of genetics, psychology and psychiatry, political systems including results of war, penal systems, and attempts to control the behavior of people, and dominant performers in their respective areas.

The major IMT concepts that form the underlying structure of PIPS include:

1. Everything is predictable given all information.
2. All events happen only one way, have only one outcome, and can be predicted if someone has all the information on the initial conditions or start of the event.
3. The concept that one individual or party can influence, control, or change another individual or entity has not been dominantly proven, and the attempt to use influence or control results in transactions, unmet expectations, actions that are not timely and are not logical, and usually result in higher time and cost deviations.
4. Experts can predict the future outcome, explain it very simply, preplan the project to minimize technical and non-technical risk that they do not control, minimize cost and optimizing profit by efficiently doing the process.

IMT concepts have been tested by the author for the past 37 years in his personal life and in the leading of his family, which included his wife and eight children. IMT was first extensively tested out in the Kashiwagi family before it was implemented in the BVP/PIPS process. The KSM model were created to teach the eight children consistency, and to make it simple and clear for the Kashiwagi children to understand reality, even if they had minimal experiences to draw from. It was to provide a "dominant" platform that they could use successfully with a limited amount of information and decision making.

The construction industry structure (CIS) was first created in 1991, as a part of the author's PhD dissertation (Kashiwagi, 1991). There have been three major additions/changes to the understanding of the CIS:

1. Understanding that the CIS applied to all industries (2007.)
2. Merging of the Kashiwagi Solution Model (KSM) concept to the CIS (2008/2009) to make the teaching of BVP/PIPS quicker.
3. Changing of the "competition" horizontal axis label to "perceived competition" (2010)

In 2007, ASU utilized PBSRG and PIPS to deliver their ten year $400M food services contract. It then ran in succession the delivery of their sports marketing contract and their IT networking services. The financial difference between the traditional delivery and optimizing the supply chain was $100M over a ten year period.

As the food services and the IT networking services were being delivered at ASU, the characteristics of the CIS were clearly seen in the operations of the services. It was immediately identified that the services had been incubated in the price based environment for so long, that their organizations had the same price based characteristics and bureaucracy as the construction contractors. Every service had to overcome an absence of meaningful performance measurements, develop a risk management system which measured time and cost deviations, minimize the use of relationships to resolve issues, and minimize the normal transactions of a non-transparent, bureaucratic environment.

In 2010, a seemingly innocuous change was made to the CIS. The horizontal axis showing "competition" from low to high was changed to "perceived competition." The diagram (Figure 1) showed equal competition in both the price based and best value environments. Using observations of the price based environment, it was dominantly perceived by the authors that the low price competitors did not increase the competition to provide greater value. In the low bid environment, general contractors received subcontractor bids up to the very last moment. General contractors never know until after the award, if their bid could actually do the project for the submitted price. The objective of all contractors was to be the low price, regardless of the actual scope of the work. Deductively, there is much more competition in a best value environment where the competition is among more competitive alternatives who all understand before the proposals are submitted that they can do the project for the submitted price. In a price based environment, the low bidder's price may be the only similarity between the high performer and the low performer. In essence, without transparency, a low bidding contractor, regardless of quality, can “seem competitive” in the price based environment, where price is the only differentiator. The horizontal axis label was changed to "perceived competition" because the price based owners perceived they were getting a high level of competition. In essence, the price based owner is motivating the vendors to collude, which is the opposite of competition.

The BVP/PIPS system is the application of IMT, KSM, and Industry Structure on the delivery of services. It was first designed in 1992 and constantly refined based on the results of the testing and understanding of the philosophy and thinking of the research clients. It has gone through the following major phases:

1. The performance information centered PIPS (1994-2001)
2. The PIPS testing phase (2001-2005)
3. The implementation stage (2005-2009)
4. The theoretical refinement and standardization of BVP/PIPS technology (2010)

In each phase, major lessons were learned, resulting in modifications to the PIPS structure. The major objectives of the BVP/PIPS system remained constant:

1. Minimize transactions and cost and maximize efficiency value.
2. Transfer risk and control to experts (who have no risk.)
3. Increase the performance, profit, and quality of expert vendors by use of best value PIPS (preplan, use experts, manage and minimize the risk that the vendor does not control, and manage and minimize deviations.)

Performance Information Centered PIPS (1994-1999)

The initial PIPS was tested on the acquisition of facility systems (roofing, painting, flooring, janitorial and landscaping service etc...or a combination of systems.) Most of the tests were delivering retrofit or replacement roofing systems. The major clients were private companies in the Phoenix Metropolitan area (Intel, Motorola, IBM, Honeywell, McDonnell Douglas, and International Rectifier) the State of Hawaii, the University of Hawaii, and the State of Hawaii Department of Transportation, the State of Utah, United Airlines in San Francisco, and the Federal Aviation Administration (FAA.) A few large projects were delivered for the State of Utah, but the PIPS system was not as well developed at that time to handle the larger projects. The researchers depended much more on the IMT/KSM concepts to set an environment of expected performance and value.

During this period, the PIPS system concentrated on past performance and used a multi-criteria decision making tool called the Displaced Ideal Model (DIM) to prioritize the best value vendor (Zeleny, 1984). The major effort was to differentiate between high performers and low performers using past performance information. The past performance information was:

1. Defined for every different technical entity.
2. Approximately 50 different performance areas.
3. Required from 25 to 50 references on each vendor, plus additional references on the key individual.
4. Collected by the client or PBSRG from submitted reference lists provided by the vendors.

The majority of effort in running PIPS at this time went into data collection (75% of all expended man hours). The explanation of the DIM also took a substantial amount of time. The construction industry (designs and contractors) had never measured their performance in terms of customer satisfaction, performance, and service periods. A risk assessment value added (RAVA) submittal and an interview of key personnel was also rated, however, the rating system and documents was not well defined. The pre-award period was also not well defined or adhered to. It was mainly used by the contractors to form a relationship with the client to iron out any misunderstandings of their proposal.

The industry viewed the best value PIPS system as a method which held vendors accountable through past performance measurements and prioritization through the Displaced Ideal Model (DIM.) Their lack of comfort with both of these mechanisms identified the political risk to the BVP/PIPS system. The political resistance in the public sector was fierce due to public law allowing lower performing vendors to protests for almost any reason. Low performers questioned the issue of fairness of award using performance information and their perception of the selection committee's subjective decision making (Hawaii court case.) This problem is phased out later with the use of "dominant" rating system.

The success of PIPS in the early stages of testing was based on:

1. The high performing vendors desire to change the delivery of construction from a price based, minimum standard system, to a system where performance and value made a difference.
2. The commitment of the owners/buyers who knew that the old system was broken, and wanted to change the paradigm.
3. The prequalification of the vendors by past performance information and creating an environment that if the contractor did not perform, it would be difficult to get future work. .

The drawbacks of the system in the early stages included:

1. The inordinate amount of time spent collecting, compiling, and analyzing performance information.
2. As the amount of information collected increased, the amount of confusion and questioning also increased.
3. The difficulty of the industry understanding the MCDM DIM and the theory of the value of information. Contractors in both the states of Hawaii and Utah challenged the use of the DIM. They saw it as a black box that they had no way to challenge awards.
4. The political pressure put on the system by low performing vendors who previously through marketing and relationships received a large percentage of the government projects, and now were not receiving work or identified as a relatively lower performer.

The authors realized during this period that the greatest risk to the PIPS system was political risk. In both the State of Utah and the State of Hawaii, the PIPS system became political issues. Once the issue became political, the political system exponentially increased the complexity of the information. Both states discontinued the use of PIPS due to the difficulty in maintaining and explaining an updated performance information system and the MCDM DIM, and the change of paradigm. To improve the system, the following changes were made in BVP/PIPS:

1. A linear matrix which used multiplication, division (normalization), and addition replaced the MCDM DIM as the prioritization tool. Total number of points could also be used. As seen in both Hawaii and Utah, multi-criteria decision making tools (DIM, AHP, and ANP) have very little probability of success cannot be used in sustained procurement of services. They are too complicated and will not be able to withstand the political pressures of actual procurement. Until proven otherwise in actual case studies, MCDM tools in procurement belong in the academic arena and cannot be used in procurement processes.
2. An analysis was performed on the performance information, and it was determined that only eight criteria were instrumental in the outcome of the selection. The performance information was minimized from over 50 to the eight criteria, and the practice of having different surveys for different services also ended (Kashiwagi, D.T., Savicky, J. et. al., 2003).
3. The system was also redefined to make the performance information the least important criteria in the selection, and to make the interview and the RAVA the most important (Kashiwagi, 2010).

