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EDITORIAL BOARD

Letter from the Editor *December 2012*

Dear friends,

With this issue, readers will see the transformation of the delivery of construction and other services in the Netherlands is unique in its scope, breadth, success and the a change of paradigm. There are a multiple tests ongoing in the Dutch transformation:

1. Change from a traditional owner controlled procurement model to a BV PIPS futuristic vendor controlled model using concepts such as "no control", no decisions and vendor determines the scope.
2. Implementation of a BV PIPS research model that uses deductive logic and dominant information.
3. Test of a PBSRG research model that does not depend on government research funding.
4. A research program where both the industry and the academic researchers are working together on the project tests.

The papers in this journal include:

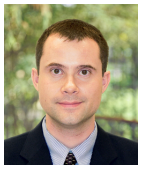
1. Why the Dutch were open to such an "out of the box" American research idea?
2. What were the unique characteristics of the PBSRG research program made it possible for the Dutch to understand and implement the BV PIPS model?
3. What is the impact of the PBSRG concept of working with "visionaries" and forming a core group on the Dutch success?
4. What problems were caused by the different maturity levels [18 year, 1,000 test BV PIPS PBSRG research program and the young Scenter/Delft Dutch research program]?
5. What test results from the Dutch effort have gone beyond the BV efforts in other countries?
6. How does the Dutch change of paradigm compare with results from a developing country [Malaysia] and a very developed country [Japan]?
7. Lessons learned from preliminary Dutch tests.

Besides the Netherlands, the BV PIPS research has been flourishing in the United States and Canada. The objective of this journal is to assist academic researchers in other countries to follow the Dutch in transforming their delivery systems in their own country. PBSRG is planning to use the Dutch model in Australia, India, Chile and Ireland in the coming year (2013).

We look forward to your continued involvement in the Journal for the Advancement of Performance Information and Value (JAPIV) as a reader, subscriber, reviewer, sponsor, or author.

Warm regards,


Dean T. Kashiwagi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The Research Model that Revolutionized the Dutch Construction Industry

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The Dutch construction industry is making a change from an owner controlled to a contractor-controlled environment. It is a movement from a top down culture (management, direction and control) to a bottom up culture (alignment and use of expertise). Owner decision making, management, direction and control are being replaced with a leadership model, which aligns and utilizes the expertise of the contractors. The changes in the Dutch construction industry validate a non-traditional research model, which used deductive logic and case studies involving dominant information and visionary industry participants, non-traditional concepts of Information Measurement Theory (IMT), the Construction Industry Structure (CIS) model and the best value Performance Information Procurement System (PIPS).

Keywords: best value, construction, Dutch construction industry transformation, leadership based supply chain

Introduction

In the early 2000s, the Dutch construction industry experienced industry collusion. The majority of general contractors, subcontractors, and material suppliers were found to be participating in the price collusion on Dutch construction projects (Doree 2004, Kashiwagi 2011, van de Rijt et al. 2009, Wearden 2008). What made this collusion interesting was the low rate of contractor profit margin (less than 4%). The initial attempt to fine the guilty parties based on their turnover, made way to identifying the guiltiest offenders and using the information from the confessed participants to convict a few offenders. It resulted in an environment of confusion and fear. The industry did not have an understanding of the cause and solution of the collusion (Ang 2011).

A visionary in the Dutch government, George Ang from the Ministry of Housing, identified a potential solution to the collusion problems. Ang was exposed to the best value approach, industry structure and a potential solution at various international conferences (2011). The solution included explanations using the Construction Industry Structure model (CIS) and the Best Value (BV) explanation from Arizona State University, which explained that the problem was not caused by the colluding vendors but actually by the owners' management, direction and control of the contractors (Ang 2011, Kashiwagi 1991). The difference with the (BV) explanation and other explanations was (Kashiwagi 2012, Santema 2011):

1. The simplicity and clarity of the explanation.
2. The solution was not a technical construction industry solution, but a supply chain solution.

3. The solution had been tested hundreds of times with dominant results (awards, time and cost savings and increased vendor profits).
4. The industry structure model explanation matched the observations of the Dutch construction collusion environment and results.
5. It was the only solution that proposed a "win-win" result, lower project cost and higher construction contractor profit.

Preliminary test results of the BV system solution from the United States included (PBSRG 2012):

1. 98% customer satisfaction, on time, on budget.
2. Vendors increased their profit as much as 100%.
3. PIPS system could reduce government transactions as much as 90%.

What made the Dutch case study unique was the reason why Ang (2011) sought out an American academic researcher's, Dr. Dean Kashiwagi, solution to solve the Dutch industry problem. The American researcher had a simple explanation, test results and dominant proof. Kashiwagi combined logic, simplicity, and repeated dominant test results to support his solution. No other proposers were ready to implement. The PBSRG was using an unconventional research model and approach. Kashiwagi's expertise was derived from simultaneous conceptual design, immediate industry testing, modification of the design solution and immediate retesting/implementation (components of the scientific method). The staggering amount of repeated industry testing, the dominance of the test results, and the simplicity of the explanation was convincing enough to "gain the attention" of Ang. Kashiwagi proposed that the solution not only theoretically explained the Dutch contractor collusion, but would also correct the problem. Ang brought Kashiwagi and the PBSRG to meet leaders from the Dutch government agencies in 2004 (Ang 2011).

Performance Based Studies Research Group (PBSRG)

The Performance Based Studies Research Group (PBSRG) was started by Kashiwagi in 1991. PBSRG was unique in the following ways:

1. It proposed that the solution to the construction industry problems of non-performance could be quickly identified, using simple explanations, which could be easily tested.
2. The simplicity of the solution challenged the more complex traditional construction management approaches of the past 20 years. PBSRG identified that traditional risk and project management by the owner increased risk and lowered performance instead of decreasing it. It proposed that owner management, direction and control cannot be utilized to increase construction industry performance. It differentiated the terms of "management, direction and control" with the term "quality control" (conducted by the expert vendor). One increased risk, one decreased risk.
3. PBSRG did not seek or receive any traditional government research funding. Government research funding was primarily given to researchers whose research was aligned to the traditional research approaches. To get government research funding, one had to believe in the traditional research methodologies and participate in the

traditional and popular research approaches and activities. All funding received was operational funding from "visionary" industry owners (visionary is defined by authors as participants who understood the BV concepts and followed exactly the proposed BV approach, oftentimes allowing the authors to test the BV concepts in totality) who used their own operational funding to more efficiently accomplish the operational requirements of organizations. PBSRG was able to do their research without catering to any constituents or previous ideas in the construction industry. PBSRG proposed if the government research funding had been utilized properly; the construction industry would not be in the dire status it found itself in. This approach was viewed as aggressive and polarizing.

4. PBSRG had control over the majority of tests that were run. PBSRG only ran research tests with visionaries. PBSRG identified the majority of industry personnel as "blind" and the reason for the industry problems. Visionary research industry partners allowed the PBSRG researchers to control the tests due to dominant past performance of the researchers' tests.
5. A deductive approach to research was utilized. It identified concepts based on simple observations. It did not depend on industry consensus and support, assuming that the industry was tainted by their incorrect practices and personal agendas. It assumed the answer would not come from the industry, which was causing the problem, nor would they have agreement of the majority of the industry.
6. The research ideas and solutions would come from outside of the traditional construction management research area. Ideas would have to be easily correlated to observations of case studies, logic and common sense. If the results were not dominant, it would not have had any value. Dominant is defined as something so simple that it would attract the industry visionary. The solution had to overcome the bias against change that their traditions, culture, and personal experiences.
7. PBSRG realized that this approach would receive stiff resistance from traditionalists, peers and industry participants. To find the solution, PBSRG realized that it would have to get into the "rice bowl" of many researchers. PBSRG assumed that most industry researchers and practitioners were "blind," reactive, and silo based personnel who were not capable of understanding major sources or solutions to the industry problems. Logically, the problems would not exist if they were visionaries.
8. By observation, most researchers were not industry experts, but academic professionals (Muatjetjeja et. al. 2009). Their main objective was to gain academic positions, and not to be a career researcher and industry expert. These individuals were not who had to be convinced, it was the industry practitioner visionaries who were actually going to implement the solutions that needed convincing.
9. To overcome the more complex traditional approaches and to find the visionary, the solution would have to be simply stated, easy to explain, testable, and re-testable over a short period of time. Although the application would be embellished and improved, the foundation tenants had to have characteristics of recursion. The foundation tenants would explain the solution to a myriad of problems that were occurring.
10. It was also determined that in order to be sustainable, a totally new research model would have to be created where visionary industry and academic researchers could work hand in hand.

The PBSRG model was to observe, identify the solution, find the visionary, test the concepts with the visionary, and document. Traditional research concerns such as type of funding, prestige of funding source, complete literature search, peer review and tying into existing traditional thought were bypassed. PBSRG did not value what others were doing if it didn't lead to dominant results.

The New Research Model

The research model was simple. Find a dominant solution through observation. Expose the solution to the industry through many educational presentations. Find the industry visionaries (client/owner, contractor, or other participants in the supply chain) who understood the revolutionary foundation concepts. Run tests with the visionaries. Document the results of the tests. Find more visionaries and run more tests. Document the tests. Sustain the iterative process. Using Patton's military maneuver of bypassing any resistance and returning later and crushing the resistance from the rear, the new research model used dominant test results, which would overwhelm the silo resistance of traditional industry thinkers. This required the researcher to have simultaneous theoretical conceptual research, prototype testing and implementation research at the same time. The margin of error has to be minimized, because the research funding is not government research funds, but operational funds of organizations, which cannot be wasted. If the concepts were correct, the research would flourish. If the concepts were wrong, the funding would be terminated. The new research model would require:

1. Robust, conceptual models that were simple and accurate.
2. Presentation to identify visionaries.
3. Industry funding by visionaries who would give control of the research testing to the researchers.
4. Repeated testing.
5. Use of the research funding to resolve issues in the entire research program, i.e. teaching concepts, conceptual research, identifying new environments where the concepts could be tested, and research tests.
6. Visionary research participants who would pool their resources and opportunities. The team would include research visionaries who funded the effort, research visionaries who help test the concepts and gain access to more visionaries but did not necessarily provide any research funding and support staff that multitask to allow the researchers to maximize their time to do the research.
7. Research experts would be researchers' first, and academic professionals, and administrators second. The strength of the research program would be the professional researchers and not graduate students. Graduate students would augment the work of the expert professional researchers.

Research Technology

The foundational components of the proposed solution were the Information Measurement Theory (IMT), Kashiwagi Solution Model (KSM), Industry Structure (IS) model and the Best Value (BV) Performance Information Procurement System (PIPS), or the Performance Information Risk Management System (PIRMS). IMT, KSM, Construction Industry Structure

(CIS) model, which is also known as the Industry Structure (IS) model were created in 1991 – 1994 (Kashiwagi 1991). The concepts were documented, copyrighted, and licensed by Arizona Tech (also known as AZ TECH, the licensing group of Arizona State University). IMT and KSM were developed in the Kashiwagi family and copyrighted (1976-present) (Kashiwagi 2011). Basic tenants of IMT included:

1. Only one outcome. Event outcomes are dictated by the event's initial conditions and natural laws that explain the change from one condition to another and which can be used to predict the event's outcome.
2. No chance element. There are no elements of chance or randomness.
3. Predictability. Every person and condition is predictable with sufficient information.
4. The expert has no risk, as risk is defined as when the outcome does not match the expectation. The expert can always see into the future and therefore knows what will happen before it happens. Experts predict, not expect.
5. No control. Practice of control increases risk. One party does not have any effective influence or control over another party. Any use or intent or dependence of a mechanism to control another party to mitigate one's risk increases the risk. Any use of a contract to enforce the buyer's expectation on a vendor would increase risk and cost.
6. Risk management increases risk. The use of project and risk management by one party who is not an expert to minimize the risk caused by another party increases the risk. Rather than have risk management, the owner should have hired an expert.
7. Common sense needs no approval. Common sense and logic do not have to be tested before being implemented. If the concepts were accurate, the concepts would work everywhere.

The concepts of IMT were developed in the Kashiwagi home (1976 – present). Examples from the Kashiwagi family that simplify IMT concepts are taught to industry practitioners due to general knowledge and commonality of family practices by most construction practitioners. By transforming these concepts from the realm of common family practices to the perceived more complex and different construction industry environments, the researchers were able to bypass the discussions of technical experts who are often focused on complex industry details and variables which usually only led to confusion and no action.

Construction Industry Structure and Practices

PBSRG research concepts identified by observation were:

1. Owner control of projects is a major source of nonperformance.
2. Owner decision making in the selection of contractors and project/risk management were a major source of risk.
3. Owner management, direction and control of vendors increase project risk.
4. Transparency is created by minimizing owner decision making and by vendors restricting their communications to performance metrics.
5. Expert vendors have no risk.

These concepts are used in the BV PIPS structure. Instead of discussing each point with industry participants who did not understand, PBSRG ran repeated testing of BV PIPS with industry visionaries. The test results validated the industry structure concepts. PBSRG gambled that it would be more effective over 20 years to:

1. Not compromise the IMT concepts with traditional industry approaches.
2. Work only with industry visionaries and bypass the majority of industry participants and peer reviews.
3. Focus on simplicity.
4. Use the deductive approach.
5. Test the concepts and quickly turn around the test results.
6. Document the results using simple metrics of customer satisfaction and project deviations.
7. Continually perform tests (repeated testing).
8. Use dominant test results to replace the need for peer reviews from other academic researchers. If the results were not dominant, there was no value to the research.

Positive Impact to the Industry

PBSRG identified its major goal to impact the industry. The secondary goal was to find industry visionaries who would assist in changing the industry. If the industry leader did not agree with PBSRG's concepts, PBSRG did not work with them. Work is only done with visionaries who understand the simplistic concepts. PBSRG put on a schedule of presenting to the industry 50 times a year to identify industry visionaries and to get research grants. The result of the effort has validated the concepts (PBSRG 2012):

1. Length of research effort: (1993-present, 19 years)
2. Research funding: $12M
3. Number of research tests: 1,600+
4. Amount of construction and other services delivered: $4B
5. Number of states in U.S. which participated in research tests: 9 states (17.6% of all U.S. states)
6. Change the construction procurement law in two states: Oklahoma and Minnesota.
7. Number of different countries who participated in research tests: 6 countries (Finland, Netherlands, Botswana, Canada, Malaysia and United States)
8. Number of refereed conference and journal papers: 200+
9. 98% customer satisfaction of test results
10. Minimized owner transactions by up to 90%.
11. Increased vendor profit by as much as 100%.
12. Assist low performing contractors to perform using the BV structure.
13. Industry awards:
    a. 2012 IFMA Fellow, International Facility Management Association for BV PIPS Development,
    b. 2012 Dutch Sourcing Awards – Best Overall Procurement Effort & Operational Excellence – Rijkswaterstaat BV PIPS Implementation,

c. 2011 IFMA Minneapolis/St Paul Chapter Facility Practitioner of the Year – ISD 287 FM Implementation of Best Value.
d. 2011 George Cronin Silver Award for Procurement, State of Idaho Dept. of Admin. Div. of Purchasing, National Association of State Procurement Officials (NASPO).
e. 2009 Educator of the Year Award, International Facility Management Association Awards of Excellence for outstanding research using BV PIPS,
f. 2008-2009 Fulbright Scholar Award to implement BV PIPS in Botswana at the University of Botswana,
g. 2007 COAA Gold Award, City of Peoria implementation of Best Value.
h. 2007 FCM's Station Style Gold Medal in Design, City of Peoria utilizing BV PIPS,
i. 2005 H. Bruce Russell Global Innovator's Award, CoreNet Global, Corporate Real Estate, Harvard University Implementation of BV PIPS, 2001
j. Pono Technology Award, State of Hawaii and Implementation of BV PIPS Technology.

The PBSRG research effort to change the construction environment from a price based and owner controlled environment to a best value environment is the longest running, highest funded construction management research effort, having the largest number of tests, and the most dominant impact on the construction industry in the most locations in the world. It identified that construction management was an inefficient practice, and should be changed to vendor quality control and owner quality assurance. It is the dominant performance of the BV PIPS system and the performance of the research program that caught the attention of the Dutch visionaries. Without the proven performance and the dominant logic, PBSRG would not have had the opportunity to assist the Dutch to change their delivery system. The authors propose that this is the reason for the ineffectiveness of the construction management research groups in assisting the construction industry to change, a lack of dominant performance results of research groups' proposals. PBSRG proposed that if the research has dominant results that the industry needs, the industry will implement. The industry is interested in decreased project cost, efficient project delivery, and increased vendor profit. PBSRG delivered a best value PIPS system that decreases project cost and increases vendor performance and profits.

Impact of Best Value PIPS on the Dutch Construction Environment

In 2004, PBSRG was brought in to present to the heads of Dutch government agencies by a visionary looking for an answer to the construction dilemma (Rijt & Witteveen 2011). As a result, two interested parties came to Arizona State University (ASU) in 2005: a representative from a large general contractor and two representatives from the largest buyer of construction services, Rijkswaterstaat, responsible for the majority of water and road construction in the Netherlands. The same year, ASU licensed both the Rijkswaterstaat and the third largest Dutch contractor Heijmans to utilize the BV PIPS technology. However, the Dutch academic community reacted to the best value approach as an American idea and resisted any significant testing of BV PIPS. In 2006, Heijmans identified a visionary from the Delft University of Technology, outside of the construction management area, from the supply chain and marketing academic area. They immediately identified the BV PIPS idea as the most accurate explanation

and solution to the Dutch construction supply chain problems (Santema 2011). At the same time, visionaries in Rijkswaterstaat were searching for a test opportunity to run the BV PIPS approach. In 2007, ASU agreed to award a license and support the Dutch visionary and their consulting firm, Scenter, and Delft University of Technology. The rationale for the licensing was (PBSRG 2012):

1. Scenter agreed to translate the concepts of IMT, KSM, Industry Structure and BV PIPS into Dutch. This was needed to make the concept of BV PIPS a Dutch idea and give Dutch government groups the opportunity to use Dutch documentation to understand the concepts.
2. Scenter would proliferate presentations of BV PIPS to the Dutch industries.
3. Scenter would search for Dutch industry visionaries and run BV PIPS tests.
4. Scenter would test out the PBSRG research model (Dutch test), and attempt to validate that the model can be duplicated.

Dutch Test

The Dutch test would include the following components:

1. Identify if the new research model created by PBSRG can be successfully implemented by Scenter to bring change to the Dutch construction industry. The validation of this component would be the identification of Dutch construction visionaries' community to run the best value approach.
2. Identify if the concepts of IMT, KSM, BV PIPS and PIRMS could effectively be tested and implemented in the Netherlands (different culture and language).
3. Identify if the research model and research concepts would be able to integrate various silos of the construction delivery process, i.e. procurement, project management, risk management, professional engineers, and major construction buyers.

Rijkswaterstaat Test Projects

Two visionaries in the Rijkswaterstaat organization, Wiebe Witteveen and Carlita Vis, utilizing the expertise of Sicco Santema and Jeroen van de Rijt of Scenter and with the assistance and support of PBSRG, made the $1B (original budget, later reduced to $800M) fast track infrastructure projects at the Rijkswaterstaat the largest best value PIPS tests in the world and the centerpiece of the Dutch effort. Rijkswaterstaat is the government agency that is responsible for execution of the public works and water management, including the construction and maintenance of waterways and roads in the Netherlands (Rijt et al. 2011, Rijt & Witteveen 2011, Andersson Elffers Felix 2010). The road network in the Netherlands (specifically the Randstad area) is heavily congested, with unreliable journey times of one in five during the rush hour. Most of the traffic jams in the Netherlands (81% in 2005) are concentrated in the four largest Dutch cities (Amsterdam, Rotterdam, The Hague and Utrecht), and the surrounding areas. Its 7.5 million inhabitants make up almost half of the population of the Netherlands. In the Netherlands there are extensive procedures preceding road construction. The average lead-time from idea to new road is over 20 years. Construction renovation projects often take 12 years to materialize. A law was passed called "Besluitvorming Versnelling Wegprojecten" (translated:

"Decision for Accelerated Road projects"). This law simplifies some public procedures concerning environmental issues for 30 specific road bottlenecks (traffic jam sources) starting January 1st, 2009. The law enabled Rijkswaterstaat to use some experimental "non-traditional" processes. The Dutch Ministry of Infrastructure and Environment identified 30 major bottlenecks (30 projects started, and ten projects completed) by May 1, 2011. The Rijkswaterstaat selected 16 projects to be completed in three years (2009-2011). The methodology selected to attempt to meet the deadlines was the implementation of BV PIPS. The BV PIPS was modified to meet the requirements of European law. The Rijkswaterstaat plan was made possible by:

1. The Scenter/Delft group and Rjkswaterstaat's ability to translate the BV PIPS into Dutch and modify PIPS to meet the European regulations. Presentations were given to both the Rijkswaterstaat project managers and to the Dutch general contractors. All documentation was in Dutch.
2. The dominant results (100% increase in profit, 90% decrease in owner project management requirements, and 98% customer satisfaction) of the American tests were sufficient motivation for both Rijkswaterstaat and contractor personnel to agree to the BV PIPS approach for the $800M infrastructure package. Less dominant test results may not have had the impact to overcome the resistance against change.
3. The Rijkswaterstaat procurement visionaries Wiebe Witteveen and Carlita Vis were highly educated by PBSRG and Scenter personnel. These two visionaries controlled the entire procurement of 6 packages and 16 projects. The tests were procurement tests and did not emphasize the risk management and project management paradigms of the BV approach. If these new paradigms were also implemented, the results may have been more dominant. Without the visionaries who understood the new paradigm, the tests would not have been possible.
4. The Dutch expertise of Scenter in BV PIPS was critical to the ability of the Rijkswaterstaat to run the tests. Scenter used the PBSRG research model, becoming an extension of PBSRG. The resulting Rijkswaterstaat tests and other Dutch organization implementations of the BV PIPS was a dominant success. The constant support of PBSRG experts to support both Rijkwaterstaat and the Dutch researchers at Scenter was also important.

By observation, the traditional research methodology of conceptual research, prototype testing and implementation of test results would not have led to the successful Dutch tests. The traditional system is too slow, and does not focus on alignment of visionaries and experts. The setting up of Dutch capability to support the BV PIPS tests was done through the creativity of the PBSRG research model. The PBSRG model included:

1. Using the license system to give the licensing rights to the Rijkswaterstaat.
2. Using a business approach to ASU teaching and research requirements to allow PBSRG to support the Dutch effort. Designing the PBSRG research, administration and research partners to act as a business allowed PBSRG to travel and support the Dutch at minimal cost. As the objective was not the "amount of the research funding" but to impact the industry, the success of the Dutch test would be a boon to all the PBSRG research clients. This objective creates an entirely different approach to the integrating of different research client funding. Because PBSRG's research is solely to

test, implement, modify and improve the explanation, methodology and the BV PIPS system, an advancement on any research client's project is an advancement for all the other research clients' projects. This allows PBSRG to use funding of one group in a test by another group. It also allows the using of the concepts in experimental teaching in the ASU and Del E. Webb School of Construction's honors classes.

3. Using the IMT development in the Kashiwagi family to simplify the concepts of the BV PIPS approach and overcome industry and cultural differences and resistance. The "no rules" environment, the inability of Dr. Kashiwagi to change, influence or control his wife and children, the results of the movement toward "no rules" and win-win of the "no rules" transparent family environment accelerated the understanding of the best value approach among the Dutch. The only resistance left was a technical resistance based on the difference of European law.

Rijkswaterstaat Test Results

The Rijkswaterstaat test results included:

1. Scenter and the Rijkswaterstaat successfully implemented the BV PIPS approach. They changed the Rijkswaterstaat construction delivery model from the traditional owner controlled contract to the following while still meeting European law requirements:
2. No control or influence environment over the vendor. The vendor identifies their own scope.
    a. Vendor writes the contract instead of Rijkswaterstaat.
    b. Transfer of risk management to the vendor. The owner only practices quality assurance, which assures that the contractor has their quality control systems and risk management systems in place.
    c. Documented performance of Rijkswaterstaat and the vendors using the BV PIPS weekly risk report.
3. Procurement transaction costs were reduced by over 50% for both Rijkswaterstaat and the construction contractors.
4. 95% of all project deviations were caused by the client. The only reason for projects that are still not completed is the owner driven changes, which the contractor experts identified early in the projects.
5. 14 of the 30 projects where completed, surpassing the goal of 10 projects.
6. Average completion time for projects was reduced by 25%.

The enormity of the change of Dutch paradigm and thinking did not allow for a complete BV PIPS implementation. What added to the difficulty is that PBSRG, even with 20 years of experience with the BV PIPS approach, is still making modifications to improve the understandability and performance of the BV PIPS system. The following areas were not implemented in the Dutch tests:

1. Clarification period. It was thought that this could not be done under European procurement law; however, it is being done in current projects.

2. Dominance check of the price. This is not being done due to potential conflict with European law, but will be analyzed extensively in the coming year.
3. The coordination between the detailed construction schedule and the weekly risk report milestone schedule was not implemented.
4. The understanding of the contractor scope, the methodology of minimizing risk that the contractor did not control and using performance metrics to measure that ability to minimize risk was not implemented.
5. The use of past performance information was also not utilized. European law identifies that in the selection of a contractor; past performance information that relates to previous projects cannot be used.

The use of critical metrics that identify the proposed project team's capability to do the proposed projects was not used. Therefore, the subjectivity of the selection team was used more than advised under normal BV PIPS deliveries. This problem has plagued users of the BV PIPS structure due to the tremendous change in paradigm of the vendor having the risk to show dominant capability instead of the selection committee using their technical expertise to identify capability of a contractor.

Due to the success of the Rijkswaterstaat projects and the continuing education by Scenter of professional consultants, government and private sector owners/procurement personnel and vendors (in and out of construction industry), the following results emanated from the Rijkswaterstaat tests:

1. Knowledge transfer to some of the top professional groups in The Netherlands. Keynote addresses on the BV PIPS approach by Kashiwagi to 2010 NEVI Annual Conference (Dutch Professional Procurement Organization), 2011 PIANO Annual Conference (Dutch Government Procurement Organization), 2012 Dutch National Infrastructure/Road Conference, and 2012 CROW/RISNET (Dutch Technology Platform for addressing project and risk management in transportation, infrastructure and space).
2. NEVI licensing BV PIPS technology from AZ Tech (licensing arm of technology developed at Arizona State University). NEVI is educating and certifying procurement professionals.
3. Formation of BV Board that will participate in the certification of practitioners. The BV Board will include project managers, risk managers, engineers, procurement professionals and supply chain experts. These participants are being trained once a year by the BV originator Kashiwagi in the IMT, KSM, industry structure, and BV PIPS and PIRMS.
4. Award of the 2012 Dutch Sourcing Award to the Rijkswaterstaat for the Dutch Procurement Innovation for public and private organizations in 2012.
5. Movement of the BV technology into the City of Amsterdam.
6. 6 of the 10 biggest municipalities in the Netherlands have been using BV.
7. Movement of technology into completely different areas, such as social work.
8. Acceptance of BV technology by Prorail, the Dutch organization responsible for all rail infrastructure in the Netherlands.

9. Scenter, the Dutch BV expert and PBSRG licensed partner, increased the BV educator/project management team from one to nine (increase of over four-fold) to keep up with demand for BV education requirement in the Netherlands. Scenter has published over 15 papers, published two Dutch books on BV PIPS (> 6000 copies distributed since 2009), given over 100 presentations to over 2,000 attendees, and participated in 50 projects.

Conclusion

Almost every major government organization in the Netherlands has now been exposed to BV PIPS. Rijkswaterstaat and Prorail, the two organizations that control a majority of water, land, and rail infrastructure are implementing BV PIPS into their delivery of services and shaping their organizations into more efficient organizations. The major Dutch procurement organization NEVI is educating and certifying practitioners.

The project managers, risk managers and engineering groups are now getting involved with the BV approach, cooperating with the procurement group NEVI. The BV PIPS approach is moving to industries outside of construction, being proliferated by the procurement professionals. The Dutch have made the movement from management direction and control, win/lose, owner controlled to alignment of expertise, win/win and vendor controlled. They are continuing to move to communication by metrics, having vendors create transparency where they measure the performance of the government and other stakeholders. The huge paradigm shift has transpired in eight years.

The paradigm shift has validated the new research model of PBSRG. PBSRG, with no government research funding, minimal coordination with peer researchers, simultaneously performing conceptual research, prototype testing and implementation, has run over 1,500 BV PIPS tests and documented dominant test results which have reinforced the simplistic concepts of logic that management, direction and control increases project cost and risk.

