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The "Seamless" Bureaucracy

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Abstract
The construction industry is suffering problems of low demand, low quality and performance, high overhead/delivery costs, dissatisfied clients, and high deviation rates. Research in best value delivery at Arizona State University has identified the problem as a "system/delivery" problem, and not a technical problem. The hypothesis being proposed is that industry "best practices" of management, direction, control, decision making, and inspection, to improve performance and minimize deviations, are inaccurate and inefficient practices. The elements of the traditional system are bureaucratic and in order for the industry to participate with the clients and buyers, the industry supply side has been forced to enter into a relational contract that mirrors all the characteristics of the buyer and the buyer's delivery system, thus maintaining a seamless bureaucracy. The research proposes the implementation of the alignment of expertise to replace the more traditional and bureaucratic characteristics of management, direction, and control. Accompanying the alignment of expertise are the concepts of self-measurement, measurement of deviation, minimized decision making, the use of dominant information and the management of risk that the vendor does not control. The concept is currently being tested at Brunsfield, one of the largest developers/contractors in Malaysia.

Keywords
Construction system solution

1. Introduction

The construction industry is divided into four sectors by performance and perceived competition (Figure 1). When perceived competition is high, the industry is divided by the price based sector and the best value sector. The major difference between the two sectors is that in the price based sector, the wrong party is doing the decision making, management, direction, and control. The buyer or client and their representatives should be hiring an expert vendor. If they are directing the vendor, the vendor is not an expert. Even if the vendor was an expert, the vendor, over time would become more reactive.

In the best value or value based sector, the client will pick the best value vendor based on price and performance. The best value vendor will then tell the client/buyer what and how they propose to meet the requirements of the client. The vendor will then write the contract that the client accepts. In the low price bid environment, the client attempts to identify the minimum standard that is acceptable, and informs contractors the award will go to the lowest price (Figure 2.) The vendors change the maximum into a minimum and submit the minimum acceptable, driving performance the opposite way. The price based sector automatically results in an adversarial environment.

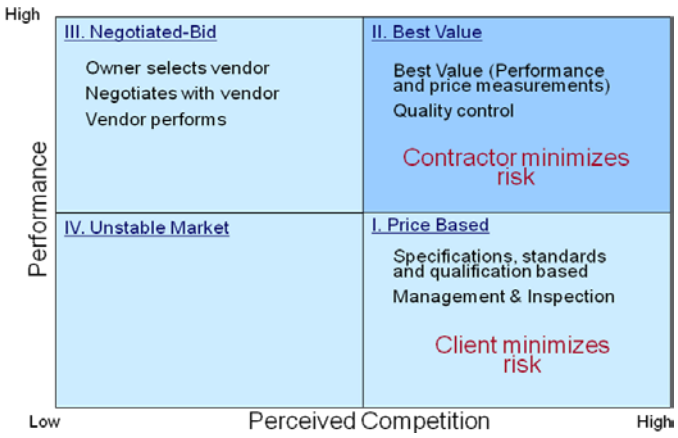

Figure 1: Industry Structure

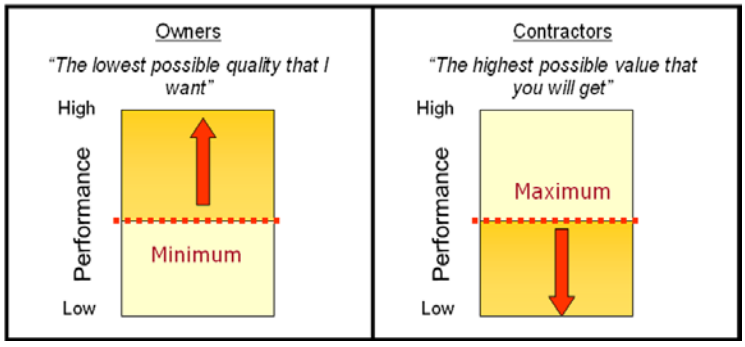

Figure 2: Minimum / Maximum

The problems with the minimum standard include (Kashiwagi et. al., 2005):

1. The standard is subjective, requires interpretation, and is very difficult to identify and enforce.
2. Government agencies rarely can prove that a contractor is below the standard.
3. Performance is continually decreasing.

