

AN EVALUATION OF PERFORMANCE INFORMATION PROCUREMENT SYSTEM (PIPS)

Joop van Duren and André Dorée*

ABSTRACT. Since procurement is seen as crucial for project success, many methods have been developed and papers written about this issue. A remarkable contribution in this field comes from Dean Kashiwagi (Arizona State University, USA) who underpins his support for the Performance Information Procurement System (PiPS) with claims of high project performance and client satisfaction. Kashiwagi's explanation for PiPS's effects is based upon a theoretical framework that relates to staff members' ability to deal appropriately with information by making sound decisions based not just on implicit expectation and tacit experience. This is not, however, a satisfactory explanation. This paper provides an overview of New Institutional Economics perspectives which are better able to explain the effects of PiPS. The linking of these theories to innovative PiPS elements clears the path to effectively select and apply PiPS elements within suitable projects in the Dutch construction industry. This will enhance industry performance and is of interest to all stakeholders.

SELECTING AND AWARDING IN CONSTRUCTION MANAGEMENT

Procurement essentially revolves around inviting project offers and selecting the most suitable one. Since procurement is seen as crucial for project success, many methods have been developed and papers written about this issue. However, most projects (over 80% of the Dutch

** Joop van Duren, ing., is Assistant Professor, Department of Faculty of Facility Management, Zuyd University, The Netherlands. André Dorée, Ph.D., is a Full Professor, Department of Construction Process Management, Faculty of Engineering Sciences, University Twente, The Netherlands. Van Duren's research interests are in innovative tendering. Dorée's research interests are in markets and organisations in construction industry.*

construction industry) are still being tendered in the traditional manner: design, bid, and make selection according to lowest bid.

The client then hires designers and engineers and the whole project is elaborated in detail, including estimated cost, quality and appearance. After this preparation and specification stage, contractors can provide quotes for what they are likely to charge. Once the winning contractor is selected, an adversarial relationship between client and contractor often develops. The client tries to force the contractor (who may lack the opportunity to utilise the latest know-how and experience) to act in a particular way, while the contractor tries to make a profit despite the low margins due to the lowest price selection. This means the contractor actively seeks opportunities to charge for extra work. In other words, in this contractual arrangement there is no alignment of goals; the relationship has more to do with competition than cooperation. This leads to cost blowouts, delays and dissatisfaction for both client and contractor.

A growing number of publications show that there is a great potential to increase the quality of tender processes and project results. The economic and environmental interests are evident; there is also social economic relevance to increase performance, avoid overspending and time-wasting, and to cooperate in order to create a high-value built environment with concurrent price/quality ratio. Therefore, it comes as no surprise that an increasing number of authors are addressing the issue of innovative procurement methods. Many publications promote integrated project delivery schemes (e.g., turn key and design-built), and propose selection on quality-based criteria rather than just low-bid (Barret, 2007; Courtney, 2004; Fernie, 2006). Another trend involves the consideration of past performance as a selection parameter.

Parallel to this, Dean Kashiwagi (Arizona State University, USA) is promoting an approach he calls PiPS (Performance Information Procurement System), and claims outstanding results in project performance and client satisfaction (Kashiwagi, 1996, 2001, 2002).

In the literature on procurement systems, the effects and outcomes of different arrangements are often explained from economic or socio-political perspectives. Behaviour is explained in terms of goal seeking, motives, gains, risks, rewards, costs and value phenomena such as power and interests. Kashiwagi ignores these mechanisms. For him, PiPS follows a "different logic". He maintains that success is not produced by

economic or socio-political intentions, but can only be explained by Information Management Theory (IMT) and the Kashiwagi Management System (KMS). The main elements and essentials of IMT/KSM: This theoretical framework relates to staff members' ability to deal appropriately with information by making sound decisions based not just on implicit expectation and tacit experience. We feel that both IMT and KMS are relevant for understanding the apparent PiPS successes, but certainly not sufficient.

