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General Services Administration Streamlines the Procurement of Construction Services

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Abstract

The General Services Administration (GSA) Heartland Region is implementing a best value process (which minimizes time and cost deviations 98% of the time) and which minimizes the need for client's decision making, transfers the risk and control of a project to the vendor, and forces the vendor to manage and minimize the non-technical risk that the vendor does not control. The Performance Information Risk Management System (PIRMS) has been tested by the US Army Medical Command and has minimized over 50% of client project management and risk management transactions, and also minimized cost and time deviations by as much as 70%. The new paradigm uses Deming's concept of managing and minimizing the project deviation instead of meeting minimum standards. The system forces the client's representatives to do quality assurance, and the vendor to do quality control. The mechanism used is a risk management plan and a weekly risk report that creates transparency between buyer and vendor. The system can minimize up to 90% of the government's transactions and activities. The system is a new paradigm for government systems.

Keywords: Best value procurement, minimized government management, high vendor performance, and measured environment

Introduction

The General Services Administration (GSA) is the largest buyer of non-military services in the United States. It is a large management based organization. An Achilles heel for any large organization is the number of layers of management, the large number of managers and subject matter experts (SME) and the practice of managing, directing and controlling vendors/contractors who are supposed to be experts at what they do.

The current status of most projects in the GSA is where vendors (architect/ engineers and contractors) continually rely on being managed, directed, and controlled by GSA project managers and contracting officers. To get a quality set of construction documents, the government project managers complete extensive quality control reviews of the A/E's construction documents, once the sole responsibility of the A/E design firms. GSA personnel (CORs, PMs, and COs) continually manage, direct, and control the contractors in construction. Control and risk are not transferred to the vendors, thus making it difficult to hold vendors accountable for deviations. Projects incur change orders due to design deficiencies. Projects are not being completed in a timely manner and the actual close-out

of projects could take between 1 to 4 years. GSA processes and requirements are continually being developed and expanded at various levels both nationally and regionally in an attempt to increase the performance of the vendors.

Upper level management in the GSA has struggled with implementing a sustainable, useable, and accurate system that measures the performance of their vendors and project managers. Shrinking budgets, increased workload requirements, and the increased need for project managers to manage, direct, and control vendors, make the updating, collection, and analysis of performance information very difficult. The GSA has been exposed to many management measurement systems and philosophies (Alsup, 2010; Topi, 2010):

1. Quality Management Circle (part of TQM)
2. TQM (total quality management) (early 1990s)
3. eTMP (electronic transaction management playbook) (2006)
4. TMP (transaction management playbook) (2006)
5. HCAM (included the following TMP, OMP, LCP, & AMP) (2005)
6. OMP (occupancy management playbook)
7. LCP (large construction playbook)
8. AMP (account management playbook)

However, the strategic objective of increasing performance and value of vendor services and measurement of the performance remains elusive.

Problem

The stubbornness of the problem of the GSA's inability to sustain performance measurements in a timely fashion and increase vendor performance may be a systems problem and not a GSA unique management/leadership problem. The current GSA system forces the project managers to document, maintain, and report the performance information. Because of the current project manager/vendor relationships and their heavy workload, project managers may not be motivated to accurately and consistently document the performance information. The current system of delivery has the following suboptimal characteristics:

1. The GSA project managers are required to manage, direct, and control the vendors.
2. There is no transfer of risk or control to the vendors.
3. The relationship between the vendors and the project managers may dilute accountability.
4. The current delivery system does not motivate vendors to preplan and manage and minimize the risk that they do not control (think in the best interest of the client).

Hypothesis

Deming (1982) identifies the GSA problem as a systems problem. The authors propose that the system may be stabilized but not meeting the expectations of the GSA's

upper level management. Increasing effort to optimize performance in a stable environment may not be successful. The system must be changed to increase performance, and have a sustainable performance measurement system that results in an increase in vendor performance.