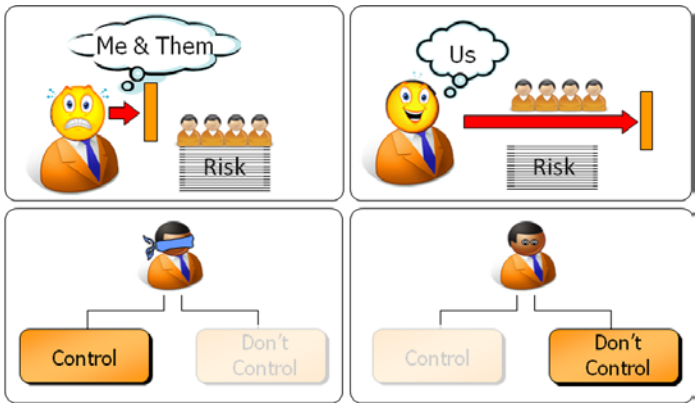

Figure 3: Experienced vs. Non-Experienced Contractor

Figure 3 shows the extremes from the very inexperienced contractor to the most experienced contractor. The following are attributes of the inexperienced contractor:

1. Before they begin, they cannot see the project from beginning to end, and cannot predict future results.
2. Needs complete and detailed instructions.
3. Is not a technical expert.
4. They are only concerned with their requirement. Does not worry about any other issues.
5. Feels comfortable with being managed, directed, and controlled.
6. They have high technical risk due to the lack of experience and expertise.
7. Are more reactive, make more decisions, and act in their own best interest.

The experienced and expert contractor can see the beginning to the end of a project before they do it. Their attributes include:

1. They are technical experts and have no technical risk.
2. See the project before they do it.
3. They have a plan.
4. The only risk they have is the risk that they do not control. This risk is caused by people outside of their control. This includes unrealistic expectations of the buyer.
5. They realize that in order to implement their plan, they must identify and mitigate the risk that they do not control. This is their only risk.
6. They need fewer directions.
7. They make fewer decisions, are more proactive, think "win-win" and are more ethical.

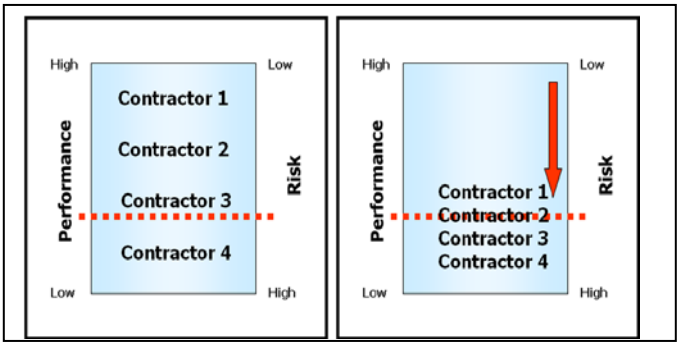

Figure 4: Best Value vs. Low Bid

When the client/buyer gives more instructions, details, and discussion to the vendors, it will create an environment where the low performer is more competitive and high performers are less competitive. Figure 4 shows the difference between the best value on the left, where the high performer has low risk and high performance, and price based on the right, where the client/buyer directs the contractor to do the following:

1. Propose the lowest price as if there is no risk.
2. Assume instructions are not only complete, but are also accurate.
3. Assume that if the directions are incomplete, or inaccurate, the contractor will be compensated.
4. The contractor does not have to think proactively or be responsible for client errors.