Scenter has become the successful "PBSRG of the Netherlands" and possibly Europe. Scenter used the same research paradigm as PBSRG. Using PBSRG's performance and technology as an extension of PBSRG, they have become as successful as PBSRG. They overcame an additional hurdle in that they have moved the technology into the Dutch language and culture.

Dominant results have now replaced the academic peer review in the proliferation of BV PIPS testing. Simplicity replaces complexity. Research that impacts, changes and leads the industry, replaces subjective research that is difficult to implement. The Dutch results are now being reproduced in Canada. Further research in the BV area is needed in the following areas:

1. Impact of culture on BV practices.
2. Optimizing organizations using the BV approach.
3. The impact of the BV approach on performance metrics.
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The Best Value Approach in the Netherlands: A Reflection on Past, Present and Future

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More than 15 years ago Dean Kashiwagi created a process called BVP/PIPS (Best Value Procurement/Performance Information Procurement System) at Arizona State University. PIPS is a procurement method that aims to select the most suitable vendor for the job, to spur this vendor on to highest performance, and to reduce the client's management and control tasks (Kashiwagi, 2009b). Kashiwagi developed the method for several years with the objective of improving the procurement and management of construction projects by reducing risk in selecting the top performer. The method (herein BV approach) has a number of steps, each built around a specific "filter", which focuses on a different element to separate high and low performers. The early phase of the adoption of the process in the Netherlands has been described by Van de Rijt and Witteveen (2011) in the special issue of the Journal for the Advancement of Performance Information and Value. In this paper an update is given and future developments are described. The paper covers the BV approach, a brief history of PIPS in the Netherlands, technology adoption theory, adoption and adaptation of the technology and future developments.

Keywords: Best Value, BVP/PIPS, Netherlands, technology adoption

BV Approach

BVP/PIPS (Kashiwagi, 2011) is a process/structure to optimize the delivery of services by hiring experts instead of managing the risk. It changes the procurement agent's role from being the guardian over the award of a contract, to a facilitator of the delivery of expert services. The new role of facilitator starts when a user has a requirement, and ends when the expert service has been delivered. The BVP/PIPS has three phases: selection, pre-award/clarification, and management by risk minimization. The selection phase has five filters: past performance information, project capability, interview of key personnel, prioritizing the vendors and performing a check for dominance to ensure that the potential BV vendor is the best value. The client's representatives assume the vendors are experts through the selection process then, to assume the BV vendor is not an expert in the pre-award phase to minimize the risk of the BV vendor not being an expert. The paradigm is to minimize the need for technical decision making in the selection process, and maximizing the need for the BV vendor to prove they are an expert in the pre-award phase. The paradigm forces vendors to show dominant differential in performance that minimizes the need for any client technical decision making during selection. 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.

Vendors are selected based on (in prioritized order of importance):

1. Interview (rated, and weighted)
2. Non-technical risk that the vendor does not control (rated blind and weighted)

3. Project capability of the vendor (rated blind and weighted)
4. Value added options (rated blind and weighted)
5. Past performance information (not rated or seen, weighted)
6. Cost (weighted, but not seen or rated by selection committee)

After prioritization, only one vendor can move into the pre-award phase. The pre-award phase is the most important phase of the BVP/PIPS. 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. It is the time to verify the technical competency of the contractor. Once the client is assured that the prioritized BV vendor is the best value (creates an approved risk management plan (RMP), weekly risk report (WRR), and performance measurements (PM)), the contract is awarded to the BV vendor. The BV 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.

A Brief Introduction to the History of BVP in the Netherlands

As described in Van de Rijt & Witteveen (2011) and Ang (2011), the first introduction of BVP to major clients in The Netherlands was done in 2004 by Dean Kashiwagi and George Ang from the Ministry of Housing. In 2005 employees from the Ministry of Transport as well as employees from a large construction company (Heijmans) attended the yearly Conference on BV Procurement in Arizona, US. From then on Dutch participants have regularly attended the annual conference. The first BVP projects in The Netherlands started in 2005. Most projects performed between 2005 and 2010 were in the construction industry.

The application of BVP in the construction industry can be seen in the context of the dramatic changes in that decade. Up until 2000, the construction industry had all the features of a low-bid arena: specifications, qualifications, standards-based (Design-Bid-Build), and management and inspection by the client. In 2002, a number of collusion cases led to the installation of the Netherlands' parliamentary inquiry Committee of Construction Fraud (Van de Rijt & Witteveen, 2011). The most important recommendations of the Committee were threefold. First, there was a need for harmonized procurement policies for public contract authorities. Second, public authorities needed to adapt their policies towards more integrated project delivery models, such as Design-Build and Design-Build-Finance-Maintain. The third recommendation was to make more use of award criteria based on price and quality (i.e. Most Economically Advantageous Tender; or "MEAT"). A very specific way of awarding contracts based on quality and price is using the methodology of BVP.

A major milestone for BVP in The Netherlands was the decision in 2008 by Rijkswaterstaat to resolve 16 major road bottlenecks in the Netherlands using BVP. The so-called Fast Track Program (Programma Spoedaanpak Wegen) is the world's largest BVP program with a combined worth of € 600 million or $ 800 million. Currently, the BV approach seems beyond the "tipping point", the point at which a trend catches fire – spreading exponentially through the construction and other industries. The tipping point idea finds its origins in diffusion theory, which is a set of generalizations regarding the typical spread of innovations within a social

system. In the next section the seminal work of Everett Rogers (1962) on the diffusion of innovations is outlined.

Technology Adoption

Diffusion is defined as the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1962). In his seminal work on the diffusion of innovation, Rogers, states that 4 elements influence the spread of a new idea: the innovation, communication channels, time, and social system.

Innovation is defined as an idea, practice, or object that is perceived as new by individual or other units of adoption. For Rogers, communication is a process in which participants create and share information with one another in order to reach a mutual understanding. According to Rogers (2003), the time aspect is ignored in most behavioral research. He argues that including the time dimension in diffusion research illustrates one of its strengths. The innovation-diffusion process, adopter categorization, and rate of adoption all include a time dimension. The rate of adoption is the relative speed with which an innovation is adopted by members of a social system (which is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal). The social system is the last element in the diffusion process. Rogers (2003) defined the social system as "a set of interrelated units engaged in joint problem solving to accomplish a common goal". Since diffusion of innovations takes place in the social system, it is influenced by the social structure of the social system.

Rogers (1962) states that diffusion of an innovation occurs through a five–step process: Knowledge Stage, Persuasion Stage, Decision Stage, Implementation Stage, and Confirmation Stage. In the Knowledge Stage, the individual is first exposed to an innovation, but lacks information about the innovation. During this stage of the process the individual has not been inspired to find more information about the innovation. In the Persuasion Stage, the individual is interested in the innovation and actively seeks information/detail about the innovation. In the Decision Stage, the individual takes the concept of the change and weighs the advantages and disadvantages of using the innovation and then decides whether to adopt or reject the innovation. In the Implementation Stage, the individual employs the innovation to a varying degree depending on the situation. During this stage the individual determines the usefulness of the innovation and may search for further information about it. In the Confirmation Stage, the individual finalizes his decision to continue using the innovation. This stage is both intrapersonal (may cause cognitive dissonance) and interpersonal, confirmation the group has made the right decision.

According to Rogers, the innovation spreads via various communication channels when adopted. During communication, the idea is rarely evaluated from a scientific standpoint. Rather: subjective perceptions of the innovation influence the diffusion. The process occurs over time. Social systems determine diffusion, norms on diffusion, roles of opinion leaders and change agents, types of innovation decisions, and innovation consequences. The rate of adoption is defined by Rogers as the relative speed in which members of a social system adopt an innovation. Rate is usually measured by the length of time required for a certain percentage of the members of a social system to adopt an innovation. The rates of adoption for innovations are

determined by an individual's adopter category. Rogers states that individuals who first adopt an innovation require a shorter adoption period (adoption process) when compared to late adopters. Within the rate of adoption, there is a point at which an innovation reaches critical mass. This is a point in time within the adoption curve that the amount of individuals adopters ensure that continued adoption of the innovation is self-sustaining. Rogers identifies five categories of adopters: innovators, early adopters, early majority, late majority, and laggards (Rogers 1962; 2003).

Innovators are somewhat risk-taking types of individuals who enjoy being on the cutting edge. The innovation's possible benefits make it exciting; the innovators imagine the possibilities and are eager to give it a try. The implementation and confirmation stages of the innovators' innovation-decisions are of particular value to the subsequent decisions of potential adopters. The data that is generated by the innovators is being used by the early adopters to make their own adoption decisions. If the opinion leaders observe that the innovation has been effective for the innovators, then they will be encouraged to adopt. According to Rogers, this group earns respect for its judicious, well-informed decision-making, and hence this group is where most opinion leaders in a social system reside. Much of the social system does not have the capability to stay informed about innovations, so they instead trust the decisions made by opinion leaders. Furthermore, a large part of the social system just wants to stay in step with the rest. Since opinion leader adoption is a good indicator that an innovation is going to be adopted by many others, these conformity-loving members are encouraged to adopt. So a large subsection of the social system follows suit with these trusted opinion leaders. This is the fabled tipping point, where the rate of adoption rapidly increases (Gladwell 2000). The domino effect continues, even for those who are cautious or have particular worries or doubts with the innovation, adoption becomes a necessity as the implementation of the innovation-decisions of earlier adopters result in social and/or economic benefit. Those who have not adopted lose status or economic viability, and this contextual pressure motivates adoption. The last adopters, laggards, can either be very traditional or be isolated in their social system. If they are traditional, they are suspicious of innovations and often interact with others who also have traditional values. If they are isolated, their lack of social interaction decreases their awareness of an innovation's demonstrated benefits. It takes much longer than average for laggards to adopt innovations.

Moore (1991) builds on the diffusion of innovations theory from Everett Rogers and states that the most difficult step is making the transition between visionaries (early adopters) and pragmatists (early majority). There is a chasm between the early adopters of the product (the technology enthusiasts and visionaries) and the early majority (the pragmatists); see figure 1. Moore (1991) believes visionaries and pragmatists have very different expectations, and he attempts to explore those differences and suggest techniques to successfully cross the "chasm," including choosing a target market, understanding the whole product concept, positioning the product, building a marketing strategy, choosing the most appropriate distribution channel and pricing. Technologies or products that cannot cross this chasm will die or remain niche. If successful, a firm can create a bandwagon effect in which the momentum builds and the product becomes ubiquitous.

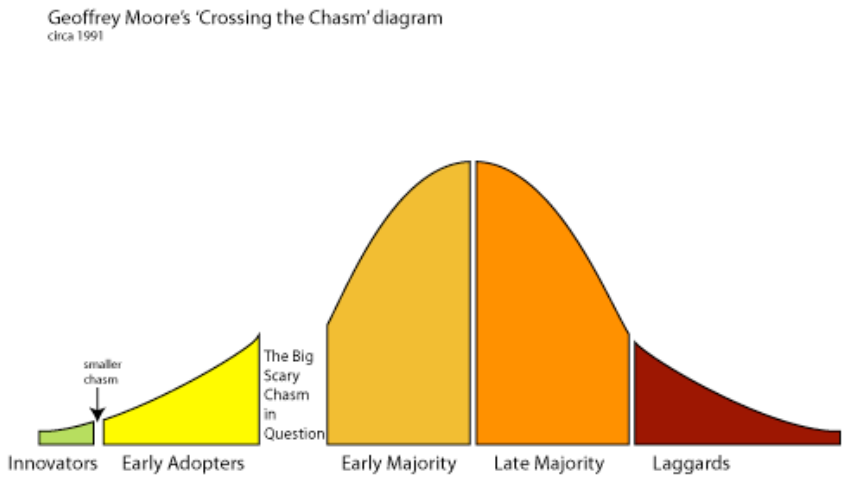

Figure 1: Crossing the Chasm (Moore 1991)

Adoption of the BV Approach in the Netherlands

The diffusion of innovation theory can be applied to the adoption of the BV approach in the Netherlands. The innovation is the original BVP/PIPS (Best Value Procurement/Performance Information Procurement System) as innovated by Kashiwagi at Arizona State University. It was introduced to a small group in 2004 in the Netherlands. The time frame between 2004-2008 can be labeled as the period of the "innovators". Only a handful of people were experimenting with the methodology. In this period, Kashiwagi found a partner who could translate BV/ PIPS into the Dutch language and vocabulary (Scenter as the licensed PBSRG unit in the Netherlands). Scenter and Dean Kashiwagi were introduced to each other in late 2006 by Marc Gillissen of Heijmans. Kashiwagi gave a presentation on BV/PIPS; Sicco Santema of Scenter presented his view on the optimization of supply chains. The presentations were complementary to each other.

In February 2007 Scenter (represented by Sicco Santema & Jeroen van de Rijt) participated for the first time in the Annual BV conference. From that time on, Scenter organized meetings in the Netherlands with visionary innovators as a communication channel to discuss the topic of BV and its applicability. These meetings started small but grew larger and larger. Since 2008 Scenter organized on a regular basis trips of Kashiwagi to the Netherlands to help build the adoption of the methodology by the Dutch. During this stage, the BV approach was called "BV Procurement", and was merely aiming at procurement agents and their role.

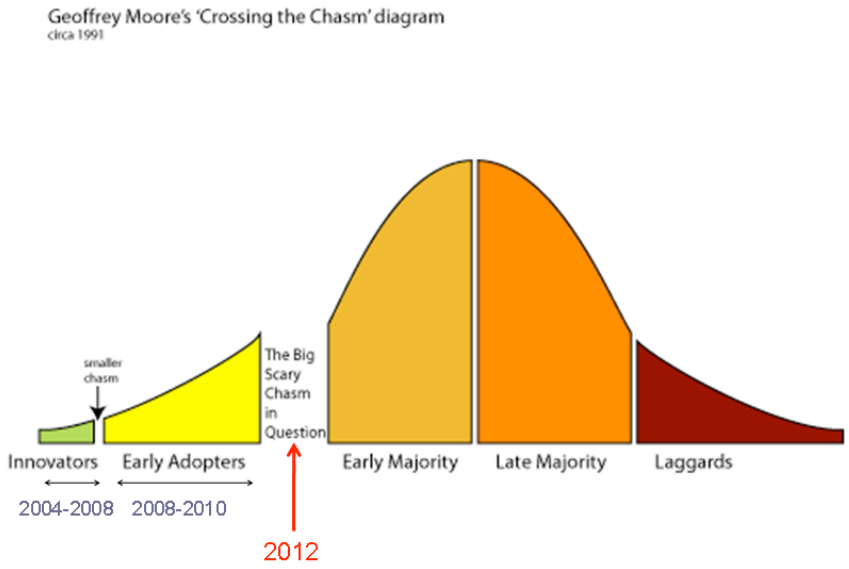

Figure 2: Diffusion of BV in the Netherlands: different stages

In the timeframe from 2004-2008 a small number of BV projects were being done. The BV implementations followed a classic example of early adopter behavior: the Ministry of Transport used the data provided by the innovators' implementation (in this case: Dutch examples and results from the US) to make its own adoption decision. The necessity of doing something different (Van de Rijt et al. 2011) and the possible success BV could bring the project caused the Ministry to adopt the process. While designing the process, the goal was to stay as close to the original PIPS methodology (as developed by Dean Kashiwagi) as possible, with a few adaptations. The following differences were observed (Van de Rijt et al. 2011):

1. Use of "consultation sessions" for individual vendors
2. Past Performance Information (PPI) was not used in the selection. PPI is currently a political issue in the Netherlands and in European law.
3. The project capability submittals did not include the value added section. All items had to be included in the contractor's submittal. This was a legal interpretation of the lawyers to meet European law.
4. Rating the Risk Assessment plans separately from the Value Added plan.
5. "Planning" (scheduling) was the coherence between milestones and the RAVA plan. This was a difference when the project was run, but is now in congruence with the current PIPS process.
6. Less weight was given to the interviews based on the unfamiliarity of using ratings of interviews as a selection criterion.
7. Vendors can choose themselves, which 3 roles (and corresponding key persons) to send to the interviews. This was also a difference at the time, but is no longer a difference.
8. Making use of two independent evaluation teams. Each team would come to a team consensus score through individual ratings of the submittals and the interview, after

which the final score for each vendor (on each criterion) would be determined by consensus of the two groups by the group leaders.

9. Ranking the vendors based on their absolute scores (instead of the relative scores), and based on price "deductions from quality scores." These rankings are based on an objective rating that is transferred into credit for value added. All credit is transformed into fictitious Euros with the lowest price being the prioritized BV.
10. The pre-award phase was not utilized due to the fear of "communications" after the prioritization. European laws are very strict on "communications" before the award. This difference is a legal interpretation, and since these tests, the Rijkswaterstaat has considered using the pre-award period as a clarification period in future tests.
11. Use of a "risk fund" or contingency fund.

With the adoption of BV by the Ministry of Transport, the pathway to the Early Majority had been paved. By then (2009), a Dutch book on BV was published (Van de Rijt & Santema 2009), which contributed to the adoption process. In the book, adaptations to the original work of Kashiwagi are laid out, as tested also in the Ministry of Transport case. Since 2009, more than 6000 copies of the book have been sold. The book was on the long-list for the nomination of "Best Management Book of the Year 2011" and recently was on the list of the "Best selling Top 30 Management Books" (Management BOEK 2012) in the Netherlands.

As Moore (1991) states: to cross the chasm between early adopters and early majority, something needs to be done. Scenter contacted NEVI (the Dutch Purchasing Association) to help cross the chasm. NEVI adopted the methodology and got its own license from Arizona State University in 2011. The social system in which BV was applied was the Dutch purchasing community. NEVI organized many meetings on the topic of BV, where Scenter and others were presenters of the philosophy. As stated, Scenter organized a year or semi-yearly visit of Kashiwagi to the Netherlands, first to help build the adoption process, later to further support it. In 2011, NEVI was the co-organizer of those events. Next to that, NEVI organized 2-day courses on the topic of BV (e.g. eight 2-day-courses organized in 2012).

As the group of early adopters earns respect for its judicious, well-informed decision-making and this group is where most opinion leaders in a social system reside, others followed (e.g. Dutch Tax office in 2011, a number of municipalities). The process that was being used (as well as the results) was presented in many meetings and in conferences. The BV core team of the Ministry as well as Scenter held many presentations on the success. The results were (Kashiwagi et al 2012 forthcoming):

1. Successfully implemented BV PIPS. Changed the Rijkswaterstaat construction delivery model from the traditional contract, to the following, while still meeting European law requirements:
    a) No control or influence environment over the vendor. The vendor identifies their scope.
    b) Vendor writes the contract instead of Rijkswaterstaat.
    c) Transfer of risk management to the vendor. The owner only practices quality assurance, which assures that the contractor, has their quality control systems and risk management systems in place.

   d) Documented performance of Rijkswaterstaat and the vendors using the BV PIPS weekly risk report.
2. Procurement transaction costs reduced by over 50% for both Rijkswaterstaat and reduction of tender costs of the construction contractors.
3. 95% of all project deviations were caused by the client. The only reason for projects that are still not completed is the owner driven changes, which the contractor experts identified early in the projects.
4. 14 of the 30 projects where completed, surpassing the goal of 10 projects.
5. Average completion time for projects was reduced by 25%.

In April 2012 The Ministry of transport received the prestigious "Dutch Sourcing Award" for its innovative and successful projects in the Fast track Program. This lead to even more interest in the BV approach (as can be seen by the rising number of 2-day courses and number of presentations).

Currently, over 130 Dutch (known) projects have been done using the BV Approach (https://docs.google.com/spreadsheet/ccc?key=0AiVilqNOs0twdHY0WVdMYXVlakFZa0UwUkZWLXBsR1E). Where in the first phases mainly the construction industry was doing BV pilots, now projects are being done across a much bigger spectrum. BV pilots have been done in the public and private sector, in many industries (IT, health, shipbuilding, education etc.), from simple projects (e.g. buying office supplies and printers) to technologically complex projects (a biorepository, which is a super complex refrigerator used in health care research), from small amounts of money (e.g. €100K) to large amounts of money (multimillion Euro projects) and from projects to services. It is understood that BV does not suit just a single niche, but can be applied as a philosophy across the whole spectrum (Kashiwagi 2011).

Adaptations and Developments

BV Procurement/Performance Information Procurement System (BVP/PIPS) has been developed by Dean Kashiwagi and the Performance Based Studies Research Group (PBSRG) from 1991. Since inception, the process has been refined following major phases (Kashiwagi 2011):

1. The performance information centered PIPS (1994-1999)
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 BV PIPS (preplan, use experts, manage and minimize the risk that the vendor does not control, and manage and minimize deviations).

In the Netherlands, the "pure" methodology has not always been followed (see for example the deliberate deviations that were used by the Ministry of Transport when implementing BV in the Fast Track Project). In this section a couple of "deviations" are described. Next to that, the development of the methodology in the Netherlands is being described. One observation that can be made is that the adoption of the latest insights from the US takes time to transfer to the Dutch implementation of BV.

Using Past Performance

Using Past Performance as a selection criterion in the public sector is not allowed under current European legislature. However, in the private sector organizations can do whatever fits them (as they are less bound to legislation). Past Performance has been used in a number of pilots as a selection criterion. As Past Performance is the least important filter, to keep things as simple and straightforward as possible and to avoid having two systems in place (one for the public sector and one for the private sector) Past Performance is currently not used by most practitioners. Instead, Past Performance metrics can be used under the Project capability. An interesting development is that the new Dutch (and probably EU) legislation is actually bringing an opening for using Past Performance in the selection phase (currently Past Performance can only be used for pre-qualification). The possibility of using Past Performance as a selection criterion means that soon there might be a possibility to use the most "pure" system of BV.

Open vs. Restricted Procedure

The European Union Procurement Directives set out the legal framework for public procurement. Above a certain threshold public authorities have to comply with European Directive 2004/18 on the coordination of procedures for the award of public works contracts, supply contracts and public service contracts. This Directive gives contracting authorities a number of possible procurement procedures (Van Leeuwen 2011). Three of the most commonly used procedures are the open procedure, the restricted procedure and the competitive dialogue. The purest way of using the BV approach is by having the possible vendors assess for themselves whether they are "up to the job". This would mean the open procedure would fit best. The disadvantage of using the "open procedure" is that it is impossible to assess the number of actual bids upfront, which brings some risk: if there are many bids, it takes time to rate them all and there is a risk of having to do (too) many interviews. This risk can be managed by introducing a filter in which only the best vendors go to the round of the interviews. Another way of managing the risk is by having a "restricted procedure" in which only a few firms can submit their bids. In the early phases of applying BV in the public sector, the restricted procedure was the favorite mechanism. With the diffusion of the methodology, we see both the use of the restricted procedure as well as the open procedure. The open procedure has been successfully used in selecting an IT vendor for the Tax Office and in finding a maintenance vendor for maintaining the trams in Utrecht (Van Abeelen 2012). Instead of the public authority deciding that a vendor is not "up to the job" and cannot compete, the vendors now decide for themselves whether they can compete or not. The process usually makes it clear for vendors when it is of no use to compete. In both cases there was "natural selection" from the part of the vendor community.

Confusion in the Project Capability Criteria

During the refinement of the methodology by Kashiwagi, a number of new criteria were introduced. In addition to "risk outside the control of the vendor" the criterion "technical risk" was briefly introduced. This criterion rather soon morphed into "scope document" and still later to what is currently known as "project capability". The idea of the criterion is that the vendors show (with metrics) that they are capable of doing the job and that they have no risk on the job. As not all Dutch users of the philosophy seek access to the latest ideas of Kashiwagi, the observation can be made that there are different ways the capability of the vendor is being assessed in the tender phase. Some buyers are using project capability, some are using "scope document" and some are using "technical risk" or "vendor risk." This has led to some confusion in the user community and from the sides of the vendor. From a 30,000-foot level, these criteria are all measuring the same: the ability of the vendor to do their job well and to have no risk in their own work.

RAVA Plan

The latest version of the PIPS process has in filter 2 of the selection process 4 criteria (Kashiwagi 2012): Project Capability, Risk assessment (risk outside the control of the vendor), Value Add, and cost. PC, RA and VA are 3 separate documents with (possibly) 3 different ratings by the client. Previously, Kashiwagi used RAVA plan (Risk Assessment Value Add combined) in filter 2. In the Netherlands, some clients are still doing RAVA combined, while others are assessing the RA and the VA plan separately. From a legal perspective it may seem more logical to assess the RA and VA (combined with the PC) combined. From a 30,000-foot level, it may not matter whether to rate the plans in combination or separately.

Schedule

One of the refinements made by Kashiwagi was that schedule is no longer being rated by the selection committee of the client. In the Netherlands, most clients are still using schedule as a criterion. Only some have started to ask for a schedule, but not rate it.

Pre-Award/Clarification or Post-Award

As stated earlier, the pre-award/clarification phase was not utilized in the Fast Track project of the Ministry of Transport due to the fear of "communications" after the prioritization. European laws are very strict on "communications" before the award. This difference was a legal interpretation, and since these tests, Rijkswaterstaat has been using the pre-award period as a clarification period in its tests. After many deliberations with numerous legal experts, it was concluded that the pre-award as a clarification process can be used, also within the framework of the EU laws. At this moment, most tests in the public sector use the clarification phase before the actual award. This represents a big change compared to two years ago.

BV as a Procurement Mechanism or BV as an Approach

The BV Approach was formerly known as "BV Procurement". Although the methodology of PIPS/PIRMS consists of 3 phases (selection, pre-award/clarification, and management by risk minimization), most clients in the Netherlands paid the most attention to the selection process (or "award process" as it is called in the Netherlands). This was caused by the label "BV Procurement" (which in itself focuses on procurement) and by the fact that the change agents were from the procurement silo. It was logical to focus on the procurement part of the process. Currently, users are more aware that BV is not a procurement process (in which a vendor is selected), but a way of working (with the vendor, in all phases of the project). This has led to a shift in focus in applying the BV principles, certainly in the organizations of the thought leaders. Still, many (especially the group of procurement users that is from the early majority stage) are mainly focusing on the selection phase when applying BV.

Future Developments

The most important element of the PIPS/PIRMS process (and underlying driver) is the concept of 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.

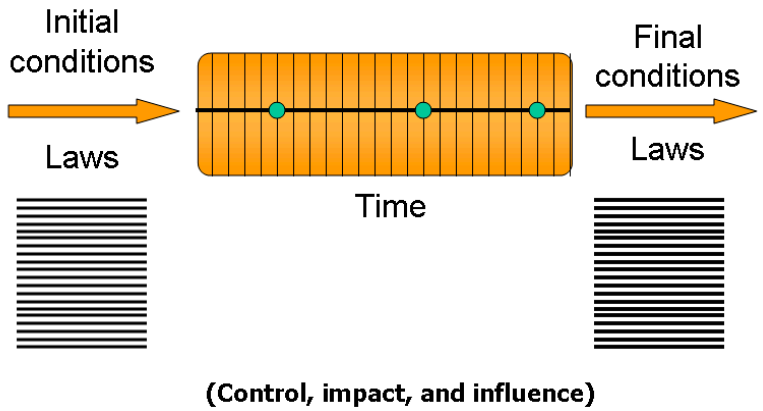

Figure 3: Core element of BV: IMT (Kashiwagi 2012)

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.

When looking at the initial conditions in the Netherlands, the observation can be made that (potential) users of BV all have different level of awareness on the methodology. Some seek access to the latest insights; some are applying "old" techniques. Some are using the 2009 version of the book of Van de Rijt & Santema (others the more updated 2011 version). Some are using a textbook of Kashiwagi of 2008 (with the "old" methodology). The same goes for the textbooks of 2009, 2010 and 2011, each with its own (minor) changes.

Some are asking for a "universal Dutch standard of doing BV." They seem confused by the differences (at a detailed level) and are seeking for certainty when applying BV. They basically are asking to "control" the methodology: one final and universal standard. However: IMT clarifies that there is no way to influence and control others. The initial conditions lead to a predication that we will see many different "ways of using BV" (final conditions). In fact: this is already happening as described in the previous section. There is no use of having the illusion that people can force others into the "right" or "pure" methodology. This will definitively not happen.

There can be a certain control mechanism in place; though this will not be a way to "control" the event. The control mechanism that has been designed in cooperation with Kashiwagi is certification of experts. The certification will be a label that can be used by experts who can show with performance information that they are truly a BV expert. When using the accurate and optimal approach, buyers/owners will seek access to the BV certified trainers as proven experts in the successful delivery of service. This applies also to the vendors who want to understand the philosophy and methodology. Since May 2012 the Board has been appointed by Dean Kashiwagi (it currently consists of 7 individuals). The Board has certified the first individuals. However: non-certified individuals will still be using the BV approach. The authors encourage not stopping them (as this will be impossible and only seeks to control, which is impossible).

