

A study into the use of on-line tendering and e-procurement in the construction procurement process

Pauline Corbett

Senior Lecturer, School of Engineering and the Built Environment,
University of Wolverhampton, UK

Rodney Moulder

Area Manager, Turner and Townsend Cost Management, Birmingham, UK

Abstract

The emergence of web-enabled software has derived as a response to the construction industry's need to drive towards more efficient processes. The purpose of this study is to investigate and establish whether adopting a method of tendering on-line will improve efficiencies in the tendering processes, resulting in time and cost savings at the tender stage of a project.

Case Studies were carried out to identify and compare the processes involved in: 1) tendering on-line, via a specialist service provider and 2) tendering traditionally, via post, fax and telephone. A questionnaire survey of quantity surveyors and contractors was also undertaken to provide an insight into their experiences and perceptions regarding the use of on-line tendering.

Findings suggest that tendering on-line has the potential to reduce the amount of time taken and costs incurred over traditional methods. The amount of cost savings achieved seems to be dependant upon the specific project details, whereas the time savings appear significant regardless of project type.

The future use of on-line tendering is difficult to predict. The results suggest that the barriers for the adoption of on-line tendering reflect the barriers faced by the construction industry generally when embracing new technology, which mainly comprise issues relating to people, cost and technology.

Keywords

On-line tendering, e-procurement, construction procurement.

1.

1. Introduction

The production and distribution of tender documents can be an extremely laborious and costly exercise. Nonetheless, tender submissions are viewed as necessary evil of the procurement process (Witt, 2001). Advances in technology and web-enabled software have made it possible to conduct tendering on-line as opposed to using more traditional methods. The intention is not to re-invent the tender process but to provide an alternative method to make the process more efficient.

On-line tendering, or e tendering as it is often referred, allows a construction team to communicate tender information to pre-selected prospective contractors on a shortlist via a secure site on the Internet. The contractors can then visit the site and download the tender information. Once the contractor has prepared the tender sum, the tender documents can be 'posted' back on to the secure site. Adopting this method of tendering strives to improve efficiencies in the communication, security and administrative elements of the tender process for both tender controller and bidder.

Some service providers also offer an auction facility, called reverse auction bidding. Once the tenderers have posted their quotes to the buyer, the buyer can invite selected tenderers to join in the auction where they can bid against each other. Once the time has elapsed the buyer selects a preferred bid. This method of tendering has encountered some opposition, who argue that the auctions diminish the collaborative spirit and price over value for money (Hampton, 2001) and undermine Egan's principles of partnering and best practice (Broughton, 2001).

On-line tendering, as well as other project collaboration tools, can boast the support of the Construction Task Force Chairman, Sir John Egan. Egan's 1998 Rethinking Construction report had the principle aim of bringing about change and improvement in the UK construction industry, often seen as consistently underperforming. Egan's report highlights the need for the industry to rethink the process through which it delivers its projects with the aim of achieving continuous improvement in its performance and products (Egan, 1998). Egan became the Chairman of Asite in April 2001, and said 'the portal, whose shareholders include Mace, Stanhope and BAA, could help instigate the changes to the sector that he recommended in Rethinking Construction' (Clarke, 2001 a). The UK government has also shown that they are determined to do business on-line. The Labour Party committed government departments to 100% electronic tendering by December 2002 (Anon, 2002). Although the target was not reached it can be seen as a positive step towards making changes in order to improve efficiencies in processes.

The purpose of this paper is to investigate and establish whether adopting a method of tendering on-line will improve efficiencies in the tendering processes, resulting in time and cost savings at the tender stage of a project.

2. The Reported Benefits of On-Line Tendering

The reported benefits of tendering on-line, sourced from companies (Asite, 2004; Buildonline, 2004, Eu-supply, 2004) whose main objective is to promote and sell their tender tool products, are that on-line tendering:

- 1) Speeds up the end-to-end process of tendering from initial tender bid to tender award, by automating the tender distribution of documentation and bidder communications.
- 2) Reduces the manual overhead associated with preparing work packages for bidders by registering them on-line, and distributing work packages electronically
- 3) Cuts down the cost of document copying and distribution by submitting electronic versions of bid documents online.
- 4) Drives bidder compliance to a common tendering process and common templates, making it easier to evaluate the responses.