In this paper we first examine the PiPS method and the claims made about it, as well as the explanations given by Kashiwagi. We then analyse the American PiPS projects, followed by the PiPS method used in four Dutch pilot projects. We discuss Kashiwagi's assumptions, logic and explanations for its success. In doing so we relate PiPS to more mainstream ideas from the field of procurement (especially the framework of New Institutional Economics).

PERFORMANCE INFORMATION PROCUREMENT SYSTEM (PIPS)

PiPS is a procurement method that aims to select the most suitable contractor for the job, to spur this contractor on to highest performance, as well to reduce the client's management and control tasks (Kashiwagi, 2001, 2003, 2006). It was developed and introduced by Dean Kashiwagi at the Performance Based Studies Research Group of Arizona State University, USA (www.pbsrg.com). He started his research in 1994 and continually 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. He has now applied PiPS over 400 times. Its method exists of six steps, each built around a specific "filter", which focuses on a different element to separate high from low performers. Four filters are employed to select the best contender, while two are related to project control.

For further analysis it is essential to understand the method. Therefore, the next section of this paper explains the PiPS method; afterwards, we discuss the claims and the explanations given by Kashiwagi.

The PiPS Method

To get the best results one should first select the highest-performing contractor and have him work to the best of his ability. To select the best contractor, this procurement method treats past performance (“P”) as an important indicator to assess whether the contractor is likely to be successful. Does he have the necessary experience and expertise; is he aware of the complexity of the project, etc? Selection decisions should be made rationally, explicitly and based on sound information.

The “i” in PiPS refers to the focus on information: for Kashiwagi, systematic information gathering and processing is key. To start with, the contractors must provide the necessary information about past performance to express their suitability for the required functionalities according to controlled criteria. Similarly, once the project goes ahead, information gathering and processing is the key to control.

The second “P” stands for procurement; this has to do with selecting and contracting the most suitable party, taking into account price/performance ratio. Finally, the “S” stands for System, which is based on a structured approach in various stages, leading to contractor selection based on careful consideration of both performance and cost.

As stated above, the PiPS method uses six filters. Each filter aims to reduce risk for the client. The first filter has to do with past performance information. Contractors ask former clients to give performance ratings on delivering within budget, planning and meeting the client’s expectations. The second filter is about risk assessment plans and interviews. The contractors indicate the project risks as they see them, and establish how they will minimise and manage these risks. Key personnel are interviewed on their insight into the project, experience, capability to cooperate and communication skills. The third filter focuses on price/quality ratio; the project approach and plan are assessed and related to the price put forth by the contractor. The fourth filter is the last in the pre-award phase. At this point all details concerning risk sharing, planning and quality management are worked out. The fifth filter consists of gathering performance data during the construction stage. Finally, the sixth filter concerns post-construction rating; when the project is delivered, the client provides a final score. Based upon the established performance level, a strong rating leads to an advantage in the next tender process, while a poor rating entails a disadvantage.

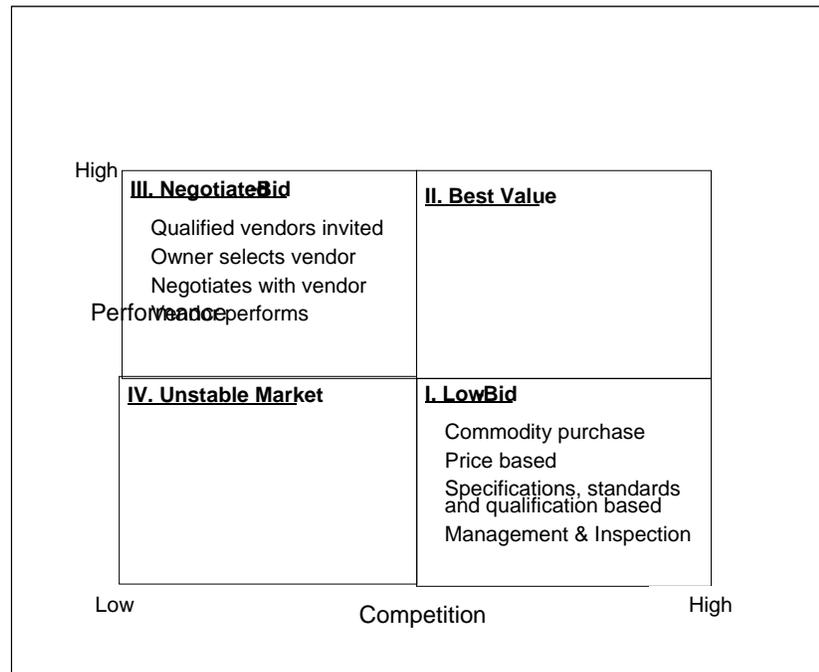
PiPS Is Expected to Raise the Industry Standard

