

Knowledge transfer processes in PFI: identification of barriers and enablers

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Knowledge transfer processes in PFI: identification of barriers and enablers

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Abstract

Increasingly, the UK's Private Finance Initiative has created a demand for construction companies to transfer knowledge from one organization or project to another. Knowledge transfer processes in such contexts face many challenges, due to the many resulting discontinuities in the involvement of organisations, personnel and information flow. This paper empirically identifies the barriers and enablers that hinder or enhance the transfer of knowledge in PFI contexts, drawing upon a questionnaire survey of construction firms. The main findings show that knowledge transfer processes in PFIs are hindered by time constraints, lack of trust, and policies, procedures, rules and regulations attached to the projects. Nevertheless, the processes of knowledge transfer are enhanced by emphasising the value and importance of a supportive leadership, participation/commitment from the relevant parties, and good communication between the relevant parties. The findings have considerable relevance to understanding the mechanism of knowledge transfer between organizations, projects and individuals within the PFI contexts in overcoming the barriers and enhancing the enablers. Furthermore, practitioners and managers can use the findings to efficiently design knowledge transfer frameworks that can be used to overcome the barriers encountered while enhancing the enablers to improve knowledge transfer processes.

Keywords: Communication, Knowledge Transfer, Private Finance Initiative, Translation, UK

Introduction

Though a range of procurement options for public facilities and services is available to the UK Government, the government's use of Public Private Partnerships (PPP) and Private Finance Initiative (PFI) to procure public facilities and services in the UK has increased

rapidly over the last decade. To date, over 700 PFI projects have been approved and approximately a further 200 projects are planned (Carrillo et al. 2008). Likewise, the UK's National Audit Office (NAO) (2009) stated that the capital value of forthcoming PFI deals is expected to be £13 billion. Introduced in 1992 by the UK government, PFI represents an alternative mechanism for procuring better public services and facilities. The PFI scheme entailed the collaboration of the private and public sectors together to share the risks and benefits of delivering public sector services or facilities (Carrillo et al. 2008, Li et al. 2005).

Over the years, the PFI scheme has evolved resulting in a large number of government reports and academic papers assessing the impact of PFI projects in the UK. HM Treasury (2008) and the National Audit Office (2009) have indicated that PFI procurement has improved project delivery in terms of time, quality of products, greater costs certainties. While many PFI projects have been regarded as successful, PFI procurement has also attracted a fair share of criticism. The main focus of criticism has been the value for money achieved by the projects (Hellowell et al. 2008, Akintoye et al. 2003). Other specific problems have been the time and high bidding cost for PFI projects and the management and transfer of risk by the private and public sectors (Carrillo et al. 2008, Akintoye et al. 2003), the differing objectives of the project stakeholders (Robinson et al. 2004) and restraints on innovation (CABE 2008). The Commission for Architecture and the Built Environment (CABE) noted that the anticipated boost in innovation from private sector providers has not been fully attained. In addition, there are still concerns over the level of knowledge and information sharing in PFI projects (Carrillo et al. 2006). Accordingly, the subject of knowledge transfer in PFI has become a core area for investigation in the UK construction industry (Liyanage et al. 2008, Carrillo et al. 2006). These authors suggest that the boost in innovation can be facilitated by the capture and transfer of expertise knowledge and skills among the project stakeholders. While Carrillo et al. (2006) and Liyanage et al. (2009) have developed different frameworks for knowledge transfer in PFI projects, less is known about the barriers and enablers that can hinder or enhance the knowledge transfer process.

The aim of this paper is therefore to identify, analyse and evaluate the relative importance of the barriers and enablers associated with knowledge transfer processes in PFI projects in the UK construction industry. The rest of the paper is organized as follows: A review of the relevant literature on knowledge transfer, knowledge transfer challenges in PFI projects is undertaken to identify factors or issues contributing to effective knowledge transfer. This is followed by an outline of the research method adopted, a presentation and discussion of the results. Finally, conclusions and implications are presented.

Knowledge transfer Process

Knowledge transfer can be described as a change process involving the movement of knowledge or skills from one specialized knowledge entity such as individuals, groups and organisations to another or from one place to another (Carlile and Reberich 2003, Nonaka 1994). A successful knowledge transfer implies that a transfer results in the receiving unit accumulating or assimilating new knowledge. To be of value to the individual or organisation, the transferred knowledge should lead to changes in behaviour and the development of new ideas, processes and practices.