In subsequent periods of development, the responsibility of updating performance information was given to the vendors. It is the vendors who should know who are their best performers, and send their best performers to the clients who run BVP/PIPS. If vendors kept performance information on their project managers and subcontractors, the transparency of the system would identify and align performance based teams, increase efficiency, accountability, and performance.

PIPS Testing Phase (1999-2005)

From 1999 -2005, PBSRG worked with owners who were interested in testing PIPS to identify the source of problems in their delivery system, but not necessarily implementing the paradigm change or PIPS into their delivery process. Clients included the State of Georgia, Schering Plough, Entergy, State of Arizona Parks, Raytheon, New York Port Authority, the Federal Aviation Administration (FAA) and General Dynamics. Many of these buyers of construction services (who partnered as research clients with PBSRG) wanted projects with no deviations and high performance, but were not willing to minimize subjective decision making, direction and control, and management. These clients by running tests, provided case studies that validated the IMT/KSM, that the client and their bureaucratic actions were the main source of deviations.

State of Utah

The State of Utah visionary Rich Byfield, the Director of Facility/Construction Management, ran five projects totaling $180K (Kashiwagi, 2010). These projects were the first large projects delivered using PIPS. Up this time only systems, maintenance and repair, and renovation projects were delivered using PIPS. It included the dormitory construction for the 2002 Winter Olympics, a large Physical Education facility at the University of Southern Utah, an educational facility addition at Draper, Utah, and a number of correctional facilities. The major deviation from BVP/PIPS in the Utah projects was the pre-award period was not used. Also at that time, the concept of transferring risk and control to the vendor using the WRR and RMP was not well developed. However, the projects were on time, on budget, and had 98% customer satisfaction. Rich Byfield, realized that without BVP/PIPS, the projects would never have been delivered on time. (Kashiwag and Byfield, 2002; Byfield and Kashiwagi, 2002; Kashiwagi and Byfield, 2001). Despite the very successful results, not all vendors, designers, and state personnel were happy. BVP/PIPS was non-biased, fully competitive, and required expert vendor project managers and site superintendents. Many of the more well established contractors who normally did the construction work were upset that other contractors were awarded projects. They wanted more government decision making into the process. Before the test PIPS projects were completed, these contractors worked with the State Building Board to change the BVP/PIPS system to a "Value Based Procurement" which used more subjectivity, stopped the practice of having “blind” ratings, and rely more on the relationship between the state personnel and the contractors (Kashiwag and Byfield, 2002; Byfield and Kashiwagi, 2002; Kashiwagi and Byfield, 2001). Over the next ten years, the State of Utah drifted back into a less competitive, relationship based procurement. Recently, when given the updated presentation on PIPS, the procurement director of the State of Utah bemoaned, “The State of Utah took best value to a lower level, while others have refined PIPS to a higher level (Beers, 2010).”

State of Georgia

The state of Georgia ran two PIPS tests in 1999. Two projects estimated at $65K were delivered at $75M. In both cases, the projects came in over budget, and PIPS was blamed for increasing costs due to high performance. In one case, the delivering of a $45M wet laboratory system, received bids for $52M, $54M, and $56M. The PIPS system was blamed for inflating costs, and the project was delivered using low price. However, after analyzing the contractors' proposals, it was identified by the state that the architect was at least $5M off, and the project was overdesigned. After minimizing the scope by over $5M, the state used the low bid award system to award to the contractor. Even after de-scoping the project ($4.5M scope removed), the project was still $1M over, and the general contractor charged the state another $2M in change orders, and took over two years more to finish the fast track project. The irony is that the low bid contractor could not commission the complicated mechanical systems for the wet laboratory facility. As a result, the state fired the general contractor, and hired a specialty mechanical contractor to come in and commission the mechanical systems so that the building would serve its intended purpose. The state of Georgia projects resulted in the following lessons learned:

1. Best value, expert contractors do not cost more than low bid awarded contractors.
2. Low bid contractors do not deliver value.
3. Architects do not scope and cost projects well.
4. Best value PIPS provides transparency and high performance.

Schering Plough (SP)

Schering Plough discovered PBSRG and PIPS in 2004. They used PIPS to procure facility services (laundry, landscaping, and scales and measurements). They discovered the following:

1. Larger, and more established services did not necessarily increase value and reduce cost.
2. Higher costing services did not always offer higher value.
3. Directing vendors on what to do, made vendors more reactive, and minimized their level of service.

Service	Annual Savings	Monthly Savings
Bottle Watered	$48,000	$4,000
Calibration Admin Support	$160,000	$13,333
Calibration Services	$1,404,000	$117,000
Calibration Transition Support	$160,000	$13,333
Elevators	$277,000	$23,083
Laundry Services	$792,000	$63,000
Overhead Door Services	$17,000	$1,417
Pest Control	$19,000	$1,583
Insulation Services	$133,000	$11,083
Plant Water Treatment	$22,449	$1,871
Scales & Balances	$225,000	$18,750
Storeroom Management	$30,000	$2,500
Sterilizers/lab Washers	$10,100	$842
Table Top Water systems	$68,354	$5,696
Total:	$3,437,903	$286,492

Table 1. Project Savings Analysis

In Table 1 & 2 it shows Schering Plough reduced their cost of 11 major services by 50%, while increasing the value of those services. A major stumbling block within SP was the inability of procurement to change the "leverage low price concept" with the "alignment of best value" principle (Kashiwagi, 2010).

Client Satisfaction of PIPS process	8
Traditional Process Client Satisfaction	5
Average Customer Satisfaction of Outsourced Services	9
*On a scale from 1-10 (10 being satisfied and 1 being unsatisfied)	

Table 2. Best Value Comparison to Traditional System Satisfaction Rating

Entergy

Entergy was interested in how PIPS could assist project management, minimizing construction cost and time deviations, and using previously black listed, low cost contractors. Entergy ran five projects with the following results (Kashiwagi, 2010):

1. Projects could be run successfully with the weekly risk report (WRR)/risk management plan (RMP) with a project manager tracking the projects remotely from Arizona State University (ASU.)
2. Higher performing contractors were faster and cheaper than some of their longtime contractors.
3. High performance contractors were in their local area.
4. Higher performance contractors minimized cost by up to 50% on two of the test projects.
5. Previously blackballed contractor was allowed to compete, won the selection based on a very low price, and did a perfect job in the new BVP/PIPS environment. When shifted back to a more traditional managed environment, the same contractor could not deliver, and Entergy was forced to pay another contractor to do the unfinished work.
6. On all successful BVP/PIPS projects the construction managers were not present during the projects.

Overall analysis of projects (After 9 months) (Kashiwagi, 2010):

1. Total # of projects (Procured/Awarded): 6
2. # of times Best Value was lowest price: 83%
3. Total # of projects completed: 2
    a. 100% Satisfaction
    b. 0% Change order rate
    c. 0% Delay rate

Although the test program with Entergy lasted only a year and dealt with modification and repair projects, the test results were significant. Entergy learned that the PIPS system had the potential to successfully replace the management, direction, and control of their project managers, deliver successful construction at much lower costs in an area which was "perceived" as lacking performing contractors in a time of high demand (Katrina hurricane damaged area), and take a "confirmed" poor performing contractor and have the PIPS structure assist the contractor to become a best value contractor, delivering high quality at a low cost (Kashiwagi, 2010) These results did make some of the Entergy and project management personnel nervous as the PIPS results ran counter to the project managers claims that the contractors were to blame for previous project deviations.