Methodology

The authors propose that the GSA find a new system that has the following characteristics:

1. Run by a core team of systems managers who understand a performance information based system.
2. Selects vendors by their capability to understand a project and manage and minimize deviations that are caused by sources outside of their control.
3. Transfer the risk and control to vendors, who by contract must preplan, manage and minimize risk that they do not control, and manage the risk of their projects by measuring and minimizing cost and time deviations.
4. Measure the vendors' performance.
5. Vendors are held accountable for all deviations unless they can dominantly document the source of the risk and how they attempted to manage and minimize the risks.
6. System has past performance of success in other government organizations.

Search for Performance Measurement Systems for Vendors/Organizations

The GSA team composed of a project manager and a procurement officer proposed the above plan to their division manager in the heartland region located in Kansas City. They proposed using a best value approach to solicitation to procure the services of an organization that could:

1. Provide a system that meets the requirements of the new system.
2. Show documented evidence that the system measured performance and resulted in a dominant increase of performance.
3. Show capability to educate and train GSA personnel to be able to understand the new system and run the system.

The solicitation was posted on August 15, 2009. There were only three proposers. The GSA identified the Performance Information Procurement System (PIPS) as the only system that could meet the new requirements. It was the only system that:

1. Had documented performance over 15 years.
2. Minimized the amount of management, direction, and control.
3. Transferred risk and accountability to the vendor.
4. Measured the vendor and all other participants who interfaced with the vendor.

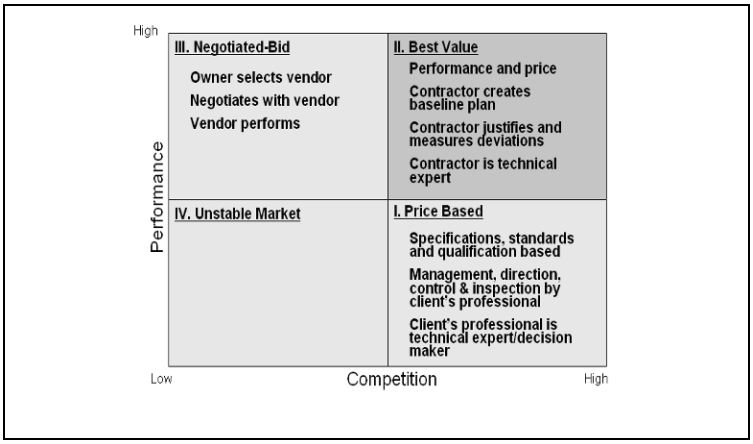
5. Provided a mechanism whereby the vendor managed the risk that they did not control.

6. Minimized the transactions (meetings, emails, and telecom.)

No other vendor options would accept responsibility for ensuring the performance measurements on all participants, a resulting increase in performance and value, and minimized management, direction and control. The other vendor options proposed to put a performance measurement system in place, but would take no responsibility for the successful implementation or the impact on performance of the organization and the vendors. The best value PIPS system dominantly differentiated itself as the only option with the potential of disruptive change required to employ a sustainable measurement system and result in a dominant increase in performance and value.

Industry Analysis

The construction industry structure (CIS) model (Figure 1) (Kashiwagi, 2009) identifies the difference between what the GSA and other owners currently employ, and what is needed to employ a sustainable performance measurement system that has accompanying increase in performance and value.



Construction Industry Structure
(Kashiwagi, 2010)

The CIS identified the current GSA system as a price based system regardless of the perception of not awarding projects based on price (Sullivan, 2005). The Price Based System (Quadrant I), has the following characteristic:

1. Owner representative attempts to direct and control the vendor.

2. Deductive logic assumes that the owner would only hire a vendor who knew what they were doing (expert).

3. Someone who should know less about what is being done is directing someone who is an expert in what is being delivered.

In the best value system, the client identifies their intent, but asks the industry (vendors) who can deliver the best value that meets the intent of the owner? This system has the following characteristics:

1. Vendors identify what they do, and what it costs.

2. Client selects the best value based on performance and price (value).
3. Vendors preplan, manage and minimize risk they don't control. (They have no technical risk; they are experts.)
4. Clients do quality assurance (ensure that the vendor has quality control and risk management systems).