Figure 5 shows the three types of buyers and the different type of vendor participants: highly trained experts, medium trained and inexperienced personnel. When the best value buyer buys, they consider performance and price, and transfer the risk and control to the expert vendor. The partnering owner wants to partner, and the best match is the mid-trained vendor personnel. The most bureaucratic owner is the price based owner who will manage, direct, and control the vendor and only hire the low bidder.

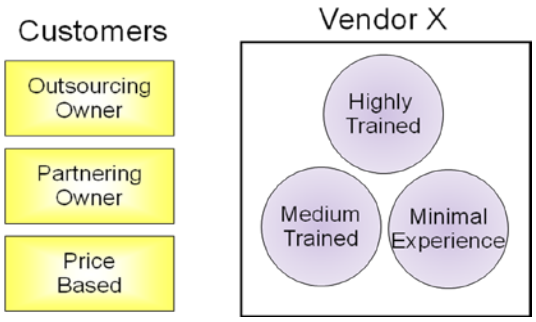

Figure 5: Seamless Bureaucracy

When the buyer directs the vendor, the following are illogical concepts:

1. Buyer knows more than the vendor does.
2. By definition, the vendor is not an expert vendor.
3. If the vendor is an expert vendor, the buyer will manage, direct, and control the expert vendor, and over time, the vendor will become reactive, inefficient, and higher costing.
4. If the vendor is a high performer, the vendor will be highly paid; however, their production will be lower if the client is trying to manage, direct, and control the expert.
5. The expert becomes highly paid and has low production.

The bureaucratic client has put the high performing vendor expert out of alignment. An even worse result is that the inexperienced personnel are not motivated to become experts. This is supported by the observation that there are less highly trained individuals in the industry every year. The construction environment as a system has decreasing performance. The industry as a system is stable when performance cannot be increased (Deming, 1982, Goldratt, 2004.) A system can be low performing and stable at the same time. The construction industry has been stable (performance has not changed for a long period, even though there have been many attempts.) The identification of the construction industry as low performing has been documented over the past thirty years (Lepatner, 2007; Chan and Chan, 2004; Egan, 1998.) The Malaysian construction industry has many of these same issues. The problems include:

1. Poor performance and lack of documented performance.
2. Minimized profit and change order issues.
3. Collusion and unethical behavior
4. Difficulty in regulating the industry.
5. Changing delivery systems (design, bid, build, design-build, construction management at risk, design-build-operate, private-public partnership, integrated project delivery), without fixing the problems (lack of trained craftsmen, decreasing numbers of trained craftspeople, low profit margins, high risk, turnover of contractors, low design performance, low customer satisfaction).
6. Legal issues.
7. Research community has a difficult time impacting the industry system.

2. Hypothesis

The authors propose that the construction delivery industry system is broken. The problem is not caused by the industry lacking technical expertise. This is a resultant manifestation, not the problem. This is a result of the bureaucratic system. The bureaucratic system increases decision making, subjectivity, management, direction, and control, non-transparency, and misalignment of resources. The construction industry system and the construction management research system are broken; because the research system is trying to work with a "broken system." It is for this reason, that the Malaysian construction research program is having such a difficult time showing impact, improvement, and value. The system is

not broken because of a lack of skilled researchers. In the academic research community, the industry is looking to fix a "broken system" through a technical solution. The authors are proposing that the only viable solution is that the construction industry system is identified as stable and nonperforming, and that the solution is a systems problem, and not a technical problem.

3. Methodology

The acceptance of the hypothesis is through the methodology of deductive logic, common sense, and observation. The paper will use deductive logic, the PBSRG systems research results over 17 years, and the results of three major surveys, which includes the results of industry participants who have used both the traditional and the deductive logic based solutions. Many of the observations have been identified in the introduction of the problem. The success of the PBSRG research is the more dominant evidences of the hypothesis' validity.