Like many other authors on procurement in construction, Kashiwagi wants to move away from the traditional selection of contractors according to lowest bid. While this creates a high level of competition, it does so without raising performance level.

According to Kashiwagi, industry has to become more performance based. He calls this type of selection "best value" procurement (see Figure 1). Kashiwagi developed PiPS to tender and manage "best value" projects in the construction field.

Although PiPS can be applied to contracting based on finalised drawing and bills of quality, Kashiwagi believes PiPS will be more

**FIGURE 1
Industry Structure**



Source; Kashiwagi (2004, p. 4-3).

effective when working with functional specifications and a fixed budget. Functional specs present high performance contractors with a better challenge to maximise value and reduce risk for the client.

In a PiPS tender, contractors face a real challenge to come up with clever and inventive solutions for the realisation of the requirements. Thus, contractors will be spurred on to produce solutions that can compete not only in terms of quality but also cost.

Contractors are also asked to indicate which risks they see in implementing the project, as well as the solutions, strategies and remedies to deal with them. According to Kashiwagi, “This really separates high performers from low performers.” (Kashiwagi states this claim at several conferences and papers. See Best Value Conference 2005 PBSRG. Maxey, E., D. Kashiwagi, and J. Savicky COBRA (2003): 443–55.)

Another typical feature of PiPS is that during the tender procedure it must be established which project leader (who will be interviewed, which invariably influences the final ranking) is to be responsible for the project’s implementation. The client thus has every opportunity to determine whether the project can safely be left to a leader with solid vision and enough influence and experience to succeed.

Summary of PiPS essentials

PiPS can be described as a predominantly information-based system which makes predictions about expected result based on performance. Bullet wise, it involves the following steps.

- Defining the project in terms of functional scope and challenge contractors to deliver clever and “fit for purpose” solutions;
- Giving the contractors insight in the maximum budget for the required functionalities, and challenging them to offer maximum value for money;
- Collecting and using information about contractors’ past performance;
- Creating a process to rank contractors and select the top performer based on past performance, current capability, price, risk management and quality of key personnel;

- Transferring responsibility for minimising and managing project risks to the contractor;
- Allowing the contractor to manage his own performance, based upon the minimised risks;
- Monitoring the contractor's performance from a certain distance, using the supplied weekly risk number reports; and
- Awarding the contractor a post-construction rating that influences future chances within tender processes.

Legislative Boundaries

However, European tender rules and laws do not allow the integrated application of PiPS as described above. There is a certain friction between the tender principles (non-discrimination, transparency and objectivity), and:

- the six PiPS filters that do not separate the selection and awarding stage;
- the relative scores as set out by PiPS (a contractor's score depends on other tenderers' scores);
- the focus on past performance information, which gives market entrants a disadvantage; and
- the post-construction rating, which conflicts with the non-discrimination principal.

The various PiPS elements, however, can be applied separately. Specifying the project with a functional scope and giving information about the maximum available budget can be done in any case. Paying heed to past performance and the quality of key personnel can be carried out within the selection stage. Similarly, contractors can be asked to provide a risk assessment plan within the awarding stage. Thus, there remain certain possibilities to apply certain PiPS elements within Dutch industry in order to improve tender processes and project results.

How Successful Is this PiPS Approach?