NO	CRITERIA	UNIT	Previous Process Ratings	Best Value Process Ratings	Difference
1	Measures risk before the project begins	(1-10)	3.9	7.9	**4.0**
2	Process selects a performing contractor	(1-10)	5.4	8.3	**2.9**
3	The amount of time spent doing administrative duties for a project	%	27.50%	29.83%	**2.33%**
4	Documents project performance (amount of risk, cost, schedule, etc.)	(1-10)	4.7	8.2	**3.5**
5	Minimizes need to manage contractor	(1-10)	5.0	7.4	**2.4**
6	The amount of pre-planning, risk minimizing, and value added by the vendor, before contract award	(1-10)	4.3	8.1	**3.8**
7	Requires contractor to minimize risk that they do not control	(1-10)	3.6	8.1	**4.5**
8	The amount of time required to supervise the contractor	%	48%	31%	**-17.0%**
9	The amount of decision making that is needed on a project	(1-10)	7.9	4.4	**-3.4**
10	Selects contractor that provides most value to Entergy	(1-10)	4.8	8.7	**3.9**
11	The process documents performance measurements, which create accountability for all parties involved.	(1-10)	4.9	8.4	**3.5**
12	Requires a schedule at the beginning of projects, assigning accountability.	(1-10)	6.2	8.6	**2.4**

Table 3. Entergy Facility Management Group Results (2007)

Projects in the State of Arizona

The State of Arizona Parks ran PIPS on projects to modify and refurbish, and upgrade state historical sites/facilities. A significant lesson learned happened in one of the projects where the client's negotiating representatives rejected the best value submitter because the vendor would not arbitrarily reduce their price. When notified that the state's budget did not cover their proposal, the vendor proposed to:

1. Minimize some of their scope.
2. Use a less qualified site superintendent/project manager who was closer to their site.

The state representatives attempted to force the vendor to reduce their price, and the vendor refused. The state representatives, acknowledged that they were the best value, but believed they could get more from the next best value vendor. This was highly discouraged by the PBSRG best value team. The State rejected the best value contractor and it went to the second best value. The State ended up paying more for the second prioritized vendor for less construction services. After completion of the project, the state representative said that they would not repeat the mistake.

Raytheon is a defense contractor with a large facility site in Tucson, AZ. They wanted to build a state of the art, food services cafeteria for $3M. They contracted with PBSRG to assist in implementing BVP/PIPS to deliver a fully designed cafeteria. The process narrowed the number of contractors to two, and both contractors identified that the budget was far exceeded by the requirements. As a part of the BVP/PIPS process, the contractors brought in their cost estimators, and using dominant, verifiable cost information, they established a baseline cost for the facility structure. They then proceeded to identify the largest costing items that caused the project cost to be exceeded by over 100%. The BV vendor identified all major sources of price deviation and proposed to the client that they could:

1. Reduce the scope and still have a functional cafeteria.
2. Build the facility shell, and later come in and build the facility out.

The client refused. Instead they minimized the scope, and attempted to use a low bid award instead of BVP PIPS. Upon finding that they were still way over their $3M budget, they decided to just build the shell and install hardscape/landscape. They went low bid, and hired a lower costing contractor. At the end of the project, the cost of the low bid contractor was more than the best value contractor's price proposed a year earlier. The client had more transactions and cost and time deviations.

Lessons learned:

1. Architects are not good at scoping and cost estimating.
2. A win/lose environment where the client wins and the vendors lose is inaccurate view of reality.
3. Low bid pricing and construction management cannot deliver construction at a lower cost than high performers who know what they are doing.

<u>Baptist Health South Florida in Miami, Florida</u>

Baptist Health South Florida (BHSF) asked two main questions. First, could BVP/PIPS work in the complicated, highly technical, and highly political health care arena, and secondly, could contractors in South Florida, who are not the most sophisticated, work the WRR and RMP to successfully deliver construction work in their organization. Two small renovation test projects were conducted. In both cases the projects were on time, and on budget, with no contractor generated deviations. In both cases the only sources of deviation was the designers and the hospital project managers. The contractors were meticulous in documenting the sources of deviation and how to minimize the deviations.

The PBSRG project manager was called in numerous times to explain how to resolve perceived contractor issues. In each case, the contractors clearly documented how the BHSF PM had made decisions, attempted to direct the contractor, and in every case, ended up causing confusion and time and cost deviations. At the conclusion of the second project, it was dominantly documented that the weak link of the BHSF construction delivery process was the designers and the BHSF's own project managers. It was also identified that the two contractors who did the projects were the most expert in using the WRR and RMP tools in the testing of PIPS. However, the manager of BHSF could not fit the very efficient and effective BVP/PIPS process into their BHSF environment. It was the lack of understanding of the BHSF project management personnel that stopped the BHSF testing.

Federal Aviation Administration (FAA)

The FAA attempted to establish BVP PIPS twice: the first time in 1996-98 to deliver storm damage repair renovations within the year of project awards, and the second time in 2003-2005 to deliver larger projects. The first test was successful due to visionary project management, but unsuccessful due to bureaucratic procurement personnel. The FAA Western Region used BVP/PIPS to do modification and repair work to storm damaged aircraft towers, FAA buildings, and roads to FAA sites in mountainous areas. The minimization of direction and control over vendors, resulted in vendors using their expertise to upgrade the damaged FAA facilities. Over a three year period of time, the FAA Western Region was able to obligate all funded work and had 100% customer satisfaction. Normal delivery was only 30% of funded repairs, and many of the repairs were substandard. The FAA operational personnel were very happy with the results and getting their damaged facilities repaired. However, the procurement personnel stopped the BVP/PIPS process because their workload increased (by 300%.) Instead of changing some of their bureaucratic practices and helping the operational personnel, they refused to change their paradigm and stopped all use of BVP PIPS. One of the practices which was identified as not needed, was the procurement officers wanted to be on every site for every meeting. With sites in Hawaii, Guam, and all over California, they proposed that they needed more administrative help, and when they did not get any help, they stopped the support of the BVP/PIPS. Interestingly, the number of contractor driven change orders almost completely disappeared with the use of BVP PIPS.

The FAA came back to PBSRG/ASU four years later, and tried to implement BVP/PIPS again, this time on larger construction projects (2003-2005.) However, due to the loss of the visionary at the head of construction, the bureaucracy and traditional FAA project management tried to dictate the running of BVP PIPS. The FAA project manager stopped the program three years later, frustrated with the inability to overcome the FAA bureaucracy. Lessons learned from testing the BVP/PIPS process during this period:

1. The major cause of project deviation was the client, the client's designers, and inaccurate expectations.
2. The owner's bureaucracy, owner's project management, direction, and control of contractors is the major cause of project deviation and failure.

3. The BVP/PIPS system is robust, and can override the client's bureaucracy, but is not sustainable over time without a core group of "visionary "personnel who are highly trained and who have control over the project.
4. Owner visionaries in leadership positions and in operational positions is required for sustainability of best value PIPS in a bureaucratic organization.
5. BVP/PIPS is a bottoms up process and not top down. Without visionaries at the top and the project management level, and with the support of procurement, the system is not sustainable.
6. High performance vendors minimize risk, not the owner's procurement or project management personnel. The paradigm shift is that the high performance vendor will manage and minimize the risk that they do not control, thus helping the client to be accountable and successful.
7. The risk management plan and the weekly risk report are the mechanism of the contractor that brings transparency and accountability to the owner. It also helps "blind" vendors preplan and be successful. The risk management capability is shifted from people to a PIPS structure.
8. PBSRG has conducted testing in every major part of the country, and have not found a location which does not have best value contractors. In the case of "perceived" poor performance, the PIPS system has the capability to help the poor performer perform.
9. There is need to minimize the transactions in educating clients and vendors. The education seems to have minimal impact on the clients as they move through the process. This requires a PBSRG expert to ensure that the process is being followed. As more and more owners learn about PIPS, better documentation is required.
10. The management of the performance data of vendors continues to be a cumbersome task, a major cost, and a major source of risk to the owner. This part of the BVP/PIPS is the least important in selection, and takes up inordinate time for clients tracking the performance information of vendors. Regardless of how simple the task, it is an area that due to the complexity of capturing, using, and maintaining the information creates a major transaction. The use of performance information must be simple, effective, and motivate contractors to measure their own key personnel, projects, and subcontractors. The use of performance information must be made simpler, and contractors must be required to keep and use the performance information.

PIPS Development 2005-2009

In the previous testing period, dominant documentation showed that:

1. The client's organization and technical/procurement personnel was the number one source of risk to project success. The "perceived" risk caused by best value contractors by client's personnel is not justified. The reactive transactions are wasteful, and become detrimental to the project performance.
2. The largest source of project deviations were caused by the owner/buyer's management, direction and control (technical expertise, decision making, and attempted control of the contractor.) The greatest obstacle to the successful implementation of PIPS was the owner/buyer's organization, culture, and technical experts. The authors recommend disabling the expertise.

3. The identification of visionaries within the owner's organization who were willing to change the paradigm and use logic and common sense is the greatest requirement to successfully implement and sustain PIPS.

