IMPROVING PROJECT PERFORMANCE OF PPP/PFI PROJECT-BASED ORGANISATIONS

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The concept of PPP/PFI promises a radical change to improve project performance and better service delivery to the public but evidence on cost and quality gains seems to be limited considering the financial commitments entered by governments around the world. This has encouraged significant number of researches based on diverse PFI projects in the United Kingdom to understand how PPP/PFI projects have performed based on cost, time, quality and operations. Nevertheless, these reports present inconsistent project performance outcomes as different data and methodologies are presented which can lead to more confusion to understand how well PFI projects have performed. Overall, the criticisms levelled against the construction industry concerning the performance of PFI projects executed have not been encouraging. Although, previous studies have identified and investigated factors that can assist to improve project performance recent studies still suggest that how to improve project performance is a perennial problem to construction professionals and project management researchers. In addressing this problem, this paper aims to re-examine these factors to consider which positively influences project performance. Also, the paper proposes the network perspective as a means to attract and transform new knowledge to improve construction delivery processes. By implementing the network perspective, practitioners and managers can explore new areas to create value to improve their project performance. This paper empirically identifies significant factors in the context of PFI projects to improve project performance, drawing upon case studies and questionnaire survey of PFI practitioners involved in on-going PFI projects in the United Kingdom. The main findings show that: 1) collaborative networks; 2) sustainable construction products; 3) clarity in project design for buildability; 4) life-cycle costing; and 5) benchmarking and market testing are significant factors to improve PFI project performance in the construction industry. Overall, the findings of this paper show that PFI projects are no different from non-PFI projects as these issues are critically applicable to all projects. Hence, the practical implication is that practitioners and managers can use the findings to plan and enhance the performance of their projects. Also, it provides guidance on how the network approach can be a potential means to improve the performance of construction projects.

Keywords: collaborative network, project performance, PPP/PFI, project-based organisations, United Kingdom

INTRODUCTION

There has been a wide range of initiatives across the construction industry to improve construction performance but these initiatives are not continuous in the United Kingdom (Smyth, 2010). For example the Department for Children, Schools and

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Families (DCSF), (2010) final report on 'Road to Zero Carbon' found that the major challenges faced to achieve sustainable school projects are: a) that it is technically difficult and costly to achieve as it is difficult to design, construct and maintain efficient buildings and few within the construction industry have practical experience of delivering low carbon buildings; b) the capital costs of achieving zero carbon schools are not accurately established as it is expected to be significant, in excess of £200 per square metre of school using on-site measures; and c) the attitude of occupants must be addressed to achieve project intentions. In a similar vein, based on an impact assessment conducted by the Department for Communities and Local Government, (2009) the technical difficulty and costs implication of zero carbon emission was equally acknowledged.

On the other hand, the performance of PPP/PFI has been investigated based on diverse projects in the United Kingdom. These reports present different project performance outcomes that suggest more research is needed to improve the delivery process to enable cost effectiveness and value creation. For instance the NAO (2010) investigated the performance and management of hospital PFI contracts in the United Kingdom. The findings suggest that most contracts are performing satisfactorily or better and meeting the expectations of the Trusts. But, the Capital Review conducted by Sebastian James (2011) on Building Schools for the Future projects suggest that 1) the design and procurement process for the BSF programme was not designed to create either high or consistent quality or low cost; 2) lack of good quality data on the condition of the BSF estate to control the lifetime cost of the schools built. The findings are contrary to the benefits suggested using PFI approach. A recent investigation conducted in healthcare PPPs around the globe indicated that spending on healthcare is growing at a pace that is likely to be unsustainable unless new funding sources are found (PricewaterhouseCoopers, 2010) and appropriate means to improve construction project performance because it is a perennial problem to construction professionals and researchers (Love *et al.* 2011).

The central point of departure for this paper is that although varied factors to improve PPP/PFI project performance has been identified in the literature, project-based organisations are limited by the short term focus of participating organisations to engage in long-term collaborative relationships to devise means to improve project performance. The paper proposes the network perspective as means to encourage knowledge sharing, innovation and cooperation to enable cost effectiveness and value creation.