The major difference is PBSRG is proposing that the construction industry has a systems problem. PBSRG research focuses on the end user who controls the system. Two major surveys were done to support the logic showing the same result. (One was a survey of over 2,000 contractors, and another was a survey of over 1,000 design and engineering professionals.) The objective of this paper is to propose that if the construction management researchers do not address the systems problem, they may be a part of the "seamless" bureaucracy that is causing the systems problem. The authors accept that there may be disagreements with the approach.

4. Deductive Logic

The price based environment is the traditional platform for delivering construction services and now has become a platform for also delivering professional services. The following are observations about the traditional delivery services (Kashiwagi, 2005):

1. The wrong party is trying to direct and control the expert vendors. The client management, direction, and control has made the industry more reactive.
2. The use of subjective minimum standards and the low price award has led to an adversarial relationship, and an inability for buyers to stop the degradation of performance and value.
3. The use of minimum standards and the downward leveling of the playing field by the price based system has lowered performance.
4. The more the buyers have instituted management, direction, and control, the more craft training is reduced, the level of expertise drops, deviation rates increase, and legal activity increases.
5. The owners/buyers do not have the capability to control the vendors through a contract.

The above deductive logic was understood by the Dutch, as they moved away from the price based marketplace and their problem with collusion in 2002 (Doree, 2004). In 2011, NEVI, the industry procurement professionals organization is teaching the best value concepts, and may be moving to certify consultants who understand these principles. The GSA heartland region funded PBSRG $250K in 2012, to integrate best value PIPS into their operations to increase efficiency, accountability, performance and value. The State of Minnesota (2007) and the State of Oklahoma (2011) both used the above logic to change their law to move to the best value delivery process. The problem is also understood by the Western States Contracting Alliance as they are moving toward a sole source contract with ASU to make the support of the education, theory, and PIPS available to their 26 member states. Brunsfield in Malaysia is attempting to increase production with minimal risk by solving system issues.

5. PBSRG Research

PBSRG research has been successful for the last 17 years. The main reason for the success has been the proposal that the construction industry has a systems problem. PBSRG research has been focused on the real controllers of the system, the buyer/client and not the contractors. The peer reviewers of the research have been the industry, and not just the academic research peers. The research effort has consisted of no government research funding. For example, the National Science Foundation, National Institute of Health, Construction Industry Institute, National Transportation Research, National Academy of Sciences, etc..

Funding has reached $9.0M, number of research tests have exceeded 900, the number of countries running the research is seven (U.S., Netherlands, Finland, Botswana, Canada, Australia, and Malaysia), 26 states in the U.S. (Western States Contracting Alliance (WSCA)), changed two state laws (Oklahoma and Minnesota), impacted four large federal organizations (Corps of Engineers, General Services Administration, U.S. Army Medical Command, U.S. Air Force), and all funding has either been sole source or competed, by determining that ASU was the only research or consulting group who was capable of impacting and documenting the system performance of the delivery of construction. Results include (PBSRG, 2011):