Although, the mechanisms for transferring any type of knowledge, from an individual or organisation or place to another, include learning, training program, communication, observation, dissemination, implementation, translating, diffusing, activities (Abjanbekov and Padilla 2004, Carrillo et al. 2004), the performance of these mechanisms is context based and therefore influenced by several issues and factors (Harada 2003, Szulanski 1996). This is due to the fact that as the transfer process begins in one context and moves into another context (Oliver 2009, Abjanbekov and Padilla 2004), performance of the processes are influenced by these factors. Thus one way of improving the transfer process is by identifying and understanding the barriers and enablers that influence the process to make a success or failure.

Knowledge transfer challenges in PFI projects

In the UK, the main sectors in which PFI is used to procure public infrastructure and services are education - under the Building Schools for the Future (BSF) programme, health - provision of hospitals for NHS trusts, transport - highways management and street lighting for local authorities, accommodation for military personnel and defence infrastructure (Robinson et al. 2004). It is also expected that through knowledge sharing among the purposely created consortia for the PFI project, the private sector will promote innovation, manage the risks, and provide value for money for the government. These expectations were to be achieved through harnessing the financial, management, and technical skills and expertise of the private sector to provide efficient and effective public facilities and services (Li et al. 2005, Akintoye et al. 2003).

Despite many PFI projects' overall performance being more than satisfactory, several challenges in the procurement, construction and operation of PFI projects have been

highlighted in several publications. For instance, Robinson et al. (2004) identified some of the challenges as the difference in PFI experience between construction organisations and client organisations, the complexity of the PFI management structure and a lack of clear set of strategies to collaborate and communicate with project stakeholders. Carrillo et al. (2008) identified the barriers that affect organisations participation in PFI projects as: high transaction and bidding cost, complex contracts, lengthy negotiation periods and inexperienced staff. These challenges have lead to inefficiencies in the PFI project delivery processes such as communication and information sharing among PFI participants and in the transfer of best practices among stakeholders and projects (H M Treasury 2008). Consequently, Knowledge transfer processes are essential in overcoming these inefficiencies. For better performance of PFI projects, Carrillo et al. (2006) and Liyanage et al. (2009) have proposed and developed appropriate knowledge transfer frameworks for capturing and transferring expertise and lessons learned in order to facilitate innovation and continuous improvement in several aspects of PFI projects. Carrillo et al.'s framework consists of three stages that explored PFI participation and opportunities, mapping the organisation's knowledge and creating an action plan for transferring knowledge. On the other hand, Liyanage et al.'s framework - consists of five processes: Knowledge awareness, Knowledge acquisition, Knowledge transformation, Knowledge association and, Knowledge application which affected or influenced a successful knowledge transfer.

Both frameworks can enable organisations and individuals to be more proactive in managing and improving knowledge transfer on PFI projects. However, due to the challenges faced in PFI projects, it is only prudent for clients and service providers to identify, assess, evaluate and rank the barriers and enablers that influence knowledge transfer processes, in order to improve existing knowledge transfer processes.

Barriers and enablers of knowledge transfer processes

There is still considerable debate on the barriers or factors that negatively affect knowledge transfer processes in general. Szulanski's (1996) identified the lack of time to receive and/or apply new knowledge as a characteristic barrier to knowledge transfer. Certainly, the times available to participants to transfer their knowledge in ways meaningful to recipients are timely and situated in the recipients' real world context (Bresnen et al. 2003, Fernie et al. 2003).

Among other factors and issues, confidentiality, reliability, copyright, and the fear of losing one's unique value (Carrillo et al. 2006); the absence of trust among the participants (Renzl 2008) have been identified. Certainly a climate of trust and willingness is necessary to achieve knowledge sharing within the organisation or project. However, trust and willingness are built on good communication between the relevant parties. Gann et al. (1998) identified policies, procedures, rules and regulations attached to projects, especially when these are treated as static sets of technical requirements. Other issues such as lack of management support (Renzl 2008, Goh 2002) and commitment and motivation of staff to share knowledge (Carrillo et al. 2006) have been emphasized as barriers to knowledge transfer. While these issues and factors have been identified, their relative importance to each other in PFI projects has received minimum attention.