Key issues from the literature on project performance

As suggested by Cooke-Davies, (2002) to determine the factors that are critical to project success depends on answering three separate questions: a) what factors lead to project management success; b) what factors lead to successful project; and c) what factors lead to consistent successful projects. An earlier study conducted by HM Treasury (1999) titled "Achieving Excellence" recommended that: a) construction supply chain integration and b) partnering could be used by construction organisations as means to improve the construction industry performance. Subsequently, "Building down Barriers" was launched to assess and demonstrate the benefits of supply chain integration. Nicolini *et al.* (2001) suggested the clustering of project functions with greatest independences and information processing as an organisational approach to construction supply chain integration. To improve value, eliminate inefficiencies, and reduce costs on projects.

Also, OGC (2003) conducted a study titled "Building on Success" initiative that identified key areas in construction to achieve success as: a) integration of construction supply chain, b) managerial skills, c) measurement of performance benefits, and d) standardisation of standard practices as key areas to achieve success in construction.

On the other hand, recent researches conducted have suggested varied means to improve project performance. Doloi, (2009) suggested that having individuals and project-based organisations with relevant capabilities can influence innovative approaches. In view of the fact that individuals or organisations that have capacity to identify and acquire new knowledge, assimilate and interpret information can exploit opportunities (Gluch *et al.* 2009) to develop sustainable products and processes to improve project performance.

Lam and Wong, (2009) using a questionnaire survey in Hong Kong, found that construction time performance has strong positive correlations with buildability in the a) design of external wall elements, b) simplicity of assembly and c) installation while other design attributes affect cost, quality and safety performances at diverge degrees. It suggests that to improve building project performance depends on how individuals or organisations can interpret clearly project design for buildability.

Wubbenhorst (1986) found that to reduce the total costs of a project or system it is essential to pay attention to the downstream costs of the system of which a typical way is to create systems with improved maintainability. But, the study conducted by Swaffield and McDonald (2008) that seek the opinions of quantity surveyors working for design and construction contractors regarding the application of life cycle costing principles in PFI projects found that quantity surveyors did not consider life cycle costs when procuring products. The practical implication is that the lack of consideration for life cycle costing means that facilities management contractors' are likely to face major financial risk in increased maintenance costs.

In addition, other studies have suggested the use of appropriate financing methods to ensure that value for money is achieved and to understand the main treats to a PFI project and mitigate them accordingly. Hellowell and Pollock, (2009) found that PFI funding of capital investment is highly problematic and highly costly. In addressing this, PFI practitioners are encouraged to benchmark and market test to monitor their PFI projects, as needs may be driven by policy, legislative or budgetary changes or operational requirements (OGC, 2007). On the other hand, Edkins *et al.* (2011) conducted an empirical study of on-going facility related operational expenditures of renewed comprehensive schools within England. The findings suggested that total facility services costs in PFI schools are higher. It implies that more needs to be done to improve the whole life costs of future PFI projects.

Furthermore, for the most part PPP/PFI projects are large and complex that it can affect the broader performance of the contractual relationships involved. Smyth and Edkins, (2007) point out that in the United Kingdom the public sector is weak to consistently manage interface with the private sector in ways that stimulate collaborative relationship in the management of PPP/PFI projects. The implication here is that relationship management can play a significant role to achieve successful PFI project. Nevertheless, since project-based organisations are companies temporarily established to specifically implement projects that are embodied with uniqueness, uncertainty and complexity and where time and budget are crucial factors (Ajmal and Koskinen, 2008), it may be difficult to implement these key issues

identified in the literature to improve project performance as the focus of most participating project-based organisations are often short-term. To address this problem, project-based organisations can embed themselves in networks of learning.