Conclusion

The diffusion of the BV approach has been tremendous in the Netherlands. What used to be a "niche" way of procuring now has gained momentum. The "chasm" is crossed in 2012 and many organizations are contemplating using BV or are using it already (6 of the 10 biggest municipalities in the Netherlands have been using BV). In 2013 the first European 2-day conference on BV will be organized.

The social system of users of BV is evolving. Where in recent years mainly the procurement community was interested in BV (where it all started), now risk managers and project managers have been made aware of the philosophy.

BV is taking off in the Netherlands. It is being embraced by the procurement professionals, the project managers, the risk managers, and the major owners/buyers of construction services. The BV approach is being also embraced by buyers of non-construction products and services. The heavy demand of the BV PIPS technology has the risk of non-experts posing as experts of the

BV approach. This risk can be partially mitigated by having a Certification Board, which certifies BV professionals who (with verifiable performance information) show they understand the idea and process. There is no real control though: many forms of BV will appear and develop. BV will grow, as long as the results show the benefits (on time/on budget) of using the approach.

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Increasing Performance in the Japanese Construction Industry

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The performance of the construction industry in Japan has been high due to a lack of emphasis of price. Due to rapid change in the industry environment such as social requirement of fair implementation process of public works; however, there is a deep concern that the performance of the industry is being lowered due to more emphasis on the public works getting the low price contractor. Many efforts are being made to keep its high performance in a more cost competitive environment. A comparison between the essence of public bidding reforms in Japan and principles of the Best Value Approach shows some ideas on the future of the public bidding scheme. The critical areas needing to be addressed are the importance of various levels of feedback loops in social capital management and clarification of the position of supervision for appropriate risk sharing between the public client and the vendor. Additionally, in order for local governments with insufficient engineering resources to be truly accountable, it is worthwhile studying an alternative evaluation method of proposal and performance including non-technical one.

Keywords: best value approach, comprehensive evaluation method, construction industry performance, Japan, public bidding.

Introduction

Recently, the construction industry in Japan has undergone major turning points. It is often said that the performance of the industry has been high but its price competitiveness has been low. Due to rapid change of the industry environment such as social requirement of fair implementation process of public works, there is a deep concern that the performance of the industry is being lowered (Review Committee of Comprehensive Evaluation Method for Public Works, 2005). Many efforts are being made to keep its high performance through enhancing its competitiveness.

To realize continuous improvement, it is always useful to study and share theory and practice in other countries. The design and operation of the public bidding system in Japan is not exceptional. To discuss what should be strengthened in public bidding reform, this paper focuses on the "Best Value Approach" advocated by Kashiwagi (2010) as a reference of theory and practice in other countries. Since this approach incorporates feeling of "site people" and has

much similarity to Japanese schemes and culture, the authors propose that it may result in reasonable and realistic solution.

The objective of this paper is, thus, to 1) explain characteristics of the conventional Japanese public bidding schemes, 2) overview the reform history of public bidding schemes and the comprehensive evaluation method (CEM), which is to appraise price, technical proposal, and past performance of each bidder, 3) compare the Japanese public bidding reforms with the Best Value Approach, and 4) identify possible areas to be strengthened to achieve the high performance through high competition in the construction industry in Japan which may also be applicable to other countries.

Conventional Public Bidding Scheme

In Japan, The Act of Public Account was enacted in 1889, which stipulated that open competitive bidding was the bidding scheme to be used (Kunishima & Shoji 1994). The Act emphasized price competition by using detailed minimum specifications, and many public projects resulted in poor quality (Takeda 1994). This can be referred to as the low bid paradigm (Kashiwagi 2010). In order to deal with this problem, the Act of Public Account was amended to introduce designated competitive bidding in 1921, which has been used as a main bidding scheme for more than 90 years.

Designation, "dango," and the ceiling price are characterizing factors of the conventional Japanese public bidding systems (Kanemoto 1993), particularly since the period of high economic growth in Japan in the late 1950s. Dango is a complementary and rotational bidding system. In this system, the client first prequalifies and designates trustworthy companies. These designated companies discuss and determine the winner for the project. In some cases the client takes the initiative and authorizes the winner. The ceiling price is the budget for the client. This price becomes the strict upper limit on the awarded price.

Rotation and distribution of works had been determined fairly among contractors or by the public client. This rotation and distribution was determined "comprehensively," that is, based on volume of works each in hand, expertise, location of each bidder, and so on. When dango was led by contractors, the dango leader had to be fair (Social Unit at Kyodo News Service 1994). Since the upper limit on contract value is the ceiling price set by the public client, excessive increase in contract value is controlled. These are reasons that dango had lasted for so many years.

This scheme has the following characteristics. First, quality is emphasized and ensured. This follows the Japanese culture and tradition of pride and accountability. Once the extremely poor work is founded by the client, that vendor would never be designated and used again. Second, transaction activities and costs, particularly the contract monitoring costs and contract enforcement costs are minimized (Watanabe 2007). The Dango system does not use owner/buyer management, direction and control of the vendor to ensure quality. The system depends on the expert contractor delivering the highest quality. The Dango system resulted in smooth implementation of many projects with good quality. Since the emphasis on price competitiveness

is low, however, the Japanese construction industry in the conventional scheme is classified in Quadrant III in the Construction Industry Structure, as seen in Figure 1.

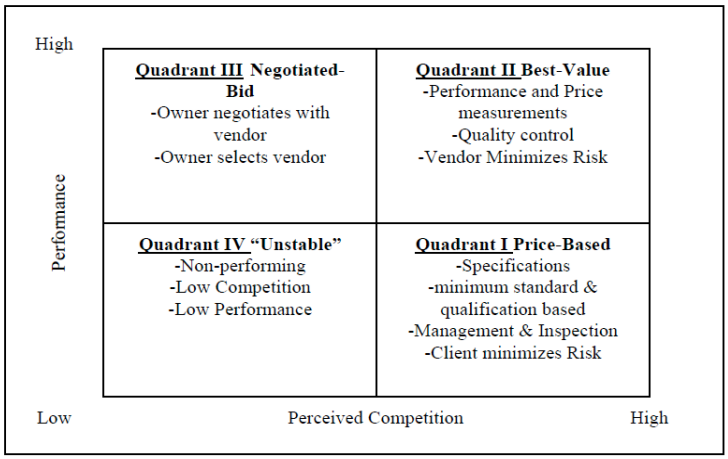

Figure 1. The Construction Industry Structure (Kashiwagi 2011)

The Dango system is difficult to defend in a public governmental environment where minimum standards and low price is the norm. Since the downturn of public investment the emphasis on price has increased. Many cases are observed in which dango system influence led to some undesirable results. In 1993, one governor and two mayors were arrested for bribery in public biddings. Contractors who desperately wanted projects bribed these politicians and asked them to give "the voice from the heaven" to the other bidders so that they would give up competing. Since then, many dango incidents have been reported. In public bidding during the downsizing economy, dango became much less successful in Japan. The development of an alternative method to dango is needed in which all bidders accept the process and the result of the selection.

Reforms of Public Bidding in Japan

The Japanese government has been making reforms of public bidding. The immediate objective was to enhance perceived fairness of the procedure by improving transparency. In 1993, the Central Council on Construction Contracting Business worked out the proposal named "Reform of the Bidding and Contracting Procedures for Public Works". In this reform, introduction of the general competitive bidding scheme was determined (Kunishima & Shoji 1994).

As the designated competitive bidding was replacing the general competitive bidding, however, there was an anxiety and fear that quality of construction works may not be ensured in future. There was a great risk that the Japanese construction industry would fall down into Quadrant I from Quadrant III. In 2005, "The act for ensuring the quality of public works" was enacted, which clarifies fundamental principles and responsibilities of the public client of ensuring quality of public works. The act also states replacement of "competition solely through price" with "comprehensively superior procurement based on price and quality." Here the CEM (Comprehensive Evaluation Method) becomes a key component to procure good quality service with fair and competitive procedure (MLIT 2009).

Other Key Components

In addition to the CEM, other key components are refined and developed. The project performance evaluation and Construction Records Information System (CORINS) are representative components.

Table 1 shows a prototype of project performance evaluation sheet used by the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) (2008). Scores associated with evaluation of "d" and "e" are very low and function to prevent execution of extremely poor works.

Table 1

A prototype of project performance evaluation sheet

Inspection item		**Chief technical evaluation officer**					**Overall technical evaluation officer**					**Technical inspector**				
Item	**Sub Item**	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e
Organization	**General**		1.5	0	-5.0	-10										
	Project Engineer	3.0	1.5	0	-5.0	-10										
Construction situation	**Constr. control**		1.5	0	-5.0	-10						5	2.5	0	-7.5	-15
	Delivery control	1.0	0.5	0	-5.0	-10	10	5	0	-7.5	-15					
	Safety management	2.0	1.0	0	-5.0	-10	15	7.5	0	-7.5	-15					
	Public relations	2.0	1.0	0	-2.5	-5										
Completed part and workmanship	**Completed part**	2.0	1.0	0	-2.5	-5						10	5.0	0	-10	-20
	Quality	2.0	1.0	0	-2.5	-5						15	7.5	0	-12.5	-25
	Work-manship											5	2.5	0	-5	
Advanced technology	**Advanced technology**	(13)[1)]		0												
Originality & ingenuity	**Originality & ingenuity**	(7)[1)]		0												
Sociality	**Regional contribution**						10	5	0							
SUM (=1+2+3+4+5+6)																
Total score (=65+SUM)																
Note: Only excellent items are evaluated																

The other component is CORINS developed by the Japan Association of Construction Information Center (JACIC). This puts the construction record of the public works, which contractors register as "construction records" into the database, and provides it with public organizations. Registration of public works was started in March 1994 for those contracts of more than 50 million JPY and was extended to more than 5 million JPY in fiscal year (FY) 2002. As of the end of March 2012, the number of contractors registered was about 138,000 in total and the number of registered completion construction projects was approximately 3,703,000 in total. This database has been in great use (JACIC 2012).

Introduction of the CEM

The CEM has been continuously revised based on results of careful monitoring (Ozawa 2012). The social environment of the CEM is changing. Vendors' strategies to the CEM are also changing. Evaluation items and weights associated with each item are changed in a timely manner based on thorough analysis of results of the CEM.

The CEM in Japan was first applied to two public projects ordered by the former Ministry of Construction in FY 1999. The original objectives of the CEM are to utilize the advanced technology of the private sector, improve the value for money of public investment, and increase the social benefits.

Since application of this type of the CEM needs much preparation; however, introduction and utilization of the CEM was very much limited. Thus, "The evaluation method of the performance in the CEM regarding the bidding on construction work" was established in 2002. This method sets the ceiling price at the price of a standard construction method, and giving 100 points as the standard points and 10 points as the additional points. This type of the CEM is positioned as "the standard type CEM." With this direction, the workload of preparation for the CEM was greatly reduced.

In "The Act of Promoting Quality Assurance" enacted in 2005, the role of the CEM was changed to ensure the quality of public works. Thus, it was required to apply the CEM to projects with small room for technical ingenuity that were ordered by the national and local governments. Here, "The Simple Type" was introduced to comprehensively evaluate the price and the technical capability to ensure the quality of a project with a standard method developed by the client. In addition, "The Proposal of the Advanced Technology Type" was also introduced to solicit advanced technologies, which may bring necessary changes in the final product. With "The Simple Type," "The Proposal of the Advanced Technology Type," and "The Standard Type," the CEM can apply to any project with varying characteristics such as type of work, scale, and requirement conditions, etc. Now the CEM is applied to more than 99% of projects ordered by the MLIT (MLIT 2009).

The following is an example of the contents of technical points in the simple type CEM:

1. Simple execution plan: Items which should be considered to perform the execution
2. Execution achievements of companies
    a. Executions of identical or similar work during the past 10 years
    b. Average evaluation scores of work performed during the past 2 years
    c. Awards for superior work received during the past 2 years?
3. Capabilities of technologists who will be assigned
    a. Executions of identical or similar work during past 10 years
    b. Average evaluation scores of work performed during past 2 years
4. Company's contribution to the region: Activities performed based on a disaster agreement during the past five years?

From the second half of fiscal year 2005, price competition became very severe. Extremely low bids frequently occurred, and concern of quality deterioration due to poor works has further risen. Thus, "On Emergency Measures to Ensure Quality of Public Works" was summarized in December 2006. As the key measure, the further additional points of evaluating construction systems were introduced. This scheme is called "Verifying Construction Systems Type." Furthermore, during the recession of FY 2008, economic measures and early execution of the supplementary budget were required to take action. To deal with this situation, an even simpler CEM than "The Simple Type" was applied by emphasizing the past performance of each bidder and skipping submission of a concise construction plan and the interview with engineers (MLIT 2009).

Effects of the CEM

Table 2 shows how much the CEM has been applied to the projects ordered by the MLIT and the average of the project performance score (MLIT 2011a). The average scores steadily increased as the CEM is applied to more projects. If scores greater than or equal to 75 are considered high, the average quality level of all projects has been increasing.

Table 2

Application and effects of the CEM in projects ordered by the MLIT

Fiscal Year	The number of applied projects	The ratio of applied projects (%)	Average of Project Performance Score
2005	8,146	16.9	73.2
2006	7,996	76.2	73.7
2007	11,248	97.1	74.2
2008	10,068	98.8	75.0
2009	9,300	99.2	75.6
2010	3,879	99.2	75.5
Note: Evaluation method was modified in FY 2010			

To further study the effects of the CEM, a questionnaire survey was conducted by the MLIT in between October 18, 2010 and November 12, 2010. Respondents to this survey were 10 Regional Development Bureaus of the MLIT, 66 local governments, 47 Prefectures, 19 ordinance-designated cities, 414 construction companies, and 716 ordinary people through WEB questionnaires. Two main questions were asked: a) what effect has already appeared or is expected to appear in the future and b) requests for improvement of the CEM. Since similar surveys were conducted in 2006, comparison was made to the previous survey. Summary of the results are given in Tables 3 and 4 (MLIT 2011b).

Both the client and construction company feel that the CEM is effective in "Decrease in nonconforming works," "Promotion of competition," and "Prevention of dango." Both parties also feel that there is still a room for improvement in the method of evaluating and reviewing technical proposals. As compared with the previous survey, except for the item of "Evaluation and review of technical proposals" a smaller ratio of people have improvement request. All related parties have been working hard to improve the CEM. However, there is still a need for improvement. Particularly, simplifying the procedure of evaluating and reviewing technical

proposals is still a formidable task. To respond to this request, a major reform is now discussed and implemented.

Table 3

What effect has already appeared or is expected to appear in future

	MLIT	Local Government	Construction Company	From previous survey
1. Decrease in nonconforming works	□	□	□	up
a. Decrease in the # of accidents				--
b. Completion on time				--
c. Improvement of work performance	□	□	□	--
d. Establishment of quality management systems by the company	□	□	□	--
2. Fairness and Transparency	□	□		no change
3. Promotion of competition	□	□	□	down
4. Prevention of dango	□	□	□	no change
5. Expansion of opportunities for participation				no change
6. Improvement of accountability	□	□		up
7. Improvement of familiarity with the field		□		down
8. Utilization of new technology				up
Note 1) □is put in the item where more than half of respondents answer "yes."				
Note 2) "—" means that question was not asked in the previous survey.				

Table 4

Improvement request for of the CEM from each party

	MLIT	Local Government	Construction Company	From previous survey
1. Time and cost associated with proceeding the procedure	□	□		down
2. Evaluation and review of technical proposals	□	□	□	up
3. Disclosure of the evaluation results			□	down
4. Cost of developing technical proposals				down
5. Effects preventing low bid		□	□	down
6. Consistency between technical proposal and the ceiling price			□	down
7. Expansion of awarded opportunities for local companies		□	□	down
Note: □is put in the item where more than half of respondents answer "yes."				

Comparison between the Japanese Reforms with the Best Value Approach

Representative principles of the Best Value Approach developed by Kashiwagi are a) Paradigm shift, b) Client should be less accountable and hold expert vendor accountable to identify scope, c) Client should be accountable for delivering high performance services by using expertise rather than direction and control of vendors, d) Utilization of past performance information to show project capability, e) Expert vendors have no risk, but are motivated to identify and mitigate, while clients have financial accountability for risk, f) Importance of clarification period from when vendor clarifies her/his proposal and identifies and has a risk mitigation plan for risk to when the client can accept the proposal, g) Nontechnical evaluation of dominant information.

Reforms of Japanese public bidding possess many of the above characteristics of the Best Value Approach. The followings are overall comparison of the two approaches.

Strength of the Scheme in Japan from the Viewpoints of the Best Value Approach

The notion of "Client should be accountable for delivering high performance services" is now widely understood in the construction industry in Japan. A research team was established in 2000 to study how to define the client responsibility and how to fulfill it in infrastructure development and management (Japan Construction Engineers' Association 2000). This responsibility is defined as "the responsibility of procuring and providing services or goods with good quality in a timely manner at inexpensive price."

Most of the public clients and the private companies have no resistance against using the past performance information. Designation, which has been a key in the designated competitive bidding process, has been made based on the past performance. After the general competitive bidding was introduced instead of the designated one, CORINS was developed. It is now widely used by both the clients and the private companies and become one of the most successful business models in the construction IT systems. The project performance score also plays a vital role in selecting high performers and supporting the CEM.

Actually the Japanese government is developing and implementing three levels of feedback loops in social capital management in a transparent manner. Minor cycle is the mechanism, which can ensure achievement of high quality products from each work. Intermediate cycle is a mechanism, which appropriately reflects the past performance of a vendor in the next vendor selection. Major cycle is the mechanism by which experience at each stage of the project life cycle is steadily handed over to its subsequent stage throughout the whole construction production systems and fed back to its upper stream stage. These types of feedback mechanisms are considered essential to keep the performance of construction industry in not only Japan but also other countries.

"Motivating the vendor to identify and minimize risk" has been commonly practiced in Japan under the notion of "responsible construction". For example, to construct facility truly suitable to the site conditions, it had not been uncommon for a vendor to voluntarily make a minor modification of the design document and execute it. High performing vendors had been willing to take risk and assist the client.

Importance of the clarification period is now well discussed. Three parties discussion is recently introduced among the client, consultant, and contractor. To ensure quality, an attempt is made to focus on quality management of each construction process more carefully.

The principle of nontechnical evaluation seems the only major difference between the reform direction headed by the MLIT and the best value approach. The technical evaluation has been possible with high quality in-house engineers and much richer human resources than most of other public client organizations.

Weakness in the Japanese Scheme

However, there is a big concern. In many projects bids concentrate around "the lower limit," and the bid competition substantially becomes price competition. It is becoming more difficult to take a proper balance between the price and non-price part.

Local governments face more risky situations of falling in the low bid paradigm than the MLIT. First, the local government has more direct pressure to be "fair" and "cost efficient" procurement from the local residence. Second, local governments with an insufficient number of engineers are feeling a big hurdle and giving up in introducing the CEM and the evaluation of project performance score, which are practiced by the MLIT. As a result, in more projects, multiple bidders bid at the lower limit and the awarded vendor is determined by tossing a coin. Acceptance of this selection process shows a possibility that governmental officers fall into believing the low bid paradigm.

A fundamental reason for the high risk of local governments to fall into the low bid paradigm is the way construction plan or technical proposal is evaluated in the current CEM. The current evaluation practice of clients forces vendors to increase the promised scope to get the job. This increases the risk and lowers the performance. The current practice also forces the client selection committee to be the expert.

Contractors want to know why they were not selected, and when this is based on the selection committee's bias, no one wants to have full transparency for fear of exposing biased decision making. This therefore forces low bidding practices when the system is supposed to be price and quality and increased quality.

The consequent risk to falling into the low bid paradigm is prevalence of the vice circle that existence of poor performers creates poor quality work, which leads to survival of poor performers. Ninomiya (2011) develops and runs a simulation model to represent the survival situation of local companies when the contract awarder is kept determined by tossing a coin. The simulation results hint at a possibility that high performers would be out of business due to hard luck in the long run. These phenomena are also observed in many other countries.

If poorer performers start executing public projects, ambiguous position of supervising scheme in Japan could be a big factor to induce the second risk of the vice circle. The "Guide for performance evaluation, inspection and supervision to ensure the quality of public works" (MLIT, 2008) states that "The supervisor should not give unnecessary guidance to blur responsibility sharing between the client and vendor or make unnecessary confirmation to lead to cost increase." This inappropriate supervising and risk sharing gives a room for survival of poor performers.

Possible Areas to be Strengthened

First, inappropriate risk sharing should be avoided through clarifying the position of supervision. Though there is a view that supervision is not needed anymore, its functions of directing design document changes and technical judgment on contract alterations are indispensable in site management. Careful discussion is desirable about the future of the supervising scheme.

Second, it is worthwhile studying how feasible and accountable nontechnical evaluation of proposal and performance of each vendor would be. Actually, the MLIT has ordered one social experimental project to which nontechnical evaluations was applied. In this CEM project, selected bidders' presentations were non-technically evaluated by residential people, and their evaluation results were incorporated into the technical score of each proposal (Kurauchi 2011). In this case the best proposal selected by the client and the residential people happened to be the same. In order for the public client in local governments to be truly accountable, alternative method of proposal and performance evaluation including nontechnical one should be seriously studied.

Conclusions and Recommendations

Comparison between essences of public bidding reforms in Japan and principles of the Best Value Approach shows some ideas on the future of the public bidding scheme. One of Japan's strength, various levels of feedback loops in social capital management, is considered essential in maintaining and improving the performance of construction industry. The position of supervision should be clarified to always realize appropriate risk sharing between the public client and the vendor. In order for local governments with insufficient engineering resources to be truly accountable, it is worthwhile studying alternative evaluation method of proposal and performance including non-technical one.

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A New Sewage System with Best Value Procurement

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The adoption rate of the BVP/PIPS or the Best Value approach (Kashiwagi 2010) has been rather high in the Netherlands (van de Rijt & Santema 2012). One of the largest industrial companies in the Netherlands, Tata Steel in IJmuiden (part of Tata Steel Group) has applied the principles of BVP/PIPS to select a vendor for a sewer renovation. BVP/PIPS is a procurement method that aims to select the most suitable vendor for the job, to spur this vendor on to highest performance, and to reduce the client's management and control tasks. The case shows that a different way of procuring by the client leads to different behavior of the vendor and to a higher performance of the vendor and less risk.

Keywords: Best Value, BVP/PIPS, sewer renovation, Tata Steel

Introduction

Tata Steel in IJmuiden is part of Tata Steel Group, one of the largest steel companies in the world. The Dutch part of the company has a long history. It was established in 1918 as Koninklijke Nederlandse Hoogovens en Staalfabrieken NV (the Royal Dutch Blast furnace and steel factory). In 1999 it merged with British Steel and the name was changed to Corus. Consecutively Corus was acquired by Tata Steel as its European branch in 2007. Other parts of Tata Steel Group, aside from Tata steel Europe, are Tata Steel India, Tata Steel Thailand and NatSteel Asia. Tata Steel Group is located in over fifty countries, is capable of producing 28 million tons of steel every year, and provides a work environment for over 80.000 employees. The focus of this case is the application of Best Value Procurement at Tata Steel in IJmuiden. In 2010 the decision was made to handle a project of Sewer renovation with this innovative way of working. The case study is interesting and provides valuable lessons learned, as the vendor who was awarded the project, and executed the project as a high-performer, was the incumbent vendor. The following aspects will be discussed:

- The context: organization
- The scope of the project.
- Preparation of the project.
- The tender process
- The pre-award phase and performance
- Conclusions and reflection

The Context: Organization

Tata Steel in IJmuiden is part of the European branch of Tata Steel Group. Over 9000 people work at Tata Steel in IJmuiden. Every year they produce and deliver more than 7 million tons of

high-quality coated steel, shaped in rolls, as well as providing design, technology and consultancy services. The steel produced in IJmuiden is primarily used in the automotive, construction and packaging industries. Other goods produced from the steel at IJmuiden are batteries, pipes, industrial vehicles and household appliances such as refrigerators and cookers. The company property is 750 hectares and directly borders the North Sea in the towns Heemskerk, Beverwijk and Velsen (TATA Steel Europe 2012).

Tata steel is currently in the midst of a significant change process whereby a new operating model is introduced. Business units are being dismantled. Sales, Marketing and Supply Chain are centralized and production locations are transformed to cost-centers with a clear focus on manufacturing excellence. Ever since the Corus merger and consecutive takeover by Tata Steel, the procurement process has been centrally organized. Globally, procurement is managed in a hybrid organization form.

The sewage project belongs to the responsibilities of the department Site Facilities. Site Facilities manages a number of facilities within the location in IJmuiden. The aforementioned developments give reason to centralize activities in order to work more efficiently and effectively, rather than having work fragmented across nine different factories. The Best Value approach was considered as a possible method to fulfill the ambitions of Site Facilities to work more efficient.

The Scope of the Project

The factories of Tata Steel use water in their processes. Aside from the rainwater and sanitary sewer the water management system includes a sewage network for company waste. This sewage system needs to function properly in order for the production progress to operate at low risk. Maintaining this sewage system requires a long-term approach, in which inspections, repairs and renewals are all included.

In April 2010 a first presentation on the Best Value Approach took place in IJmuiden with a number of senior managers. In 2010, the Best Value Approach was still in its early phase (early adopters) (van de Rijt & Santema 2012). The conclusion of the meeting with the senior managers was that that there was a solid basis for using the BV-approach. During the spring of 2010 a number of potential projects were identified. Eventually the sewage renovation project was chosen as a pilot project. The advantage of this project is that it had a relatively short lead-time and was straightforward. An additional reason for an alternative approach concerning this project was that previously similar projects did not go as desired. Frequent interaction and communication between the client and vendors led to inefficiency, which in turn led to additional work. The idea of this project pilot was to increase efficiency and minimize non-value adding communication, in line with the Best Value approach (Kashiwagi 2010).

The scope of the activities concerned the inspection of a number of sewage pipes on the IJmuiden property and cleaning and renovating parts of previously inspected sewers. The available budget (the ceiling price) was € 632.500.

The Preparation of the Project

In August and September 2010, preparatory meetings were held with the core team of Tata steel. This team consisted of a number of technical experts in addition to a representation from the Procurement department. Although the technical specifications of the project were already defined, the sessions allowed the scope to be refined. The ensuing discussions during this refining of the scope led to the decision to leave a number of items out of the tender-document, simply because it didn't fit with the philosophy of Best Value. One such example was a risk assessment as done by Tata steel: in the "standard" applications of Tata Steel the suppliers are asked to present the way they mitigate the risks that Tata identifies. One of the intents of Best Value is to identify which risks the vendors perceive (and which risk mitigation they propose). Best Value is about selecting the vendor who is most capable of seeing and managing risks (mainly risk outside their control). This does not match with having the vendors answering questions on prescribed lists as defined by the client.

During this first phase a shortlist of possible vendors was made. Market research and earlier experience was used to ask six vendors if they were interested to do this project. All six proved to be interested. As Tata Steel is a private firm (and not a public organization), there were no legal requirements or boundaries on the selection criteria. During the preparation phase the selection criteria were defined (Table 1). Past Performance was not used as a selection criterion.

Table 1

Selection criteria (Van de Rijt & Santema 2009)

No.	Criteria	Weight
1	Price	25%
2	Scope	15%
3	Risk analysis and value-added (RAVA)	25%
4	Schedule	5%
5	Interviews	30%

The RAVA plan consisted of the following three elements (Kashiwagi 2010), which lead to one final mark concerning the quality of the RAVA-plan:

1. Technical Risk
2. Risk the vendor does not control
3. Value adds

On September 23, 2010 the first meeting with the six vendors was held. The objective of this meeting was initially to introduce the philosophy of the Best Value approach. Although the invitation for the meeting was specifically directed to project leaders, site superintendents and main subcontractors, a number of sales directors attended the meeting. The client foresaw this and therefore a second training meeting was already planned two weeks after the first meeting. During the first meeting the focus was the philosophy and the procurement method of Best Value, while the second meeting was focused on the philosophy of working "post-award" and devoted much attention to the actual content of the project. The second training day was also used to inspect the domain with the selected vendors (a joined tour on the site of IJmuiden).

After the meeting, the opinion on the part of the vendors was in general that Tata chose an interesting and innovative way of tendering/procurement. The market was pleased that they were given the opportunity to present their own ideas and qualities within the communicated ceiling price (budget). The vendors were also given drawings and additional information about the sewer as well as inspection images that were made during prior renovations. The deadline for submitting the plans was five weeks after the first market meeting. In the meantime there was an opportunity to ask questions. It appeared that a number of vendors were having difficulty with the freedom that Tata had given them. Below is a list of some examples of questions that were asked during "the notification" phase, and include the answers given by Tata, which are in line with the BV philosophy (Table 2). Many questions were "technical" questions and concerned the expertise of the vendors.