In terms of factors or issues that can positively influence a successful knowledge transfer, organisational culture, incentive structure, interpersonal trust in general, trust in management, supportive leadership and supportive structures such as clearly articulated goals and strategies were identified by Renzl (2008) and Goh (2002). Among other factors, the reliability of the source of information is important to the knowledge transfer process was identified by Ko et al (2005); policies, procedures, rules and regulations when used as part of a portfolio aimed at improving performance by Gann et al. (1998); the presence of management support by Renzl (2008) and Goh (2002); commitment and motivation of staff to share knowledge through incentive or reward structure and the willingness to learn from others by Carrillo et al. (2006); organisational and individual capabilities and competencies by Szulanski (1996).

Clearly due to the complexity of PFI projects, some of these factors must be important than others. Therefore it is prudent to attempt to rank them from the perspective of PFI participants, in terms of the consideration that should be given to them in the knowledge transfer process.

Research method

A questionnaire survey was deemed the most suitable way of obtaining the views of a large number of clients and construction practitioners on specific PFI issues. The questionnaire content was informed by literature reviews, and interviews which identified success factors for knowledge transfer from other sectors and industries. A total of thirteen factors relating to knowledge transfer barriers and twenty-three factors relating to knowledge transfer enablers were identified.

Between April and July 2009, over 250 questionnaires were posted to potential respondents using a database of education sector, transport and NHS PFI projects. The respondents included PFI directors, bid managers, partners, associates, and procurement managers. The survey process followed Dillman's (2000) Total Design Method. The sample survey consisted of a self-reported questionnaire which was completed by a senior manager of a construction related company or firm. A total of 53 usable responses were obtained. This represents a response rate of about 20%. This rate is higher than rates achieved by comparable survey study reported in the construction and project management journals (Akintoye et al. 2000). All respondents were either senior managers or partners with responsibility for PFI projects in their respective organisations.

Findings

The main findings are presented below.

Barriers that negatively affect knowledge transfer processes

Table 1 below shows respondents' view of the most important as well as the least important barriers to the knowledge transfer process.

Table 1: Barriers that negatively affect a knowledge transfer

Barriers	Respondents	%	Ranking
Time constraints	33	65	1
Lack of trust between parties (i.e. individuals and companies)	25	49	2
Budget limitations	24	47	3
Fear of losing the competitive edge	23	45	4
Policies, procedures, rules and regulations attached to the project	23	45	4
Not-invented here syndrome (This usually occurs as an unwillingness to adapt an idea or product because it originates from another company/culture)	22	43	6
Companies' lack of willingness to share knowledge	21	41	7
Reluctance to change the industry routines	17	33	8
External influences (political and social)	17	33	8
Reluctance to embrace new ideas	16	31	10
Organisational context and structure (i.e. complex structure and barren Organisational context)	15	29	11
Unnecessary influence made by other parties in the PFI project	15	29	11
Lack of motivation of staff to share knowledge	13	25	13

The five barriers that negatively affect knowledge transfer in order of importance are: Time constraints (65%), Lack of trust between parties (i.e. individuals and companies) (49%), Budget limitations (47%), Fear of losing the competitive edge (45%) and Policies, procedures, rules and regulations attached to the project (45%). Similarly, the five less important barriers that negatively affect knowledge transfer are: lack of motivation of staff to share knowledge (25%); unnecessary influence made by other parties in the PFI project

(29%); organisational context and structure (i.e. complex structure and organisational context) (29%); reluctance to embrace new ideas (31%), and external influences (political and social) (33%).

Enablers that positively affect knowledge transfer processes

Similarly, Table 2 below shows respondents' view of the most important as well as the least important enablers to the knowledge transfer process.

Table 2: Enablers that positively affect knowledge transfer

Enablers	Respondents	%	Ranking
Supportive leadership	48	96	1
Participation/commitment from the relevant parties	43	86	2
Good communication between the relevant parties	39	78	3
Organisational Culture (awareness, willingness to embrace new ideas and technology, etc.)	38	76	4
Willingness to learn from others	34	68	5
Individual capabilities and competencies	31	62	6
Feedback mechanisms	27	54	7
Reciprocity	26	52	8
Clearly articulated goals and strategies	23	46	9
Performance Measurement	23	46	9
Direct relationships or networking	22	44	11
Capacity to learn	22	44	11
Organisational capabilities	21	42	13
Training and development	21	42	13
Organisational structure (i.e. well-balanced structure)	20	40	15
The support from the other companies/partners	20	40	15
Common language and understanding	16	32	17
Reward mechanisms	15	30	18
Environmental Influences (Political, Economical, Social, etc.)	14	28	19
User-friendly technology	14	28	19
Understanding, interpretation and use of Information technology (IT)	13	26	21
Ensure reliability of the source	10	20	22
Policies relating to knowledge transfer	10	20	22