Kashiwagi is no doubt proud of his PiPS method: he claims success rates superior to other procurement methods both on client satisfaction and project control measures, and provides figures and statistics to support this. Furthermore, Kashiwagi claims in several papers (2001,

2003, 2004, 2006) and his “Best Value Procurement” book), that PiPS positively affects management load and the efficiency and clarity of decision making.

In this section we first examine Kashiwagi’s apparent successes. We then report on a study that investigated these claims by way of information available on a part of the USA PiPS projects, and evaluate a number of PiPS pilots in the Netherlands. First, though, we analyse the figures and claims put forth by Kashiwagi and the PBSRG. Stated PiPS claims (Kashiwagi, 2004, 2006):

- 98% of all PiPS projects are on time and on budget,
- 98% of PiPS project meet the client’s expectations,
- Reduction of management effort on the client’s side of up to 80%, and
- More value for money for the client; more profit for the contractor(s).

Are the PiPS Success Claims Justified?

To answer this question, Andries van Bentum researched the 400 tendered USA PiPS projects. In February 2005, Van Bentum, two project leaders from UMC St Radboud’s housing department and the author of this paper visited Arizona and participated the annual, four-day Best Value Conference at Arizona State University. We also met privately with Dean Kashiwagi and his staff member John Savicky to discuss the PiPS method and its results, and asked for additional explanations; in addition, PBSRG allowed us to analyse the available data for the 400 PiPS projects. Besides these analyses, a questionnaire was sent to a (small; n=19) selection of clients and contractors who worked with PiPS. The combination of information gathered at the conference, from Kashiwagi himself, the clients and contractors, and the PBSRG data led to the insights concerning the PiPS successes that we discuss in this section.

Apart from assessing the US projects as mentioned above, we also applied PiPS within three technical maintenance projects (worth approximately €600K) for UMC St Radboud in Nijmegen, the Netherlands. In these tender processes we applied the PiPS method in full. We trained contractors and established criteria, weight factors, score models and so on. We assessed past performance information, risk

assessment plans, key personnel, prices and the quality of the solutions. Detailed information about these tenders is available.

We also applied some PiPS elements in the tender process for the design, engineering and building of a parking garage for approximately 630 cars (worth approximately €200K) for the same client. In the next section these findings are compared to Kashiwagi's claims.

ON TIME, WITHIN BUDGET?

Kashiwagi's claim: 98% of the USA projects were finished on time and within budget (Kashiwagi, 2001, 2002). The US assessment pointed out that until 1998 most of the 400 projects were rather small and one-dimensional (e.g., re-roofing or painting jobs as opposed to, e.g., renovation projects involving construction and technical installations as well as interior decoration and so on). Since 1998 also larger and more complex projects have been tendered using PiPS. A few examples:

- University of Utah Phase II (48 million US dollars),
- Reconstruction Nimitz highway Hawaii (5 million US dollars),
- University of Utah, building of gymnasium (17,3 million US dollars),
- Georgia Institute of Technology, Environmental Science and technology Building (45 million US dollars), and
- Nadaburg ESD School (7,7 million US dollars).

Of the clients who worked with PiPS, 93.5% indeed stated that the project was delivered on time, while 96.7% stated that the project was delivered within budget.

In the US projects, 91% of the clients stated that there were no charges for extra work. The pilot projects we processed in the Netherlands underline this: no work is being charged other than that initiated by the client. The maintenance projects and parking garage were delivered on time and within budget. The parking garage was awarded to a contractor whose price was 12% under the maximum budget. All the Dutch pilot projects are delivered and evaluated. The documents are filed and the books are closed. It is highly unlikely that the contractors will still put in claims for extra work.

Better Quality

Kashiwagi's claim: 98% of the projects meet the client's expectations (Kashiwagi, 2001, 2002, 2004). In the US, 93.9% of the clients awarded the contractor's performance with an A or B (>8 on a 1–10 scale); 94% would hire the same contractor again. Contractors indicated their appreciation of the focus on quality instead of lowest price.

The Dutch pilot projects all met the clients' expectations. In one maintenance project there were some difficulties in achieving the established performance levels, but the contractor solved this problem without issue. The parking garage is a financial, functional and architectural success – it can, in fact, hold 10% more cars than the number required.