There were three major challenges in doing this:

1. IMT expertise and people experience. The requirement of the PBSRG staff was shifted from running a simple PIPS structure/process to being a leader who could identify visionaries; identify their level of understanding of Information Measurement Theory (IMT), and developing the visionaries to become efficient and effective in utilizing IMT principles. This is far more difficult than running a simplistic PIPS process/structure.
2. Theoretical change in selection process. Develop and modify the PIPS process to force the owner to minimize the use of the client's technical expertise and force the contractors to use their project/risk management skills instead of their technical expertise to differentiate themselves. This requires a mechanism to stop client decision making which requires technical expertise.
3. Use of dominant information that minimized the need of technical information. The movement of the effort to get the owner/buyer and contractors to change from a technical approach to a non-technical approach. The PIPS process approach must be changed to emphasize the logic of IMT and the PIPS structure to replace the dependence on technical expertise.

During this period the emphasis changed from testing PIPS to testing if best value PIPS was sustainable in organizations. The major clients were the City of Peoria, the University of Minnesota, the U.S. Army Medical Command, the State of Idaho, the State of Oklahoma, the Dutch national infrastructure agency, Rijkeswaterstaat, and Arizona State University. PIPS testing underwent the following advancements:

1. The first test of sustainability of the process was done with the University of Minnesota. It has been ongoing for five years.
2. The first test of using the risk management system, the Performance Information Risk Management System (PIRMS) to transfer the risk to the vendors and measure the level of risk of projects independent of the selection and award process.
3. The first testing that was directed from a procurement office, Arizona State University and the State of Idaho, and not from a construction oriented group.
4. The first use of the BVP PIPS system to deliver non-construction systems and services.
5. The first major efforts outside of the United States, in the Netherlands, Botswana, and Malaysia.
6. The first adoption of the BVP PIPS technology to shape the operations of a vendor (Global Engineering Inc. and Brunsfield.)

<u>Sustainability of PIPS at the University of Minnesota.</u>

UMN was interested to utilize PIPS because of their difficulty in delivering projects on time, within budget, and satisfying their university clients. For the past five years they have delivered projects using PIPS. The results at the University of Minnesota (UM) are shown in Table 4.

Construction Award Information	
# of Best-Value Procurements	184
Avg. proposal cost:	$64 M
Awarded Cost:	$57.9 M
Avg. # of proposals:	4
Projects where best Value was also Lowest Cost:	54%
Project Performance	
# of Completed Projects:	140
Cost Increases:	8.80%
Schedule Increases:	45.50%
CPPM PM post project rating of Contractor:	9.6
CPPM PM Management requirements:	-62%

Table 4. PIPS at University of Minnesota Results

UM was the first organization to sustain the implementation of PIPS for over 3 years. After five years, the following was observed and measured: customer satisfaction at 98%, projects awarded within budgets, minimized vendor caused deviations, targeted business goals met, and all projects are measured in terms of deviation. However, the following was observed:

1. Documented PIPS results no longer sufficient to sustain PIPS implementation. Although PIPS results are well documented, client visionaries were not able to convince all their project managers to utilize PIPS in an optimal fashion, and due to this difficulty, did not finalize their own process to fit the UM PM environment and culture.
2. A tested PIPS system without the visionaries is not sustainable. There was no strategic plan to ensure that the visionaries were sustainable. Five years of PIPS testing did not ensure sustainability of PIPS. The visionaries did not develop their individual performance line and strategic plan. the time was used for PIPS testing, and not the growth of the individuals in terms of position, pay, and individual performance line/resume. This resulted in an inconsistent plan which was reactive focused on trying to get the UM environment to accept PIPS and not a consistent strategic plan to develop the visionaries.
3. Client visionaries focused on successful project results, did not focus on the strategic plan to develop and position their core team nor concentrate on leaving a structure in place that would sustain PIPS.

U.S. Army Medical Command (Medcom)

The U.S. Army Medical Command (Medcom) also implemented best value PIPS in 2005. Because they did not control their own procurement (they were mandated to use the Corps of Engineers (COE)), they implemented PIPS after the selection/award/procurement of the contractor to do risk management (name changed to the Performance Information Risk Management System (PIRMS)). Medcom tracks 300 projects per year, at 26 different sites in the U.S., Korea, and Germany. Implementation of PIRMS led to the following results:

1. Identified the client as the major source of risk (similar to all other projects since 1994.)
2. Minimized the deviation rate by 60%.
3. Documented problems and led to a faster solution of the problems.
4. Identified the higher performing vendors.
5. Measured all the different participants in the delivery process including government personnel.
6. Improved the customer satisfaction to 9.8 (10 being the maximum.)
7. Gave the U.S. Army Medical Command a timely (once a week) and accurate way to identify the performance and risk of their $300M repair and modification construction program.

One of the most difficult tasks for organizations is to identify the reason for implementing PIPS/PIRMS. If it is successful, the vendors/contractors will use the system (RMP/WRR) in their own companies to maximize efficiency/effectiveness and profit. Therefore the goal of Medcom should be to:

1. Use the information provided by PIPS to ensure that companies who use the system in their organization get the work. If the vendors who are using the system do not get the work, then Medcom is not using the system for what it is supposed to do.
2. Ensure that the system is being used.
3. Ensure that everyone is held accountable.

City of Peoria PIPS Results

The results of running PIPS at the City of Peoria are shown in Table 5. After five years of using PIPS, some components within the City of Peoria wanted to return to the price based, low bid award system. However, the users and project managers did not want to give up a system that was efficient and effective, and used the government bureaucracy to maintain the use of PIPS.

NO	CRITERIA	RESULTS
1	Number of years using/testing PIPS	6 years
2	Total number of project procured using PIPS	63
3	Total size of projects	$500 M
4	Total number of vendors with PPI	531
5	Total number of completed projects	34
6	Overall change order rate (owner and vendor combined)	0.6 %
7	Overall schedule delay rate (owner and vendor combined)	5.1 %
8	Final post project close out rating (1-10)	9.4
9	Overall customer satisfaction with PIPS program	100 %

Table 5. City of Peoria Results of Implementation of PIPS

Arizona State University

The procurement and business services personnel at Arizona State University (ASU) decided to use the technology created at PBSRG on their own campus. After watching the development of the process for over ten years, they implemented the process on the:

1. Selection of their food services vendor on a ten year, $400M purchase.
2. Selection of their sports marketing professional.
3. Outsourcing their IT networking capability.
4. Modifying their document control vendor's contract.
5. Outsourcing their bookstore services.
6. Selection of their long distance education services.
7. Selection of their help desk, answering service.

The services have brought ASU over $100M in higher commissions, capital investment by vendors, and have created a seamless resource of experts with minimal management, direction, and control needed for the ASU leadership. The PIPS has been used not only to optimize the services, but to increase the performance and value, and to integrate the ASU leadership and vendor expertise to slash costs and provide measured professional services at ASU.

ASU has succeeded in having the vendors implement PIPS into their organizations, thus minimizing the need for another layer of management directing the services. As the economy is forcing ASU to cut costs, PIPS/PIRMS has been the organizational model to integrate ASU with its vendors.

State of Oklahoma

The State of Oklahoma has implemented PIPS as both a procurement process and a process to deliver construction services for the past three years. An overview of their efforts is shown in Table 6. Lessons learned at the State of Oklahoma include (PBSRG, 2010):

1. The paradigm shift is from technical description to performance measurement. Technical specifications are used, but performance measurements for services are the most critical information.
2. The transfer of risk and control to the vendor is a disruptive concept. Vendors are used to being reactive and depending on the client to work together with the vendor to attempt to resolve issues. The transfer of risk and control to the vendor, forces the vendor to be an expert.
3. Vendors need assistance to move to the new paradigm of being the expert, being proactive, and knowing how to minimize risk that they do not control.
4. Government procurement and project management personnel have been micro-managing the vendor and creating a shelter for vendors avoiding accountability.
5. The price based system has eroded the expertise of the vendor base and increased the overall cost to the state of Oklahoma.