- 5) Improves tender management by improved visibility of and commitment to deadlines with bidders
- 6) Maintains complete confidentiality of all parties' work in progress with a sophisticated security mechanism, which mirrors the off-line 'sealed bid' process.
- 7) Simplifies and saves time in the bidder comparison and evaluation process.
- 8) Quickly and easily inform all parties of any changes and issues as they occur, reducing communication time.

2.1 Construction Innovation

By and large, the construction industry has been slow to adopt new technology and new methods of working, considerably behind other innovative industries. In the year 2000 the construction industry was set to take a giant leap onto the internet and technology experts promised that ecommerce will change the business world (Anon, 2001). However, by early 2001, e-commerce was reported to have 'crashed to earth' and construction 'had taken a wrong turn in cyber space' (Clarke, 2001 b).

Even though construction may be making slow progress on the information superhighway (Fairs, 2002) it is not all doom and gloom; this is a barrier, which can be overcome. If the principle is taken that construction is a slow-moving industry and cannot embrace technological upgrades overnight (Barrick, 2002) it is possibly a safe assumption that the shift to e-construction, and on-line tendering, will take a matter of years as opposed to months to embrace.

People may provide a barrier for the implementation of new technology. There will be cultural issues that will need to be addressed; some people will welcome the change with enthusiasm and acceptance whereas others may not be so forthcoming. According to Mustafa and Bingunath (2001) traditional practices such as requiring written confirmation of the receipt of drawings is still commonplace in the construction industry. Although this may seem an insignificant change, it highlights how people can be opposed to slight deviations in day-to-day duties.

Insufficient training can also lead to problems when implementing new methods of working such as on-line tendering. The need for training is highlighted by Mark Dodds, Senior Manager of Microsoft, who believes that construction has been fairly slow to adopt IT because it is not being used properly and giving people technology and then not training them is a waste of money (Fairs, 2002).

Further there are several legal issues, which should be considered with the implementation of on-line tendering. It has been advised to take care when embarking on the selection and the use of e-construction tools, to try and guard against being caught out if an IT system fails, so until the legal situation is confirmed in the respect of the exchange of legally binding documents, such as forms of tender, it will continue to undermine full implementation of e-tendering (Westcott, 2003).

Additionally problems have been reported regarding incompatibility between the parties' hardware and software when exchanging information. These occur when team members possess different degrees of IT sophistication. In some instances this can be resolved by members reverting back to earlier versions of the software to be in line with the rest of the team. However, it is not always

that simple, as highlighted in an experiment into paperless construction (Pearson, 2002). They discovered a problem with the compatibility of the different software used by the consultants. The Architect used Microsystem as its design tool, which at the time was incompatible with AutoCAD – the software that the rest of the design team was using. This meant that they were unable to use CAD on the project.

3. Research

As traditional tendering methods are most predominantly used it was sensible to compare the traditional method of tendering with on-line methods. Case Studies were considered an appropriate approach, as they would enable the collection of data observed first hand from ‘live’ projects. This data could then be used to make direct comparisons between the two methods of tendering.

3.1 Study sample and procedure

Using projects available to the Authors, two Case Studies were carried out. The project selected and analysed in Case Study 1 was approximately £2million and made up of 42 different work packages. The project selected as Case Study 2 was a much smaller and simpler project with an approximate value of £200k. Both of the projects were at tender stage and were being tendered using traditional processes and methods.

To establish whether on-line tendering leads to improved efficiencies in the tender process, it was important to identify the processes involved in both methods of tendering. This was also necessary so a time and/or cost implication could be placed against each process to form the basis for comparison. The subsequent analysis of the two projects identified generic headings of the traditional tender process. The processes were refined to the following headings indicated in Table 1; each heading is accompanied with an explanation to how a time and/or cost implication were calculated.