-

The price based system is:

1. Inefficient.
2. Requires more people.
3. Has more confusion.
4. Subjective.
5. Higher flow of information required between parties.
6. If performance measures are kept, they are very subjective and potentially could be construed as biased. There are more measurements that require an expert to decide what is good performance.
7. Requires people to partner.
8. Relationships are important between vendors and the client's PMs.
9. Adversarial.
10. Because minimum requirements are used, performance will be in decline.
11. Not accountable.
12. Has high risk.
13. Low performance (on time, on budget, meet client's expectations.)

The best value system:

1. Is more efficient.
2. Requires less people.
3. Is measured with few and simple measurements.
4. Is transparent.
5. Uses alignment of resources.
6. Has minimized flow of information.
7. Minimizes partnering exercises.
8. Managed by minimizing deviations.
9. Has continuous improvement.
10. Has a high level of accountability.
11. Has high performance and low risk.

12. Minimizes transactions.

Difference Between the Two Systems

The difference between systems is that the price based vendor is reactive, managed, controlled and directed by the client/buyer; the best value vendor is proactive, preplans, manages and minimizes risk that they do not control, measures their performance, and manages their project by minimizing deviations. In the price-based sector, the client directs the vendor using minimum requirements; the vendors transform the minimum into a maximum, and drive the performance the opposite direction (Figure 2).

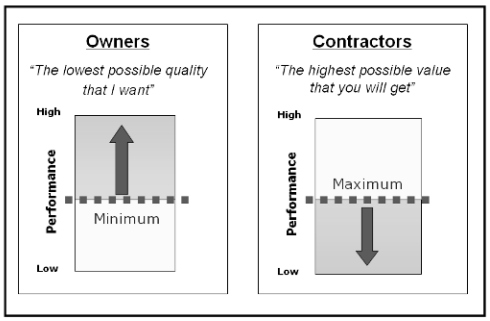


Figure 1. Min/Max Dilemma (Kashiwagi, 2010)

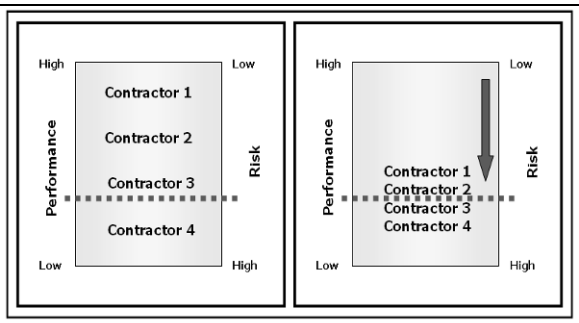


Figure 2. Price-Based Award (Kashiwagi, 2010)

The high performance vendor (high performance and low risk) can see a project from beginning to end. They identify risk that they do not control, and plan solutions to minimize the risk. The low performer (high risk) prices only what they are directed to price. The overall effect of the client directing the vendors is the following (Figure 3):

1. High performers become reactive instead of proactive. They are told to price only what is directed, regardless of completeness, correctness, or whether it is doable.
2. They are directed to assume that the directions are perfect.
3. Therefore, they are directed to give the lowest possible price, assuming nothing goes wrong.

Figure 4 shows the business approach to Quadrant I Price Based system. The high performers, who get paid more for their expertise, get sent to the price based system, where they are directed and controlled by someone who is not an expert. The confusing environment results in lower production of the high performer. They become out of alignment, overpriced, and leave the environment. A more damaging result of the system is that the less experienced are not motivated to become like the highly trained.