Table 2

Common questions and responses

Question	**Answer Tata Steel**
Is it possible to shut connections to the sewage channels or is it required to clear the connections by pumping the water out of the channels?	We assume this to be the expertise of the vendor
Do you require the entire sewage system to be verifiably calculated concerning the presented debits?	We assume this to be the expertise of the vendor
What is the definition of a sewage channel? (does it include for example: pits, pit edges connections etc.)	We assume this to be the expertise of the vendor
Who will be performing the inspection pre- and post-renovation and cleaning of the sewage channels?	As a supplier you can indicate in "scope document" which activities you assume to be doing yourself and which activities you assume to be done by the client
Which standards and directives are we required to use?	We assume this to be the expertise of the vendor. Furthermore the tender documents mention that the Tata specific standards can be found at www.corusveiligheid.nl

The Tender Process

At the end of October 2010, six offers where presented to the contracting officer (this role was fulfilled externally by Jeroen van de Rijt). Of the six offers, one was above the communicated ceiling prices. During the training sessions it was explicitly stated that vendors who would offer above the available budget of €632.500 would be excluded from further participation. The contracting officer verified the price with the company in question and the vendor explained that they were aware of their price and their potential disqualification, but nevertheless decided to send all their tender documents. The regulation of the procedure requires the tender documents of a disqualified company to be put aside and not be taken into consideration; essentially meaning that the effort put into the offer by the vendor was unusable.

The five valid offers where (anonymously) given to the members of the review team. They individually reviewed the offers with all the tender criteria. They used a four points scale as:

- 1= very insufficient
- 4 = insufficient

- 7 = sufficient
- 10 = excellent

The individual scores of the team members were sent to the contracting officer (Table 3). During the meeting the individual scores were "revealed" and the members came to a consensus review per supplier on each of the 3 criteria (scope, RAVA and schedule). Prior to the review, the team had practiced with a test case in order to recognize the "dominant scores." During this practice case it was clear that some team members needed more time to understand the process. Nevertheless, the practice case did contribute to an easier review process during the real reviews.

Table 3

Team scores

No.	Criteria	Vendor A	B	C	D	E
1	Scope	4	7	7	7	7
2	RAVA	1	4	7	4	4
3	Schedule	1	7	10	1	7

Consequently, it wasn't always clear for the vendors to identify what information went into each of the different submittals. Some mixed up "technical risk" with "risk outside their control" and with "value adds." Because the evaluation team evaluated the RAVA as one document (and not as three separate parts) it eventually did not matter during the rating process: the scores were not influenced. It did; however, illustrate the difficulty the vendors had to think this way. It was noticed that the vendors found it hard to formulate their plans in a SMART way (Specific, Measurable, Acceptable, Realistic, and Timely). This applies to both the scope and the documents of the RAVA-plan.

The proposed scopes of the various vendors were very different in nature. There are different techniques possible to renovate a sewer. It is possible to "plast plasters" on weak spots inside the sewer, it is possible to bring on "a new stocking" inside the sewer (the so-called relining) and it is also an idea to totally renew the sewer. Each method has its own advantages and disadvantages. There was a difference in the offered scopes of the various vendors. In table 2 one can tell that 4 of 5 vendors got the same scores on the criterion "scope". The team members didn't give a "technical review" about the direction of the solution and did not fall into the trap of judging an expert (in this phase the vendors are considered to be the experts). The members of the rating committee only rated the way the plan was substantiated (with verifiable performance information) and which solutions were formulated in a SMART way. Four out of five vendors presented their solutions in a sufficient way. Only vendor A did not do a good job at describing why they choose their solution. The proposal lacked motivation. This vendor also scored sub-par on the other criteria. The following are examples of risks and solutions that were submitted by vendor A:

- Risk: Extreme winter weather conditions will cause for extension of the planning
    - Solution: applying protective risk measures up till -4 C
- Risk: the delivered footage is dated

- Solution: pre review the relining and anticipate after the results are clear. Possible scope change.

The risks are adequate, as they are beyond the control of the vendor. The mitigation of the risks; however, is in contrast to the philosophy of Best Value (e.g. what's going to happen when the temperature is colder than -4C? And what effect will this then have on the planning?). The mitigation of the second risk is not what Tata steel envisioned a good vendor to be: starting to contemplate on changing the scope at this moment (without becoming specific) is not really SMART and not in the best interest of the client. It was decided to use this dominant information as a filter. Based on the scores of the quality of the documents, vendor A was the only vendor that didn't qualify for the interviews. All the other vendors went to the interview round.

Vendor C had a considerable better RAVA plan and a better schedule than the other vendors. The following risks submitted by vendor C illustrate that they had more SMART characteristics than vendor A:

- Risk: There is more risk of frost during the wintertime. If that's the case it's not possible to use the sewer renovating technique "relining" (envisaged by us). This has direct consequences for the sewerage activities and is disturbing the production process of Tata Steel.
  - Solution: The relining activities are scheduled as far as possible at the end of the winter. This is the period with the least chance of frost. There is also a go or no-go-decision made 5 days before the beginning of the renovation activities. This decision will be communicated directly. If a no-go-decision is made the activities will be planned again. In our planning we have schedule 10 extra days for possible extension of the planning. These 10 days are the average number of frost day in January, February and March of the last three years according to the statistics of Building Netherlands.
- Risk: The state the sewage canals are in could be so bad that they could collapse during cleaning. Due to the obstacles relining is not possible on that part until that part is restored. With rupturing the sewer also gives an additional delay and extra costs. We are expecting this risk primarily on the pipes of the Deldenweg, Drijverweg, PE-hal and PC hal.
  - Solution: With these parts of the pipes we use an adapted cleaning technique. We also use a special camera to inspect in real time. For all the pipe diameters, we have everything on stock and available in <8 hours. There is also material present on location to start digging and clearing and replacing the pipes within an hour. To directly start digging we make sure there are groundwork instructions present for all parts of the sewage. If a part of a pipe would collapse it can be replaced immediately.

After setting the final scores with quality criteria "scope", "RAVA" and "Planning," the names of the different suppliers were revealed to the team members. After that the Contracting Officer called the suppliers and made the final schedule of the interviews. Vendor A was informed that they would not be interviewed because they didn't meet the required score. Three key individuals were identified to be interviewed from each vendor:

- Site superintendent
- Site intendant
- The most important under contractor

Each interview lasted up to one hour. The interviews took place shortly after each other. This made interviewing an intense process. The choice was made to give each key individual a separate score (thus: 3 ratings per vendor, instead of 1 overall rating for the whole team). This gives a maximum transparency and a maximum accountability. Again it turned out there was dominant information. Vendor C scored the best again: twice a "10" and once a "7" score on the interviews. Two site-intendants (of vendor B and D) failed their interviews: they both scored a "1." Vendor C turned out to have the best quality by far (Table 3).

To calculate the best vendor, the relative rating process of Kashiwagi (2010) was used. This differs from the model that is most widely used in the Netherlands to determine the best vendor, the Most Economically Advantageous Tender (MEAT). However, irrespective of the method of calculating, vendor C was the best vendor by far (Table 4 and 5). For competition considerations the overview doesn't contain prices (and the corresponding points). After consideration of the price the total ranking didn't change. Vendor C stayed the best followed by E,B, and then D.

Table 4

Unweighted vendor scores

No.	Criteria	Vendor A	B	C	D	E
1	Price					
2	Scope	4,00	7,00	7,00	7,00	7,00
3	RAVA	1,00	4,00	7,00	4,00	4,00
4	Quality interview 1	-	4,00	10,00	4,00	7,00
5	Quality interview 2	-	1,00	7,00	1,00	7,00
6	Quality interview 3	-	7,00	7,00	4,00	10,00
7	Time schedule	1,00	7,00	10,00	1,00	7,00

Table 5

Weighted vendor scores

No.	Criteria	Vendor A	B	C	D	E
1	Price	8,57	15,00	15,00	15,00	15,00
2	Scope	3,57	14,29	25,00	14,29	14,29
3	RAVA	-	4,00	10,00	4,00	7,00
4	Quality interview 1	-	1,43	10,00	1,43	10,00
5	Quality interview 2	-	7,00	7,00	4,00	10,00
6	Quality interview 3	0,50	3,50	5,00	0,50	3,50
7	Time schedule	8,57	15,00	15,00	15,00	15,00
8	Quality criteria	-	45,21	72,00	39,21	59,79
9	Ranking based on quality criteria	-	3	1	4	2
10	Ranking including price	-	3	1	4	2

Immediately after the ranking, the vendors were informed about their score. Vendor C went to the pre-award phase. The other vendors were informed briefly by telephone concerning their scores (including a brief explanation on their respective scores).

Later on in the process a detailed debrief session with all the suppliers was held (each vendor separately). During these meetings the different criteria and the motivations of the scores were discussed. All the suppliers accepted the invitation for the evaluation meetings, except for the supplier whose offer exceeded the maximum ceiling price. The evaluation sessions with each of the suppliers lasted approximately 45 minutes.

The objective of the meetings was to explain the ratings and to zoom in on the process. All five suppliers appreciated the opportunity given to them to gain more insight in the entire process and the evaluation. There was an overall positive response to the way in which Tata-Steel had tendered the project: finally it was not lowest price, but the best value that determined the winner of the tender. Even those suppliers that did not win the contract were very positive about the process. The suppliers were very honest about the way they handled the process and were able to accept their place in the ranking. The suppliers saw this tender and ensuing evaluation as an opportunity to learn for possible future tenders.

During the evaluation sessions it needed to be stressed that the scores of the interviews should be interpreted correctly by the team of the vendor: the scores did not reflect the abilities or capabilities of the key individual in general terms, but rather the extent to which the person in question understood and apprehended the Tata sewage project from beginning to end. The interviews often confirmed the ratings on the submitted plans and in particular the RAVA plan. During the evaluation meetings with the suppliers it became clear that the suppliers needed to get used to the new way of thinking. The "old way of thinking" was still very much engrained. The suppliers were critical about one part of the tender process: they had preferred to be informed of the winner of the tender earlier in the process. It appeared that the suppliers were only informed of this decision during the evaluation meetings. This was a point of improvement in the process.

The Pre-Award Phase and the Execution

Immediately after the ranking, the pre-award phase started with the best supplier (BAM Wegen). Interestingly, this vendor was also the incumbent vendor. A list of sixty-seven risks and concerns was compiled by Tata, this list included the risks as described in the bids of all the suppliers in the tender process, as well as additional risks and concerns on part of Tata. The primary goal of the pre-award phase was to allow the supplier to envisage and comprehend the project from beginning to end.

After the pre-award-kickoff the intended contractor started with the project. The mitigation measures were formulated for each potential risk and a detailed planning was made. The contractor proposed to take more time for the pre-award phase so he could translate the preliminary design to a final design. Although this is not necessary in the pre-award phase, it showed the level of ambition of the contractor. Upon completion of the pre-award phase, BAM Wegen was contracted in mid-December 2010.

Directly after the project was awarded a risk occurred; it turned out (after the schedule was finalized) that a certain part of the sewer could only be relined in week 2 of 2011. If it did not happen in week 2 the next opportunity would be week 52 of 2011. It would of course have been best if Tata Steel would have told the vendors at the start of the project that the relining of this certain part was supposed to be done in week 2. Site Facilities however was not aware of this requirement. BAM was very proactive in solving this issue and proposed to divide the activities in two halves, each with their own delivery of parts. The way this risk was mitigated scored a "10" in the Weekly Risk Report. The project was eventually completed with a satisfaction rate of 9.84. The following comments by members of the project team reveal invaluable lessons learned:

- "Aside from the training on Best Value, the preparation was relatively easy for us. It was pleasant to work on realizing a goal rather than a specified price offering. Looking back upon the project we should have interfered more as Site Facilities in the pre-award phase. Not that BAM was underperforming, but in the execution it was evident that some information was still missing concerning how BAM would work. Next time there will be more frequent communication between Tata and the contractor in the pre-award phase. For me as a project leader the risk matrix was good to handle and the time I needed to spend on the project was minimal while still being well informed about what was going on. I found it annoying that the collaboration with the internal customer (the steel factory) delivered the most problems. Although the development can be seen as positive, it remains difficult to adjust to the new way of working. The steel factory, for example, did not want to do business with BAM but with Site Facilities, while the whole design of the project was that that BAM was leading." (Bakker, Wouter) Project Manager Tata Steel.
- "As a contractor BAM was stimulated to finish their tasks earlier, faster and better than usual. The subcontractor was selected earlier, the project was prepared in a more detailed manner, we were able to put more thought into the underlying interests of parties involved and we devoted time to developing intelligent solutions for the question. Our activation as a contractor is mainly caused by the given responsibility of several matters. We want to make the right choices, and now we were allowed to think together with Tata about the potential solutions. The effect was that there was more time invested in the preparation phase, but also that this extra time was recovered during the execution. The process was very controlled and that limited deviations and costs of failure." (Mullink, Sander) Director BAM Wegen

Conclusions and Reflections

This case shows that Best Value Procurement also works for a sewer project on an industrial complex. The project was delivered on time and within budget, with a high customer satisfaction. The pilot made clear that the other way of tendering had influence on the behavior patterns of the suppliers. BAM Wegen took the lead as the "expedition leader" (where as an incumbent vendor, it used to be "managed, inspected and controlled" by the client). Previous experiences of Tata Steel with BAM Wegen showed that with other (more traditional) procurement processes ignited different behavior on the part of BAM. In other processes, BAM leaned more on Tata Steel. This procurement method has had a significant influence on the

execution of the project. The more room given to a supplier to come up with their own solutions during the procurement phase, the more logical it is that the contractor will be more proactive during the execution phase. The execution phase showed significantly fewer questions about the project, which resulted in less consultation time and communication between client and contractor, and less bureaucratic processes. As such the almost evident item of "additional work" (change orders) was avoided during this project.

The method has some demands on the team members that are involved on behalf of both the contractor and the client. The contractor is required to formulate their objectives very clearly (instead of complying with various technical requirements). Furthermore, it is important to be able to "let go." The contractor needs to learn to be strict in risk management thinking. Furthermore it has proven to be difficult to specifically define the "product." Both Tata Steel and the BAM Wegen concluded the pilot worked and that there was a need for more Best Value pilots within Tata Steel.

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Case Study: Contracting Rolling Stock Maintenance of Utrecht Tramway, The Netherlands

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This is a case study of the Utrecht tramway rolling stock maintenance project (21.6M euros). The case study is unique to the Dutch environment, which has experienced many construction-related projects. As it is one of the first services contracts in this area, it is different from a construction project, where the performance can be more easily and quickly identified. Another unique factor is that the vendors are also less educated in the Best Value (BV) approach. The BV approach and concept of the "vendor having no financial risk, and the owner having all the financial risk" was not well understood. At the time of its procurement (May 2011), the understanding of the clarification period in the Netherlands was not mature, causing potential issues with this type of contract. The uniqueness of this project, coupled with the approach to BV, presents invaluable lessons learned for entities interested in implementing BV.

Keywords: best value, clarification period, maintenance contract

Introduction Bestuur Regio Utrecht

The Utrecht region is the heart of The Netherlands. With a population of over 600,000 people, 400,000 jobs, and 300,000 houses in the Utrecht region, transportation reliability is critical. People move, change jobs, commute on a daily basis between home and work, and in all those movements they constantly cross over municipal boundaries. Utrecht is at the center of the national road and train traffic and the connection between the urban agglomeration of Western Holland (the Randstad) and the European hinterland. Bestuur Regio Utrecht (BRU), the Utrecht Regional Executive, promotes the interests of the region. In this executive agency, nine local authorities work together to ensure accessibility, quality of life and economic development. The nine local authorities form one region: the urban region. BRU´s core duties are traffic, public transport, housing, economy and nature.

As the public transport authority for the region, BRU is responsible for granting and managing concessions. This includes matters such as timetables, fees, safety, communication and marketing. BRU owns the tramlines, tram stops, trams and tram depots, and is responsible for their management, maintenance and operation. This also applies to the future developments in light rail. The public transport ambition of BRU is to have a high quality public transport network in 2040 that fits an increased use of public transport, is affordable, available and sustainable.

Project Background

The tram system of BRU, between Utrecht and its satellite cities Nieuwegein and IJsselstein (the so-called SUNIJ-line), is one of the most important public transport connections in this region and started operations in 1983. On a daily basis, 40,000 passengers are using the tramway. Until 2008, the concession holder Connexxion owned the rolling stock, stations and depot. Until 2010, the rail infrastructure was owned and managed by the Dutch mainline network operator ProRail. BRU became Asset Owner and Asset Manager of the rolling stock, stations, depot, and rail infrastructure and inherited existing maintenance contracts from predecessors.

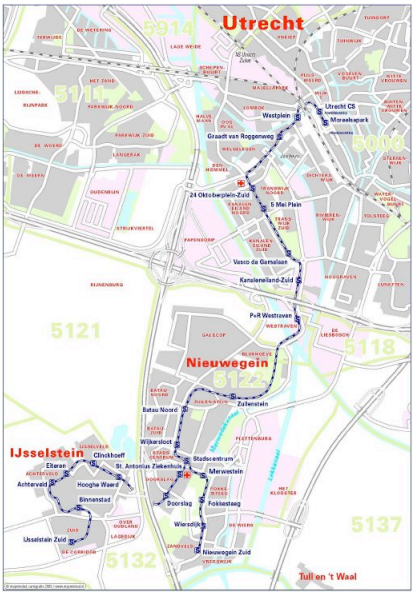

Figure 1. Utrecht tram system

Procurement Strategy on Maintenance of Rolling Stock

In line with infrastructure vision, BRU decided on contracting the Best Value (BV) vendor to maintain rolling stock, to ensure availability, improved reliability & safety of trams against the lowest possible cost:

1. BRU discovered that some existing contractors had developed a weak safety and performance culture, by working in the same way after more than 25 years.
2. Performance measurement on tram maintenance lacked maintenance and performance information.
3. In 2010 BRU decided on an asset management model with a strategic function and in outline at tactical level. This means all operational management tasks at a tactical level as well as all operation and maintenance tasks will be outsourced to third party contractors.
4. BRU's vision on the infrastructure tramway is to have a high performance tramway system with maintenance and performance information that supports the expectation: "availability of the best tramway system in The Netherlands, cost efficient & compact organization".

5. BRU also has an expectation that the BV contractor should, during the contract period, also help BRU to manage various project interfaces, such as major overhaul of fleet & rail system, expansion of tramway system to the Uithof (University Campus Area Utrecht) and introduction of new rolling stock in the nearby future.

Figure 2. Impression of expansion to the Uithof

Best Value (BV) Approach

The BV approach was introduced to the Netherlands in 2004 and momentum in the use of the BV approach increased in 2008 as the Rijkswaterstaat started their $1B fast-track infrastructure projects (van de Rijt & Witteveen 2011, van de Rijt & Santema 2012). The BV approach is a new paradigm that continues to transform as the stakeholders get a better understanding of the BV approach. The BV approach differs from traditional procurement processes in the following ways (Kashiwagi 2011):

1. Minimizes client/buyer decision making and direction and control.
2. Selects the BV vendor on the basis of performance and price.
3. Vendors create a transparent environment by proposing a plan to meet the client's needs, uses metrics to measure performance, and identifies and mitigates risk that they do not control.
4. Identifies that the expert vendor has no risk.
5. Vendors attempt to minimize their scope and risk that they do not control.
6. Client's and buyers assume financial responsibility for all risk.
7. The vendor is the offerer and the client is the acceptor of the vendor's proposal.

The implementation of the BV paradigm in the Netherlands was affected by various factors:

1. The Performance Information Procurement System (PIPS) approach was being continually modified in the United States to make the process easier to implement and simpler to understand. The Dutch implementation team led by Scenter and the Rijkswaterstaat, and later by NEVI, was a year behind the PBSRG process in the U.S. The Dutch model was therefore being improved every year.
2. The Dutch model emphasized the selection process in the first couple of years (2007-2009).
3. The emphasis changed to the clarification period activities of the vendor in the later years.

4. In the last year, the emphasis has changed from the owner controlled BV process to the vendor driven BV process.
5. The most difficult activity for vendors has been the identification of a detailed project plan, understanding how to quantify the risk that the vendor does not control, and how the vendor measures the risk.

Impact of Information Measurement Theory (IMT)

At the time of the running of this procurement, the emphasis of the Dutch BV effort was on the selection phase. This translated to the focus of the clients believing that the selection of the BV vendor was the most important issue. This led to a reaction of having vendors submit a scope of work as a part of the Project Capability PIPS filter (intent was to procure a high performance maintenance contractor). The Project Capability ratings are followed by an interview of the key personnel. They are rated based on what they understand they are offering in their proposals and the ability they show to manage the project at all times. Their interviews are also rated.

In this environment, the vendors are motivated to increase their scope of work that they are providing. This increases their risk and cost. However, if they do not increase their proposal, they might not get the project due to a low rating on their proposal. They therefore increase their proposed scope and worry about the increased risk after they are identified as the BV vendor. Their objective then becomes to get the project, and worry about how to do it after the award. This is a "short term, get the job" attitude. This is the spirit of the low bid vendor. Getting the job is much more important than doing the job well.

The client however is intent on identifying the BV or the largest scope for the lowest price. This forces them to:

1. Be an expert on what is being proposed. Make the decision if what is being proposed can be done for the price being proposed.
2. Make a decision on which is the better value.

Both of these actions require the client to:

1. Be the expert.
2. Use their own experience.
3. Assume that they understand what the vendor is proposing.
4. Make decisions.
5. Become liable for the decision they are making.
6. Shift all responsibility and accountability away from the vendor.

In a services contract, where the performance of the vendor is long term, this approach will lead to the price based, owner controlled environment. The vendors will become more reactive, the environment will become non-transparent, and both parties will lose.

The BV approach therefore, is for the vendors not to submit a proposed scope. This stops the buyers from making decisions and stops the vendors from increasing the scope, instead of

decreasing the scope to minimize their risk and improve value and performance as an expert. This concept was not understood at the time of the procurement, and therefore a scope was requested from the bidders. In the BV approach, the scope is only requested in the clarification phase (which follows the selection phase.) The selection is therefore done on dominant performance metrics showing capability, the ability to identify risk that the vendors do not control (motivating vendors to minimize their scope and do risk mitigation, and measure their performance of their risk mitigation), and add value for the lowest possible price.

This concept was continually briefed by the creator of the PIPS process, but he also identified that when the BV approach is first used, this concept is almost never understood (Kashiwagi 2012).

Set Up of the Process

Besides the previous discussion on requesting the scope from vendors, the goal was to stay as close to the original BV PIPS methodology (as developed by Dr. Dean Kashiwagi) as possible, with a few adaptations. Earlier, the Ministry of Transport successfully made minor adaptations to the original PIPS methodology in its Fast Track Project (van de Rijt et al. 2011). In this section the differences between the methodologies used in the rolling stock maintenance contract and the "pure" PIPS methodology are described.

The budget of this project was $28M and the duration of the contract is eight years (excluding one year prolongation of contract). The procurement phase was May to September 2011. It was anticipated that the vendors were not well-versed with the BV approach.

The differences with the optimized PIPS methodology are described as well as why changes were made. The phases and adaptations (Table 1) will be described.

Table 1

Overview of phases and adaptations to BV PIPS methodology

No.	Phase	Adaptation
1	Preparation	No adaptations were made
2	Selection	1. Dutch ranking method (public sector clients) was used 2. PPI as a PIPS filter was dropped, no alternative was used 3. Scope document was added to project capabilities, rated and weighted to help client and vendors in making the PIPS/PIRMS paradigm shift 4. The schedule was rated and weighted and focused only on the logical sequence between the activities and the RAVA plan 5. Short listing on the basis of the Dutch ranking method
3	Pre-Award (Clarification Period)	No adaptations were made
4	Execution (Risk Management and Quality Control)	No adaptations were made

Preparation Phase

Education of selection committee and vendors was an important part of the procurement plan: Dutch BV expert Jeroen van de Rijt was hired to guide the contracting officer in applying the BV Approach to the tender and to educate the teams of client and vendors.

Vendors were invited, in the tender announcement, to visit the two 4-hour educational meetings in which the BV Approach was explained and information about the project was given. Both meetings focused on making the paradigm shift (to BV Procurement from traditional procurement). IMT, the vendor selection process and pre award phase were explained. Also vendors participated in an exercise on risk mitigation (to understand technical versus non-technical risk and value added). Vendors who attended the educational meetings had a hard time understanding the new contracting model, where the vendor manages/minimizes risk with the contract. To write their own contract in the Pre Award Phase did not fit into their bid management structure: getting their proposals authorized in their organization was not easy.

Selection Phase

The intention was to copy the procurement phase as much as possible from the pure PIPS methodology. Award criteria were scope, risk assessment (technical and non-technical risk) & value added (RAVA) plans, schedule (planning), interviews, and pricing. Due to European tender regulations, some adaptations were made to the early 2011 PIPS methodology.

Within European law, contracts can be awarded either on the basis of lowest price or most economically advantageous tender (MEAT). Logically, the system of MEAT was chosen for rolling stock maintenance contracting. When an award is going to be based on MEAT the suppliers must be reasonably informed on the award criteria and relative weighting that will be applied to the award criteria. Award criteria must be objective criteria to ensure compliance with the principles of transparency; non-discrimination, equal treatment, and which guarantee tenders are assessed in conditions of effective competition. As mentioned before, the award criteria were RAVA plans, scope document, schedule (planning), interviews and pricing. Logically, these criteria were disclosed prior to the tender process.

In the Dutch infrastructure sector, bigger public clients have adapted a specific way to combine price and quality into BV (PSI Bouw 2007). A major adaptation was the short listing and ranking of the vendors based on their absolute scores (instead of the relative scores), and based on price deductions from quality scores is the "Dutch ranking method." All "quality" criteria are "transformed" into "fictitious" Euros. To calculate which vendor has the most economically advantageous tender, the amount of "fictitious" Euros scored on quality is deducted from the vendor's budget (Figure 3). This was the first adaptation to BV PIPS.

Criteria, weighting			
maximum year budget		€ *2.700.000,00*	
RAVA	25%	€ -675.000,00	maximum fictitious deduction
scope	20%	€ -540.000,00	maximum fictitious deduction
planning	5%	€ -135.000,00	maximum fictitious deduction
interviews	30%	€ -810.000,00	maximum fictitious deduction

total maximum fictitious price deduction: € -2.160.000,00
total maximum fictitious price addition: € 2.160.000,00

Evaluation model	Fictitious price deduction			Fictitious price addition	
	100%	50%	0%	50%	100%
Rating	9	7	5	3	1
Criterion	Monetary value of rating				
RAVA	€ -675.000,00	€ -337.500,00	€ -	€ 337.500,00	€ 675.000,00
Scope	€ -540.000,00	€ -270.000,00	€ -	€ 270.000,00	€ 540.000,00
Planning	€ -135.000,00	€ -67.500,00	€ -	€ 67.500,00	€ 135.000,00
Interview1	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00
Interview2	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00
Interview3	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00

Figure 3: Overview criteria, rating, monetary value of rating

Within the Selection Phase, there are also the following sub-phases or filters (van de Rijt & Santema 2009):

- Past Performance Information
- Project Capability (risk assessment (technical risk and non-technical risk) & value added, scope, planning)
- Short listing of vendors
- Interviews
- Ranking

Past Performance Information

The second adaptation to BV PIPS was that Past Performance Information (PPI) was not used. Under European law, award criteria cannot include selection criteria (i.e. financial standing, technical or professional ability), therefore the PPI filter was dropped. No filter could be found to create the same effect as the PIPS filter for PPI, so no alternative was used. It was recognized the PIPS filters Project capability, Interviews and Pre Award period would be sufficient to show the BV at the end of the tendering process.

The use of performance metrics as a first selection filter to show project capability was not used on this project. Instead, performance metrics could be used by the vendors to demonstrate their capability of the proposed scope. Understanding of how to use dominant information to show capability that would minimize the decision making of the selection committee was not well understood by the vendors. Dominant information was to be considered in the form of metrics in which two people can more easily understand when communicating. This is the second most misunderstood issue after the scope issue previously discussed. The lack of understanding of dominant information that affects the vendor's capability to understand their own performance and how they can improve their performance was detrimental. It also creates non-transparency where the client's expectations may abuse the vendor's performance.