Eighty Percent Less Management Effort for the Client

Kashiwagi's claim: the client's management effort can be reduced by 80%. During the Best Value Conference (February 2005), a figure of 40% was also mentioned. The US research shows that many clients in fact achieved a much smaller reduction; Kashiwagi's claim of 80% seems overly optimistic. Still, two out of three agreed that there is less monitoring and inspection effort.

Within the maintenance pilot projects in the Netherlands we did not see a reduction of clients' management effort. This can be explained by way of the learning effects; PiPS was brand new for the clients and contractors' representatives. In addition, in terms of project characteristics, small projects do not provide the opportunity during the construction stage to earn back the extra time invested in the preparation stage (the selected maintenance pilot projects were too small). Some projects call for the client's involvement because of intensive interfaces between the project and ongoing business. Thus, because of the project characteristics, a substantial reduction of management effort did not occur within the first few pilot projects.

The tender process of the parking garage however, was very efficient. After awarding the tender there were some extra demands from client's side which called for extra coordination time on his part. The project leader indicated that apart from these extra demands, the whole project progressed very efficiently.

Client More Value for Money, Contractor More Profit

Kashiwagi's claim: "best value" PiPS projects offer the client more value for money, whilst the contractor can also profit well (Kashiwagi, 2001, 2002, 2004, 2008 on <http://www.pbsrg.com/pips/testimonials/index.html> viewed April 18th, 2008). In the US, 94.1% of the clients (NB: only 17 clients have been assessed on this point, so the evidence is inconclusive) state that they selected a better contractor using the PiPS method compared to experiences with traditional tendering. They also state that this leads to better cooperation and more efficiency. At the same time, 100% of the clients stated that they would use PiPS again indicating that their expectations were fulfilled.

The US contractors (NB: only two have been interviewed, so the value of these statements is marginal) stated that the PiPS-tendered projects allowed them to make good margins. This allows them to spend enough money on safety and workman training; thus, PiPS tendering contributes to the professionalisation of the construction industry.

The maintenance projects brought the UMC St Radboud in the Netherlands clever solutions and good workmanship. However, there is no information available on the margins achieved by the contractors.

In the parking garage project in Nijmegen, we applied some PiPS elements: selecting a contractor for the design, engineering and construction of the car park. The client indicated that one of the clear results of the tendering procedure was better value for money: the contractor selected proposed to build the parking garage for 10% more cars, for 88% of the maximum available budget.

What Conclusions Can Be Drawn as to the PiPS Claims?

1. PiPS projects show significantly better results regarding time and budget compared to traditionally tendered projects. The 98% claim seems rather too positive given that it partly concerns small and relatively simple projects. Recent information on www.pbsrg.com, however, shows that the amount of large and integrated construction projects is increasing while the results PiPS claims are maintained on the same level.

2. Within traditional projects there is something of a custom of charging for extra work. PiPS tenders show that charges for extra work from the contractor's side are exceptional.
3. PiPS clients are substantially more satisfied (A or B on a 1–10 scale = >8) about contractor performance than was indicated in 2005 and 2006 by the EIB (Dutch organisation for applying economic research in the construction industry). The average scores for satisfaction with contractors' performance is a D (6.8 on a 1–10 scale).
4. Contractors rise to the challenge offered by clients to deliver creative solutions with extra value.
5. Within suitable projects of a certain minimum size, a reduction of client management effort is possible; however, a reduction of 80% seems to be a rather too-high estimate.
6. PiPS tenders lead to more value for money for the client, while more profit for the contractor cannot be concluded as evidence-based. Still, the indications from this research tend to point in the same direction.

SO WHY IS PIPS SO SUCCESSFUL?

Kashiwagi's Rationalisation of PiPS's Successes

Kashiwagi's explanation for the effects of this method is based upon information management theory and the Kashiwagi solution model. This has to do with staff members' ability to deal effectively with information and make sound decisions based upon expectations and experience. In this section we examine both frameworks and conclude that additional explanations are needed to explain certain behaviour and the increased cooperation which led to better project results.