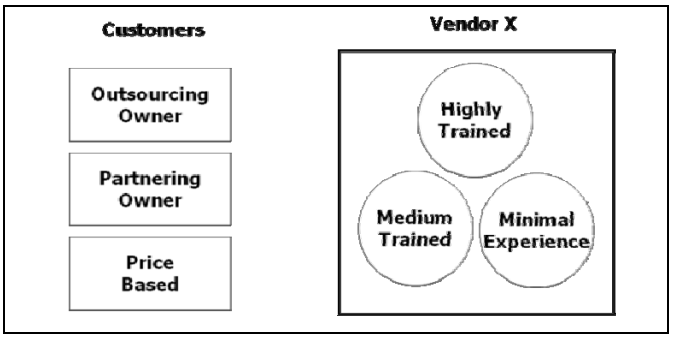


Figure 3. Business Approach (Kashiwagi, 2010)

The outsourcing owner who transfers risk and control to the expert vendor will get the high performer. It is the only win-win situation. The high performer will preplan, manage and minimize risk that they do not control to finish on time and maximize their profit, do the project once, and get paid and not go back to redo or fix problems. This is the efficient best value system.

Best Value Performance Information Procurement System (PIPS)

After identifying the requirement to have a new system/environment that reflected the best value environment, the GSA selected the best value PIPS system to move from the price based to the best value environment (GSA contract #: GS06P09GYD0027). The documented performance of the PIPS system included:

1. 16 years of testing (1994-present) delivering 700+ construction services projects valued at over $800 million.
2. Research funding of $8.5 million.
3. Minimized client risk/project management activities by up to 90%.
4. Maximized vendor profit by up to 100%, at no additional cost to the client.
5. Delivered performance of 98% on time, no contractor generated cost and time deviations, and meeting client's expectations.
6. Arizona State University (ASU) moved PIPS into non-construction areas including the delivery of food services, IT networking, IT data centers, help desks, sports marketing, gym equipment, document control, long distance education services, and furniture buys. ASU received investments of $100 million over ten years due to the change of system environment, from price based to best value.
7. The Dutch infrastructure agency used PIPS to deliver $1 billion of highway infrastructure to solve their problems with the delivery of construction.
8. The Bank of Botswana used PIPS to deliver a critical bank facility and found it tremendously better than the traditional process.
9. The State of Alaska is delivering a $200 million Electronic Resource Planning system using PIPS.

PIPS is a licensed structure/process from Arizona State University developed by Dean Kashiwagi and the Performance Based Studies Research Group (PBSRG.) PIPS has three main phases (Kashiwagi, 2010):

1. Phase I: Selection of the best value vendor.
2. Phase II: Pre-award/pre-planning and creation of the risk management plan (RMP) and the weekly risk report (WRR.)
3. Phase III: Project delivery by the risk management of deviation of time and cost.

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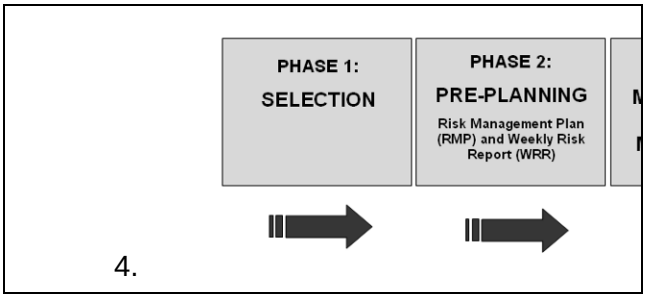

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Figure 4. PIPS/PIRMS Phases
(Kashiwagi, 2010)

During the early development of PIPS, the selection phase was identified as the most important phase. As more tests were run, it was identified that the pre-award, preplanning phase was a more critical phase. The risk management capability of PIPS became obvious, and the term, the Performance Information Risk Management System (PIRMS) was created to allow owners to use the risk management capability of the system even though they would select their vendor using the price based selection mode.

PIPS has six major filters in the selection phase to ensure performance (Figures 6 and 7):

1. Requires the vendors to prove the potential to perform through documented past performance including the performance of critical personnel (project manager), and critical sub-vendors (engineering, professional consultants, or other crafts).
2. Capability to do the project. This submittal is a blind review of the vendor's capability to do the project:
   a. Requires the vendors to show an understanding of the scope of the project in terms of the biggest technical risks in a concise and short explanation (two page submittal). The high performers should identify the major technical challenges of the project and what makes them capable of minimizing the risk of nonperformance.

   b. Risk Assessment/Value Added (RAVA) submittal that forces the vendor to identify the risk that the vendor does not control, and how they will manage and minimize that risk so it does not occur. It also asks the vendors to document dominant added value being offered by the vendor (that is not in the client's specified scope, and will create a dominant

difference in project value) that makes them different from their competitors.

c. The vendor is also asked for a milestone schedule, and how they will measure their performance during the project.

d. The vendor will also submit a cost breakout.