Oklahoma Best Value Project Information	
# of Best-Value Procurements	12
Estimated Value of Best-Value Procurements	$115M
Protest Success Rate (# of protest won / # of protests)	2/2
# of Different Services	8
% Where Identified Best-Value was Lowest Cost	71%
Project Performance	
# of Completed Projects	4
Average Customer Satisfaction	9.09
Cost Savings	$500K
% On-time	100%
% On-budget	100%

Table 6. Oklahoma Best Value Results

WSCA, State of Alaska, State of Idaho, and State of Oregon

Mark Little, the procurement director for the State of Idaho, discovered PIPS in 2007. He introduced the concepts to the Western States Contracting Association (WSCA) in 2008. His efforts led to the use of PIPS in the following procurements:

1. Medical insurance for four of the Idaho university systems (successfully completed.)
2. Medical services for the Idaho Department of Corrections (successfully completed.)
3. $200M ERP system for the state of Alaska (ongoing.)

4. Procurement of integrated facility management software/hardware system (ongoing.)
5. $30M procurement of a Driver Motor Vehicle (DMV) integrated system (ongoing.)
6. Food services procurement at two Idaho universities (one completed, one ongoing.)

The procurement for the medical service for the Idaho Department of Corrections (IDC), was a landmark success for BVP/PIPS. IDC was having problems with their service. They used PIPS to get a better quality of service. PIPS was used for the selection of the vendor. The best value vendor turned out to be the incumbent who IDC did not like due to poor service. They saw no possibility of increased service. As many vendors, the incumbent vendor perceived BVP/PIPS as just another procurement system, another method to get an award. However, upon winning the award, the vendor was directed to proceed with the best value approach of identifying the risk that the vendor does not control, and measuring their technical performance. After receiving further PIPS education from PBSRG, the vendor did the following:

1. Changed their regional manager. Previously, they had stated to the IDC that they would not change the regional manager.
2. Measured their performance in critical areas. They also measured performance of four other regions where they have contracts to benchmark the IDC performance. They also started to use the quarterly performance ratings to look for trends. The vendor is giving IDC the WRR and RMP, and is also making the measurements available to the IDC, creating an environment of total transparency.
3. The vendor is using the performance measurements to identify if they had an internal problem with technical performance, and if it is not a performance issue, they can propose how to the IDC needs further services that would increase the scope of the contract.

The vendor has taken the best value PIPS approach to increase their performance, value, and profit. This action is the first time the vendor (who is a major provider of health services for correctional facilities) has taken the best value approach. WSCA is now crafting a contract modification which will allow all WSCA members, and other government organizations to use the WSCA contract to implement best value PIPS (WSCA Board Meeting Minutes, 2010).

<u>Conclusions of Development Period to Implement and Sustain PIPS</u>

The development of PIPS between 2005 and 2010 resulted in the following conclusions:

1. The sustainability of the BVP PIPS system is directly related to the understanding of the visionaries of the core team. Strong understanding, high probability of sustainability. The more visionaries the greater the chance of sustainability.
2. PIPS is based on a foundation of IMT of deductive logic and common sense. if PIPS is done accurately, it is easier to sustain because easier to explain, simpler to understand, and gets better results. The most accurate version is described in the following section. If it is not done in that fashion, it will bring confusion, transactions, and higher costs.

3. The use of dominant information (information that allows everyone to predict the future outcome) is key. The best value is the best value for the lowest cost. If contractors do not offer dominant information in their technical risk proposal, their non-technical risk proposal, and their value added submittals, the best value is the lowest priced option. Dominant information means minimal decision making, minimum use of technical expertise during the selection process, and shorter selection processes.

The demand for the implementation of PIPS/PIRMS has been exponential in the last five years. PBSRG, the research center of PIPS/PIRMS development has been struggling with the growing demand. As a group that is assisting in the implementation and development of PIPS, PBSRG is an advanced representation of an organization implementing PIPS. In 2010, PBSRG is attempting to change its operational model, the process itself, and the explanation of the process.

2010 PIPS/PIRMS Model

In 2010, PBSRG is changing its structure and PIPS process to increase the probability of making PIPS a sustainable system. In January 2010, Kashiwagi made the following observations:

1. Not all of the research clients (owners) and PBSRG researchers were making use of the lessons learned from the tests of other clients.
2. Not all the research clients were taking the visionary approach. They were mired in the actual PIPS/PIRMS tests, and not the future direction.
3. The paradigm was not changing fast enough. There was too much resistance, and Kashiwagi perceived that the requirement of PBSRG as the "source" of PIPS/PIRMS to stabilize the many research clients was not sustainable. A new model would have to be created.

The Development of Core Teams of Experts

PBSRG has set the following research goals for 2011 and beyond:

1. Visionaries can no longer depend on PBSRG to be the visionary. PBSRG can assist in the implementation of PIPS, but visionaries must understand the strategic plan and paradigm shift of IMT and PIPS. Visionaries who lead a research client's core team, must work with other visionaries, and must know the latest lessons learned on all of PBSRG's projects..
2. Visionaries must have a strategic plan of personal and organizational sustainability within their organization and learn and implement PIPS faster than before.
3. Visionaries must identify leaders in their organization who have authority, control, and an understanding of the need for efficiency, effectiveness, and accountability. They must continually educate their leaders.
4. Visionaries must study and understand Information Measurement Theory (IMT). PBSRG will now exam and certify visionaries who understand.
5. BVP/PIPS must be simplified.
6. PIPS transactions must be minimized.

BVP/PIPS has gone through the biggest renovation in its 16 year development due to the lessons learned. The process has changed, and the explanation has become much simpler. The next section will introduce the latest BVP/PIPS process and steps.

BVP PIPS

BVP/PIPS is a process/structure to deliver services. It changes the procurement agent's role from being the guardian over the award of a contract, to a facilitator of the delivery of services. The new role of facilitator starts when a user has a requirement, and ends when the service has been delivered. Instead of being a procurement process, it assists in the development of an intent of the client by expert vendors, identifies the best value vendor (most value for the lowest price), assists the best value vendor to determine if they can meet the intent of the client, and then ensuring that the vendor can deliver on their proposal.

1. The BVP/PIPS has three phases: selection, pre-award, and management of the project risk (Figure 2)
2. The selection phase has five filters (Figure 3): past performance information, competitive ability to manage and minimize project risk, interview of key personnel, prioritizing the vendors and doing a dominance check to ensure that the best value vendor is the best value.
3. The client's representatives assume the vendors are experts through the selection process (award process in the Netherlands) then assume the best value vendor is not an expert in the pre-award phase to minimize the risk of the vendor. The paradigm is to minimize the need for technical decision making in the selection process, and maximizing the need for the best value vendor to prove they are an expert in the pre-award phase.
4. The previous paradigm also forces vendors to show dominant differential in performance that minimizes the need for any technical decision making by the client.
5. The risk is shifted to the vendors to show value through dominant expertise, knowing that experts minimize both risk and cost, thus providing the best value for the lowest cost.