Information Management Theory (IMT)

IMT states that an event shall only occur in one way, which is determined by a number of initial conditions and laws (Kashiwagi, 2004, page 2 – 3). The number of laws is constant; laws are discovered, not made. The more relevant the information you have *and* use, the better the outcome of an event can be predicted. The less information you have and/or use, the more decisions you have to make. Making decisions

brings with it the risk of poor decision making. Although this seems to be a paradox, when more sound information is available and being used, fewer decisions have to be made. As Kashiwagi (2005, Best Value Conference) explains, “IMT can be defined as: a deductive, logical explanation of an event. It includes the use of relative and related data, to create information that predicts the future outcome of an event.”

To Kashiwagi, the processing speed of procurement officials is a very important issue. Officials capable to process information very quickly and effective are being called “information workers”. They gather and use more relevant data, and process it more quickly. This is an important advantage in an information environment such as PiPS. Kashiwagi (2004, Best Value Procurement, 2 – 6): “In addition (...) the author suggests that, when an individual is constrained by a slow processing speed, he or she is unable to see readily available information, and is forced to use his or her database of past experience, or incomplete information, to form expectations of future outcomes.”

Kashiwagi Solution Model (KSM)

KSM separates type A, B and C people. Type A possesses high-speed processing skills, type C slow processing skills, and type B average. Type A people are typical information workers as defined by Kashiwagi (2004). Information workers:

- have and use more information;
- have high-speed information processing abilities;
- are more focused on win-win situations;
- show more leaderships (rather than management) skills; and
- create value instead of reducing it.

Kashiwagi clarifies the PiPS effects and results with these two frameworks. According to him, the main reasons for PiPS’s success are:

- More information equals more predictability and fewer risks. PiPS is designed to generate and provide a structured information environment.
- People differ in their capacity to process information and manage projects. PiPS is designed to select and stimulate high performers.

Are IMT and KSM Adequate Explanations?

Although Kashiwagi sees IMT and KSM as the key to PiPS's success, we feel there must be more. "Good people and good information" is not enough to explain "good" action and PiPS's apparent successes. Kashiwagi overlooks and ignores the fact that client and contractor are contractually tied into an economic relationship. Since budget control is one of the performance criteria, and risks are expressed in dollars and distributed amongst two parties, economic principles most come into play.

Apart from the use of more relevant data and the faster processing of it, our expectation is that other mechanisms influence people's behaviour and cooperation. Since both clients and contractors take part in economic business when tendering a project, we suggest that economic theories could give a broader and more scientific explanation for the working of PiPS.

CLARIFICATION BASED UPON NEW INSTITUTIONAL ECONOMICS

First we give a brief overview of the most relevant theories. Afterwards, we link the mechanisms from these theories to the PiPS claims.

Theoretical Overview

New institutional economics (NIE) contains a set of up to date and acknowledged theories that fit to tender processes (tendering can be described as the organisation of a transaction), and describe and clarify useful mechanisms that contribute to project results. The dominant theories are transaction cost economics (TCE), the property rights theory and the principal/agent theory (Kim & Mahoney, 2005).

TCE focuses on transaction plus production costs being as low as possible given a demanded quality level. Transaction costs include all those concerning finding, evaluating, selecting, contracting, planning, inspection, sanctioning, monitoring, bonding, dealing with conflicts, inefficiencies due to misunderstandings, interfacing problems and risks (Williamson, 1985).

In NIE, the most important published works are from Coase (1937), Simon (1945), Williamson (1975) and Nooteboom (1993). Dorée (1996; Boes et al. 2002; Dorée et al., 2003) applied TCE to contracting issues in the construction industry. Essentially, given bounded rationality, opportunism and uncertainty and the characteristics of a transaction (specificity, frequency, uncertainty), there will be predictable problems for all parties to deal with. NIE offers some mechanisms to manage these problems.