Table 1: Traditional tender activities and implications obtained from case studies

Traditional tender activity	Time measure	Cost implication
Printing documents	Time taken to print documents was measured and recorded	Labour cost calculated by the time it takes to print documents X charge out rate paid
Photocopying	Time taken to photocopy documents was measured and recorded	Labour cost calculated by the time it takes to photocopy documents X charge out rate paid
Binding	Time taken to bind tender documents was measured and recorded	Labour cost calculated by the time it takes to bind documents X charge out rate paid
Postage to contractor	Time taken for documents to reach tenderer	Costs of postage e.g. post or courier
Return Postage	Time taken for documents to reach QS	Costs of postage e.g. post or courier

Amend tender period	Time taken for amendments to be issued and acknowledged	Labour time is calculated by the time taken to make and communicate the amendment
Tender analysis	The time it took to set up a spreadsheet to compare and analyze returned tenders	Labour time is calculated by the time it took to set up the spreadsheet, multiplied by the charge rate paid by the Client

Once the project details had been established, such as number of tenderers, types and sizes of files etc, it was possible to mirror the project as if it had been tendered on-line. In order to do this a meeting was set up between the Co-Author and the Managing Director of a company who have produced a tool for tendering on-line. The meeting provided an insight into the necessary processes involved in tendering on-line.

The time and/or cost implications were calculated using the demonstration function on the e-tendering collaboration tool. This function enabled listing of the processes involved and to calculate a time and/or cost implication as achieved in the instance of the traditional tendering method. The processes were refined to the following headings indicated in Table 2; each heading is accompanied with an explanation to how a time and/or cost implication were calculated.

Table 2: On-line tender activities and implications from case studies

On line tendering	Time measure	Cost implication
Cost of using system		
Training and setting up	Time taken to set up the system for specific project	Training costs
Time to upload documents (QS)	Time taken to load documents onto the site	Labour cost is calculated by time taken to load document to site X charge out rate
Time to download documents	Time taken for tenderers to download documents once they were on the site	
Time to upload documents (Contractor)	Time taken for tenderers to upload documents to submit tender	
Amendments in tender period	Time taken to receive amendments	Labour cost is calculated by time to make amendment X the chargeout rate paid
Tender analysis (set up)	Time taken to set up a spreadsheet for comparison of tenders	Labour cost is calculated by time taken to prepare spreadsheet X charge out rate paid

The use of case studies therefore provided a list of tender activities both traditional and on-line approaches, the validity was tested by applying project data from the case studies in terms of time and cost. Both case studies indicate that on-line tendering takes less time and costs less to carry out than traditional tendering.

3.2 Limitations of the case studies

The findings from the case studies in terms of activities, time and cost implications have been identified. However the Authors acknowledge there are several drawbacks and problems with the method in which the Case Studies were conducted. Notably the Case Studies were based on specific projects using one on-line tendering tool, which makes it impossible to make any global statements regarding the widespread use of on-line tendering. A drawback of not using an actual 'live' project tendering on-line is that no feedback could be gained from parties using the system. This could have provided the research with useful insight and highlighted possible problems or benefits, which have not been picked up. Subsequently a questionnaire survey was undertaken to provide feedback from experienced practitioners.

3.3 Questionnaire survey

A questionnaire survey was chosen to elicit the views of practitioner users of on-line tendering and those who had no experience of using on-line tendering but were aware of the concept. The questionnaire responses would therefore rectify the problem discussed earlier of the Case Study not being able to pick up any feedback. A total of 200 questionnaires were distributed to the top 100 UK quantity surveying firms (based on total number of chartered surveyors) and to the top 100 contracting organizations (based on annual turnover).

Questions sought responses on the processes involved in tendering traditionally and tendering on-line in order to identify any significant differences and to establish whether there were any benefits of using one method in lieu of the other. The key indicators used to compare the tendering methods comprised the amount of time taken and cost incurred from preparing the tender documentation through to the set up of tender analysis. The findings of the questionnaire survey were that the majority of respondents when surveyed about on-line tendering thought time was not saved, that costs were reduced, that distribution of documentation was quicker, that communication of changes was quicker and tender evaluation was simpler. There was no perceived change in confidentiality aspects. Disadvantages were identified as shifting costs from client to contractor, cost of software, cost of accessories and ability to send large files easily.