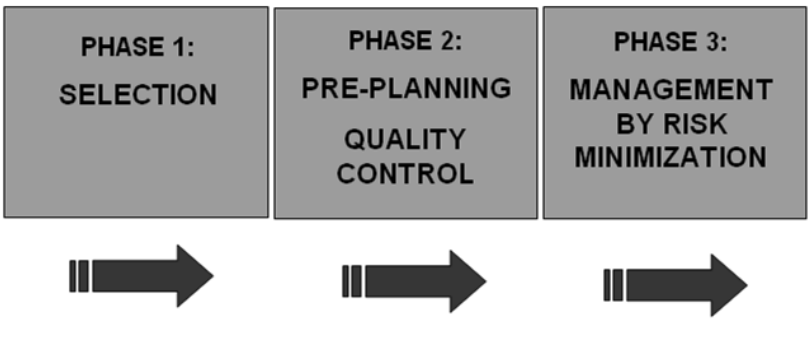

Figure 2. Phases of BVP/PIPS

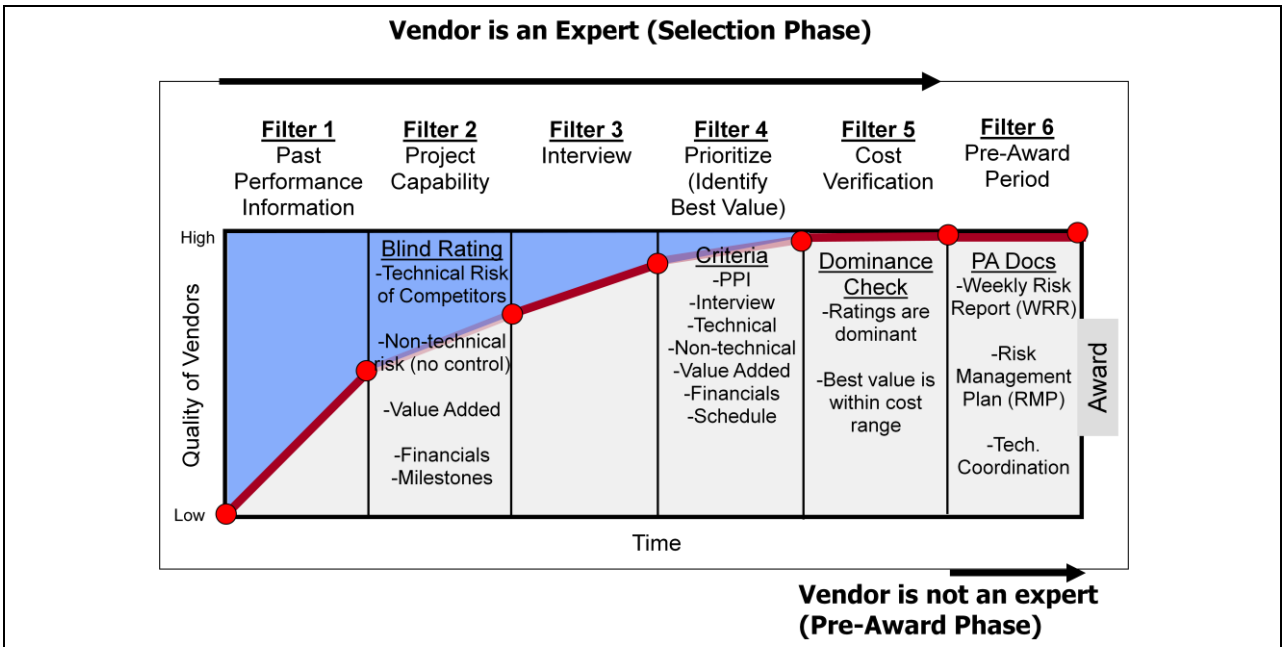

Figure 3. PIPS Selection Phase 1

The BVP/PIPS is a closed loop system (Figure 4). Only one vendor at a time can move into the pre-award phase. If the vendor clarifies their proposal sufficiently by completing their risk management plan (RMP) and their weekly risk report (WRR), and meets the client's technical intent and their proposal as specified in the technical specifications (written by the contractor and agreed to by the client's representatives,) the contract is awarded to the best value vendor. The best value vendor uses the contract as a risk minimization mechanism, by meeting the technical requirements of the project and managing and minimizing the risk that they do not control.

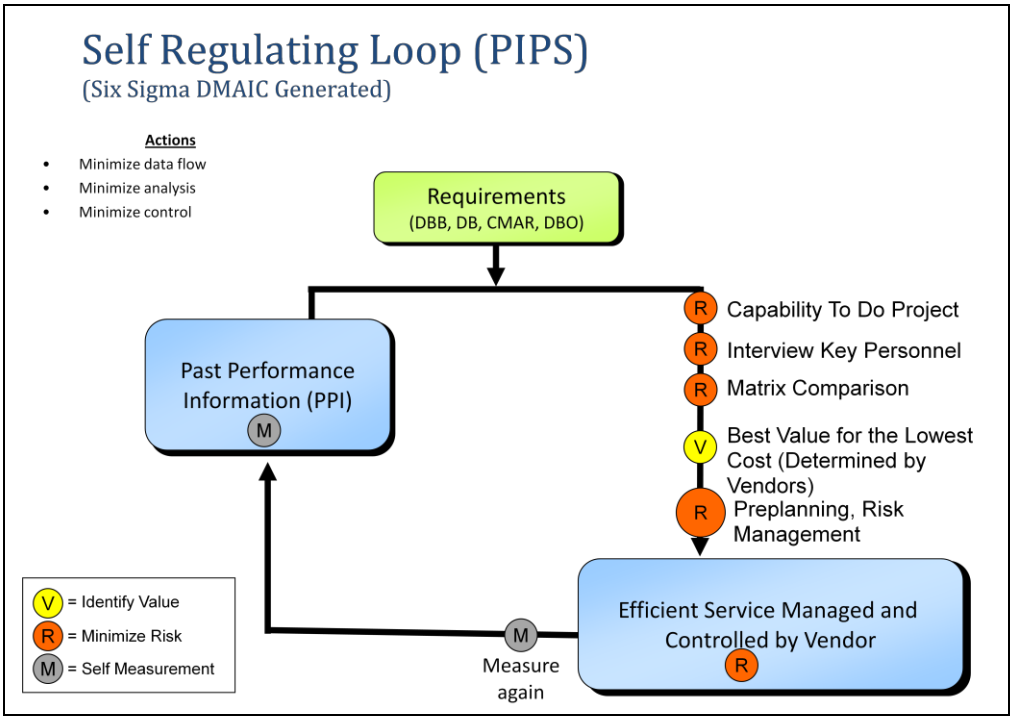

Figure 4. PIPS Self Regulating Closed Loop System

PIPS Selection of Best Value Vendor

BVP/PIPS differs from other procurement and risk management systems because it minimizes subjective decision making of the client's experts. It forces the vendors to compete based on value (quality risk management capability and price.) By making the assumption that the vendor is an expert, and disciplining the client's representatives to follow this structure, the client's representatives do not make any technical decisions or judgments on the vendors. If a vendor is dominantly better (easy to see, get a consensus dominant rating, or a non-technical reason why they are dominantly better), they have provided information that clearly shows their dominant performance. If not, the process will be followed, and the best value for the lowest price vendor shall be identified. PIPS extends the definition of dominance to include if any vendor cost is either over a pre-specified amount, or under the average proposal price, that vendor will be dismissed from the competition unless they can show dominant proof why they should not be dismissed.

The most important filter of the process is the interview, followed by the risk management capability that shows a management of the risk that the vendor does not control. The least important is the past performance information on the company and key individuals.

The vendor's capability to do the project is represented by five submittals: schedule, price, capability to minimize technical risk (1 page), non-technical risk that they do not control and how they will manage and minimize them (2 pages), and value added (things that were not included in the intent of the client.) Schedule and price should not be scored by the selection committee. The vendors are requested to be

experts. If they are experts they do not have technical risk. The vendors are requested to identify why their competitors may have a risk, but why they do not have the risk. Dominant inputs include:

1. Vendor has done six of these projects in the last ten years and has:
2. Cost and time deviations are under 1%.
3. Proposed project manager has done all six of these projects, with deviation rate of 1% (due to the owner), customer satisfaction rate of 9.8 (out of 10.0), has used RMP/WRR on all of the projects, is the best project manager in the company by 2.0 points in the company.
4. When encountered with any unforeseen issues, project manager finds the most economical solution in terms of time and cost, proposes it to the client, and gives them a preset schedule to follow.

The technical risk submittal should not be technical in nature (require technical experts to rate.) It should not include items that may have been left off the specifications (value added section.) It should identify the technical dominance of the vendor over competing firms that minimizes risks that competing vendors may have, and why they do not have that technical risk. If there are technical issues with the buyer's intent, the vendor should identify the risk to the project in terms of longer performance periods, potential issues, and higher costs, and put their solution in the value added submittal.

The non-technical risk submittal should include identification of risk that the vendor does not control, and how the vendor will manage and minimize risk that they do not control, and how they will react to the risk to minimize the project deviations to the buyer. This submittal allows the buyer to make the vendor accountable to manage and minimize project risk including risk that is caused by other parties who participate in the delivery of the project. With one party managing and minimizing project deviation, the confusion caused by non-transparency, subjective decision making, a lack of accountability, and no clear documentation is alleviated.

The interview filter is the most heavily weighted filter/criteria because it gives the most dominant information in the shortest period of time. What the interview should produce on the vendor's critical personnel includes:

1. The ability to minimize risk by managing deviation.
2. The ability to be proactive.
3. The ability to act in the best interest of the client and to resolve issues quickly.
4. The ability to understand PIPS.

The selection group is looking for quick, short, concise, non-technical, and simple explanations. The key personnel should be able to show why they were picked for the project and give total confidence that they can do the project.