Classical and neo classical contracts try to arrange all possible future eventualities. When contracting large and complex projects this is a hell of a job and brings in enormous transaction costs. Given bounded rationality it even is a mission impossible. Therefore NIE introduces the perspective of relational contracting (Macneil). These types of contracts focus on the relationship between parties and contain a set of rules including safeguards to cover main risks. Relational governance appropriately aligned with transaction dimensions leads to enhanced performance (Geyskens et al., 2006)

Another issue is the transfer of risks, based upon the property rights theory (Coase). If a contract party owns a risk, he or she will act differently, compared to the situation that someone else is risk owner. Conscious transfer of risks contributes to the alignment of goals. Goal alignment increases corporatism. Increased corporatism contributes to better project results and the reduction of transaction costs.

The principal/agency theory (Jensen & Meckling, 1976) states that the information asymmetry between client and contractor should be balanced. If there is too much unbalance, the client is not able to assess the behaviour of the contractor. In that case the client does not know whether the contractor is acting opportunistic or not. This brings in uncertainty; increases transaction costs and can turn into an adversarial relationship.

Opportunism is a central issue in the research of transaction costs (Williamson, 1985). Opportunism matters when transaction specificity is high. Opportunism is being seen as the most important factor that leads to increasing transaction costs (Stip, 1995). The inclination into opportunism will be decreased when the alignment of goals between client and contractor is more obvious. This makes behaviour more predictable and more cooperative.

Applying these mechanisms will reduce transaction costs, promote cooperation and lead to better results for both the client and the contractor(s) (Williamson, 1985; Dorée 2001; Geyskens, 2006). Thus, according to NIE, it is vital to organise the tender process and project management in such a way that:

- opportunism is discouraged: opportunistic behaviour increases the need for inspection and control and disturbs goal alignment;
- uncertainty is reduced: uncertainty means risk. If risk can be minimised, transaction costs are reduced as is the inclination to opportunism. Risk transfer to the firm most capable of managing risk is a powerful tool here;
- bounded rationality has minor impact: project scopes and contracts cannot foresee all possible contingencies and people cannot oversee all eventualities. Not all information is available – and in any event, it is costly to gather “all” information. It is thus important to select only relevant data, and create contracts that anticipate this; and
- trust between client and contractor is encouraged: wherever there is more trust, the inclination to opportunism decreases along with the need for inspection and control, and there is a better base for cooperation. Economic relationships based on trust are very efficient.

Can NIE Explain PiPS’s Effects?

NIE-based explanations of PiPS’s success should explain how PiPS counters bounded rationality, decreases the inclination to opportunism and reduces uncertainty. These mechanisms are the focus of this section.

Reduction of Uncertainty

The PiPS method reduces uncertainty because the filters exclude contractors that bring in project risks. Facts and figures are available, which contributes to objective- and result-oriented project management. Contractors can distinguish themselves on quality. The quality focus influences the competition and reduces risks and failure costs. Contractors are involved within PiPS projects. They bring in *their* solutions in an early stage. High performance (past and current) leads to strong ranking; so contractors are triggered to deliver good workmanship on time within budget. The better prepared and experienced contractor reduces the likelihood of unforeseen events and subsequently uncertainty.

Sharing information with participants about the maximum budget reduces the risk of overly expensive solutions.

The Inclination to Opportunism Reduction

Contractors know that price counts for example for 30% and quality for 70%. This means they are aware of the fact that a good solution with a higher price can compete with the cheapest solutions. So they can count with fair margins, good materials and workmanship. A “healthy” margin can be made; this reduces the inclination into opportunism. Contractors construct their own solutions instead of using solutions developed by others, which results in stronger commitment; this discourages opportunism. Sharing information about the maximum available budget with the contractors allows them to maximise value for money by finding solutions that fit the budget and give the best affordable quality whilst quality is the dominant factor in the competition. Using Past Performance Information (PPI) contributes to the predictability of the tender process and the project result. Contractors are spurred on to continuously improve their image of good quality and workmanship. Opportunistic behaviour does not fit into this mindset.