RESEARCH METHODS

Information sharing to support the benchmarking of project performance and effective ways of working to drive efficiencies are cited by the National Audit Office (2010) to improve PFI performance. Hence, questionnaire survey and case studies in on-going projects were considered appropriate to obtain the views of a large number of practitioners working within project-based environments in the context of PFI to identify the significant factors to improve project performance. The questionnaire survey was informed by literature reviews to provide insight on critical factors to improve project performance. Respondents are PFI managers, PFI directors, associates, partners and project managers working in both the public and private sectors. A total of 66 usable questionnaires were obtained. This represents a response rate of about 33 per cent. Factor analysis technique was chosen to capture/classify cluster of relationships within the variables through the help of Statistical Package for Social Software (SPSS).

Qualitative data was necessary in order to substantiate the analysed results obtained from the questionnaire survey. Hence, semi-structured interviews were conducted with the main project-based partners working for three separate consortiums in Leeds, Manchester and Blackburn with Darwen responsible for the delivery of three different BSF schemes in the United Kingdom. Interviewees are: a) the project clients, b) construction firms and c) project financiers. Overall, seven senior executives were interviewed and each interview took approximately one hour.

Questionnaire survey findings

The paper identified eight (8) essential factors to improve project performance from the literature. Table 1 shows PPP/PFI practitioners' views of the factors to significantly improve PPP/PFI project performance. The perspectives of respondents were obtained using a 'likert style rating' questions based on three-point scale. The scale intervals are interpreted as: a) not significant b) Moderately significant and c) very significant. The views of respondents on each variable were ranked according to their degree of significance between public and private sectors practitioners which the authors referred to as category ranking. Table 2 shows the factor loading after extraction and rotation. Factor loadings with an absolute value greater than 0.5 was interpreted and Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .568. According to Kaiser (1974) the measure is satisfactory for factor analysis, and all KMO values for individual items > .522, which is well above the acceptable limit of .5 (Field, 2009). Barlett's test of sphericity tests is 28.28 and the associated significant level is $p < 0.00001$. This indicated that correlations between the variables were sufficiently large for factor analysis. Three factors groupings are interpreted as: Factor 1) Clarity in project design - includes a) clarity in project design for buildability, and b) ability to reduce construction and development risks; Factor 2) Benchmarking and market testing; and Factor 3) Life-cycle costing. Following the factor extraction, four variables were not part of the factors grouping. A likely reason is that, as a rule during the process of conducting factor extraction the shared variance of a variable is partitioned from its unique variance and error variance to reveal the underlying factor structure; only shared variance appears in the solution. In the case of principal component analysis, it does not discriminate between shared and unique

variance which can produce inflated values. Factor analysis avoids the inflation of estimates of variance accounted for (Costello and Osborne, 2005).

Table 1 Respondents' ratings of factors to improve project performance

Factors	Private Sector respondents Severity Index	Public sector respondents Severity Index	Category Ranking (Private Sector)	Category Ranking (Public Sector)
Relevant human resource expertise	83.33%	92.75%	6	2
Clarity in project design for buildability	92.86%	97.10%	1	1
Appropriate project financing method	86.51%	92.42%	4	3
Risk/reward sharing mechanisms	80.95%	84.72%	7	6.5
Better understanding of project external factors such as government policies/market treats/public opinion	72.22%	80.56%	8	8
Experienced PPP/PFI practitioners/consultants	87.30%	90.28%	3	4.5
Life-cycle costing	84.55%	90.28%	5	4.5
Ability to reduce construction and development risks	88.10%	84.72%	2	6.5

Table 2 Rotated Factor Matrix for factors to influence project performance

Factor label	**Influential Factors**	**Code**	**Factor loading**
Factor 1: Clarity in project design	Clarity in project design for buildability	CTQ1bDS	0.549
	Ability to reduce construction and development risks	CTQ1hDS	0.528
Factor 2: Benchmarking and market testing	Better understanding of project external factors such as market treats, government polices	CTQ1eDS	0.634
Factor 3: Life-cycle costing	Life-cycle costing	CTQ1gDS	0.987

CASE STUDIES ANALYSIS

According to Patton (2002) 'there are no rules for sample size in qualitative inquiry it depends on what you want to know, what will be useful, what will have credibility, and what can be done with available time and resources' (p.244). Below is a summary

of the outcomes of the various interviews conducted: First and foremost, collaborative working was highlighted as a significant factor that contributed to the successful delivery of the school projects investigated. However, the co-location of the various teams was identified to play a significant role in enhancing project partners' cooperative behaviour.