To get some innovation into the traditional rail rolling stock market, no qualification criteria were used in the tendering process. To attract the more innovative automotive industry to enter

the tendering process, the "Open procedure" (within European tender regulations for special sectors), was used without any selection criteria.

The RFP was published only after the first educational meeting, opposite to simultaneously publishing announcement of the tender and tender documents, as is a custom in The Netherlands. This stimulated vendors to visit the educational meetings so the right context (BV Approach) was given to the RFP and discouraged non-committers from placing a bid.

Selection Filter #1 Project Capabilities

The Risk Assessment (technical and non-technical risk submittals) and Value Added (RAVA) were reviewed together as the first criterion, scope document as a second, planning as a third criterion. In contradiction to the 2011 PIPS methodology, a scope document was added as a criterion in the selection process (the third adaptation) to help client and vendors in making the PIPS/PIRMS paradigm shift.

The milestone schedule was rated and weighted in contradiction to the 2011 PIPS methodology. The schedule focused only on the logical sequence between the activities and the RAVA plan. This adaptation attributed to the contract characteristics that: speed of delivery was not a critical factor however was perceived as a distinctive element in the expert evaluation process when dominant information on RAVA and Scope document failed (and therefore mitigating the risk of not having valid submittals to enter the interview phase). The planning or scheduling issue is very similar to the scope issue. The only expert who understands the meaning of the scheduling is the expert vendor. The rating and weighting of the schedule was the fourth adaptation.

Short Listing of Vendors

To prevent excessive transaction costs created in the interview phase, since no PPI filter nor an alternative filter was used in the selection process, only submittals that were given an overall positive dominant rating on RAVA-scope-planning were invited to the interviews. After evaluating project capability documents, submittals rated with no fictitious price deduction or with a fictitious price addition (monetary value of < 0) were discarded. Vendors whose submittals were rated a fictitious price deduction were invited to the next phase: interviews. The short listing method is explained under the "Dutch ranking method" in this document.

Selection Filter #2 Interviews

Vendors that were short listed for the interviews were asked to send 3 key individuals with operational responsibilities for planning, personnel and contract management on the tendered contract to the interviews. The interviews were held individually in 3 x 60 minutes and were rated first individually by the selection board members later unanimously with an overall score per interviewee. The selection board scores were checked on dominance.

Selection Filter #3 Prioritize (Identify BV)

The total monetary value of each submittal that was short listed was added to the financial bid of that submittal (ranking on the bases of "Dutch ranking method"). The highest rank is the lowest fictitious price and therefor the BV vendor. Short listing on the basis of the Dutch ranking method was the fifth adaptation.

Pre-Award Phase

The BV vendor was invited to enter and lead the pre-award phase to clarify their proposal, start a detailed pre planning of the execution phase and to write the contract:

- The technical scope, financial plan, value adds and milestone schedule (planning) in their submittal were elaborated by the vendor and clarified;
- A risk management plan (RMP) was created by the vendor. All risks that were identified in the other vendors' submittals in the tender and the list of concerns from the client, were given to the vendor as part of the RMP;
- The vendor scheduled all meetings and deliverables, created a weekly risk report (WRR) and tracked all deviations during the pre-award phase in the WRR;
- The vendor assembled the contract.

Baseline deviation pricing was part of the financial plan for this eight-year maintenance contract. The baseline was set on historical data in year 2010 that was provided in the RFP by the client, such as data on rolling stock, technical failures, modifications, and vandalism. The duration of the pre award phase was determined by the vendor. During the pre-award phase the vendor could decide to withdraw from the project. If the client determined the vendor did not meet the requirements of the pre award phase, they could have decided not to award the contract to this vendor and invite the next prioritized BV vendor into a new pre award phase. The pre award phase started with a pre award meeting, in which the vendor was trained on the use of the weekly risk report, on the pre award period and execution phase. The pre award phase ended with a summary pre award meeting in which the final contract was presented by the vendor.

Execution Phase

The execution phase started with an award meeting, where the contract was closed. The execution phase was broken down into two phases: the transition phase and the execution phase; the vendor used a specific WRR for each phase. During the transition phase, the vendor executed the hand over process and employee transfer. A part of the baseline information (that was provided by the previous vendor and was not audited by the client) proved to be inaccurate and complicated the transition phase. This caused risk for both the client and the vendor.

Results

The goals of the procurement strategy were to contract a vendor who:

- Is focused on performance
- Makes rolling stock available that is needed to execute service/time table
- Gives above average attention to work safety

- Optimizes processes to reduce costs drastically
- Delivers a higher service level than the current vendor and
- Offers a transparent service level

The tender submittals of 3 vendors were received (Figure 4). The project capability of one submittal was evaluated under the required minimum quality and was subsequently discarded. The project capability of two submittals was evaluated above the required minimum; these vendors were invited to the interviews. The interviews were rated and the chart completed. The difference in price between the two vendors could not compensate the difference in fictitious monetary value. Vendor 2 was brought into the pre-award phase. The vendor met the client's requirements in six weeks.

Criteria, weighting			
maximum year budget		€ 2.700.000,00	
RAVA	25%	€ -675.000,00	maximum fictitious deduction
scope	20%	€ -540.000,00	maximum fictitious deduction
planning	5%	€ -135.000,00	maximum fictitious deduction
interviews	30%	€ -810.000,00	maximum fictitious deduction

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Scope	€ -540.000,00	€ -270.000,00	€ -	€ 270.000,00	€ 540.000,00
Planning	€ -135.000,00	€ -67.500,00	€ -	€ 67.500,00	€ 135.000,00
Interview1	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00
Interview2	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00
Interview3	€ -270.000,00	€ -135.000,00	€ -	€ 135.000,00	€ 270.000,00

Validity check

	Vendor #1	*Vendor #2*	*Vendor #3*
Financial bid	€ *2.391.750,00*	€ *2.612.868,00*	
financial bid below or on maximum budget?	*yes*	*yes*	*yes*
submittal contains RAVA, Scope, Planning?	*yes*	*yes*	*yes*
submittal to be rated?	*yes*	*yes*	*yes*

Rating/weighting by selection board

Rating RAVA Scope Planning	Vendor #1	Vendor #2	Vendor #3
RAVA	7	7	3
scope	7	9	3
planning	5	5	3
Monetary value RAVA Scope Planning			
RAVA	€ -337.500,00	€ -337.500,00	€ 337.500,00
Scope	€ -270.000,00	€ -540.000,00	€ 270.000,00
Planning	€ -	€ -	€ 67.500,00
Fictitious deduction or addition after 3 criteria	€ *-607.500,00*	€ *-877.500,00*	€ *675.000,00*
Ranked for interviews? (when monetary value <0)	*yes*	*yes*	*no*

Rating Interviews	Vendor #1	Vendor #2	Vendor #3
Interview 1	7	9	
Interview 2	3	5	
Interview 3	5	5	
Monetary value Interviews			
value interview 1	€ -135.000,00	€ -270.000,00	
value interview 2	€ 135.000,00	€ -	
value interview 3	€ -	€ -	
Monetary value interviews	€ -	€ *-270.000,00*	
Total monetary value (fictitious deduction or addition)	€ *-607.500,00*	€ *-1.147.500,00*	
Final monetary value of submittal	€ 1.784.250,00	€ 1.465.368,00	

Figure 4: Overview of submittal evaluation results

Update

At the time of writing of this paper, there are still struggles in understanding and enacting the execution phase of the BV process on this project. The vendor is still having difficulties providing performance information and measurements that are dominant. The vendor is not using the WRR and there is no clear performance monitor in place for continuous improvement.

The lessons learned on this project should be utilized in order to ameliorate similar challenges on future projects.

Lessons Learned

Due to the paradigm shift, as in other projects, the client concentrated on the selection phase of the BV approach. The biggest challenge was in the pre-award/clarification stage. Because the vendors had been in an owner controlled price based environment the vendor had a difficult time understanding the following:

1. The paradigm shift is that a BV expert has no risk. The BV expert is supposed to minimize their risk by minimizing the scope of the contract. Any risk is then the financial responsibility of the client. However, to do this, the BV vendor must know how to identify the value of their services in maximizing the service and quality of the client's equipment. This value that the vendor is providing must be clearly identified by performance metrics.

2. The only way that the vendor can do this is to identify how they will add value, and what can stop them from adding their value (risk that they do not control.) The risk that they do not control has to be quantifiable with metrics, and those metrics must be dominant enough to assist the parties who are responsible for the risk to be accountable. To help the vendor track the risk that they do not control, the vendor must have the performance metrics of the factors that they do not control which may put their maintenance performance at risk. These factors could be equipment usage or loading, vandalism, problems with the equipment that are manufacturing related, lack of maintenance area or equipment.

By not identifying their performance metrics and the performance metrics on the risk that they do not control, the vendor has created an environment of non-transparency where they are at risk to meet the expectations of the client. This creates an environment where the client may have high expectations, and where the vendor may be at risk due to the lack of performance metrics. The vendor was instructed to come up with the metrics as soon as possible.

This lesson learned on the importance of performance metrics to both define the expectation on the BV vendor and to protect the vendor against the risk that they do not control, is the most difficult part of the paradigm shift of the BV approach. The overall objective of the BV approach is to create transparency by measurements. The measurements minimize decision making, and therefore create consensus between the parties. Without the metrics, both the client and the vendor are forced back into using their own experience, making decisions and having expectations. This leads to the client/buyer to exercise direction and control to minimize the risk of nonperformance of the vendor, and could lead to a situation where the vendor perceives they are being abused or never doing enough.

Summary and Conclusions

The client has evaluated the tender as successful with the following improvements:

- Client must verify/audit all project information that was given by current vendor
- Client and vendor need intensive training not only during preparation phase, but more during pre award phase/clarification stage and execution phase to help them to understand the paradigm shift.
- The vendor has to take responsibility for using a consultant to assist in understanding and implementing PIPS in his company.

Due to the process using a scope submittal, not understanding the importance of minimizing the risk that the vendor did not control, and the vendor not understanding the BV approach as more than a selection process, the vendor is now at more risk than in a price based situation. Due to this, the client will also lose because the vendor will waste resources in a reactive mode. This paper identifies the importance of understanding the theory behind PIPS, and understanding that it is a paradigm shift, and not just a procurement process.

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Case Study: Use of Best Value Process for Inspection and Preventive Maintenance of Pumping Stations

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The water board Velt en Vecht is a Best Value (BV) client who used the Performance Information Procurement System (PIPS) process to select professional services in 2012. The client had a procurement mission of integrity, transparency, objectivity, and non-discrimination that aligned them with the BV PIPS system. With a strategic plan of leadership instead of management and control, the water board is an example of a visionary owner that can be successful with BV PIPS. Lessons learned from the water board implementation of PIPS are that BV PIPS is a change of paradigm, even for a visionary owner. Both the owner who selects and the contractors who compete for the award must learn the new paradigm of minimized decision making, proactive planning, and risk management.

Keywords: Best Value Procurement, the Netherlands, PIPS, Water board Velt en Vecht, pumping stations, inspection and preventive maintenance

Introduction

The maintenance of sewage pumping stations and other pumping stations is a recurring service that is outsourced by the water board Velt en Vecht (herein: Velt en Vecht). In February 2012, the water board started to prepare the tender “Inspection and preventive maintenance of sewage pumping stations and other pumping stations.” Due to the high value of the contract, Velt en Vecht had to follow the European tender process.

The procurement mission of Velt en Vecht was: "Velt and Vecht is a social responsible and reliable customer, based on the core values of integrity, transparency, objectivity and non-discrimination. We focus on results, solutions for which we also use the knowledge, innovation and creativity from the market"(Velt en Vecht 2012). As a result of the purchasing mission, Velt and Vecht gave itself the objective to perform procurement procedures in a different way, making best use of the knowledge of the market. Velt en Vecht decided to make use of the principles of Best Value (BV) Performance Information Procurement System (PIPS), founded by Kashiwagi (2011), for the tender “Inspection and preventive maintenance of sewage pumping stations and other pumping stations” to experience if this would be a suitable methodology for Velt en Vecht.

Water Management in the Netherlands

Water is critical to the livelihood of people, livestock, and industry. In the Netherlands, there is not enough clean and sanitary water. Therefore, water management is necessary. In the Netherlands, the surface water is managed by regional water authorities (water boards). Flood protection is the core task of the regional water authorities. The Netherlands is constantly

threatened by both sea and rivers because the country lies below sea level. Protection against floods is literally and figuratively "a matter of life and death." Economic interests must also be protected: behind the dikes lies € 2.000 billion of invested capital. Together, the national government and the regional water authorities are responsible for the management of water barriers. The government is in charge of the protection of the coastline and the maintenance of the dams, which close off the major sea-arms in the west. The other water barriers (dikes, dunes and quay-walls) are managed by the regional water authorities.

Regional Water Authorities

The protection of surface waters from pollution is also an important task of the regional water authorities. An important element of this task is the construction and the operation of purification works (wastewater treatment plants), which are used for the cleaning of the sewerage water of households and companies. The national government is responsible for the maintenance of the main system of the bodies of water. The regional water authorities are legally bound to manage regional and local bodies of water. For this, they operate about 360 sewage purification plants. Regional water authorities also see to the control of the quantities of surface water in a certain area on a daily basis. The management of water quantities aims at reaching and maintaining certain water levels dependent on the function of the body of water in question.
A correct supply and drainage of surface water prevents surpluses and shortages. The national government maintains the main water infrastructure. Regional water authorities are in charge of water quantities at regional and local levels (UVW 2012).

Organization of the Regional Water Authorities

A regional water authority is governed by its General Assembly, an executive committee and a chairman. The General Assembly consists of representatives of stakeholder organizations and is authorized to make all decisions that are necessary for fulfilling its tasks, such as the annual budgeting and accounting, setting water levels, performing inspections, and taxation.
The executive committee consists of a chairman and regular members (the number of which is determined by the General Assembly) and is responsible for day-to-day management and policy preparations. The chairman is charged with promoting the interests of the regional water authority and chairs of both the General Assembly and executive committee. Like local and national governments, the members of the General Assembly are elected by the general public (UVW 2012).

Velt en Vecht

Velt en Vecht is responsible for the water management in Southeast Drenthe and Northeast Overijssel. The management area of Velt en Vecht is very diverse, there is nature, agriculture, construction, and open water. These waterways are very critical as they support (Velt en Vecht 2012):

- 90,000 acres
- 200,000 inhabitants
- 300,000 pollution units (v.e. 's)

- 1200 km waterways
- 7 wastewater treatment plants
- 700 sewage pumping stations, other pumping stations and water works
- 185 employees

The purchasing department of Velt en Vecht has been working on professionalizing the procurement for several years. It started with the adoption of a procurement mission by the General Assembly. Originally, purchases were primarily based on the lowest price. In recent years, the use of the criterion Most Economically Advantageous Tender (MEAT) has increased. The professionalization of the procurement requires a different kind of leadership of the employees. Best Value (BV) Procurement and its philosophy behind (Information Measurement Theory and Kashiwagi Solution Model) can help Velt and Vecht to change to a new type of leadership. Therefore, with the objective to perform procurement procedures in a different way, making best use of the knowledge of the market, Velt en Vecht decided to make use of the principles of BV Procurement, the Performance Information Procurement System (PIPS), for the tender "Inspection and preventive maintenance of sewage pumping stations and other pumping stations."

Scope of the Project

The scope of work for Velt en Vecht contained about 134 sewage pumping stations and 298 other pumping stations. Due to the different types of installations, the tender was divided into two lots, one for the sewage pumping stations (Lot 1) and one for the other pumping stations (Lot 2). Both lots are assessed separately.

For both lots the purpose of the tender was gaining insight into the state of maintenance, while any preventive maintenance and cleaning is performed. Inspection reports should form the basis for the outsourcing of the corrective maintenance. The long-term goals were:

- The full functionality of the installations are guaranteed;
- Disturbance, failure and sewer overflows are prevented; and
- Control of operating costs is achieved.

Tenderers had to describe in their "offering scope," which activities they offer, the way they will execute the activities, and how they will report to Velt en Vecht. Besides a description of the execution of the work, Velt and Vecht asked the tenderers in their "offering scope" to give a vision of effective preventive and corrective maintenance in the future and how the tenderer would lay a foundation for this with the execution of the contract.

Preparation of the Tender

For both lots, Velt and Vecht had assembled a tender team for the selection process. Both teams were trained twice. The first training took place at the start of the preparation of the tender procedure and was focused on the methodology of BV Procurement. The second training took place a few weeks after the start of the tender procedure. This training was focused specifically on the evaluation of tenders; using an exercise case.

The contractors who were planning to tender also had the opportunity to attend a training session about BV procurement. This training focused on the methodology of BV Procurement and gave examples of what to do and not to do in their offers.

To define the project-goals was a difficult and time-consuming process for the tender team. The members of the tender team had different ideas on the implementation of preventive maintenance and were not used to formulate SMART fitting within the BV system (van de Rijt & van den Hoogen 2012). Therefore, it was a time-consuming process. For Velt en Vecht, this was the first European tender without giving a concept contract (definitive scope of work) in the selection phase of a tender-procedure. Velt en Vecht shared the BV point of view that the contract should be part of the Pre-Award (or clarification) phase.

The Procurement Process

The procurement process followed the "Dutch ranking method" (PSI Bouw 2007), in which all "quality" criteria are "transformed" into "fictitious" Euros. To calculate which vendor has the most economically advantageous tender, the amount of "fictitious" Euros scored on quality was deducted from the vendor's budget (van Abeelen 2012). The quality was determined via the award criteria as: scope, Risk Assessment and Value Added (RAVA) plan, planning (schedule), and interviews.

Selection Procedure

The tender took place based on the so-called "open procedure." Therefore, every contractor who meets the minimum requirements for financial and economic standing and technical competence was admitted to the tender procedure.

For both lots, Velt and Vecht used an adapted version of the BV Procurement methodology to fit within the European legislation for tender procedures (Kashiwagi 2011, van Leeuwen 2011). The same adaptations have been made with the procurement of rolling stock at BRU (Van Abeelen, 2012 in this issue). These adaptations differ for various reasons from the adaptation made by the Ministry of Transport in 2009 in its Fast Track Project (see Van de Rijt et al, 2011)
The award criteria (Table 1) and possible scores (Table 2) were given.

Table 1

Award criteria

No.	Criteria	Weight
1	Scope (offering scope)	10%
2	Risk Assessment and Value Add plan (RAVA)	25%
3	Planning	5%
4	Interviews	30%

Table 2

Possible scores

Rating	Explanation	% of Maximum Value Quality
10	Excellent (maximum value)	100
8	Good (significant value)	50
6	Neutral	0
4	Insufficient	- 50
2	Very bad	- 100

The ratings given per criteria were given the following deductions or additions (Tables 3 and 4). Lot 1 had a ceiling price of € 120.000. Lot 2 had a ceiling price of € 90.000.

Table 3

Lot 1 deductions or additions

	Deduction		Neutral	Addition	
Item	**Maximum deduction at 10**	8	6	4	2
Value scope	€ 12.000	€ 6.000	€ 0	€ 6.000	€ 12.000
Value RAVA	€ 30.000	€ 15.000	€ 0	€ 15.000	€ 30.000
Value Planning management	€ 6.000	€ 3.000	€ 0	€ 3.000	€ 6.000
Value Interviews Per Key person	€ 36.000 € 18.000	€ 18.000 € 9.000	€ 0 € 0	€ 18.000 € 9.000	€ 36.000 € 18.000

Table 4

Lot 2 deductions or additions

	Deduction		Neutral	Addition	
Item	**Maximum deduction at 10**	8	6	4	2
Value scope	€ 9.000	€ 4.500	€ 0	€ 4.500	€ 9.000
Value RAVA	€ 22.500	€ 11.250	€ 0	€ 11.250	€ 22.500
Value Planning management	€ 4.500	€ 2.250	€ 0	€ 2.250	€ 4.500
Value Interviews Per Key person	€ 27.000 € 13.500	€ 13.500 € 6.750	€ 0 € 0	€ 13.500 € 6.750	€ 27.000 € 13.500

The Tenders

On the day of the deadline for submission of the tenders, all tenders submitted on time. Lot 1 had seven tenders and Lot 2 had two tenders. For Lot 1, two tenders had to be declared invalid: one

tenderer did not meet the minimum requirements and one tenderer had made a mistake in its offer price. According to the European tender legislation, it is not allowed to give that tenderer the opportunity to submit a new price. For Lot 2, one tender had to be declared invalid because the tenderer did not meet the minimum requirements. All valid tenders meet the requirements for the "quality documents" (Scope, RAVA and Planning) regarding formatting and length of the documents. Velt en Vecht decided to continue with the BV procedure with the remaining tenderer for Lot 2 in order to determine whether this would be the expert Velt en Vecht was looking for.

Judgment of the Tenders

The assessment of tenders took place by two independently functioning committees:

- The Tender Committee consisted of two members: one of the Purchasing Department of Velt en Vecht and an external expert.
- The Assessment Committee (for each Lot a different Committee) consisted of relevant expert evaluators on the different (sub) disciplines.

The Tender Committee received all parts of the tender (the price documents and the quality documents). The Committee reviewed for both Lots the tenders on completeness, the minimum requirements for financial and economic standing and technical competence, the minimum requirements for the quality documents (anonymity, number of pages, etc.), and assessed whether the proposed prices were below the established ceiling price. After assessing the tenders, the Tender Committee stored the price documents in a safe.

The Assessment Committee only received copies of the valid quality documents of the tender. The tender prices were not disclosed to the Assessment Committee. First, the members of the Assessment Committee individually evaluated the quality documents. Then, the Assessment Committee came together in a plenary session to give the final scores in consensus and motivation for the scores. For the assessment of the quality documents, the members of the Assessment Committee had to use a series of assessment points as given in the Descriptive Document of the tender (Table 5).

Table 5

Assessment points

Criterion	Points of attention	Assessment criterion
Scope	1. Fits the project objectives and conditions in the project description 2. Vision on the execution of the project 3. Identification of the most important activities with regard to the execution of the project with differentiation to - Activities of tenderer - Activities of Velt en Vecht 4. SMART description. 5. Ambition and commitment	Tenderer shows that they truly and thoroughly understand the assignment, and that they will meet the project objectives of Velt en Vecht.
RAVA plan	1. Identification of the most important Risks and Value Adds. 2. Identification of effective measures to minimize Risks and use Value Adds. 3. SMART description. 4. Ambition and commitment	Minimize risks to contribute to the project objectives. Maximize the value adds to contribute to the project objectives.
Planning management	1. Identification of: - Activities - Critical path - Milestones 2. Consistency with the Risk and Value Add plan	Tenderer shows with a realistic plan that the milestones are met.
Interviews	1. Comfortable with the project and consistent with the tender, demonstrated by the given answers. 2. Fitting knowledge and experience, demonstrated by the given answers.	Key officials of the tenderer will be assessed on the understanding of the project and his or hers commitment to the project.

The scope documents of the tenderers were all sufficient. What was remarkable was that almost all tenderers submitted poor RAVA plans. Tenderers formulated mostly technical risks or the measures to minimize the risks were not effective related to the project objectives (example: risk: bad weather; measurement: appropriate clothing for the staff). The value adds of some tenderers were not realistic. Also remarkable was that some tenderers submitted bad plans: key activities were missing in the planning (so the planning did not correspond with the scope and the RAVA plan), with no milestones and critical path.

The judgement of the quality documents seemed to be more difficult than the judgement of a "traditional" tender-procedure. The members of the assessment team tended to refer to their own knowledge in their individual evaluation of the tenders (judging as an expert instead of a non-expert). The evaluators found it difficult to "Assess what you see and not what you think." The educational plenary sessions were very valuable. In that session, it was possible to the take the subjectivity out of the judging. The entire assessment process of the quality documents took considerably more time than estimated. However, it leads to clarity and well-founded scores, potentially enabling a clearer picture of which tenderer was "top the crowd".

Interviews and Prioritization

The assessment of interviews did not start until after the final scores and motivation for each award criterion of the quality documents were adopted by consensus. For the assessment of the interviews the members of the Assessment Committee had to use the assessment points as given in the Descriptive Document of the tender (Table 5). Velt en Vecht had prescribed in the Descriptive document that two key persons were expected at the interviews. The key persons were interviewed during half an hour.

The interviews were better than the quality documents. Most of the key persons scored sufficient or even better. Thus, the interviews had a great added value and showed dominance. The final scores are given for Lot 1, revealing the potential best value vendor as vendor C (Figure 1).

Scores

	A	B	C	D	E	F
Scope	6	8	8	6	6	4
RAVA	4	2	6	2	2	4
Planning	2	6	8	4	2	2
Interview 1	8	8	6	6	8	4
Interview 2	2	10	10	4	8	4

Value on quality

	A	B	C	D	E	F
Scope	€ 0	-€ 6.000	-€ 6.000	€ 0	€ 0	€ 6.000
RAVA	€ 15.000	€ 30.000	€ 0	€ 30.000	€ 30.000	€ 15.000
Planning	€ 6.000	€ 0	-€ 3.000	€ 3.000	€ 6.000	€ 6.000
Interview 1	-€ 9.000	-€ 9.000	€ 0	€ 0	-€ 9.000	€ 9.000
Interview 2	€ 18.000	-€ 18.000	-€ 18.000	€ 9.000	-€ 9.000	€ 9.000
TOTALL	€ 30.000	-€ 3.000	-€ 27.000	€ 42.000	€ 18.000	€ 45.000
Price	50.000,00	117.000,00	98.963,00	100.999,74	80.136,00	45.958,00
TOTALL	80,000,00	114.000,00	71.963,00	142.999,74	98.136,00	90.958,00
Ranking	4	6	1	5	3	2

Figure 1. Final scores Lot 1

The Pre-Award

Vendor C, the potential best value vendor of Lot 1, was also the remaining tenderer for Lot 2. For Lot 2, they also had a good score, and were therefore invited to enter and lead the Pre-Award phase for both lots. Already in the first Pre-Award meeting, vendor C (herein, the contractor) was very proactive. They took the lead, gave a schedule for the next meetings and proposed to make one integral plan for the execution of the assignment for both lots. In this meeting an explanation of the weekly risk report (WRR) and its use was given to the contractor. In the next week, they immediately started working with the WRR (see annex 1 for a submitted WRR).

The Pre-Award phase took about four weeks. The contractor determined the duration of this phase. During this phase, they clarified their proposal (scope, financial plan, and the value adds) and made a detailed plan of the execution. They also made a risk management plan (RMP). All the risks of the other tenderers and the list of concerns of Velt en Vecht were given to the

contractor as part of the RMP. The contractor compiled them into the RMP.
The contract for the assignment was also made by the contractor and Velt en Vecht, based on the contractor's project plan.

Execution

During the first months of execution, Velt and Vecht was satisfied with the way the contractor was performing the contract. The inspection reports they had to submit were complete and submitted on time. After about three months there was deterioration. The maintenance was performed less accurately (e.g. oil in the pumps was not refreshed and because of that there were failures) and the inspection reports were incomplete and submitted too late. The employees of Velt en Vecht had a tendency to interfere with the execution and tell the contractor how to act. The purchase officer of Velt and Vecht asked the author to support them. First, there was a meeting with the employees of Velt en Vecht. The employees had the opinion that the problems were caused by the fact that BV procurement was used and the contractor had too much freedom. It was explained to the employees that the contractor has to take his responsibility as an expert and that they will be asked how to solve the problem at hand.

Subsequently, a meeting was held with the contractor. The contractor's project leader and director attended the meeting. They were told about the problems in the field and the incomplete inspection reports were shown to them. They were asked if it was possible for them to make an offer for corrective maintenance based on their inspection reports. They both had to admit that their employees had not performed well. They were asked to give a solution for this. The contractor decided to inspect again all the objects where the maintenance had been carried out poorly, to do the necessary preventive maintenance, and draw up new inspection reports at their own expense.

In an evaluation meeting, the contractor's project leader said that they had underestimated their role. Their employees were accustomed to a client who tells them what to do. They also had other projects and thought that their maintenance staff would know what to do after a few months and gave less attention to support them in their new role. As a result, they fell back into their old roles (reactive). Furthermore, the project leader and director said that they are very enthusiastic about BV because it enabled them to show what their capabilities were and held them accountable to work more efficiently because they themselves are now able to decide how to execute the contract. They have learned from the past period and now pay more attention to supporting their employees.

Evaluation of the Tender Procedure

In December, the tender-procedure was evaluated with the tender committee. Velt en Vecht evaluated the tender as successful with the following points of attention:

- Two tenderers had to be declared "invalid" because they did not meet the minimum requirements. This brings the perceived risk that the contracting authority had to exclude a tenderer who might be the expert. A solution can be next time not to give minimum requirements for financial and economic standing and technical

competence. The only requirements can be a copy of a relevant entry in the trade or professional register and that the grounds for exclusion as given in the European Law are not applicable. In the BV system: after judgment of the tenders it is clear who the expert is, so there is no immediate need to give minimum requirements.