3. The interview of the critical personnel of the vendor to identify the person's relative vision, ability to predict things before they occur, preplan and their capability to be accountable.

4. A cost check to ensure the best value is not overly expensive.

5. Prioritization of the best value based on the capability to perform (the past performance information, scope rating, RAVA rating, milestone schedule rating, rating on performance measurement system, interview rating and price).

6. Pre-award Phase where just the best value vendor creates a risk management plan (RMP) and a weekly risk report (WRR) that they will use to manage and minimize the deviation of the project. The WRR and RMP track risks that the vendor does not control. This is the key mechanism in PIPS/PIRMS, and is the regulator that ensures that risk and control is transferred to the vendor. This becomes a key component of the contract, and decommissions any attempts for the owner's PM to manage, direct, and control the vendor. This results in an alignment of resources, as it is in the best interest of all parties.

A major paradigm shift is the movement from management, direction, and control to quality control/quality assurance. This movement assumes that the vendor has no technical risk, and therefore will concentrate on managing and minimizing the risk they don't control. This will be more fully explained in a following section.

The vendor then writes their own contract (technical requirement, legal requirements of the owner, risk management plan and weekly risk control report.) The project is then awarded. The vendor self manages themselves based on the contract, managing and minimizing the cost and time deviation of the project. At the end of the project, the vendor is rated. The rating becomes 50% of the vendor's future rating.

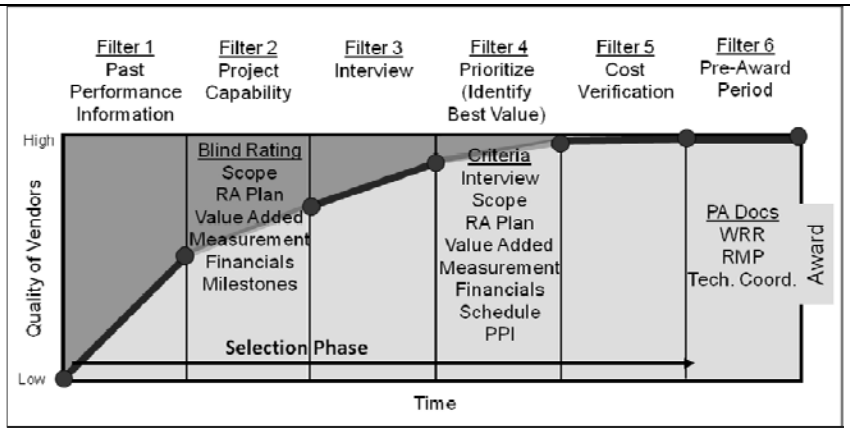

Figure 5. PIPS/PIRMS Filters (Kashiwagi, 2010)