4. Conclusions

The use of case studies identified key activities and implications of using traditional tender approach and on-line tendering. The findings of the questionnaire identify that tendering on-line has the potential to achieve time and cost savings. The amount of cost savings seems to be affected by the type of project and the greater the project value the greater the potential cost savings, whereas time savings have remained significant and stayed relatively consistent regardless of project details. The research also gave an insight into the possible pitfalls of on-line tendering. The main drawbacks comprised the shifting of costs, the cost of software/accessories and the problems with sending large files, with the main barriers for the adoption of on-line tendering, categorised under the headings of people, cost and technology compatibility.

In conclusion, E-business is providing the industry with alternative ways to do business in an attempt to make processes more efficient. On-line tendering has been developed as one of the solutions to streamline the tendering process with the main aims to reduce the amount of time and cost spent. Online tendering is seen, as being very much in its infancy and it is difficult to predict how it will develop in the future.

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A Survey of the Use of KPI to Augment Current Evaluation Criteria of Projects

Tik Sang Lueng

Department of Civil and Building Engineering, Loughborough University, UK

Francis Tekyi Edum-Fotwe

Department of Civil and Building Engineering, Loughborough University, UK

Abstract

The emergence of performance indicators in the 1990s as tools for internal monitoring of construction projects promised a step change in the way projects were monitored and evaluated. There is sufficient evidence to support the growing use of such indicators, and in particular, standardised key performance indicators (KPI). KPIs are applied for evaluating projects, and to provide objective measures for assessing potential future performance of project stakeholders. The incorporation of KPIs into existing active progress monitoring for construction projects has been rather slow. While there are several anecdotal evidences of successful use of KPI to actively manage projects, these are often the exception and not the rule. In this paper, the authors present an investigation into the use of performance indicators in Hong Kong construction industry to shed some light on the constraints that surround the apparent slow adoption of such indicators. The investigation is preceded by a review of current performance indicator systems that have evolved in recent times. The study shows that the use of performance indicators is a new concept in Hong Kong construction industry. It also shows that current performance indicators typically provide parallel evaluation for existing factors of time, cost, quality, and client satisfaction. Other constraints that mitigate full incorporation of performance indicators are discussed.

Keywords

Performance Indicators, Construction, Projects, Management

1. Introduction

Over the last two decades the development and use of project performance measurement systems has been growing steadily and gaining an increase in recognition from both business project managers (Constructing Excellence, 2004). The main driver for this growing trend in the use of performance measurement has been the increase in the number of successful implementation of such systems and its attendant influence on what is considered as project success. In particular, the use of such systems has been addressed at improving project performance, in terms of *cost*, *quality* and *time* (Gibson, 1994; Baully, 1994). When applying these measurement systems, *indicators* are one of the main elements used to evaluate performance. As such, a well-defined set of indicators would help to improve the accuracy and reliability of the project being measured, and thus, a more desired outcome could be assured (Latham, 1994; Egan, 1998; Constructing Excellence, 2000).

This paper present an investigation into the use of such performance indicators to augment current project evaluations in the Hong Kong construction industry. It presents an overview of performance indicators and metrics used in construction industry, and employs the metrics to explore the application of project performance indicators as a tool of project assessment in Hong Kong. The investigation is preceded by a review of some of the current performance indicator systems that have evolved in recent times. The study shows that the use of performance indicators is a new concept in Hong Kong construction industry. It also shows the current performance indicators typically provide parallel evaluation for the existing factors of time, cost, quality, and client satisfaction. Other constraints that mitigate the full incorporation of performance indicators to augment existing evaluation criteria are outlined and discussed.

2. Performance Measurement

Amaratunga (2000) has emphasized a popular adage often associated with benchmarking schemes that, *you cannot manage what you cannot measure* which, has been employed to give credence to the role of measurement in successful projects. Amaratunga (2000) argued further that “what gets measured gets done”. Reflecting on the growth of performance evaluation, Neely (1999) stresses that the uses of such measurement as an aid to the promulgation of core values throughout an organisation were now widespread. *Performance measurement* is described as the process of quantifying and establishing the efficiency of an activity or task. Bititci and Swenson (1997) explained that such a measurement system “... is at the heart of the performance management process and it is of critical importance to the effective and efficient functioning of any management system” for any organisation.