1. The General Services Administration (GSA), the largest buyer of nonmilitary services in the United States, Region 6 is adopting the systems solution for their entire region, making it their operating system for delivering performance.
2. Arizona State University (ASU)), the home university of the researchers, is the only major university in the United States to turn over their procurement/delivery system to a research created solution, created at their own university, by construction management experts with engineering backgrounds. The success of the system in prototype tests has convinced the university to replace its traditional process with the PIPS process in the delivering of non-construction services. The implementation of the PIPS process at ASU, has led to a cash payout from the vendors to the University of $100M. This achievement becomes even more dominant, when it is understood that the W.P. Cary School of Business, one of the most highly rated business schools, and home of the worldwide Institute of Supply Chain Management (ISM) group, is located at ASU, and ASU procurement and business services came to PBSRG to solve their system delivery problem.
3. Rijkeswaterstaat (Dutch national infrastructure agency), the national agency of the Netherlands identified that they had a construction industry systems problem. They used PIPS within the constraints of European law and a different (Dutch/European) culture to run 16 test delivering $1B of infrastructure. Their results were staggering, as they were able to deliver the fast-track projects 50% faster than by using their traditional system. Their efforts have led to efforts by their national procurement group PIANOO to introduce the best value PIPS paradigm at their 2011 annual conference, the only topic to have three straight sessions. Their national industry procurement group NEVI (combination of government and private sector procurement professionals) is putting together educational packages, and is considering a certification of consultants.
4. The states of Idaho, Alaska, Oregon, Oklahoma, Arizona, and Minnesota (10% of states in the United States) are testing the process involving millions of dollars of construction and other systems delivery.
5. Universities of Minnesota, Boise State, University of Idaho, Arizona State, and New Mexico State are using the process.
6. One of the largest contractor developers in Malaysia (which is operating in a more underdeveloped culture) is using the best value PIPS and IMT concepts to optimize their operations.
7. The researchers have convinced industry research partners to use the PIPS/IMT process to procure a $200M ERP software implementation and a $30M Department of Motor Vehicles (DMV) system.
8. Delivered a 10 year $400M food services contract, and health care services for four universities and for correctional facilities.

Received the 2005 H. Bruce Russell Global Innovator's Award sponsored by CoreNet Global, and lead researcher has also received the 2009 International Facility Manager Association "Educator of the Year" award for the research/graduate program at Arizona State University. Kashiwagi also received a Fulbright grant for testing the system in Botswana in 2007/2008. PBSRG is also the coordinator of the CIB W117 working group Implementing Performance Information in Construction.

6. Survey to Construction Professionals

There are three major surveys that support the proposed deductive logic. The first was given to contractors. The survey was sent to over 2,000 contractors and had a return of over 14%. The results of the survey included (Erdmann, 2002):

1. The contractors identified the price based system as the problem of the construction industry.
2. The construction industry is losing their expertise.
3. Training is a huge problem.
4. The resources are being misaligned.
5. Designers and the delivery system have become a huge problems.
6. Contractor profit margins are being minimized and risk is increasing.

What makes these survey results so dominant is that the majority of the responses agreed with the issues. Responders who agreed that the problems were dominantly obvious were at 70%, the percentage who agreed was at 85%, and the number who disagreed with the concepts was at 15%.

7. Survey to Design Professionals

The survey to design professionals (over 1,200 surveys sent out and 449 surveys (37% response rate) resulted in similar results. Results included (Child, 2010):

1. The design industry would be far better off to go to a best value environment considering performance and price.
2. The current "qualification based system" is a low price environment.
3. The professionals agree that the industry is relationship based, and not based on capability, but the owners agree that the designers are being picked based on capability and not relationships. The disagreement with the above results show that there is confusion in the industry.

The study also identifies that the performance of the industry is suffering, and the industry is trying to solve the problem addressing technical competency and not recognizing the "systems issue."

8. Survey for Industry Participants Who Are Exposed to Both Solutions

The third major survey was done to clients exposed to both the systems solution and the traditional approach attempting to use the price based system and technical competencies of the participants. The major results of this study include (Kashiwagi, 2011):

1. The systems solution is dominantly better than the traditional approach.
2. The problems are resolved when moving to a systems approach.
3. The alignment of expertise is more efficient than using management, direction, and control.

9. Conclusion

The seamless bureaucracy is a systems problem and not a lack of technical expertise. PBSRG dominant research results, survey results to the construction industry contractors, design professionals, and industry professionals who have been exposed to both the traditional and new systems approach, support the hypothesis that the construction industry has a systems problem. The seamless bureaucracy which is inefficient in resolving the industry issues include the clients and owners, the bureaucratic system of management, decision making, direction and control of experts, and the academic research community who continues to search for a technical based solution instead of a systems solution. This result is based on deductive logic, and observation of dominant results, and not inductive or exploratory research. The authors recommend that the construction management research community address this issue further by exploring the possibility of a systems issue.

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