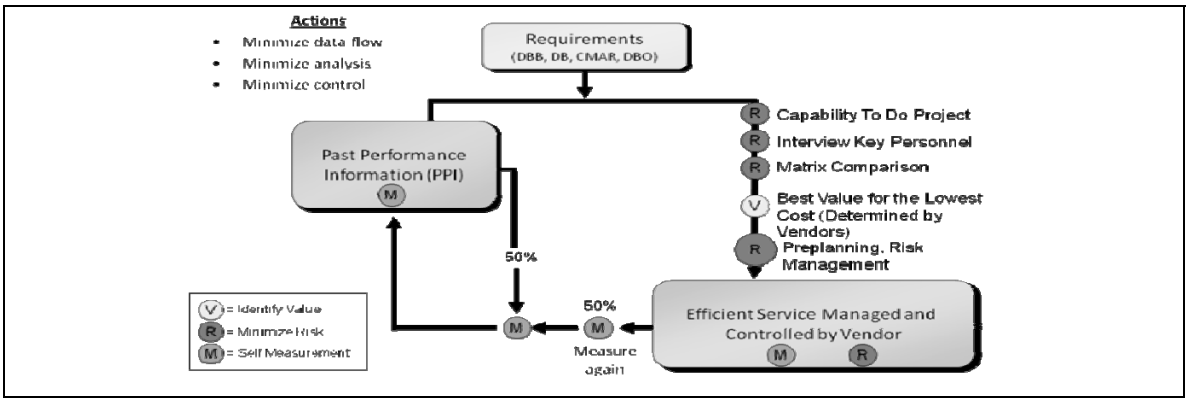

Figure 6. PIPS/PIRMS Self Regulating Closed Loop (Kashiwagi, 2010)

A Paradigm Shift: Understanding that Expert Vendors Have no Technical Risk

A major departure from the traditional project management practices is the understanding and handling of risk. Information Measurement Theory (IMT) identifies that by definition, high performance/expert personnel have minimal or no technical risk (Kashiwagi, 2010). If there is technical risk, it is only because the client hired a vendor who does not have the expertise and therefore is not capable of minimizing risk. Instead of managing, directing, and controlling the vendor, the owner is now creating a new environment, where the vendor is identified as the expert. Therefore, the new environment minimizes all management, direction, and control of the vendor. This simple but difficult change in paradigm, forces the transfer of risk and control to the expert, and aligns all resources.

The authors propose that the impact of unforeseen conditions can be minimized if experts are used to manage and minimize the risk that they don't control. The only risk high performers have is risk that they do not control (risk that is brought by other participants, mainly the client in the form of over-expectations, items outside of the scope, decision

making by other participants at the wrong time during the process, and the changing of expectations) (Figure 8).

The new paradigm motivates vendors to preplan the project from beginning to end and know the risk that they do not control and how they will manage that risk before they accept the project. By deductive logic, a system that increases client management, direction, and control moves the activity to the more inexperienced vendors and personnel (Figure 8). This results in lower performance, reactive behavior, minimum standards or expectations, and minimum accountability.

Price based contracts emphasize the technical risk that the vendors must control. Price based contracts attract the less experienced, and makes the very experienced less competitive (Figures 4 and 8). Best value contracts must identify and communicate the expectations of the client but emphasize the requirement of the vendors to manage and minimize the risk that they do not control, thus thinking in the best interest of the client and creating a "win-win." Price based contracts must cater to the inexperienced and increase the flow of information, contract documents, and client management, direction, and control. Best value contracts cater to the high performing contractors who need minimal information, who act in the best interest of the client by giving high technical service (no technical risk) and manage and minimize the risk that the vendor does not control through the use of quality control and risk management plans.

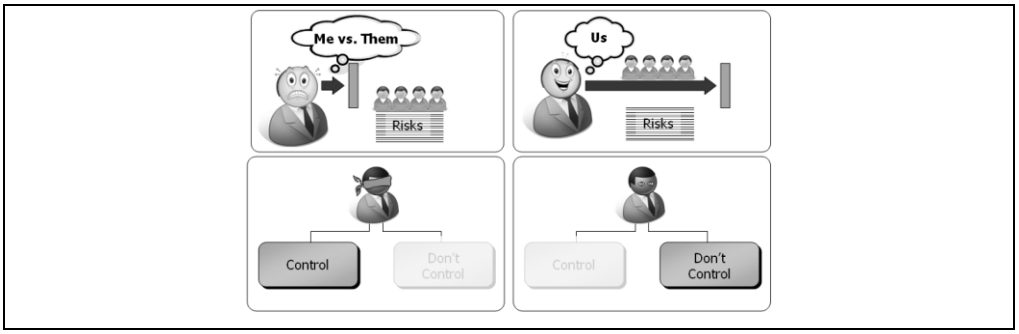

Figure 7. Inexperienced versus Experienced Vendor Risk Model
(Kashiwagi, 2010)