2.1 Performance Indicators and Measures

Inherent in any measurement system are the indicators or scales against which an objective assessment of performance can be established. The subsequent sub-sections profile a few of these indicators.

2.1.1 Key performance indicators

The Constructing Excellence, provide a set of such indicators which it describes as Key Performance Indicators – KPI (Constructing Excellence, 2000, 2002, 2004). The KPIs capture the salient measures of performance that are deemed critical to the success of projects and organisations. The KPI framework consists of seven main groups; time, cost, quality, client satisfaction, client changes, business performance and health and safety. Table 1 provides a listing of various measures and how they are evaluated under each of the seven groups.

Table 1 Constructing Excellence KPIs for UK Construction

Grouped Indicator	No. of Indicators	Level of assessment
Time	7	Headline, Operational, Diagnostic
Cost	8	Headline, Operational, Diagnostic
Quality	3	Headline, Operational
Client Satisfaction	3	Headline, Operational
Change Order	2	Diagnostic
Business Performance	11	Headline, Operational, Diagnostic
Health and Safety	4	Headline, Operational

(Source: KPI Report for the Minister for Construction 2002)

2.1.2 The excellence model

A system similar to the KPI’s is provided by the European Foundation for Quality Management (EFQM) Excellence Model. The *Fundamental Concept of Excellence* is applicable to all organizations regardless of sector, industry or size and underpin the EFQM Excellence Model. This provides a non-prescriptive

framework based on nine criteria for assessment. Five of these are *Enablers* and four are *Results*. The Enabler criteria cover what an organisation does whilst the *Results* criteria cover what an organisation achieves. The rationale is that there are causal linkages between what qualifies as the *Results* of an organisation or task, and its. As such the *Enablers* rely on feedback from *Results* to help improve overall organisational or task performance (British Quality Foundation, 1998).

2.1.3 The Project Management Performance Assessment (PMPA) Model

Bryde (2003) argued for the development of an appropriate project management performance system to be derived from existing models for assessing quality management. Bryde subsequently provided such a model which, was branded as the *project management performance assessment* (PMPA) model. Bryde's model drew heavily on the structure and indicators from the EFQM Excellence Model and the principles of TQM. Figure 1 shows the Structure of PMPA Model showing the clear demarcation between enablers and results as reflected by the EFQM model.

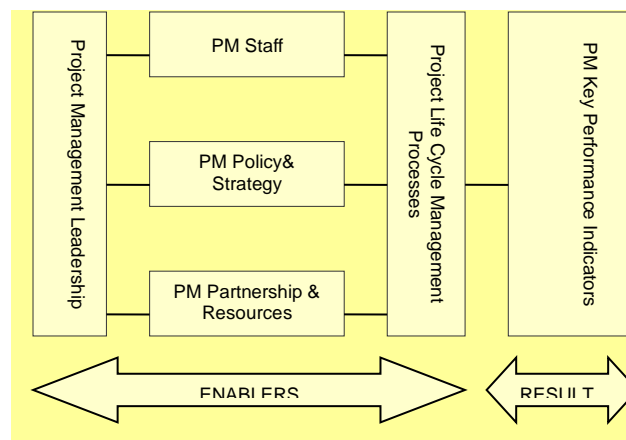


Figure 1 PMPA Model (Source: Bryde, 2003)

2.1.4 CONQUAS

The Construction Quality Assessment System (CONQUAS) was developed by the Construction Industry Development Board (CIDB) of Singapore in 1989 (Low, 1991). It was initially designed primarily to assess contractors in public sector building contracts (Low, et al., 1999). The assessment of CONQUAS is divided into three parts; Structural work (40 per cent), Architectural work (50 per cent), External work (10 per cent). The 40:50:10 weighting adopted for assessment is essentially based on the approximate cost ratio of structural, architectural and external works for a typical reinforced concrete building project. The scores from the above assessments are then summed to provide the total CONQUAS score for the building being evaluated (Low, et. al., 1999). The CONQUAS system provides a quality performance indicator for assessing both the product and organisation that delivers the product in construction (CIDB, 1995).