Dominance Ratings and Dominance Check

Dominance ratings and dominance checks are both products of the client's selection board "not making decisions," but forcing the contractors to take accountability and show dominant value. All ratings given to contractor project capability submittals and the interview of contractor key people should use the "dominance" concept. If the submittal or interview results are not dominant in terms of performance, they should be given a "5" rating, in a 1 to 10 scale, 1 being dominantly bad, and 10 being able to dominantly perform. Another explanation of the use of a dominant rating is that the information provided is dominant that the contractor will perform. Dominant information includes performance information that is clear, simple, and predictive, benchmarked performance ratings that show very high and unique performance, and very high experience and expertise levels, if the information is not dominant, and decision making may be required, the rating should be a "5." The job of the selection panel is to ensure that no decision making is done that helps any particular competing contractor. If there is no dominant information, the best value will be the best value for the lowest price where there is no dominant information that predicts nonperformance.

The dominance check has its origins in the Federal Acquisition Regulation (FAR.) At the end of the selection phase, when the proposals have been rated, and the best value vendor has been prioritized, a dominance check is performed. The Procurement officer takes all the information and reviews it to identify if the best value vendor is indeed the best value for the lowest price. The dominance check is encompasses two main issues. If the best value vendor is over a preset amount of the next prioritized best value, the best value vendor must show dominant rationale why they shouldn't be eliminated for high price. if the procurement officer cannot identify the dominant information, the next best value is selected to go through the dominance check and pre-award period. If any vendor is under a preset amount under the average submitted price of the vendors, the low priced vendor must also show dominant information why they should not be eliminated. If they cannot they should be considered non-responsive because low price brings risk to a project. If a question can be asked, or justification is being required, or the project manager or procurement officers are at risk, there is no dominant information.

PIPS Pre-Award Phase

The most important phase of the BVP/PIPS is the pre-award phase. If done correctly, the pre-award phase should be used as a clarification period to clarify how the vendor will deliver what they have proposed. To clarify their proposal they shall:

1. Create a risk management plan (RMP) that addresses every concern and risk of the vendors and client.
2. Create a milestone schedule that incorporates the RMP.
3. Confirm the technical requirement, and how they will deliver the requirement.

If the prioritized best value vendor cannot do the above, the next best value vendor will be pulled into the pre-award phase. The pre-award phase is not a discussion phase, it is a clarification phase. The vendor should not be allowed to change their pricing, what they are offering, or the intent of the buyer.

Risk Management Plan (RMP)

The RMP is a living document that identifies concerns or risks to the project. the RMP should identify:

1. The risk and who causes the risk.
2. How the vendor will attempt to minimize the risk from happening.
3. If the risk does happen, what will the vendor do.
4. Should identify the best ways to solve the risk, cost and time deviations, and which method should be used and why.
5. The time frame the client should make the decision to approve.

The RMP must be approved by the client, and becomes a living document throughout the project duration.

Weekly Risk Report (WRR)

The WRR contains the following (Figure 5):

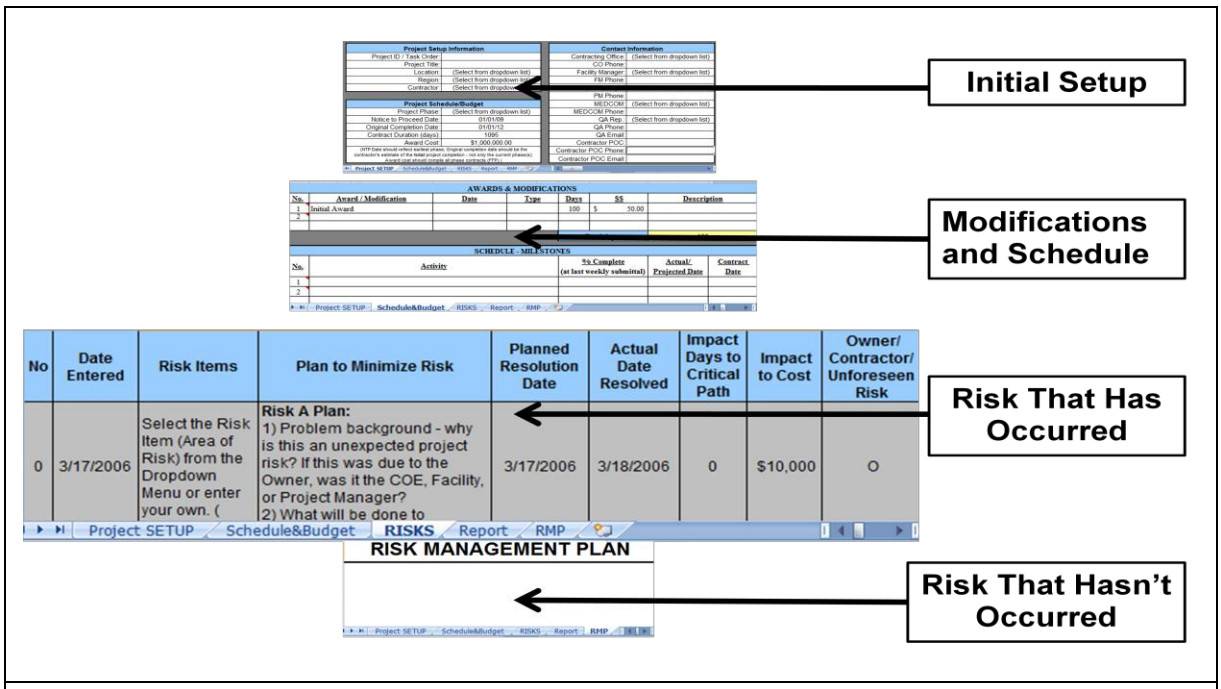

Figure 5. Weekly Risk Reporting (WRR)

1. Points of contacts who will receive the WRR during the project.
2. Milestone schedule.
3. RMP.
4. Risk sheet that identifies who caused the risk, solution, and time and cost deviations.
5. Modifications (deviations) on the project.
6. Performance measurements for services contracts.

If a risk happens and causes a cost or time deviation, the risk is explained and documented on the risk sheet. If the risk has not happened it goes on the RMP, and a plan to minimize the risk, and mitigate it if it happens is documented. All modifications should have concise, simple, and dominant documentation. The WRR should be distributed weekly to all the participants who are involved and interested.

The weekly risk report and the risk management plan are the main document and communications of the contract administration. It allows the owner's representatives to do quality assurance. It therefore defines quality assurance as a non-technical function.

Conclusions

PBSRG has been developing BVP/PIPS for the last 16 years. Lessons learned on the 700+ tests have resulted in simplifying the process, and making the PIPS/PIRMS more sustainable. BVP/PIPS is different from other processes due to:

1. The minimization of owner/buyer subjectivity and technical decision making during the selection phase (Dutch award phase).
2. The process allows the best value vendor to define the delivered service and how it will be delivered.
3. It transferring the risk and control to a best value vendor who has minimal technical risk.
4. It allows the vendor to measure and document the performance of all parties involved and makes them accountable by using the risk management plan (RMP) and weekly risk report (WRR.)
5. Uses the contract to manage and minimize risk instead of controlling, directing, and inspecting the vendor.

The development of PIPS has gone through the performance information period, the PIPS testing period, and the implementation period. The research test results have confirmed the following IMT principles and industry structure model concepts:

1. Management, direction, and control of vendors by buyers is ineffective, inefficient, and results in higher costs and lower profit margins for vendors.
2. The use of minimum standards in directions coupled with the award to the lowest bidder results in a degeneration of vendor quality and skill.
3. Project and services value and cost are optimized by expert vendors who document project deviations. This confirms the thesis of Deming (1982) who stated that the minimization of deviation and not minimum standards will lead to optimization of value.
4. Expert contractors have minimal technical risk. It is their ability to manage and minimize the risk that they do not control, that differentiates them from the non-expert contractors.
5. PIPS/PIRMS process/structure with the IMT based environment, has the capability to assist non-performers perform.
6. The development of visionaries who work together in core teams is the most critical task in the sustaining of the new best value environment. Because they have no influence or control over their own organizations, PIPS visionaries must develop themselves into sources of PIPS technology. They will define themselves, their capability, and their results by using PIPS/IMT.

Best value PIPS/PIRMS is a new way to deliver services, run organizations, and optimize supply chains. It forms a leadership structure that assists inexperienced project managers to get optimal results. The underlying philosophy of visionaries implementing PIPS/PIRMS is the Information Measurement Theory (IMT.) It's basic tenants include the inability for a person to manage, direct, and control others, an event has only one outcome once the initial conditions are fixed, and experts can always tell you what they are going to do, and what problems they will encounter, before it happens. And because no one knows everything, they have a method to manage and minimize risk that they do not control before the risks occur.