High performers and experts by definition are rarely surprised, are rarely affected by "unforeseen conditions," and if there are "unforeseen conditions," high performers have a preplanned solution that they can easily identify, manage, and minimize the cost and time deviation. Due to the low performing mentality of the construction industry, and resulting low performance of the industry participants, the risk of "unforeseen conditions" has increased, and instead of requiring high performance and the minimization of risk that the vendor does not control, the industry has created a transaction based solution of client management, direction and control, which increases the number of participants who do not have the capability to minimize the risk. These participants create silos where they verify and manage the vendors schedule and cost, negotiate prices, and approve all deviations in schedule or materials. In this inefficient system, the inexperienced contractor becomes more competitive than the high-performance contractor with very experienced personnel, who cannot efficiently do their project in an environment of redundant and un-needed transactions.

These deductive concepts have not only been confirmed through the 15 years of testing, but have been identified in other non-construction industries. By minimizing the

management, direction, and control of subject matter experts (SME), transferring the risk and control to the vendor, by forcing the vendor to write the contract which requires an expert vendor, and by forcing the vendor to manage and minimize the risk they do not control, a structure has been created which aligns resources and minimizes the transactions. The regulator of the structural change is the weekly risk report (WRR) and the risk management plan (RMP.) They create transparency, which minimizes the need for management, direction and control.

Method of Measurement

The method of measurement of performance utilized by PIPS is a novel approach which has had successful results in the past five years (Kashiwagi, 2009). The assumption is that a large organization delivering services with project managers who are accustomed to manage, direct, and control, will have a difficult time consistently and doing timely reporting and analysis of performance due to the inefficiency of a management based system. PIPS identifies who should be at risk (expert), and forces the measurement of performance (deviation of project time and cost) by the vendors. The deviations are then reviewed for accuracy by the client/buyer's professional (quality assurance.) The information goes directly to the top decision maker in the organization, bypassing the normal filtering system in a bureaucracy. A simplistic use of spreadsheets does the following:

1. Identifies the deviation rates of all projects.
2. Identifies the top ten riskiest projects, and which participant in the supply chain caused the deviation.
3. Measures all participants in the supply chain, giving a relative performance rating based on deviations and performance.

The PIPS measuring system overcomes the major obstacles large organizations have:

1. Subjective filtering of measurements.
2. Lack of timely reporting.
3. Lack of time to do accurate reporting.

GSA Strategic and Tactical Plans to Implement New Environment

The GSA signed a five-year contract with the Performance Based Studies Research Group (PBSRG) to implement the new best value system. Previous research results (Kashiwagi, 2010) identified that both a strategic plan and a tactical plan are required to successfully make the transformation. Previous results identified the following priorities:

1. Identification of a core group of visionaries who could understand the theoretical change in systems, and be systems managers and managers of personnel.
2. Education, development of the core group of visionaries to learn how to use the system.
3. Implementing and modifying PIPS to fit the environment of the owner.

4. General education to the owner's organization of the PIPS system.

The strategic plan encompasses the first two objectives, and the tactical plan is the second two objectives. The tactical plan (second two objectives) cannot be implemented without the strategic plan. The strategic plan therefore, must include the following:

1. The development of the visionaries.
2. Theoretical education of the visionaries.
3. Job transformation of the visionaries from project managers to educators and systems managers.
4. Changing of the effectiveness of the chain of command.
5. The visionary group must learn to apply the concept of PIPS to their organization's transformation.
6. Documentation of the transformation by the system.
7. Peer review by other visionaries located at other organizations who are working toward the same goals.
8. Development of measurements and a schedule showing the improvement in performance and value.

The tactical plan must include:

1. The modification of the PIPS to move the owner's organization without increasing resistance due to the change of efficiency and structure.
2. Education on PIPS to both vendors and PMs running the system.
3. Prototype testing and implementing PIPS by core team visionaries.
4. Design of the information system.

If the concept of transferring risk and control to the expert vendor, and aligning the resources in the entire supply chain through measurement of deviation is accurate, this system transformation is not industry specific. It is a system regulated by measurement, which aligns all the participants in the supply chain, minimizing the transactions and forcing experts to be accountable. It will bring discomfort if a subject matter expert (SME) is misaligned or does not currently have accountability. Therefore the transformation has to be "gentle" and evolutionary.