- Tenderer F had bad scores on the quality documents and the interviews. Nevertheless, they still ended at the second place, due to a very low price. At the next BV procurement, Velt en Vecht will introduce "a threshold" for the interviews. If a tenderer has a negative (weighted) score on the quality documents, resulting in an addition on his price, they will not be invited for the interviews.
- As evidenced by the issues in the execution phase, this was a learning process for Velt en Vecht and the contractor. The contractor should regularly consult with the employees of Velt en Vecht and do what is necessary to help them to become comfortable in their new "BV role".
- The contractor should regularly consult with the client in order to evaluate the execution. The contractor is responsible for feedback to their employees.

Conclusion

The following conclusions can be drawn from the Velt and Vecht test of BV PIPS:

- Velt and Vecht is a BV owner and is actively looking for contractors using the BV process.
- The change to BV PIPS was a paradigm shift even for the visionary owner.
- The selection committee still was using their experience to rate the contractors rather than allowing the contractors to differentiate themselves.
- The contractors could not overcome their lack of familiarity with the PIPS system to become proactive and expressing their vision for the project.
- An improvement on the BV PIPS methodology, using project capability instead of scope, would minimize the selection panel experts' propensity for using their experience to rate the contractors.
- In the execution phase of the contract, it's important that both the employees of Velt en Vecht and the employees of the contractor are aware of their "BV role." It's the responsibility of the visionaries of Velt en Vecht and the contractor to support their employees in this. It's not necessary that the employees change, it's enough that they understand their role and fall back to their visionary as soon as there is a question or problem.

The use of BV PIPS in Velt and Vecht shows that there are BV clients who are looking for a solution. When visionary clients use BV PIPS, it shows that BV does not require the visionary professional to change the client personnel. The author suggests that organizations that will use BV do exist, and their minds do not have to be changed.

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The Source of Degradation of the Construction Industry Performance

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The construction industry performance has been analyzed for the past 20 years. There has been no simple answer to the source of the construction industry problems. In 1991, the Construction Industry Structure (CIS) was formulated, and identified that the price based environment was more inefficient than the best value environment. Over the past 18 years, the analysis of the CIS has led to the hypothesis that the price based sector is inefficient because the buyer controls it. The hypothesis has been tested through case studies, and test results show that the owner is the biggest source of project risk and deviations. The dominant information was formed through repeated testing by moving the control to the vendor, and documenting all sources of project deviation. The studies have shown that the use of decision making, management, direction and control of the contractor by the owner increases the project risk. Two longitudinal studies are used to confirm the potential accuracy of the deductive logic. Key words: contractor control, owner releases control, contractor defined scope

Keywords: construction industry structure, deductive logic, degradation, and longitudinal studies

Introduction of Construction Industry Performance

Poor performance in the construction industry has been a stubborn problem for many years. Projects not on time, not on budget and with poor customer satisfaction have been a problem for the last twenty years (Berstein 2009, British Property Federation 1997, Cahill & Puybaraud 1994, CFMA 2006, Chan & Chan 2004, Davis & Sebastian 2009a, 2009b, Doree 2004, Egan 1998, Georgy Luh-Maan & Lei 2005, Glancy 2008, Imtiaz & Ibrahim 2005, Ibrahim et. al. 2010, Langlinais 2011, Lepatner & Barry 2007, Murphy 2012, Post 2000, Rijt 2009, Rwelaimila et al. 2000, Simonson 2006, Tucker 2003, Wang 2009, Wearden 2008). Different solutions have been attempted: lean, preplanning, partnering, integrated project delivery, design-build, CM@Risk, and Building Information Modeling (Egan1998, Grimsey 2002, Grout 1997, Hopper & Goldman 2004, Konchar & Sanvido 1998, Kumaraswamy & Morris 2002, Matthews & Howell 2005, Nellore 2001, Pietroforte 2002, Williams et. al. 2003, Wong 2006).

Even though the different approaches have worked in limited case studies, the solutions have not been dominant enough to change the industry structure and the practices of large government agencies to eliminate the issues of non-performance (Hutton & Solis 2009). The economic downturn in the early 2000s has made the focus on competition and lower prices. This led to overregulation by the owners resulting in inefficient practices, contractor collusion, poor

performance and low contractor profit margins (British Property Federation 1997, CFMA 2006, Cahill & Puybaraud 1994, Chan & Chan 2004, Doree 2004, Egan 1998, Glancy 2008, Langlinais 2011, Murphy 2012, Rijt 2009, Rwelaimila et al. 2000, Tucker 2003, Wearden 2008). The culture of the traditional owner controlled, directed and managed approach has overridden the meaningful impact of almost all innovative delivery systems (Gransberg 2008, Hale et. al. 2009, Konchar &Sanvido 1998, Lam et al. 2004, Ling et. al. 2004, Williams et. al. 2003). The latest report on contractor performance by the Western Australian Construction Industry Board reconfirms this observation. Integrated Project Delivery (IPD), relationship contracting and alliance contracting have not impacted the overall construction performance (Murphy 2012). The GAO report also identifies that the construction industry is not alone in poor performance (Hutton & Solis 2009).

Examples that substantiate this abound (Kashiwagi 2012). The collusion of the Dutch construction industry in the early 2000s and the movement to the Best Value (BV) Performance Information Procurement System (PIPS) where the vendors and not the clients controlled the delivery of construction gives a potential explanation of the problem and a possible solution (Ang 2011, Kashiwagi 2012, PBSRG 2012). In the United States, the changing of the laws of the State of Minnesota and the State of Oklahoma to allow a best value vendor driven approach are two other examples of government agencies changing their structure from an owner controlled price based environment to a best value vendor controlled structure. The willingness of the U.S. Army Medical Command to move to a vendor controlled environment gave researchers another opportunity to test the concept.

The authors propose that there is a misunderstanding of what causes construction non-performance. The authors propose this is an industry structural issue, and not an issue with the lack of technical expertise of the construction industry. The authors also propose that the current industry structure is degrading the industry's capability to sustain high quality construction management and a force of highly skilled technical craftspeople.

The Construction Industry Structure (CIS)

The Construction Industry Structure (CIS) (Figure 1) has been around since 1991 (Kashiwagi 1991). The CIS divides the highly competitive marketplace into two environments:

1. The price based environment is where the owner is in control, directing, controlling, and managing the delivery of construction.
2. The best value based environment is where expert vendors are directing, controlling, and managing the project.

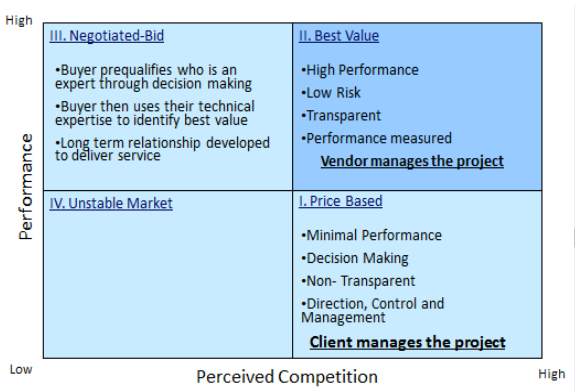

Figure 1. Construction Industry Structure

If the owner is controlling, directing and managing the delivery of contractor services, the owner is required to be the expert. If the owner is the expert the following are logical ideas:

1. The contractors become more reactive than proactive. It is difficult to have two experts when one of the experts is the owner who is constantly directing and controlling the real expert.
2. The competitive value of the contractor's expertise diminishes.
3. As the value of the contractors' expertise diminishes, the contractor's price becomes more important.
4. As price becomes the sole factor of selection, high performance contractor's prices are pressured by lower performing contractors' prices, which may not meet the owner's determined scope. There is no proven methodology to identify if the lower priced proposals are complete. Lower performing contractors may also not use the high quality craftspeople and therefore are not offering the same finished product. This drives the delivered contractor's performance down even further.
5. An additional problem that may occur, if the owner and their expert's scope is incomplete, the high performing contractors who attempt to price a completed scope, and not the incomplete scope, become non-competitive. This results in the lower performing contractors getting the project, and resulting change orders.
6. When the owner causes the problem of non-performance, non-transparent practices or transactions must be initiated to stop the detection of seemingly "inefficient and non-expert" owner actions. The lack of clear and convincing documentation of non-performance minimizes owner and low performing contractor accountability and responsibility.
7. If the owner is the expert, than they are hiring a non-expert vendor. The non-expert vendor must be managed, directed and controlled. The non-expert, by definition is more reactive and does minimum standard work.

The following summarizes the "price based environment" which uses management, direction and control to minimize risk to meet the owner's expectations of performance (Kashiwagi et. al. 2012):

1. The owner is the expert. If the owner was the expert, why is the owner hiring a contractor?
2. The contractor is not an expert. Why is the owner hiring non-expert contractor?
3. The owner attempts to hire a "non-expert" to do the work efficiently and effectively to get value.
4. The owner uses a contract to manage, direct and control a contractor. The more the contract is used, the worse the observed result.
5. The owner assumes that all qualified contractors offer the same level of performance. This has not been proven. Neither has this ever been observed. This is not logical.
6. The owner communicates to the contractors in terms of "minimum acceptable" performance. This focuses the contractor's performance and the owner's attention on the minimum levels of performance.
7. The owner must have a system in place to ensure a minimum level of performance, and that the performance is not lower than specified.
8. The owner's management, direction and control of minimum levels of qualification have not improved the level of performance of contractors over time.
9. The contractors' profit margins decrease in the price based, owner controlled environment. This has been confirmed in two documented studies in the State of Hawaii and the University of Minnesota tests, when the contractors became the experts and dictated their scope.

The price based environment has several practices that have been proven to be inefficient and illogical (Kashiwagi, J. 2012):

1. One party can control another party through use of a contract or other mechanism.
2. Management, direction and control are an effective means of minimizing risk.
3. An expert can make a non-expert deliver high performance services.
4. It is more efficient to manage, direct and control, than it is to hire an expert who knows what to do.

The authors propose that a more efficient method to minimize risk is to hire contractors who are experts and who know what they are doing. The author proposes that an expert contractor has very little risk. The only risk that the expert has is the risk that they do not control. The authors propose that the number one source of risk is the owner or buyer, that unforeseen risks are minimized to acceptable levels when hiring an expert, and that the expert contractor causes negligible risk. The authors also propose that the traditional processes where the owner assumed they could direct and control the contractors resulted in the following:

1. Reactive contractor behavior.
2. Over-emphasis of the importance of price at the beginning of the project.
3. Degraded contractor project management and craftsperson's skills.
4. Transactions from all parties trying to protect their own interests.
5. Minimal levels of performance due to process of specifications.
6. Poor overall construction industry performance.

The Best Value Environment

The best value environment assumes that the vendor or contractor is the expert. The major difference between the best value environment and the price based environment is that owner does not use direction and control to minimize risk, but uses the alignment of expertise to eliminate risk. The best value environment has the following characteristics:

1. The contractor is an expert and acts as the expert. The owner does not manage, direct and control the expert contractor. If the contractor is not an expert, the environment is price based.
2. The contractor receives the owner's requirements as an intent and determines the delivered scope and cost. A contract is created; however, the contract is never used to minimize risk. Instead it is put away and never used. Some question why so much resources is put into creating the contract if it will not be used. The proposal of the authors is that to "not use a contract" would require convincing the legal representatives of all parties, and the cost and time to achieve would be prohibitive. The authors propose to do what expert contractors do, sign the contract, and never use the contract. Use expertise to resolve issues.
3. The contractors compete for the best value project by showing that they have the capability to do the project, can identify their scope (submitted in the clarification phase) and what is not in their scope and can identify risk that they do not control and assist in tracking and mitigating the risk, so the risk does not impede their performance.
4. Contractors compete based on price and proven capability to perform. The capability to perform is in terms of performance metrics on similar type projects showing their capability to satisfy the customer and minimize cost and time deviations. It also allows contractors to use their cutting edge technology and processes to efficiently deliver construction. In the best value environment, a contractor will now receive the competitive advantage due to their performing construction project management, craftsperson skill of critical subcontractor components, and the ability to see a project from beginning to end before the project is awarded.
5. The contractor writes the final scope (which includes all requirements of an owner's financial, bonding and insurance requirements, scope, and identification of risk and risk mitigation), manages the contract and practices risk management and quality control. The owner practices quality assurance.
6. The owner gets the project at the highest possible value and the lowest possible cost and a high performance contractor uses their expertise to deliver a risk free construction project while maximizing their profit. This creates a "win-win" situation.

The best value environment is efficient, effective, minimizes communications and flow of detailed information, creates a "win-win," the highest possible value at the lowest possible costs, high vendor profit and minimal project cost and time deviations. The best value environment will attract high performance contractors due to the opportunity to use their capability and maximize their profit.

Transition from Price Based to Best Value

The authors propose that to move from a price based environment to a best value environment, the following must transpire:

1. A visionary owner must be identified. If the vendor is the visionary, they must practice extreme discipline in following the best value approach.
2. The control of the project must move from the owner to the contractor.
3. The contract cannot be used to direct and control the contractor.
4. The contract, which includes the scope and cost, is put together by the best value contractor. They are the offeror, and the owner is the acceptor of the offer.
5. Management, direction and control are replaced by the alignment and use of expertise by expert contractors.
6. The best value environment is transparent. A transparent environment shows that the best value is delivered by experts who increase value and deliver it at the lowest possible cost. Eliminate all decision making and subjectivity, which causes confusion and fear.
7. The contractor measures performance of the project of both the contractor's performance and the performance of all other entities in the project.
8. Moves from a win-lose, to a win-win environment. If someone loses, everyone loses.

Moving from a price based environment to a best value environment requires a change of paradigm and concepts that are different from traditional practices. Many industry personnel believe that the transformation requires legal changes. They are mistaken. Legal changes may make the transition easier, but the transition is one of a paradigm change. The following are transition concepts:

1. Top down, or manage, direct and control practices and mechanisms need to be discontinued.
2. Owner decision making, expectations, direction and control need to be released to those doing the work.
3. Owner approvals need to be minimized.
4. All risk must be given to the owner.
5. Experts must minimize their scope, taking all risk out of their scope. If there scope is unacceptable to the buyer, the buyer does not need to accept their offer.
6. Risk is also defined by the difference between the expectation of a non-expert and the future project result that is dictated by the initial project conditions and natural laws. If the contractor is an expert, there is very little risk. They will explain to the owner, before they start, the expectation from beginning to end.
7. Decision making should be minimized. Decision making is when someone who is not an expert uses their own experiences to create a future expectation. Risk is caused because the non-expert's expectations are not related to the initial conditions.
8. Risk cannot be shared. Risk cannot be transferred. Shared risk leads to decision making. Decision making increases risk.

The most difficult transition actions by owners include changing their requirements into intents, not having expectations, admitting that they are not an expert and they themselves are the major

cause of risk. The owner needs to select a contractor based on dominant performance metrics (information that does not require decision making by the owner). The owner should use a best value expert to initiate the process. Contractors should also do the same. 18 years of experience of assisting owners to change their paradigm have produced the following lessons learned:

1. Owners need to use best value expert consultants to help change their paradigm. Attempts to change their own paradigm or culture have led to terminations of the effort [State of Idaho, GSA, University of Minnesota, and the FAA] (Kashiwagi 2012).
2. Best value may seem simple, but it is very difficult to implement due to the owner's organizational culture and people's instinctive need to direct and control others. People also have a need to communicate and therefore have many meetings. Best value consultants are required to change the paradigm.
3. The owner is their own worst enemy.
4. The number one cause of failure in moving from the price based environment to the best value environment is the owner's lack of or misunderstanding of best value and the Information Measurement Theory (IMT) concepts. Owners who think they know are actually the biggest source of risk.
5. The owner tries to take over the program prematurely, and ends up destroying the best value program. Premature takeover can be easily identified by not having the proper best value (BV) test documentation listed in the BV manual. If there is no documentation, a best value expert is needed.

Management, Direction and Control

The authors propose that management, direction and control (MDC) cannot be used to minimize risk by owner or vendors. This eliminates top down behaviors and structures. This forces the hiring of an expert contractor who knows how to meet the owner's intent. The owner should ensure that the expert contractor can accurately identify their intent, see and define the service from the initial conditions to the final project conditions, and can identify risk that they cannot control and assist in the mitigation of the risk. The owner's representatives should always listen to the best value contractor before communicating their concerns. The expert contractor becomes the project leader, expert and controller of the project. Under the BV PIPS approach, if a contractor cannot do this, they should not be hired.

Risk

The authors propose that risk is what the expert contractor has no control over, or areas where the expert contractor has insufficient information to clearly see into the future (Kashiwagi, et. al., 2012.) Risk is when the contractor cannot see into the future. If a contractor cannot see the entire project (milestones, activities that they do not control) from the initial conditions to the final project outcome, they are not an expert and have risk. An expert does not have technical or project risk. If they perceive risk, they should minimize their scope, so the risk is not in their scope. Owners can also cause risk by having expectations that do not match reality or the initial conditions.

Decision Making

The authors propose that decision making (DM) should be minimized on a project. An expert is one who can clearly and simply explain the initial conditions and the final project conditions. An expert can see into the future, which minimizes DM. An expert understands that the initial conditions will change into the final conditions, as dictated by natural laws at the end of the project. An expert understands that they cannot override natural laws. An expert speaks simply, in dominant language (everyone understands without having to use their own expertise or experience). Therefore an expert minimizes everyone's DM.

Risk Sharing

Risk cannot be shared. If a partnership is formed and the risk is split "50 – 50", decisions will be made to assign the accountability for the risk that occurs. If an expert can see into the future, they have no risk. If someone cannot see into the future, they create risk with their DM. Theoretically, the only way to minimize DM and mitigate risk at the same time is to assign all risk to one party. Tests have shown that the client is the source of almost all risk. Therefore, in the best value approach, the authors propose that the contractor has no risk within their scope. The only project risk is the risk that they do not control and the risk that is caused by insufficient information, which is the owner's risk. The risk should always be the financial obligation of the owner.

Proposal: Best Value Approach

The authors propose the only remaining issues are:

1. Are there expert contractors who have no risk?
2. Why would the owner take all the risk of the project, and pay for the results of the risk?

The authors propose that if the owner uses a best value approach:

1. The contractor generated risks are minimal.
2. The cost and time deviations decrease.
3. The customer will be satisfied.
4. The visionary client will clearly understand that they cause the majority of the risk.
5. The project cost would not increase, and in many cases the expert contractor would be the lowest cost.
6. The owner will not manage, direct and control the contractor, thereby increasing the number of projects they can effectively manage. They will have more time to observe the contractor's performance.

Testing of the Best Value Deductive Logic

The authors will use two longitudinal studies to confirm the potential accuracy of the deductive logic. The first is the implementation of the best value approach by the U.S. Army Medical Command (Medcom) to minimize the risk of the Indefinite Delivery Indefinite Quantity (IDIQ)

contractors doing modification and repair projects on 26 U.S. Army Medical Command sites. The second case study is the implementation of best value projects by the University of Minnesota (UM) and other government groups in the State of Minnesota including the Rochester School District, the City of Rochester, School District 287, Hennepin County, and the City of Roseville. The constraints of the two tests included:

1. The implementation of the best value process changed over the duration of the tests.
2. The owners' understanding of the process improved over time.
3. The owners' use of management, direction, and control was minimized over time.

Medcom Test Results

The Medcom tests facts include (Figure 1):

1. Date of tests: 2006-2011
2. Number of projects and value of projects: 619 projects ($1.02B)
3. Number of contractors: 12
4. Project cost deviation (%): 5.5%
5. Owner caused cost deviations (%): 5.44% (1.31% due to unforeseen conditions)
6. Vendor caused deviations (%): .06%
7. Change in cost deviations (2006 – 2011) over time (%): 44%; 6.42% - 3.61% = 2.81% reduction
8. Change in time deviations (2006 – 2011) over time (%): 40%; 47.78% - 28.53% = 19.25% reduction
9. Customer satisfaction of contractor performance: 9.27 (out of 10)

The Medcom test led to the following results:

1. The client/owner was the source of project cost and time deviations (risk).
2. The best value environment minimized project deviations by 40%.
3. The contractors caused very little risk.
4. The clients/owners were satisfied.

The results support the proposal that the client/owner is the major source of risk (Figure 2). It also showed where the owner transferred their control over to the contractor and their risk was minimized.

Criteria	NTP 2006-2011
# of Projects	619
# of Projects with RMP	305
# of Contractor Companies	12
# of Facility Locations	48
# of Owner Participants	300
# of Contractor Participants	161
$$ of Projects Tested	$1,027,534,878.97
$$ for ASU Support (9 years)	$ 856,000
Estimated Savings ($$)	$ 8,673,591.59
Estimated % Saved ($$)	0.89%
Estimated Savings (Days)	16541.34
Estimated % Saved (Days)	7.24%

Figure 1. Medcom BV project performance

Completed Projects	NTP 2007	NTP 2008	NTP 2009	NTP 2010	NTP 2011
# of Projects	110.00	129.00	122.00	92.00	27.00
Original Awarded Cost ($$)	$181,945,282.27	$177,275,551.80	$183,989,041.03	$107,091,486.62	$16,278,439.41
Final Awarded Cost ($$)	$193,881,007.60	$187,844,708.77	$192,602,961.59	$110,952,677.38	$16,352,909.79
Total Over Budget ($$)	$11,935,725.33	$10,569,156.97	$8,613,920.56	$3,861,190.76	$74,470.38
Total % Over Budget	**6.56%**	**5.96%**	**4.68%**	**3.61%**	**0.46%**
% due to owner	4.58%	5.59%	3.61%	2.36%	0.46%
% due to Designer	0.00%	0.14%	0.00%	0.21%	0.00%
% due to contractor	0.11%	-0.17%	-0.01%	0.08%	0.00%
% due to unforeseen	1.88%	0.40%	1.09%	0.96%	0.00%
Total % Delayed	**51.56%**	**48.43%**	**36.77%**	**28.53%**	**3.31%**
% due to owner	41.38%	39.96%	28.51%	16.53%	9.20%
% due to Designer	0.00%	0.49%	0.00%	1.32%	0.00%
% due to contractor	1.86%	-0.02%	1.29%	0.12%	-6.40%
% due to unforeseen	8.32%	8.01%	6.97%	10.56%	0.51%

Figure 2. Project cost and time deviations over time

Other interesting observations of the test include:

1. The visionary who brought the best value system retired, and his replacements attempted to control the performance information, and use direction and control to minimize their project risk.
2. Two of the six IDIQ contractors adopted the best value approach as their operational model. One contractor did three times as much work with the almost the same staff. Another contractor duplicated the Medcom system internally using the performance information to mitigate risk.

The best value system changed the Medcom into a transparent environment. The IDIQ contractors immediately received their current performance information along with the performance information of all other contractors once a week. All Medcom facility managers and their representatives were offered education in both the deductive logic and the best value approach. The approach had allure due to the potential time savings of minimized transactions. However, when the visionary Medcom leader retired, his successors halted the immediate posting of performance information, stopped the best value educational training for Medcom FMs and the vendors, and put in place a system that required lengthy approval for access to performance information.

Instead of giving the contractors the information to improve their performance, the system was changed into a management system, which attempted to mitigate risk through management, direction, and control.

State of Minnesota BV Tests

The UM and other tests in the State of Minnesota facts are listed below:

1. Dates of Tests: 2005 - present
2. Total number of projects and value of the projects: 399 projects | $433.9M
3. Customer satisfaction of contractor performance: 9.5 out of 10
4. Number of contractors: 95
5. Project cost deviation (%): 8.2%
6. Owner caused cost deviations (%): 7.6%
7. Vendor caused cost deviations (%): 0.2%
8. The full performance data is in Table 3 shown below.
9. The construction cost vs. the construction budget (%): -6.2% (awarded cost is 6.2% less than budget)
10. The percent of times the best value was the lowest cost (%): 54%

The Minnesota test results were very similar to the USA Medcom test results (Figure 3). The owner was identified as the major source of risk. Contractors caused very little risk. There was no perceived increase in construction cost. Customer satisfaction was high. Based on these high performance results, the construction law was changed in the State of Minnesota to permit local municipalities (counties, cities, and school districts) to use a best value selection and contract management process.

Project Overview	**Overall**	City of Roseville	City of Rochester	Hennepin County	Olmstead County	Rochester Public Schools	School District 287	University of Minnesota
Total number of projects	**399**	1	8	10	1	21	3	355
Total awarded cost ($M)	**$434.9**	$0.2	$37.8	$5.1	$12.4	$17.3	$29.5	$332.7
Projects where BV lowest cost	**54%**	0%	83%	33%	0%	42%	33%	55%
Percent Awarded from budget	**6%**	11%	1%	-13%	29%	9%	12%	5%
Cost Deviations								
Overall Change Order Rate	**9%**	-	4%	1%	5%	4%	3%	10%
Client	**8%**	-	2%	0%	1%	1%	0%	9%
Designer	**1%**	-	2%	1%	3%	2%	2%	0%
Contractor	**0%**	-	0%	0%	0%	0%	0%	0%
Unforeseen	**1%**	-	0%	0%	1%	1%	1%	1%
Schedule Deviations								
Overall Delay Rate	**47%**	-	35%	16%	13%	2%	7%	52%
Client	**22%**	-	15%	7%	5%	0%	4%	24%
Designer	**4%**	-	6%	9%	7%	2%	0%	4%
Contractor	**3%**	-	11%	0%	0%	0%	4%	2%
Unforeseen	**5%**	-	3%	0%	0%	0%	0%	5%
Satisfaction Ratings								
Satisfaction rating - Vendor	**9.5**	-	9.0	-	8.8	9.9	-	9.5
Satisfaction rating - PIPS	**9.7**	-	8.5	-	10.0	10.0	-	9.6
Number of returned surveys	**233**	0	2	0	1	18	0	212

Figure 3. Project performance of Best Value tests in Minnesota

Similar to Medcom's experience, when the visionary (who had brought the best value approach into the University of Minnesota) retired, the replacement changed the best value system to an owner managed, directed and controlled system.

Conclusion

Two owners who procured construction services were in the owner controlled price based marketplace. Both owners, led by visionary representatives, heard and implemented the best

value approach. Both owners had a culture, and faced resistance in implementing the best value approach. Both owners were very successful in minimizing their project risk (cost and time deviation.) Both owners followed the transformation proposals including:

1. Identified that the owner was the major source of risk.
2. Identified that best value contractors do not cause project deviations.
3. Minimizing owner direction and control.
4. Minimizing owner decision making.
5. Transferred the control of the project to the best value contractor.
6. Minimized project communications and meetings.

The two case studies show that the major source of construction project risk is the owner. It shows that when the control of the projects was moved to the contractors, and risk was documented, the risk created by the contractor was negligible. It also shows that the risk by unforeseen events was also negligible. It shows that the overall project deviation over time also decreased, showing that an expert contractor also had impact over and the capability to minimize the risk caused by the owner. The results of the two case studies match other results of the best value approach in construction and non-construction results (PBSRG 2012). There are also documented case studies where the owner refused to release control to the vendors resulting in owner decision making, management, direction and control (Kashiwagi 2012). This creates non-transparency, unclear accountability and no documentation of the actual source of risk. In both case studies, the visionaries who brought the best value approach and a change of paradigm were followed by replacements who returned to the traditional owner controlled and directed paradigm.

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Best Value Solution Designed in a Developing Country

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For the last two years, researchers have been working with parties in Malaysia to implement best value practices. After two years of research work, the effort has many lessons learned. Lessons learned include a combination of factors that make the best value approach difficult in a developing country such as Malaysia. The different strata of economic levels give the upper levels (owners) a greater perceived ability to control the supply chain even though they may lack the expertise. This causes owners to attempt to deliver construction by controlling the vendors, both professionals and contractors. This increases the difficulty moving from a price based or owner directed system to a best value environment, which releases control to experts. The authors use deductive logic models which show decision making, direction, and control negatively impact accountability, proactive behavior, and the use of expertise. The two-year research program results in addressing the issue of how a buyer in a developing country can utilize the expertise of experts, and how the expert can change their function to get a controlling owner to use their expertise. The paradigm shift needs to take place among the elite and the visionary, before the overall environment can make the change. The product of this research project is to meet the requirements of a visionary group of quantity surveyors in Malaysia.