Bounded rationality is countered

PiPS only uses relevant data and translates it into objective numbers. This increases objectivity, counters bounded rationality and decreases transaction costs. After awarding PiPS controls the construction process with weekly facts and figures; efficient monitoring contributes to decreased transaction costs and counters bounded rationality-

What Can Be Concluded as to Explanatory Power?

In Table 1, we compare the explanatory power of IMT and KSM with that of NIE. As we can see in the table, NIE provides a more explicit and broader explanation of more PiPS elements and effects than do IMT and KSM. Even in this general table where the claims are not linked one on one to the different elements, and the IMT and KSM isn't yet being linked one on one to the claims and effects, it becomes clear that the explanatory power of PiPS overrules IMT and KSM's power in this field. It appears that the decreased uncertainty, dealing with bounded rationality and the decreased inclination to opportunism brought about by PiPS comes from mechanisms other than just better and quicker information processing and thereby the use of more relevant information by individuals.

TABLE 1
Explanatory Power of IMT and KSM with That of NIE

<i>PiPS Elements</i>	<i>Effects</i>	<i>Claims</i>	<i>Kashiwagi Explanation</i>	<i>NIE explanation</i>
Functional Scope	Allows contractor to offer clever solutions based on strengths and recent experience	98% within planning and budget Less mgmt effort for client	IMT & KSM	Challenges contractor, increases involvement, decreases opportunism and transaction costs
Focus on quality and price (usually 70/30 ratio)	Allows contractor to make good margins and utilise better workmanship	More value for money for client		Decreases inclination to opportunism, increases goal alignment Triggers contractors to distinguish themselves in terms of value
Information about maximum available budget	Allows contractor to offer best-value quality	More profit for contractor		Decreases information asymmetry, transaction costs
Past performance information	Allows indication of expected performance level based on proven performance	Charging for extra work is an exception More facts and figures available		Increases predictability of tender process; counters bounded rationality; reduces transaction costs because contractors with bad PPI rates do not pass first filter
Risk	Separates			Gives insight into

<i>assessment plans</i>	high from low performers, reduces risk	Risks minimised Lower transaction costs		project risks and contractors' capability to manage them; thus contributes to decrease in uncertainty Also counters bounded rationality
<i>Interviewing of key personnel</i>	Key personnel are no longer anonymous; workmanship and relevant personal skills can be assessed			Reduces uncertainty and inclination to opportunism; increases cooperation; counters bounded rationality
<i>Risk transfer when awarding</i>	Contractor triggered to manage risks			Makes contractor risk owner
<i>Construction ratings</i>	Weekly performance data available			Counters bounded rationality, reduces transaction costs
<i>Post-construction ratings</i>	Contractor stimulated to deliver high performance			Reduces opportunism, uncertainty; high performance contributes to future professionalisation

CONCLUSIONS

PiPS is a well-structured procurement method. Though not well known, it has been developed and applied over ten years. The PiPS success claims are justified, but not to the extent published by Kashiwagi. His "different logic" does not bring with it enough explanatory power to

explain all the effects. When examined more closely, PiPS does not, in fact, work according to a “different logic”. The mechanisms and inner workings of PiPS follow the logic of NIE far better than IMT/KMS.

In terms of the Dutch goal of revaluing construction initiatives (that is, more focus on quality and integration in the building chain, better cooperation, harmonisation of relationships between clients and contractors, and a foundation of trust) we see clear alignment with PiPS's effects and claims. Thus, PiPS can contribute to the changes aspired to by the Dutch construction industry as well as bring in added value, though the boundaries brought about by legislation need consideration. The added value consists of better project results (more projects within planning, budget and clients' expectations, more value for money) and cooperation.

Contractors appear to embrace the challenge to find clever solutions as a way of distinguishing themselves. Within a PiPS tender, then, contractors compete on quality, which contributes to the professionalisation of the construction industry. In addition, PiPS creates an environment that focuses and encourages the alignment of goals and gives a real boost to cooperation.

In light of these effects, it is our strong belief that applying PiPS elements in the Dutch construction industry can contribute to industry performance and is of interest to clients, engineers, (sub)contractors, end-users, policy makers, the built environment, and ultimately the whole of society.

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