Progress of the GSA

The implementation of PIPS in the GSA has been relatively optimized due to the following:

1. The head of the core team visionaries, the region director of the organization, was already attempting to transform the organization to a measured organization. His strategic goals of efficiency and effectiveness of both vendors and the GSA organization was already in place.
2. The PMs of the core team were identified and selected based on the Information Measurement Theory (IMT) and therefore were attempting to use the concepts of PIPS before the transformation effort.

3. This is the first time in 16 years of testing that both a PM and procurement officer were original members of the visionary core team, and the director was already attempting the transformation.

4. This is the first time that the PIPS was selected through application of PIPS, thus confirming to the core team that PIPS was dominant in its ability to transform organizational environment/systems.

First Measurement of Existing Performance

The core team selected 8 projects where information was readily available to identify the performance of the existing environment. The performance measurements include:

1. Average cost/scope of projects: $526,992
2. Average duration of projects: 152.5 days
3. Cost deviation of projects (percentage): 7%
4. Time deviation of projects (percentage): 231%
5. Customer satisfaction (1 -10 rating, 10 being optimal): 6.5

The core team is also interested in the following measurements that will be collected through surveys:

1. Vendor profit margin: TBD
2. Vendor rating of delivery system: TBD
3. Vendor perception of new system (1 – 10 rating): TBD
4. Number of projects a PM is responsible for: TBD

The GSA's next step is to complete six (6) test projects and collect data to confirm increased performance with the new best value PIPS system. The Contractor and PM shall rate the following before and after on the traditional system vs. the new best value PIPS system:

1. Effectiveness (deviations.)
2. Value of preplanning by vendor as perceived by both the vendors and the GSA PM.
3. Value of vendor managing and minimizing the risk that the vendor does not control as perceived by all participants.
4. Vendor's profit margin maximization.
5. Accountability of all the participants as perceived by all participants.
6. Successfulness and impact of the transfer of risk and accountability to the vendor.
7. Project coordination by the vendor with the client.
8. Minimization of surprises.

Schedule of Implementation

It is a five-year tactical plan:

1. Year 1: set up core team structure. Run the first tests with core team and a few PMs.
2. Year 2: set up the Directors Report and expand both the running of the entire process and the risk management reporting (which measures the performance of projects).
3. Years 3 - 5: expand implementation within organization. Visionary core team becomes a subject matter expert (SME) to assist in the transformation of other organizations.

Analysis of the Effort

This research effort is using the deductive approach (confirmatory) instead of the inductive approach (exploratory.) The success of the project will be determined by measurements of observation which minimize subjectivity as much as possible. The following are observations of the effort thus far:

1. PIPS has been identified by a GSA selection process as the only option with documentation of proven success to transform an organization's environment from a management, direction, and control environment to a best value, alignment, leadership based environment.
2. A large federal organization who is constrained by federal law, will implement the PIPS process for selection of vendor, and contract administration.
3. A visionary core team has been organized that is optimal in terms of a high-ranking visionary leader, and visionary PM and procurement components.
4. For the first time, strategic and tactical plans have been drawn up and will be used in the research test.

Conclusion

The GSA Heartland region is implementing an advanced and theoretically sound best value delivery process to transform the system from a price based to a best value environment. The major objectives include: minimization of management, direction, and control transactions, the transfer of risk and control to vendors who can minimize the risk, measurement of performance of the vendors and the GSA organization, and to measure an increase in performance and value of the services being delivered. A core group of visionaries are attempting to transform the organizational approach from one of management of personnel to a systems management, where performance measurements drive alignment of resources. This is a significant effort for a large federal organization that normally is management based and has difficulty in minimizing bureaucracy.

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- Evolutionary Acquisition
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- Pallet Management System
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- R-TOC AEGIS Microwave Power Tubes
- Sense-and-Respond Logistics Network
- Strategic Sourcing

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