Keywords: Best value approach, developing countries, Information Measurement Theory (IMT), Kashiwagi Solution Model (KSM)

Introduction

Academic and industry research has identified construction performance issues worldwide for the last 20 years. Every country has the same performance issues (Abdul Rahman et al. 2005, Abdul Rahman & Alidrisyi 1994, Berstein 2009, British Property Federation 1997, Cahill & Puybaraud 1994, CFMA 2006, Chan & Chan 2004, Davis & Sebastian 2009a, 2009b, Doree 2004, Egan 1998, Flores & Chase 2005, Georgy et al. 2005, Glancy 2008, Hamel 2007, Hamzah 2003, Imtiaz & Ibrahim 2005, Ibrahim et al. 2010, Langlinais 2011, Lepatner & Barry 2007, Murphy 2012, Post 2000, Rijt 2009, Rwelaimila et al. 2000, Simonson 2006, Tucker 2003, Wang 2009, Wearden 2008). This includes developed and developing countries. However, there is a "perceived" lack of technical expertise in a developing country by owners [it has never been proven]. By observation, owners in developing countries import expertise from developed countries to overcome the "perceived" technical shortfall. After meeting with professionals from the Institute of Engineers Malaysia (IEM) and the Royal Institute of Chartered Surveyors (RICS) in Malaysia, the number one challenge identified by professionals in Malaysia has been that the owners do not give proper attention to the expertise of the Malaysian professionals. This is not to say that the average level of technical competence in a developing country may be lower; however, vendors not having the capability to perform the work, and owners not listening to the expertise of highly trained technical experts, are two different problems. They also propose that

the environment will not turn around until the owners change. Professionals perceive that they are faced with the challenge of using and increasing their technical expertise, while reacting to owners who are using a top-down, management, direction and control philosophy, which ignores their technical expertise. These feelings were voiced in multiple industry meetings to the author (CIDB 2009, Hussien 2009, Kashiwagi 2010).

This problem is also faced by professionals in more developed countries (Child 2010). The basis of the proposed solution to the problem is to identify that the owner and professional may be in a situation of the "abuser and the abused" (Kashiwagi 2012). The authors propose that both the abuser of power, and the abused (who gives up the right to do what is right and stops the abuse from going on), are actually partners in crime. They need each other. Both are wrong. And to continue the situation, both must continue to ignore the concepts of an efficient supply chain and a "win-win" solution.

The resulting problem is that the expertise of professional experts is becoming less important. Relationships have become more important than expert capability. This relationship is a "win-lose" relationship for the expert professionals. The resulting research questions are:

1. Can the expert professionals find a way to optimize the value and minimize the impact of project cost of their expertise?
2. Can the expert professionals find a method to convince the owners of the value of their expertise?
3. Can the experts increase the professionalism of their profession?

An approach to the problem has been tested in three countries: United States, Netherlands and Canada (AEF 2010, Kashiwagi 2011, Little et. al. 2012, Meyer et. al. 2010, Rijt & Witteveen 2011, Riley et. al. 2012, Sullivan & Guo 2009, Sullivan et. al. 2012a, Sullivan, et. al. 2012b, Kashiwagi 2012). The solution has come from academic research, using a deductive logic called Information Measurement Theory (IMT), the Kashiwagi Solution Model (KSM) and the best value (BV) approach called the Performance Information Procurement System (PIPS) (Kashiwagi 1991). The authors propose the same IMT, KSM, and PIPS solution may be applicable in a developing country to overcome the problems of "silo" thinking and the inability to efficiently utilize the expertise of expert professional vendors.

Proposal

The author proposes that owners and professionals are in a confusing situation where the use of expertise to assist clients is not being optimized (Kashiwagi 2009). The proposal is defined in the following steps:

- Identify a profession.
- Identify the current professional activity in terms of IMT and KSM characteristics.
- Identify the potential solution.
- Identify a potential plan to test the concepts.
- Run and analyze the results of the test.
- Run more tests.

- Educate the industry on the results.
- Make the new paradigm into an industry standard and educate the industry.

The authors are proposing to capture the first four steps in the proposal, based on the developed IMT and KSM logic. The industry must then move ahead and achieve the last four milestones. The authors are proposing that the problem facing the professional industry is that they do not have a logical solution to correct the reactive practices (IEM 2012, RICS 2012). The professional industry that the authors propose their solution to is the Malaysian Royal Institute of Chartered Surveyors, and in particular to the practices of Quantity Surveyors (QS). The justification of this proposal is the following:

- The logic of IMT and KSM has been developed for the past 20 years.
- The PIPS system has been tested over 1,500 times with a customer satisfaction rate of 98%.
- The solution has worked in solving the problem in developed countries (United States, Canada, Finland, and the Netherlands).

Case Study

The paper proposes a change in the quantity surveyor (QS) operating model that will increase their professionalism and value, assist them to be more proactive, and have sustainability through the next generation of automation that will come with the development of Building Information Modeling (BIM), 3 dimensional drawings, and integrated cost estimating.

Methodology

This paper uses a logic construct that is a recursive solution based on the foundation building blocks of simplicity and dominant extremes. The alignment of characteristics that lead to efficiency and effectiveness will be used as the methodology and the final check of the model. The normal iterative process of learning of an industry in a developed country will be cut short by a recursive solution called Information Measurement Theory (IMT) and the Kashiwagi Solution Model (KSM) that uses logical building blocks to optimize the perceived "technical" delivery of construction service. IMT and KSM will minimize the need for further case studies based on simplicity. IMT and KSM will only use dominant extremes (minimizes the need of information and more data). The "non-dominant ideas" which normally require decision making or use of experience or expertise will not be used in the solution process.

The authors will first start with an objective. It will be followed by definitions. It is then followed by the application of the recursive or seemingly infinite complex case and broken down into simple foundational building blocks. The foundational building blocks will identify the requirements for a future state of the QS. The objective of the paper is to identify the actions, which will lead to a future state of a professional Quantity Surveyor (QS), which is sustainable, adds value, and increases the professionalism of the QS in Malaysia.

Information Measurement Theory

IMT was first developed in 1991 by Kashiwagi at Arizona State University (Kashiwagi 1991). The basic tenants of IMT include:

1. Natural laws dictate the change in conditions from a set of initial conditions to final conditions.
2. Everything that happens or takes time is an event, with initial conditions and final conditions (which has changed over time.)
3. People change based on their level of perception of conditions and natural laws.
4. People who change faster are more perceptive to conditions, the change of conditions and natural laws.

Individuals who are fast changing have the following characteristics:

- Perceptive and observe/listen,
- Do not use control to override natural law,
- Use knowledge of initial conditions and natural laws to predict the future outcome,
- Do not use own limited experience and decision making to alter future outcomes.

Individuals who are slow changing have the following characteristics:

- Cannot observe and perceive conditions and laws,
- Attempt to control the conditions to change to some other conditions,
- Make decisions due to a lack of perception of the initial conditions. They base the future on their limited experience and expectation instead of on the initial conditions and natural laws,
- All natural laws and conditions are related and relative.

In utilizing KSM, the first step is the definition of natural laws, conditions and event.

Natural Laws, Conditions and the Event

The following is defined by the author (Kashiwagi 2012):

1. Natural laws regulate the change of conditions over time and exist in all locations and times.
2. Natural laws always exist, whether perceived or not and are discovered and not created.
3. Conditions are unique based on time and location. No two conditions can be exactly the same.
4. Conditions change over time and situation.
5. Whenever conditions change (due to time elapsing or situation changing) there is an event.
6. Initial conditions change into final conditions in an event.
7. The change and change rate is controlled by natural law.

8. An event and event outcome is fixed by the initial conditions, the passing of time and natural law.
9. Information is composed of descriptions of the conditions and the natural laws. If an individual had all information on the initial conditions and the natural laws, they can predict the future outcome/conditions.
10. If a person knows the information, they cannot predict the future outcome with a degree of accuracy.
11. However, not knowing does not infer that the outcome will not happen. It will still happen, and it will happen only one way as all events have only one observable outcome.

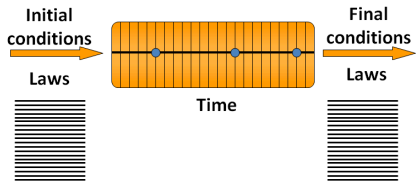

Figure 1. The event

The understanding of the natural laws and events leads to the observation that the only opportunity to change the outcome is to change the initial conditions. However, there is risk when someone does not understand the initial conditions, attempts to change what they don't understand, and then expects a different outcome. For example, when an owner perceives that they are hiring an expert who understands the initial conditions, they can still cause risk (not having final conditions that match their expectations) due to the following:

1. Directing the experts on what to do.
2. Does not listen to the experts.
3. Changes what the experts recommends.
4. Thinks that they are more expert than the experts.

Change Rate of Individuals

Individuals change at a different rate based on their perception of initial conditions and natural law. They perceive information that is already there, process the information, and if they understand a newly perceived concept, they will apply the new idea and will therefore change. The change always leads to the perception of more information. As individuals continue to learn (Figure 2), they will perceive process, apply newly perceived ideas, and change at a faster exponential rate. The faster an individual learns, the faster they change.

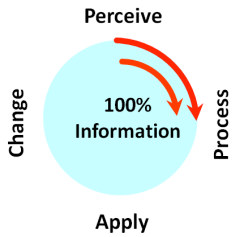

Figure 2. Cycle of learning

Figure 3 shows that the two-way KSM with the rate of change levels. All options in between the 100% knowledge and 0% knowledge are ignored (even though most people's characteristics are between extremes.) For example, the top of the left side (LS) of the KSM split rectangle is 100% perception of information. On the bottom of the right side (RS) is 0% information perceived, or 100% of the time, there is no information perceived. At every other level between the extremes, there is an amount of information that is perceived and not perceived. Type A individuals perceive more, Type C individuals perceive less. KSM is utilized to identify which characteristic is at the top or LS, and which is at the bottom or RS, and not the degree of the characteristic the person utilizes.

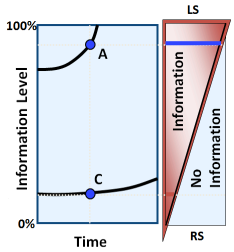

Figure 3. KSM rate of change

In practice, no one is at the very top (100% information) or at the very bottom (0% information). Every person is at a level which they have both the perceived information characteristic and the no-information characteristic. For example:

1. Some level of documentation is always required. It will be minimized if experts are being utilized, and maximized when non-experts are being utilized. Documentation is therefore a RS characteristic. Therefore if non-experts are hired, more documentation is required. If experts are being utilized, less documentation is required. Documentation will therefore be a RS characteristic, and "no documentation" is the LS characteristic. Possible metrics may be the number of documents or the number of pages of documents.
2. Some level of communication is required. The more non-expert parties will use more communication.

All the top LS characteristics will be related to perceiving and using more information. All the bottom RS characteristics are related to perceiving less and not using information.

Three KSM Levels

The author developed three KSM levels. The levels are: the foundation characteristics (information, decision making, and management, direction and control of others (MDC)), the second level is the easily observed processes and actions, and lastly the third level is the more difficult to define or perceived characteristics that explain what is happening (Figures 2-4). The first foundation levels are recursive; they are defined by their definition. Level I characteristics include:

1. Use of predictive information (no use of predictive information).
2. Decision making (no decision making).
3. Use of management, direction and control (MDC) to mitigate risk (no use of MDC).

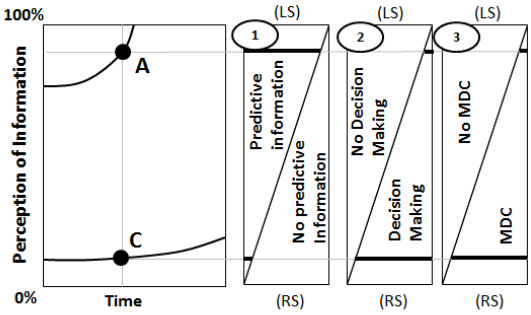

Figure 4. Level 1 foundational KSM characteristics

For example if someone perceived all information, they would not make any decisions because they would see the future outcome and know exactly what to do. Because they understand that the changing conditions are regulated by natural laws, they realize there is only one outcome, they do not need to make decisions on a single output. When they understand there is only one outcome, any attempt to control the conditions to result in a different outcome or to pick an outcome that is clearly not going to occur, is fruitless, therefore they do not attempt to control or change conditions that they have no control over. For example, if someone is using risk management, "Is the actual level of risk higher or lower?" Traditionally, people would answer lower, because risk is being managed. However, if there was an expert on the project, the risk would be lower, and risk management would not be used to manage the risk (because there is no risk). When people are using risk management to mitigate risk, they are actually increasing the risk because they hired a non-expert, and now must manage risk due to the non-expert's lack of expertise. An expert who has very little risk should be hired.

Level two addresses the observable process and action characteristics. They include (and their opposites) (Figure 5):

1. Meetings (no meetings).
2. Communications (no communications).
3. Passing detailed technical information (not passing detailed technical information).
4. Rules (no rules).

5. Documentation, which includes specifications, emails, meeting minutes (no documentation).
6. Prequalification (no prequalification.)
7. Experts engaged in the beginning of the event (engaged at the end).
8. Performance measurements (no performance measurements).
9. Posting of performance metrics (no posting of performance metrics).
10. Work short hours (Work long hours).
11. Blame (no blame).
12. Stress (no stress).
13. Surprised (not surprised).
14. Excuses (no excuses).
15. Approval (No approval).
16. Emphasis on contract importance (contract not important).
17. Owner inspections (quality control).
18. Vendor risk management (owner risk management or micromanagement).
19. Focused on technical risk you can control (focused on technical risk you cannot control).

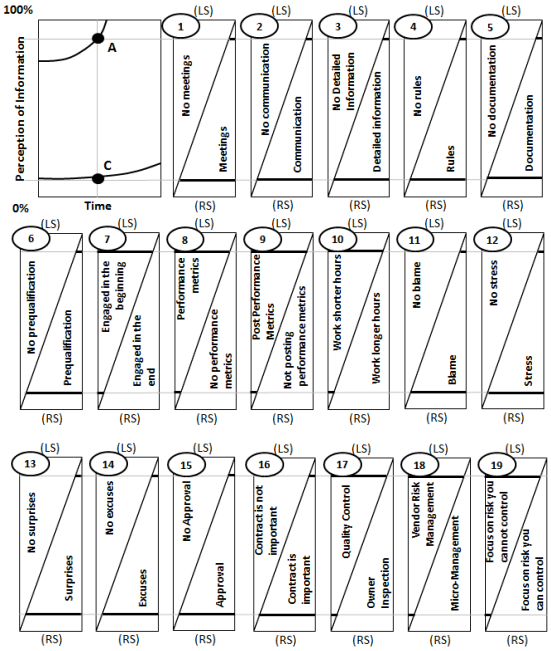

Figure 5. Level 2 observable KSM actions/characteristics

At level three are the difficult to define characteristics, where people normally make decisions to identify (Figure 6):

1. No risk (high risk).
2. Expert (non-expert).
3. Leadership (management).
4. Minimum standards (high performance).
5. Efficient (not efficient).
6. Effective (not effective).

7. Transparent (non-transparent).
8. Dominant information (non-dominant information).
9. Simplicity (does not require expertise to understand)/complexity or technical.
10. Strategic or longer term (tactical or short term).
11. Detailed or low level concentration (aggregate picture @ 30K feet).
12. Professionalism (no professionalism).
13. Confidence (no confidence).
14. Self-dependent (integrates with others).
15. Fear (no fear).
16. Accountable (not accountable).
17. Courageous (weak).
18. Value (no value).
19. Visionary (not visionary).
20. "Win-win" ("win-lose").
21. Abusive behavior (non-abusive behavior).
22. Abused by others (not abused by others).
23. Use expertise (do not utilize expertise).
24. Silo (supply chain approach).
25. Self (others).
26. Price based (best value).
27. Proactive (Reactive).
28. No Culture (Culture).
29. Expectations (No expectations).
30. Freedom (No Freedom).

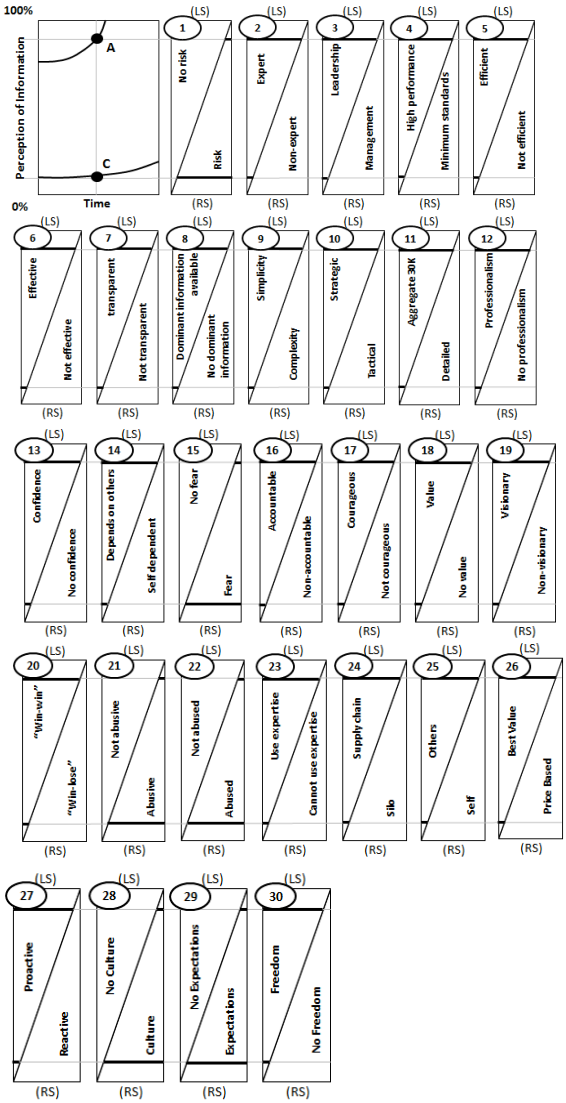

Figure 6. Level 3 difficult KSM concepts to grasp

Level Two and Level Three are created by deduction or observation from Level One. Level Two characteristics should be easily observed. The definition of Level Three characteristics are often debated, but resolved by simple logic. All three levels are consistent with the foundation factors:

1. Someone who perceives all information (leader) does not control others, rather aligns them to be successful.
2. Someone who perceives all initial conditions and natural laws (expert) knows there is only one outcome. There will be no decision making. Decision making enters when the initial conditions are not totally understood.

Characteristics from all levels are related by either being on the top (left side) or bottom (right side). If they are on the bottom in any level (I, II, or III), they have all the characteristics of the bottom of right side KSM diagrams. Therefore, a practitioner can observe the actions going on,

identify if the actions are LS or RS on Level II, and then identify the characteristics of the actions in Level III. For example, extensive meetings by an organization is a manifestation of abusive and "win-lose" actions. In this organization, morale will be difficult to raise, individuals will be reactive, and expertise and paradigm shifts will be difficult to implement.

Case Study Development Using the QS Profession in Malaysia

Currently the QS in Malaysia perceive that they are facing the following issues (IEM Meeting 2012, RICS Meeting 2012):

1. Owners are pricing their services below perceived market value.
2. Owners are controlling the QS.
3. QS are blamed for projects, which are over budget.
4. QS are heavily dependent on the owner's desires and the work of the other professionals before they can do their work.

QS wait until the designers and engineers are finished with their detailed design before they can cost out the project. When the project is over budget, the project undergoes value engineering, and the QS are forced to recost the project. The shorter time to react/doing rework will increase the stress of the QS. Further adding to the dilemma of the QS is the technology of BIM and 3D drawings with costing systems that threaten to replace the professional services of the QS. Analysis of the event and KSMs identify the following about the work of the QS (Figure 7):

1. They are brought in at the end of the event (Level II, #7, RS).
2. They have no control over the other stakeholders.
3. Their value is not being recognized (Level III, #18, RS).
4. They are reactive and not proactively engaging in actions to mitigate the risk that they do not control (Level III, #27, RS).

Proposed Change in the QS Model

Based on the KSMs and the event model, the author proposes that:

1. The QS needs to enter the event earlier in the event, preferably in the beginning (Level II, #7, LS).
2. The QS needs to be able to use their expertise (Level III, #2, LS).
3. The QS needs to minimize drawing focus on their reactive or detailed activities (Level III, #27, LS) and become pro-active (Level III # 18 LS).

Using the event diagram from Figure 7, the Figure is redrawn to show the reality of the QS situation, showing first the traditional practice, and second the LS, proactive practice.

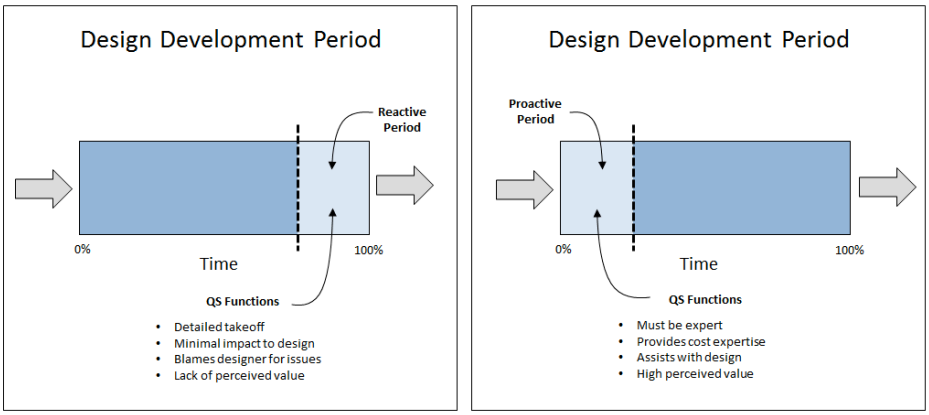

Figure 7. QS expertise: traditional and new approach

If the QS are to have an added value impact, they will have to have the capability to estimate costs at a very general level. This requires the capability to scope and cost. This is when detailed information is usually not available. The QS will also be required to do detailed costing for construction drawings and bill of quantities (BQ) to ensure that their costing was accurate.

The authors propose that the BQ is not to give to vendors in the price based award system, but to check their own general estimates to ensure the project is within scope and cost. Testing of the best value concepts with contractors in Malaysia quickly showed that the ability to determine their own BQ was a primary factor in identifying if a contractor was an expert and could understand their own project. Although the test did not preclude a non-expert contractor from being awarded the project, it did show that the awarded contractor (Kashiwagi 2012):

1. Knew their project better than the buyer and the buyer's experts.
2. Could see their project from beginning to end.
3. Was into risk mitigation despite slightly higher costs.
4. Did not low price the project, but could justify their pricing as being "normal."
5. Was slightly uncomfortable with the new "transparent" environment and the release of control to use their expertise.

The new proposed QS model would move the QS's emphasis to general estimating of project scope and cost at the beginning of the project, and a control on scope and cost during design, rather than the detailed costing currently done at the end of the project, and value engineering which is the cost cutting activity, and assisting to negotiate vendors' prices down at the beginning of construction. This new expertise would be based on database of construction activity costs, experience, and the ability to scope and cost in an environment of limited information at the beginning of the project development cycle and the development of the construction drawings. The QS role would be more of assisting other supply chain partners rather than one of direction, control, regulation and inspection.

The QS needs to have the expertise to do cost estimating at 30K feet level of major components in an environment when there is incomplete information. The QS cannot be focused on the details, because the details are not available until later in the project (when they are forced to be

reactive, and where repeated transactions occurred because of the lack of expertise in the beginning of the project). However, if the other stakeholders know the estimated cost of the major construction divisions or components, they are much less likely to overdesign or have unreal expectations. To be able to talk simply, communicating with stakeholders who have no understanding of scope and cost is utilizing the expertise of the QS.

The QS needs to come in earlier, needs to be able to cost out a preliminary intent, and needs to ensure that the other "blind" or "non-expert" scoping and costing stakeholders stay within their bounds. The QS must use a system, which is simple and dominant (helps the ignorant participants do the right thing due to obvious implications).

Proposed Solution to Change Paradigm

The proposed solution to assist the QS community to change the QS role includes:

1. Identify a postgraduate research program where a visionary researcher who is a best value expert can assist the industry. In the 20 years of BV development, the only BV visionaries who can bring industry change have been identified in university research programs.
2. Have the postgraduate research program work with government heads, RICS, and visionary QS.
3. Create a strategic plan, which includes testing of the proposed new QS.
4. Seek a grant from the CIDB to implement the strategic plan.
5. Create an education program.
6. Educate owners and QS.
7. Change the education in the QS undergraduate programs to include and focus on using expertise and understanding industry structure.

This solution has worked in the U.S., Canada and the Netherlands. Based on the success of those programs, the authors propose that this program has a chance of success. In presentations to both the engineers and the quantity surveyors in Malaysia, the experienced in the industry agree with the deductive model explanation. They must now face the challenge of changing the paradigm.

Conclusion

The professionals in a developing country face the problem of a controlling owner not using their expertise. The Information Measurement Theory (IMT) and Kashiwagi Solution Models (KSM) identify that the industry does not understand how to resolve their problem. This problem is not confined to Malaysia and developing countries, but also in developed countries. The solution lies in the understanding of industry structure, and the use of expertise to minimize confusion and transactions. The analysis of the problem identifies that the traditional role of the QS is too late in the development/design, the expertise is needed but not used and the traditional role of a reactive and detailed function needs to be changed.

As a result the professionals find themselves in an abusive relationship. The simple IMT/KSM analysis proposes the value that the QS can have if they enter the project earlier, be proactive and

assist the owner to minimize their expectations caused by the lack of expertise. The results of this research will be used to propose to the QS professionals to attempt to implement the conclusions of this research.

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Case Study: Implementation at Hanze University of Applied Sciences

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Best Value PIPS has become popular in the Netherlands and at the Hanze UAS. Hanze UAS started its first BV PIPS project in June 2011 and is currently performing seven projects. The Hanze UAS encountered major difficulties in the clarification period with an IT project. Therefore the main thrust of this paper is to explore the clarification and risk management phase. For this purpose the author uses an IT project as a case study. The conclusion is that it is in the clarification phase that the major paradigm shift takes place. BV practitioners must understand that the clarification phase is critical in the changing of the paradigm. The client and the vendor must continually implement the new BV concepts and lessons learned. This case study is similar to projects in the U.S., where the culture of the organization is the biggest challenge to the BV system.

Keywords: change of paradigm, clarification phase, lessons learned, IT project

Best Value Procurement (BVP) in the Netherlands

More than 15 years ago, Dean Kashiwagi created a process called Best Value (BV) Procurement at Arizona State University. The actual system name is the Performance Information Procurement System (PIPS.) BV PIPS is a procurement method that aims to select the most suitable vendor for the project and to motivate the vendor to the highest possible performance, while reducing the client's management and control tasks (Kashiwagi 2011). Kashiwagi developed the method over several years with the objective of improving the procurement and management of construction projects by reducing risk in selecting the top performer. The BV PIPS process has been used in more than 1,500 tests with an overall spending of $2.3 billion (PBSRG 2012). BV PIPS is being used in the US, and has been tested in Botswana, Finland, The Netherlands, Malaysia and many other places around the world. After the US, the Netherlands is the country where BV PIPS is applied on the largest scale. BV PIPS in the Netherlands is applied in the public sector as well as in the private sector (Van de Rijt & Witeeven 2011). Since 2010, BV PIPS is on its way to becoming the mainstream procurement method in the Netherlands.

BV PIPS is different from all other delivery systems due to the following:

1. The client identifies what they desire. It is an intent. What they procure is dictated by the vendor.
2. The vendor is the offeror of the proposal.
3. The client/buyer is the acceptor of the proposal.
4. Does not use management, direction and control to minimize risk.
5. Win-win model where the vendor increases value, quality and profit, and minimizes project cost.

6. The selection of the best value vendor is based on capability to perform, ability to minimize risk that the vendor does not control, and adding value that is above the intent of the buyer.
7. After the best value vendor is identified, the best value vendor clarifies the scope they are offering, the risk that they do not control and their project schedule.
8. There are no price negotiations.
9. Reduce the buyer's transactions by up to 90%.

BV PIPS is a change of paradigm from the procurement practices of the last 50 years. Practices of leverage, negotiation, and selecting the low price vendor and cutting their price further are not practiced in BV PIPS. The biggest paradigm shift is to use the expertise of expert vendors to meet the requirements and not management, direction and control. BV PIPS forces buyers to release control to the best value vendors. It changes the owner's procurement system from one of directing, to one of listening. This paradigm shift is affected by organizational culture and the ability of organizations to use deductive logic and common sense.

Questions that face the use of BV PIPS include:

1. What duration is required for a buyer to change from the traditional direction, control, and management model to a best value approach?
2. What is required to transform the procurement function?
3. How many tests should a procurement group run to identify if the BV process is an improvement over the traditional process?
4. What justification is required to test the BV PIPS system?
5. Does the BV PIPS system require legal changes in the local laws?