2.1.5. Performance Assessment Scoring System (PASS)

In 1991, the Performance Assessment Scoring System (PASS) was introduced by the Hong Kong Housing Authority (HKHA) to assess and manage the contractors bidding for public housing projects (Tam et al., 2000). The PASS system is based on CONQUAS. By 1993, the HKHA adopted a Maintenance Assessment Scoring System (MASS), together with the PASS to assess contractors' performance on maintenance works and new works respectively. The systems are designed to reward contractors who perform to the required *standard* with higher tendering opportunities by granting more tendering chances to contractors whose average PASS score falls into the upper quartile of the overall PASS scores (Kumaraswamy, 1996). As it is essential to look at the building after its occupation and the performance of the contractor during the maintenance period, the maintenance period assessment has been a part of the contractor's overall performance in a contract (Kam, et. al., 1997). The output assessment in the PASS system has mainly four elements, namely structural work, architectural work, external work and general obligations.

3 Use of performance indicators in Hong Kong

There has been limited research into the use of project performance indicators in Hong Kong (Lai et al., 2004). One of the reasons that could account for such a situation is that there is no organization similar to the Constructing Excellence in the UK to promote performance improvement in the construction sector. Current research on the use of indicators and performance improvement has been confined to a academia, and often driven by individual academic interests. The majority of the construction practitioners within the Hong Kong construction industry are yet to be fully acquainted with the concept and practical workings of such performance assessments (Chan et al., 2004). Gieskes and Broeke (2000) suggest that in a diverse industry as construction in Hong Kong, it is difficult to achieve of a systematic diffusion of performance related practices within an organization or across organizational boundaries. This argument of Gieskes and Broeke explains why, notwithstanding the recent development and current research on project performance measurement and indicators, the adoption by industry of project performance measurement in Hong Kong construction seems to fall behind practices in UK and US.

4. Investigating Use of Performance Indicators in Hong Kong

To understand the reasons and constraints that account for the relative slow adoption, an investigation into the use of performance indicators in Hong Kong construction industry was conducted. This was achieved through a survey of views from project executives on what areas they employ performance indicators for, and their current constraints and setbacks in the deployment of performance indicators. The investigation drew on the developments in performance indicators that have taken place outside Hong Kong to develop an appropriate elicitation instrument.

4.1. Questionnaire Design

The questionnaire was divided into four main parts. Part I covered the general background of the respondent organizations. Part II evaluated the current situation of applying performance indicators in Hong Kong and contribution to project performance assessment. In Part III, a series of performance indicators were listed for respondent to indicate the importance of such indicators in assessing company and project performance. The indicators were based on the UK KPI's the PASS, and CONQUAS to derive a seven category – and thirty-eight indicators for the investigation. Part IV consisted of several open-end questions to let the interviewees suggest for improvement of using performance indicators.

4.2. Questionnaire Survey

The main source of data was collected by a structured questionnaire survey, which was developed, piloted and distributed by means of post. A total of 100 questionnaires were sent to randomly selected construction companies located in Hong Kong. The selected organizations were drawn from the approved contractor lists and consultant lists published in the Housing Authority, and Environment, Transport and Works Bureau of the Government of Hong Kong Special Administrative Region. They included Architects, Clients, Consultants and Contractors and ranged from medium to large size companies in Hong Kong so as to make them more representative of the industry in Hong Kong.

5. Analysis and Results

The result of the analysis showed that the use of performance indicators is a new concept in Hong Kong construction industry. It also demonstrated that the current performance indicators typically provide parallel evaluation for the existing factors of time, cost, quality, and client satisfaction. Figure 2 presents annular maps for the three main issues investigated within the survey. These represent salient indicators that the respondents rely on in evaluating performance, the benefits and constraints for implementation.