Second, both the BSF project clients and project-based organisations stressed the significance of clarity in project designs seeing that construction organisations delivered the buildings to the vision of the schools. As most school Heads are not skilled in construction and project management practices. It was found that the consistent interaction between all project partners assisted in the development of project designs that enabled buildability.

Third, all the interviewees acknowledged that the school designs demonstrated the integration of whole life costing principle such as the selection of building materials for better building maintenance. Although, one of the BSF clients raised concern in the high costs involved maintaining the school facilities. Four, the interview analysis suggested that the BSF project consortiums are measuring project success on the PFI projects in terms of time and cost. However, with the current recession records kept may not be relied upon as no two schools are identical. From respondents' perspectives, there are significant benefits to be derived when project-based organisations embed themselves in networks to learn and develop sustainable products to improve construction performance.

DISCUSSION OF FINDINGS

Concerning the significance of collaborative relationships in construction project performance, Leverick and Littler (1993) found that collaborative arrangements can be useful means to reduce development and construction risks in projects. To achieve this, the trust and commitment of partners should be continually maintained to enable joint learning (Davies and Love, 2011) and knowledge sharing to improve project performance. However, this paper found that collaborative networks can play a more significant role in integrating project partners' capabilities to construct sustainable projects. The implication for project-based organisations working within the PFI contractual framework is that their embeddness in networks of learning can facilitate the transformation of their project knowledge to develop innovative architectural designs that takes into consideration whole-life costing.

Also, from respondents' perspectives, the ability to understand and evaluate project external factors such as government policies and market treats is crucial. Since better understanding of treats to a project can be significant to reduce project costs and time. Market treats relates to the unpredictability of actual unit prices. For example, a shift in the price of materials during project development and operation has the tendency to increase project costs and delay project completion unless contracts or guarantees are signed to guard against rising costs.

The first government's policy, concerning PFI is set out in the Treasury Taskforce (1998) 'Partnerships for Prosperity' report. The report suggested areas of importance in the adoption of PFI such as clear and measurable output performance or specification, scope for innovation, and risk transfer. Middleton (2001) indicated that the cost of financing PFI projects between 1997 and 2001 reduced to the public sector clients because of better understanding of PPP/PFI working process. In a similar vein, NAO (2009a) demonstrated that construction firms involved in BSF schools, can

reduce costs and prices through the use of benchmarking tools. The purpose is to ensure that prices remain economical. The inference here is that project-based organisations (PBO's) that are skilled at project evaluation using benchmarking and market testing tools can be successful at delivering successful projects. But, it is worth emphasizing that the short-term focus of PBO's makes it impossible to maintain clean data on project performances. Hence, it is crucial for PBO's to embed themselves in networks to share vital knowledge and experiences.

However, there are still shortfalls across government establishments for commercial skills needed to deliver projects according to NAO (2009b) report titled 'Commercial skills for complex government projects'. The report also confirmed that value for money has often been compromised by a lack of commercial skills and experiences. A possible solution mentioned in the literature of PPP/PFI is to retain and recycle expertise within the public sector. Overall, the implication of the findings from the studies conducted suggests that project-based organisations need to focus their effort in facilitating cross-organisational learning and continuous knowledge and experience transfer between projects to encourage sustainable project designs. Also, it suggests the importance of integrating life-cycle costing concepts in project designs to improve project buildability and maintainability to reduce project delivery time and costs.