This paper is a case study of the Hanze University of Applied Sciences procurement agents using the BV PIPS system.

Hanze University of Applied Sciences (HUAS)

Founded in 1798, the Hanze University of Applied Sciences (UAS) in Groningen is the oldest university of applied sciences in the Netherlands. With a student population of over 25,000 and approximately 2,000 staff members, it is also the largest university of applied sciences in the north of the Netherlands. The Hanze UAS is respected internationally as a knowledge institute in which applied research and innovation are integrated into the various curricula of the institution. In 2010 Hanze UAS stated its strategic plan for a five-year period (2010-2015), with the main goals to: 1) improve the quality of the educational programs; and 2) invest in the development of applied research. In November 2012 Hanze UAS had 52 Bachelors, 18 masters and 7 Associated Degrees. Its education focuses on the four domains: science and technique, arts, humanities, and economics. The main focus of Hanze UAS is to contribute to the large scale, interdisciplinary programs of Healthy Aging and Energy. Wherever possible Hanze UAS tries to align the educational process and research of the four domains mentioned above to these two focus points.

Recently, in 2011, Hanze UAS performed a thorough analysis in order to determine the ratio of staff in the primary process versus the number of staff in facilitating and supporting processes. The outcome of this study was unequivocal and called for action: there was simply not enough focus on the primary process and too many people were employed in the supporting facility areas. A new strategic goal for Hanze UAS was therefore to focus on the primary process and to outsource the supporting activities of Hanze UAS within the constraints of crucial criteria, such as process quality, continuity of delivery and operational costs.

Introduction of BV PIPS at Hanze UAS

The Hanze UAS started its first BV PIPS project in June 2011 and is currently performing seven projects. The author became acquainted with BV PIPS at the Neijenrode NEVI (the Dutch Purchasing Association) congress in November 2010. At this time, the following had transpired (van de Rijt & Santema 2012):

1. Kashiwagi had introduced BV PIPS into the Netherlands in 2004.
2. Heijmans, the third largest construction contractor in the Netherlands, signed a license with Arizona State University (ASU) in 2006.
3. Rijkswaterstaat signed a license agreement for use of PIPS in 2006.
4. Scenter signed a license agreement with ASU in 2008 and became the Performance Based Study Research Group (PBSRG) Dutch representative.
5. Scenter initiated test projects, wrote the Dutch BV PIPS manual "Prestateinkoop," and gave presentations on BV PIPS.
6. The Rijkswaterstaat, with the assistance of Scenter, kicked off $800M worth of fast track projects in 2009. The initial success of these projects was: reducing procurement time and cost, and the ability of expert vendors to finish projects in 25% less time. This created interest in the procurement community.

In 2010, Kashiwagi was requested to speak at the NEVI congress along with the Scenter and Rijkswaterstaat representatives. The procurement agent from Hanze UAS was introduced to BV PIPS at this conference in an environment of great curiosity by the mainstream procurement professionals.

In May 2011 the agent followed the two-day course of the NEVI. After this course and being discontented with the traditional price based tenders and also striving to end the string of unsuccessful IT projects at the university, the agent decided to run a pilot. In addition, Hanze UAS was attempting to reduce its supporting staff and BV PIPS was regarded as a means to accomplish this.

Development of the BV PIPS Technology in the Netherlands

In the period of 2008-2010, the BV PIPS technology was brand new in the Netherlands. The visionaries testing PIPS were instructed that there were three phases of PIPS:

1. Selection Phase
2. Pre-Award Period/Clarification Phase

3. Risk Management Phase

The immediate attention was given to the selection phase due to the perception of finding the best value vendor and allowing them to utilize their expertise. For the public sector, a process called the Most Economically Advantageous Tender (MEAT) was used wherein qualitative criteria is given financial credit. Extreme care was used to ensure that BV PIPS met the requirements of European law. Due to the perception of legal representatives, various changes were made to the PIPS selection process. The changes included:

1. Using individual educational sessions with the proposing contractors during the selection phase.
2. Using redundant rating teams.
3. Not using the clarification phase.

The understanding and use of the clarification period was poor. Because the process was new and the foundation theory of Information Measurement Theory (IMT) was not well understood, many of the projects did not use the clarification period properly. This added to the confusion in the risk management phase. This practice of BV PIPS practitioners not using the clarification period properly is not uncommon. In many of the U.S. tests, the requirements of the clarification period are ignored. This will be one of the most important parts of the research test: to see if the clarification period can be properly implemented.

The BV PIPS process and structure was seen by Hanze UAS as a method to focus on quality, reducing supporting staff as well as reducing costs, as it is different from traditional procurement processes in the following ways (Kashiwagi 2012a):

1. Minimized decision making.
2. Minimized management, direction, and control of vendor by the client.
3. Alignment of experts.
4. Best value and highest level of performance.
5. Award based on prince and performance.
6. Minimal relationship between parties and no favors or gifts.
7. Minimized flow of information.
8. Quality control and risk management by vendor.
9. Quality assurance by the buyer's representative.

BV PIPS Testing at HUSA: the Need for a BV PIPS Expert

In order to gain a greater acceptance for a new way of tendering, the author invited a BV PIPS expert (Sjoerd Posthuma) from Scenter to help introduce it at Hanze UAS. Hanze UAS started by sharing the results of performance based procurement with the management of the Facilities Department. In June 2012, Posthuma presented BV PIPS to the management team of this department and to other interested individuals who encountered problems with the traditional price based procurement. As the reactions were very positive, the Facilities Management team decided to start a pilot project. Soon, another two projects started with BV PIPS. Though all of these projects were deliberately started using BV PIPS, Hanze UAS also realized that the

embracement of BV PIPS by Hanze UAS personnel and the vendors was going to be its main risk.

Therefore, all three projects were supported by Posthuma with the task to transfer skills and knowledge to Hanze UAS personnel. Without the assistance of Posthuma, the project would have been very difficult. The change of paradigm was the main difficulty. At the beginning of 2012, these skills were at an acceptable level, so the projects that started in 2012 were done under supervision of Hanze UAS itself, except for the final check on the award. After the seventh project, Hanze UAS now feels confident enough to conduct BV PIPS projects without assistance, but will keep their advisors (Scenter and NEVI) close should any issues arise. Hanze UAS also realizes that a lot remains to be learned. Table 1 lists BV projects that are currently running at Hanze UAS.

Table 1

Hanze UAS current projects

Phase	Initiated	Project Title	Cost	Schedule
Selection	2012	Printed matter services	M€ 4	4 years
Selection	2012	Telephone services	M€ 3.6	4 years
Clarification	2012	Student information system	M€ 5.2	8 years
Clarification	2012	Audio visual services	M€ 2.5	4 years
Risk Management	2011	Travel agency services		2 years
Risk Management	2011	Rifle: a financial system, an HR-system and a payroll system	M€ 2.8	4 years
Risk Management	2011	Multifunctional services	K€ 850	3 years

The IT Rifle Project

One of the objectives of this paper is to describe the BV PIPS IT test project. The main thrust of this paper is to explore the Clarification and risk management phase. For this purpose, the author uses the IT Rifle project as a case study, describing the difficulties with IT projects, followed by the scope of the IT Rifle project. The paper will then describe the PIPS selection phase, the PIPS clarification phase and the risk management phase of the BV project.

Difficulties with IT projects

In previous years, Hanze UAS encountered difficulties in executing large IT projects. One of these projects was the implementation of a personnel and financial system. This project was tendered in 2008. Part of the tender was the description of the current financial processes and the description of the shortcomings within these processes. In this tender, Hanze UAS did not try to enforce a minimum standard for quality delivered, but emphasized price as an important factor in

the selection. After the award, the vendor performed well for a few months, but very soon disputes between the client and vendor emerged. The vendor did not act in an accountable fashion and a long and tedious phase set in with mutual disagreements, difficult communication and a lot of decision making. In 2010, the contract was ended by the vendor going bankrupt. These problems are not unique. As described in the case ASU UTO Networking Best Value Case Study more or less the same difficulties occurred: "There was too much complexity. Too many people involved. Too many questions that no one understood. The problem seemed too complex" (Kashiwagi 2012a). Other authors claim more or less the same difficulties. Martijnse en Noordam state that IT projects have a negative image, "They are expensive, are always delayed and they do not deliver the needed functionality" (2007).

Project Scope

In 2008 Hanze UAS selected a vendor for delivering the financial and HR-system. The financial processes had been supported by outdated financial functionality. The strategy of the Hanze UAS was to build a solution reusing the existing solution and the data in the existing financial system to support both the financial and HR-processes. Thus, a singular shared source of data would be created. This was, for example, the case with the data describing the organizational structure on which almost all of the management reports were based. A single solution for this problem would result in a dramatic decrease of effort spent in sorting out the mismatches between HR and finance reports. Moreover, a reduction of effort in data input would be achieved because of this single data source-solution. Following this strategy, a majority of the financial system and a small portion of the HR-system were implemented during 2009 and 2010 in a project that was rather difficult to manage. However, in the spring of 2010 the vendor went bankrupt and this put a halt to further development. As a result, another tender had to be started. In this second tender vendors were allowed to work with subcontractors. Because Hanze UAS had learned from the previous phase that a custom solution, although based upon the ERP-framework of MS-Dynamics, was a very tedious and difficult route, it was decided that only a solution based on proven technology was allowed with minimal software development. Only customization would be allowed for. Therefore, processes within the organization were going to be adjusted in order to meet this criterion. Another criterion was that the functionality had to be based on Microsoft Dynamics AX for at least the financial system as they were already running on this platform.

Due to the frequent failure of IT projects and the difficulties Hanze UAS experienced with IT projects, Hanze UAS assumed that Best Value could find an answer to their dilemma. Therefore, Hanze UAS started the IT project using BV PIPS.

The goals of Rifle were:

1. Continuity of the organization's key supporting processes.
2. Optimal quality of processes and systems.
3. Maximum flexibility of processes and systems in regard to both new legislation and regulations and future adaption to changing company policies.

The goal was to deliver, implement and service a solution for financial, HR and payroll processes for a maximum of € 2.800.000 (including tax). The task included the implementation.

This implementation role would require a lot of change management skills on the part of the vendor because of the need for substantial changes in existing processes.

PIPS Selection Phase

Each BV project starts with a plan of the strategic elements of the project. Without this strategic plan the project will not start. An in-depth business case focusing on the strategic goals of the project is a prerequisite, as it is proven to be one of the lessons learned by failing and successful IT projects (Martinjse en Norrdam 2007). Before the official kick off of the BVP project, the project manager had already started defining the strategic elements and the project goals during spring and summer of 2011 together with a project team. Members of the project team were: the client's principal, the contract manager, several clients, a controller, a lawyer, a BVP expert and a procurement officer (the contracting officer). In June 2011, the official kick off of the selection process took place. Part of the kick off was the training of the project team in BVP by an expert and explaining the purpose of the tender. One of the risks identified was the availability of vendors. How many would be able to deliver the assignment and fulfill the goals given the restriction of at least the partial dependency on Microsoft Dynamics AX? The estimate was that several vendors would be able to fulfill these requirements and to fulfill the goals of the project.

The time needed for composing the tender including the supplement 'This is how we work now' and the supplement 'This is what we think we want' was limited, because a lot of preparation was already done in advance of the official kick off of BV PIPS. On November 9, 2011, the tender was published at the European official publication site Tender Electronic Daily (TED). On November 10, the educational meeting on the philosophy of BV PIPS for all interested vendors took place.

At the education meeting for the vendors two main topics were discussed:

1. The philosophy of BVP
2. The PIPS process (selection phase and clarification phase)

The tender documents consisted of the tender document itself, the supplement 'This is how we work now' and the supplement 'This is what we think we want' and a further 111 supplements that described the current situation ("this is how we work now") as well as describing "this is what we think we want." Despite the criterion 'does this information help the vender to make a better proposition?' the number of supplements was still very high.

During the PIPS process the following criteria were used:

1. Price
2. Scope
3. RAVA plan
4. Planning
5. Interviews

Nineteen vendors showed their interest in the tender as could be seen in the electronic tender tool. There were three question rounds on November 18, December 1 and December 19, 2011. On January 10, 2012 only one vendor (herein, the vendor) submitted their proposal.

In January 2012, the assessment of the documents and interviews took place. The assessment committee was unanimous in their joint assessment and positive. Though only one vendor had submitted its proposal and therefore no comparison could be made, the assessment committee rated the proposal and the key personnel as dominant, better than neutral (6). The assessment committee rated as follows:

1. Scope: 6
2. RAVA plan: 7
3. Planning: 6
4. Interviews: 8

After the assessment of the documents and the interviews the price was opened. The price was slightly less than the preset maximum price of M€ 2.8. The assessment committee was somewhat disappointed with this price and some discussion arose about the seeming lack of competition although the prevailing opinion was that the set maximum price maybe was set too low to begin with. On February 10, 2012 the steering committee approved the start of the Pre-Award phase with the vendor. On February 29, 2012 the kick off took place.

PIPS Clarification Phase

During the clarification phase the selected vendor pre-planned the whole project delivery. The clarification phase started with the kick off and ended with the award meeting. The award meeting would take place when the vendor had proven, based upon verifiable information, that it could carry out the assignment and would be able to achieve the project goals.
The clarification phase started with the kick off. Three main topics were discussed:

1. The philosophy BV PIPS in relation to the clarification phase
2. The solution of the vendor
3. The plan of the vendor to clarify the solution and demonstrate how his solution would accomplish the goals of Hanze UAS.

The goal of the kick off was to get to know each other and to discuss the three topics. The meeting was supported by a BVP expert. Attendees were project team members of the client and project team members of the vendor. The mood of the kick off was drivers. Both sides did not know what to expect. Some members (especially the technical people of the vendor) were very skeptical about the solution of the vendor. Some attendees of the client thought that the vendor was going to solve all of their problems as stated in the tender document, and some people believed that the vendor had already won the tender. The atmosphere was one of enthusiasm and everyone "enjoyed the cake."

At both sides, a project manager was assigned to the project. The project manager of the vendor was responsible for the project. The project manager of the client was assigned to facilitate the vendor.

After the kick, off nothing much happened. It was rather quiet at the vendor's side though the vendor was told during the kick off what was expected of them during the clarification phase.

After a few weeks the project manager of the vendor started seeking collaboration with the project manager at Hanze UAS. Though both project managers did their utmost best, the collaboration between them was difficult. The project manager of the vendor did their best to manage the project. The project manager of the client did their best to facilitate the vendor. However, it seemed as if both parties were living in different worlds and were not able to understand each other's perspectives on the job that had to be done.

The project manager of the client tried to preplan the whole project, but no planning for the Pre-Award was made. They also claimed resources, but reaction from the client was that the resource claim was too general. It was not clear for the client when the resources were needed, who had to be claimed and for how many hours the resources had to be claimed for the project.

Another aspect that led to difficulties was the enormous need of the technical people for technical details. Although very relevant in some cases, it seemed that the answer of one technical question led to two or even more technical questions in return. A phrase that was often used by client staff during this phase was: 'Don't ask me, we've hired you, the expert to tell us!' The result was that this non-committed attitude led to the inability of the vendor to make good progress on issues.

Another issue was the implementation date. The assignment was to implement (part of) the solution at January1, 2013 because of the risk of disrupting the pay roll process due to several external causes. Due to this deadline, the vendor started implementation activities during the clarification phase in order to be able to meet the deadline. Thus, the vendor already started activities, which were meant to be carried out during the risk management phase. The project manager of the vendor tried to organize the implementation activities while still developing the project plan. This proved to be too difficult to manage. The result was a delay in the Pre-Award phase.

The award meeting was postponed twice. Though the vendor had taken account for the activities of the clarification phase in the pricing, they felt that the financial risk became too high. Therefore, they asked for a prepayment of the client. The client decided not to approve the prepayment because of the still uncertain outcome of the clarification phase. This resulted in tension on managerial levels and the pressure to finish the clarification phase on the vendor's side.

On June 6, 2012 the award meeting took place. The atmosphere of the meeting was somewhat tense. Although the vendor presented the plan and approached the problem in a decent way, one could feel the tension because the plan had not been approved before the award meeting by the

project team members. An hour before the award meeting the contract had already been signed with the board of Hanze UAS.

PIPS Risk Management Phase

After the award meeting, the same events took place as during the Pre-Award phase. Because the Weekly Risk Reports (WRR) were still not implemented, Hanze UAS decided to support the project managers with the WRRs. The owner of the WRR was the vendor's project manager, but both project managers sat down together before submittal. At first, the author and Posthuma coached the project managers on using the WRRs. During these (weekly) sessions, it became clear that the project managers were not aligned. They reacted very strongly on each other. Meanwhile, the project fell behind schedule, claimed resources proved not to be available; facilities that the vendor asked for were not made available on time by the client. A lot of detailed information was communicated and the WRRs were still not in place because the primary focus of the coaches was on the collaboration between the project managers.

After about 5 weeks, both project managers decided to step down in the interests of the project. They were replaced and the freshly appointed project managers got along much better and also had a better understanding of each other's interests and specific needs. They realized that Hanze UAS really needed to get things in place so the vendor could do their job. Hanze UAS facilitated the vendor, e.g. by making resources available and working together. Then the summer holidays started. Though, theoretically and on paper, resources were claimed and made available, the project suffered a big delay due to the non-availability of the critical resources on the client's side. Stand in's for project staff were often not capable of delivering the results needed. Both sides simply had not taken into account the extent of the disruptive effect of the long summer break in an educational institution like Hanze UAS.

During the months of September and October, the vendor was not able to make up for the lack of resources during the summer break. They were not able to explicitly show the effect of the delay in the schedule. They merely stated that they still would be able to make the schedule in the end, by parallel execution of project activities. However, in order to succeed in this approach, the Hanze UAS had to increase the resource availability dramatically. For some resources this claim was approved, but the client could not make all claimed resources available in time. In November 2012, another method of working was introduced by the project: 'The Pressure Cooker.' The project team members all worked together in one location, five days a week for a prolonged period. Every team member was made responsible for delivering a well-defined work package. At the time (with only 6 weeks left before the first scheduled release) the steering committee was worried the project would not make the deadline of January 1, 2013. As a precaution, the steering committee started meeting on a weekly basis. Finally, it became clear at the end of November that the project would not make the deadline for the first release. This release was postponed to February, meanwhile managing the risks as mentioned before.

Dominant Observations and Lessons Learned

As Dean Kashiwagi stated, "BVP is not easy to implement for some organizations that are mired in the traditional model of management, direction and control. It is a paradigm shift" (Kashiwagi

2012b). As the author has experienced the first phase (selection) is achievable as long as the BV PIPS process is strictly followed and this procedure is supported by a BV PIPS expert. However, as observed in the presented case study, the clarification phase and the risk management phase are difficult. Though several difficulties also took place during the Pre-Award phase in other BV projects at Hanze UAS, these difficulties are mostly overcome during the Pre-Award phase. In the case of Rifle project, the vendor and Hanze UAS did not seem to be able to overcome the difficulties.

These difficulties are more or less similar to the difficulties of the 'ASU UTO Networking' case study, but in that case the vendor seems to be very accountable. As reviews show, the project at ASU UTO has been a great success. Jacob Kashiwagi concludes in the case study, "The process has not been easy for either the client or the vendor to adjust to, but if the PIPS/PIRMS structure is enforced, efficiency and quality increases, and cost decreases" (Kashiwagi 2012b).

In this chapter the author will explore the case of Hanze UAS in order to determine the lessons learned in how to enforce the PIPS/PIRMS structure for the Pre-Award and risk management phases at Hanze UAS.

Observation 1: Vendor finds it hard to be accountable from day one

As observed in the presented case there was a deafening silence on the vendor's side during the first weeks of the Pre-Award phase. The vendor waited for the client to take the lead and acted as in a traditional price-based structure, because they did not know how to act differently. Though they strove to take the lead, they did not know how to do this and therefore were reluctant to take a clear expert role and step out of the relatively comfortable consulting role ("tell me what you want and I will provide for it"). This phenomenon has been observed to some extent in all BV PIPS projects at Hanze UAS.

Lessons Learned: Help vendor taking accountability at clarification phase by 'hopping over'

Nowadays the Hanze UAS assigns a BVP process expert during the Pre Award phase. This BVP process manager 'hops over' to the selected vendor and coaches the selected vendor in the process of composing the project plan. The BVP process manager coaches the vendor to take his expert role. Depending on the project managers a weekly meeting or call is planned between them and the BVP process manager. The guidelines for the coaching by the process manager comes down to: using dominant information, pre-planning and managing risks and also client-facilitates- vendor.

Observation 2: Project managers' characteristics are crucial for the results of the project

The role of the project manager on both sides is crucial as observed in the presented case. Collaboration was bad due to a collision of characters and an insufficient understanding of the philosophy. While meeting during the risk management phase it was simply not possible to implement the WRRs because of the problems between the two project managers. The project manager of the client blamed the vendor's project manager that they did not take the expert role needed. The project manager on the vendor's side on the other hand blamed the project manager

of the client that they did not facilitate them in a sufficient manner (e.g. by making resources available). From the author´s point of view both project managers had difficulties applying the philosophy of BVP. They both claimed to understand it, but meanwhile details ruled, there was no preplanning, a lot of insignificant risks were managed but the actual and relevant risks were not managed at all.

Lessons Learned: Select on attitude of key personnel on client's side

Kashiwagi has developed the Kashiwagi Solution Model (KSM), which can be looked to as a resolution. This model is a mechanism where dominance or radical extremes are used to minimize decision making in understanding the difference between Type C and RS characteristics and Type A and LS characteristics (Kashiwagi 2012a). By applying this model it might have been possible to identify the characteristics of the project manager before the start of the project. Nowadays selection of the client's project manager is done in a more conscious way. Hanze UAS tries to apply the model.

Observation 3: The vendor has difficulties in preplanning and mitigating risk.

The presented case shows that the vendor had difficulties to preplan the whole project. It proves hard for vendors to first concentrate on preplanning; instead they seem to have a more hands-on attitude and are eager to start the actual work to be done. Also the vendor had difficulties in pre planning the Pre-Award phase. The whole point of BVP is that the vendor pre plans the project by mitigating all risks in order to reach the goals. Because they are the expert they are most able to identify the risks that might occur during the project.

This idea is explained by Kashiwagi by means of the Information Measurement Theory (IMT). IMT can be defined as: A deductive, logical, and dominant observation/explanation of an event. It includes the use of relative and related data to identify information that predicts the future outcome of the event (Kashiwagi 2012a). This theory explains that if one has all the information about the initial conditions of an event and if one knows the patterns that are applied on this event one can predict the outcome of this event. In other words: if a vendor has a lot of experience they should be able to know all the patterns that are applicable on this project and they should be able to see most of the risks (initial conditions). Therefore, with this information they are able to pre plan the project in such a way that only one outcome is possible: the achievement of the project goals. In the presented case the vendor clearly did not see all the initial conditions and patterns.

Lessons learned: Help vendor preplanning and mitigating risk at clarification phase by 'hopping over'

Nowadays the Hanze UAS presents IMT at educational meetings for client and vendor. It helps to understand why pre planning is so important. If needed the BVP process manager coaches the selected vendor in preplanning the Pre-Award phase. After preplanning the Pre-Award phase the vendor should be able to preplan themselves.

The presented case also shows that implementation activities started during the Pre-Award phase. Due to the pressure of deadline of the first system release on January1, 2013 and the rather long Pre-Award phase, the vendor started implementation activities. Nowadays, the BVP process manager prevents the selected vendor from starting implementation activities, because almost every selected vendor at Hanze UAS still falls into this trap to some extent. As we know not starting implementation activities is essential because the vendor first of all has to prove they are able to do the job well. A project start without a signed contract is almost always a risk in itself and last but not least: it draws the attention away from the Pre-Award activities that are crucial for later success.

In the case study 'ASU Data Center and Help Desk Project' Jacob Kashiwagi describes that the best value vendor had failed to really grasp the best value process and deliver the items that were required. Then vendor seemed to try and rely on direction from ASU more than taking control and telling ASU what was required and what needed to be done (Kashiwagi 2012a). In this case, UTO decided to cancel the project. Perhaps Hanze UAS should have considered this decision as well, but the Vendor and Hanze UAS became more and more dependent on each other because of the January first release deadline and the vendor had already put in a large amount of work.

Observation 4: Expectations were unrealistic

As described in the case, it was only in a very late stage that Hanze UAS realized that the vendor was going to deliver the best possible solution within the limits of his capabilities, but that this solution would not be the solution that would solve all of the problems in relation to scope and goals.

Hanze UAS wanted to contract a vendor who would implement a solution including both the IT-system delivery as well as the business change management needed for this job. However, the core business of this vendor was implementing systems and not applying business change management. It took valuable weeks before Hanze UAS accepted this.

Lessons Learned: Accept the solution of the vendor as the best option given the predefined goals of the project

Nowadays the Hanze UAS educates the project team in the acceptance of the solution. Given the predefined project goals the presented solution of the best vendor is by definition the best we can get.

Observation 5: Client becomes unaccountable because the expert is hired

As described in the case, a phrase that was often used by client staff was: 'Don't ask me, we've hired you, the expert to tell us!' The result was that this non-committed attitude led to the inability of the vendor to make good progress on issues. This non-committed attitude contributed to a prolonged Clarification phase. The Hanze UAS needs 1) to organize their own business change management and 2) facilitate the vendor in developing the project plan.

Lessons Learned: Assign project manager at client's side who is accountable for facilitating vendor and organizing activities at client's side

Nowadays Hanze UAS assigns for each BVP project during the Pre-Award phase a project manager whose job is: facilitate the project manager of vendor and organize activities at the Hanze UAS which are not in scope of the solution of the vendor but need to be done anyway. This way Hanze UAS takes accountability of its own activities, which helps the vendor to improve value and performance.

Conclusion

Best Value PIPS has become popular in the Netherlands and at Hanze UAS, the procurement group is attempting to transition from the traditional price based, owner controlled, directed and managed processes to the Best Value PIPS process. Due to the first tests of BV PIPS in 2011, the BV process has continued to be improved. The first implementation period found the BV practitioners focusing on the selection phase, instead of the paradigm changing pre-award, clarification phase.

It is in the clarification phase that the major paradigm shift takes place. This includes:

1. The vendor taking over and defining the scope, identifying the risk that they cannot control and the mitigation of the risk.
2. The owner/buyer accepting the offer of the expert vendor.
3. The owner does not use management, direction and control on the vendor. The vendor must know what to do.
4. This paradigm shift is not easy, as vendors for the past 50 years have been managed, directed and controlled by the clients. Hanze UAS tests concentrated on attempting to perform the clarification period. The following are lessons learned:
5. Help vendor taking accountability during the clarification period by assisting them to have a detailed plan, identifying risk activities and having risk mitigation plans.
6. Select client representatives who understand Information Measurement Theory (IMT). If client representatives do not understand, they will revert and use management, direction and control the vendor.
7. Accept the solution of the vendor as the best value option given the predefined goals and intent of the client.
8. Client representatives will be directed by the expert vendor. However, until that happens, the client's representatives must support the best value vendor to get the project completed.
9. The newness of the clarification period to the Dutch practitioners and the conditioning of the vendors to be reactive to the needs and directions of the client will cause problems in the transition from price based to best value. The above four lessons learned are common also in the United States.

BV practitioners must understand that the clarification phase is critical in the changing of the paradigm. The client and the vendor must continually implement the new BV concepts. This

case study is similar to projects in the U.S., where the culture of the organization is the biggest challenge to the BV system.

The Hanze UAS tests also show that visionary procurement agents and clients can implement BV PIPS projects within two years after the introduction of the technology. It also shows that a BV consultant is very helpful in the process. It also proves that visionary clients exist in the Netherlands as well as in the U.S. The methodology to implement BV PIPS includes:

1. Owners/buyers should utilize a certified BV expert to get educated and trained. Dutch BV board members and train the trainer experts receive training and certification at the Performance Based Studies Research Group (PBSRG) at Arizona State University (ASU) or from the Kashiwagi Solution Model (KSM), which is run by the BV PIPS founder's family, the Kashiwagi family. Dutch BV board members and certified trainers can certify BV experts in the Netherlands by NEVI in a two day training course.
2. Run BV PIPS tests.
3. Capture lessons learned and modify the practice to the "pure" BV PIPS model.
4. PIPS tests can be conducted within two years of exposure to the BV technology.
5. When implementing PIPS for the first time, assist the vendors to preplan and document their detailed project schedule, their milestone schedule, and risk mitigation plan.

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