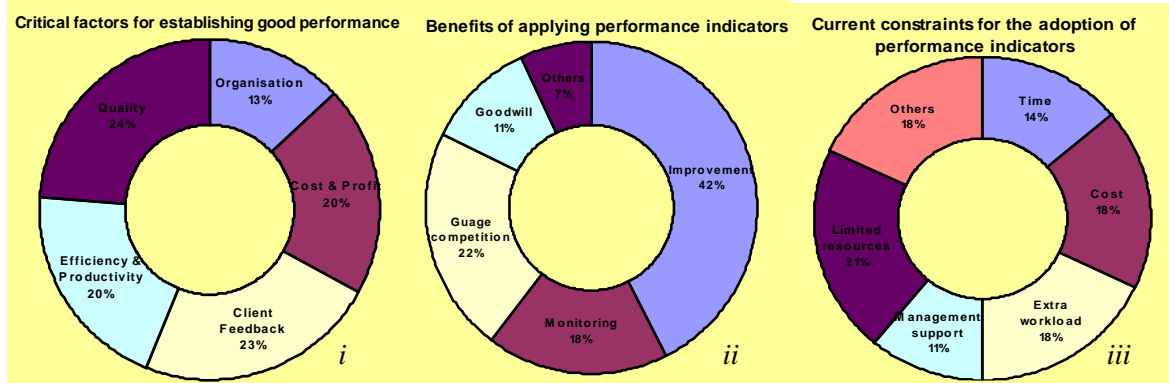


Figure 2. Results of analysis for respondent perceptions

The result shows that the criterion of quality presents the dominant indicator that construction in Hong Kong focuses on. However, the other key criteria of organisation, cost and profitability, client requirements and feedback, and productivity factors are given comparable attention for monitoring and improving performance. In general the benefits of implementing particular performance indicators are considered to be improvement of project and organisational performance. The use of the indicators to judge the *level of competition*, as well as provide a means by which the organisation or project can *monitor* its performance on a continual basis also rank very high among the benefits. The need to be seen as being compliant plays out as important in securing future orders for contractors, and gaining the required public sector support for projects by clients. The use of indicators in Hong Kong presents a potential to demonstrate compliance to gain the necessary *goodwill*. Benefits that played out to a lesser degree from the responses, such as need for greater *transparency*, have been grouped together as *other*.

The principal constraints that mitigate the adoption of the indicators stem from factors that can be associated more with the personal circumstances of the respondents. They include a *limitation in the resources available* and a *lack of guidelines* to assist implementation of any required performance indicators. In addition the respondents indicated a *reluctance of employees to accept extra workloads*, and an *increase in administrative cost* would hinder any efforts to implement performance indicators. Other constraints included a *lack of senior management support* and *no immediate benefit*. The category of other represented the factors of *change in the working system*, *resistance to change due to culture and norms*, and *perceived sensitivity of data*.

6. Discussion

The respondents expressed the view that the coverage of the current performance indicators employed in Hong Kong is adequate for the purposes performance measurement. However, it is important to bear in mind that the sets of performance indicators that the respondents are using typically reflect the classical project *quality*, *cost* and *time*. Any other performance indicators are considered if there is clear demonstration as to their importance to their organizations. As such, there is considerable variation in what individual organisations adopt for evaluation performance of projects. The results of the analysis also indicates that within the construction industry in Hong Kong, the use of performance indicators is not confined to assessing company's performance but also include project performance. The respondents are willing to accept performance indicators as a form of performance measurement tools. Most of the

respondents indicated that they have implemented performance indicators for less than one year. This shows that the concept of performance indicators may be at an embryonic phase of development within the construction industry in Hong Kong. This perhaps reflects the situation whereby, there is still no formal programme to introduce and promote the use of performance indicators in Hong Kong, as is the case for the Construction Best Practice Initiative in the UK. Such a national programme would help to overcome the current constraints identified by the respondents.

7. Conclusion

The use of performance indicators for monitoring construction projects promises a step change in the way projects would be evaluated in Hong Kong. The use of such indicators within the construction industry in Hong Kong however has been limited to the traditional cost, time, quality and client satisfaction factors. The survey on which this paper is based identified several constraints that could hamper the wide adoption of performance indicators in Hong Kong. The study showed that the use of performance indicators is a new concept in Hong Kong construction industry. It also shows the current performance indicators typically provide parallel evaluation for the existing factors of time, cost, quality, and client satisfaction. In addition the use of the indicators for evaluating internal company performance appears to be a strong motivation for their adoption in Hong Kong.

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