Best value procurement PIPS/PIRMS will be continually modified to make it simpler and easier to run. It is the future of the delivery of services because it minimizes the need to manage, direct, and control, and increases value and quality. It also aligns the supply chain to minimize cost and transactions.

References

Adeyemi, A., Kashiwagi, D. T. and Sullivan, K. (2009). Acceptance of IMT/PIPS Philosophy in Botswana, RICS Cobra Research Conference, University of Cape Town, pp. 509-521 (September 10-11, 2009).

Adrian, James J. (2001). "Improving Construction Productivity." Construction Productivity Newsletter,Vol.12,No 6.

Al-Ahmad, W., Al-Fagih, K., Khanfar, K., Alsamara, K., and Abuleil, S. (2009). A Taxonomy of an it project failure, Root Causes, 5(1), 93-106.

Beers, Kent (2010). Personal Conversation, Albuquerque NM, Western States Contracting Association Meeting, December 8, 2010

Brown, T. (2001). Modernisation or failure? IT Development Projects in the UK Public Sector, Project Management, 17(4), 363-381.

Byfield, R. and Kashiwagi, D. (2002). Testing of Minimization of Subjectivity in 'Best Value' in Procurement by Using Artificial Intelligence Systems in State of Utah Procurement. ASCE: Journal of Construction Engineering and Management, 128 [6], 496-502.

Cahill, D. and Puybaraud, M. (1994). "Constructing the Team: The Latham Report," Construction Reports 1944-98." Blackwell Science ltd, pgs. 145-160.

CFMA's. (2006). *Construction Industry Annual Financial Survey*. Moss-Adams, LLP, Eighteenth edition.

Chan, A.P.C. and Chan, A.P.L. (2004). Key Performance Indicators for Measuring Construction Success. Benchmarking an International Journal. Emerald Group Publishing Limited, Vol. 11, No. 2; pp. 203-221.

Computer Weekly. (2010). "Why IT Projects fail," Pp. 16-17.

Connolly, M. (2006). Strategies to avoid failure of it projects, 11(3), 6-7.

Egan, S.J. (1998). Rethinking Construction: The Report of the Construction Task Force to the Deputy Prime Minister, John Prescott, on the scope for improving the quality and efficiency of UK construction. The Department of the Environment, Transport and the Regions.

Flores, V. and Chase, G., (2005). Project Controls from the Front End. Cost Engineering, April 2005, Vol. 47, No. 4; pgs 22-24.

Goodridge, S.,Sullivan, K. and Kashiwagi, D. (2007). Case Study: Minimization of Best Value Issues in the Procurement of Construction Services at the City of Miami Beach, COBRA 2007 - Construction and Building Research Conference, Georgia Institute of Technology, Atlanta, GA, USA, CD-T68 (September, 6, 2007).

Grady, D., (2010). "Study Finds No Progress in Safety at Hospitals," NYTimes, Retrieved Nov. 24, 2010, http://www.nytimes.com/2010/11/25/health/research/25patient.html?_r=2&hpw=&pagewanted=print

Kappelman, L, McKeeman, R, & Zhang, L. (2006). Early warning signs of it project failure, THE DOMINANT DOZEN, 23(4), 31-36.

Kashiwagi, D. (1991). Development of a Performance Based Design/Procurement System for Nonstructural Facility System, Dissertation in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy, Arizona State University.

Kashiwagi, D., (2010). *Best Value PIPS/PIRMS*. Distributed by Kashiwagi Solution Model Inc., Mesa, AZ, Copyrighted by Dean T. Kashiwagi.

Kashiwagi, D., (2010). *A Revolutionary Approach to Project and Risk Management.* Distributed by Kashiwagi Solution Model Inc., Mesa, AZ, Copyrighted by Dean T. Kashiwagi.

Kashiwagi, D., Byfield, R. (2002). Selecting the Best Contractor to Get Performance: On Time, on Budget, Meeting Quality Expectations. Journal of Facilities Management, 1 [2] pp. 103-116.

Kashiwagi, D. and Byfield, R., (2002). Case Studies of the State of Hawaii and Utah Implementation of Performance Based Contracting, COBRA 2002-Construction and Building Research Conference, Nottingham Trent University, UK, pp. 297-309.

Kashiwagi, D.T. and Byfield, R. (2001). State of Utah Performance Information Procurement Delivery System Tests, ASCE Journal of Construction Engineering.

Kashiwagi, D., Kashiwagi, J., and Sullivan, K., (2010). Performance Information Procurement System (PIPS), 2010 Industrial Engineering Research Conference, Cancun, Mexico, #95. (June 5-9, 2010).

Kashiwagi, D.T. and Savicky, J. (2004). The Implementation of Performance Information in the Design-Bid-Build Process. CIB W92 Symposium on Project Procurement for Infrastructure Construction, Indian Institute of Technology, Madras, Chennai, India, pp. 103-110 (January 7, 2004).

Kashiwagi, D.T., Savicky, J. and Parmar, D. (2003). The Use of Performance Information in the Delivery of Construction, COBRA 2003 - Construction and Building Research Conference, University of Wolverhampton, UK, pp. 385-393 (October 22, 2003).

Kashiwagi, D.T., Savicky, J. and Parmar, D. (2003). Case Study of the University of Hawaii Implementation of Performance Based Procurement, Joint International Symposium of CIB Working Commissions: W55 Building Economics, W65 Organization & Management of Construction, W107 Construction in Developing Countries; Singapore, Vol 1, pp.395-402 (October 22, 2003).

Kashiwagi, J. and Kashiwagi, D., (2009). Industry Structure Misunderstood by Industry and Researchers, 2nd Construction Industry Research Achievement International Conference, Kuala Lumpur, Malaysia, CD-Day 1, Session B-4 (November 3-5, 2009).

Kashiwagi, J., Sullivan, K. and Kashiwagi, D. (2009). Risk Management System Implemented at the US Army Medical Command, Vol. 7 No.3, 2009 pp. 224-245.

Kruus, M., Sullivan, K., Kashiwagi, D., and Kiiras, J. (2006). Selection Process of Construction Management Service Provider, International Conference in the Built Environment in the 21st Century (ICiBE 2006) Kuala Lumpur, Malaysia, pp. 539-550 (June 13, 2006).

Lepatner, Barry B. (2007). "Broken Buildings, Busted Budgets," The University of Chicago Press. United States of America: Chicago.

Lesca, N, & Caron-Fasan, M. (2008). Strategic scanning project failure and lessons learned, 17, 371–386.

Meyer, J., Witt, S., Kashiwagi, J., and Kashiwagi, D. (2010). General Services Administration Streamlines the Procurement of Construction Services, Procedings Seventh Annual Acquisition Research Symposium Volume II, Naval Postgraduate School, Monterey, California, pp. 609-625, (May 12-13, 2010).

Natovich, J. (2003). Vendor related risks in it development. A Chronology of an Outsourced Project Failure, 15(4), 409-419.

PBSRG (2010). "Performance Based Studies Research Group Internal Research Documentation," Arizona State University, Unpublished Raw Data.

Post, N.M. (1998). Building Teams Get High Marks, Engineering News Record, 240[19], 32-39.

Schneider, G., Lane, S., & Bruton, C. (2009). Monitoring risk in information, 13(1), 63-67.

Simonson, K. (2006). "Quick Facts," Association of General Contractors, Chief Economist Report.

Sullivan, K., Kashiwagi, D., Chong, N. (2010). "The Influence of an Information Environment on a Construction Organization's Culture: A Case Study" Advances in Civil Engineering, 2009, Article 387608, (10).

Sullivan, K. and Michael, J. (2008). Industry Transformation: Testing Best-Value and Leadership in Non-Construction Industries. Journal for the Advancement of Performance Information and Value, Performance Based Studies Research Group & CIB Task Group 61, 1 (1) pp. 20-34.

Sullivan, K. and Michael, J. (2008). Case Study of Sustainability of the PIPS Best Value Program at the University of Minnesota. Journal for the Advancement of Performance Information and Value, Performance Based Studies Research Group & CIB Task Group 61, 1 (1) pp. 73-82.

WSCA Board Meeting Minutes, 2010, December 7, 2010. WSCA Board Meeting, Sheraton Uptown Hotel, Albuquerque, NM.

Zeleny, Milan (1984). *Multiple Criteria Decision-Making*, McGraw-Hill Publishing, NY.