Implication of collaborative networks on project performance

The embeddedness of project-based organisations in networks of learning can result to the development of new processes, patterns and practices in construction management to improve project performance. Partnering and alliancing has been extensively researched as a means to improve the performance of construction projects. To date research on partnering initiatives are mix with divergent outcomes which may suggest that the main contribution of partnering might lie in its intangible effects, such as creating better working environment (Nyström, 2008). The pursuit of long-term collaborative relationship between PBO's can be a significant approach to stimulate innovation to improve project performance in the construction industry. Gambatese and Hallowell, (2011) suggested that better communication among project teams, better integration of varied disciplines, development of effective processes and sharing lessons learned are critical to enhancing innovation in construction. But, failure to transfer and integrate knowledge within organisational boundaries or along construction supply chain may impair project performance (Leseure and Brookes, 2004) as well as not having the required capabilities.

In view of the fact that, innovation and knowledge management practices have been acknowledged to be important components to improve the construction industry's performance. This paper opinion is that taking a network approach can play a significant role in this direction to encourage project-based organisations to focus their capabilities on specific performance outcomes through knowledge sharing. Networks provides entry to project-based organisations or construction organisations to fields in which relevant knowledge resides or is widely distributed and not easily produced inside the boundaries of an organisation or acquired through market transaction. "A network serves as a locus of innovation because it provides timely access to knowledge and resources that are otherwise unavailable, while also testing internal expertise and learning capabilities" (Powell *et al.*1996:119).

It is crucial that diversity is encouraged in networks formed to attract specialist knowledge across the construction industry and outside the industry to exploit opportunities to develop sustainable products. The intent of a network should

determine relationships that need to be maintained. Potentially, networks can also act as a channel to collect project performance data for analysis to address specific construction issues. Fig 1 presents a typical collaborative network. The network includes likely practitioners or organisations that should be involved to effect change in the industry. Overall, the inference here is that embracing the network perspective can be a significant means for project-based organisations to learn, innovate and disseminate new knowledge.

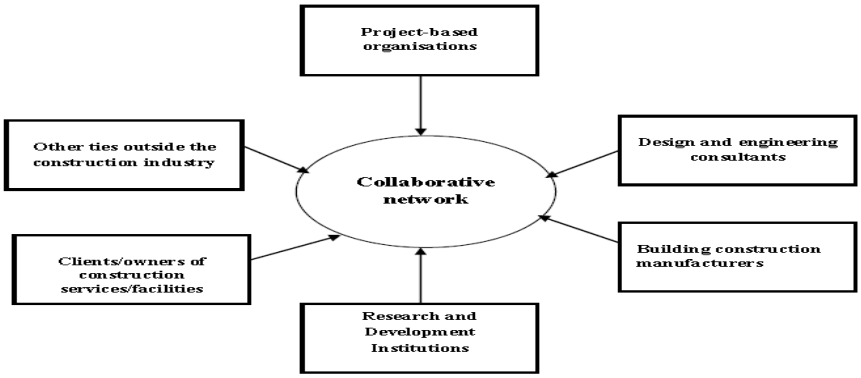

Fig 1 network of relationships between different construction practitioners

IMPLEMENTATION AND CONCLUSION

Looking at the vast scope of literature on how to improve project performance, practitioners and academia should be able to draw upon considerable knowledge on how to address poor performance that has continually confronted project-based organisations in the PPP/PFI market. Evidence informed by literature reviews on construction project performance still suggest that costs over-run, delays and high maintenance costs are key problems to construction practitioners. The introduction of new management tools and techniques from more technologically advanced industries has not changed or resolved this problem (Love *et al.* 2011). Nevertheless, a number of conclusions could be drawn from this paper with significant academic and practical implications in the construction industry.

From a practical perspective, there is an opportunity for project-based organisations to embed themselves in networks of learning to support their projects. The case studies investigated demonstrated that long-term collaborative relationships are needed to develop sustainable approaches to improve project performance. Overall, the studies conducted demonstrated that if project-based organisations need to improve project performance it is required to emphasis more on the identified key factors: 1) collaborative networks; 2) sustainable construction products; 3) clarity in project design for buildability; 4) life-cycle costing; and 5) benchmarking and market testing. The findings and recommendation presented here are applicable to the whole industry and not just PPP/PFI projects. It implies that regardless whether one is involved in PPP/PFI projects or not these issues are critically important which makes PPP/PFI projects no different from projects delivered through conventional methods.

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