Table 2 indicate that the top five enablers that positively affect knowledge transfer are: supportive leadership (96%), participation/commitment from the relevant parties (86%), good communication between the relevant parties (78%), organisational culture (awareness, willingness to embrace new ideas and technology) (76%), and the willingness to learn from others (68%).

The five enablers that least positively affect knowledge transfer are: environmental influences (Political, Economical, Social, etc.) (28%); User-friendly technology (28%); Understanding, interpretation and use of Information technology (IT) (26%), Ensuring reliability of the source (20%).and policies relating to knowledge transfer (20%).

Discussion

Barriers that most negatively affect knowledge transfer

Time constraints are perceived as the most significant barrier that negatively affects the knowledge transfer process (Table 1, 65% of respondents). A reason may be that as exchanging and internalizing information is time consuming (Szulanski 1996), there is a possibility that individuals with numerous other demands on their time will focus solely on work demands for which they have primary accountability. Also the lengthy negotiation periods associated with PFI procurement and its subsequent influence on bidding and transaction costs (Carrillo et al. 2008) may limit the time required to implement the knowledge transfer process. This finding suggests that PFI firms need to provide enough time for employees and relevant parties to learn and share information.

The second most significant barrier that affects the knowledge transfer process is the lack of trust (Table 1, 49% of respondents). This suggests that some participants in PFI projects are still experiencing a lack of trust between the project stakeholders. A reason may be that the trust between parties has to be developed over a shorter period rather than over the concession period considering the time allocated for the design and construction of the facility. This suggests that project stakeholders in PFI projects should pay attention to encouraging and developing trust between stakeholders for a successful knowledge transfer.

In terms of the least important barriers to knowledge transfer process, the lack of motivation of staff to share knowledge (Table 1, 25% of respondents) is perceived as the least important barrier to knowledge transfer in PFI projects. Even though motivational factors act as barriers to knowledge transfer process (Salmi and Torkkeli 2009, Szulanski 1996), it seems the lack of motivation to share knowledge is not a growing concern. Li et al. (2005) found out that staffs are willing to share knowledge in PFI projects. Another reason may be that project stakeholders seek external skills and experience from competent advisers to complement their knowledge and skills in the bidding stage of the project. However, the cost of such advice makes PFI bidding cost and transaction costs very expensive. This suggests that staffs in most of the organisations are motivated to share knowledge but other issues are significantly influencing the knowledge transfer process. Thus stakeholders should pay more attention to the significant barriers identified.

Enablers that positively affect knowledge transfer

Supportive leadership is perceived as the most significant enabler that positively affects knowledge transfer processes (Table 2). 96% of the respondents believed that this was the most important factor that positively enables a successful knowledge transfer processes. This finding concurs with previous findings by Yang (2007) and Eppler and Sukowski (2000) that supportive leadership functions do foster and enhance effective knowledge transfer processes. This suggests that for a successful knowledge transfer, support and good leadership from key stakeholders and senior managers is vital. Relying solely on frameworks may not be sufficient. Effective and supporting leaders will be able to support favourable knowledge transfer framework through clearly articulated goals and strategies (Renzl 2008). Thus PFI stakeholders should pay more attention to encouraging senior managers to partake in the knowledge transfer processes.

Participation/commitment from the relevant parties is ranked as the second most significant enabler to knowledge transfer in PFI projects (Table 2, 86%). Bresnen et al. (2003) noted that the process of knowledge capture, transfer and learning in project settings rely upon social patterns, practices and processes which emphasizes the value and importance of trust, commitment and collaboration. This suggests that for a successful knowledge transfer to occur in PFI projects, stakeholders should secure commitment and participation from relevant stakeholders where appropriate. This suggests that in order to achieve a successful knowledge transfer, all relevant stakeholders should commit their best resources to the knowledge transfer process. As such commitment and participation must be encouraged throughout all levels of management.

In general the finding that 96% and 86% of respondents perceived supportive leadership and participation/commitment from the relevant parties respectively, as the most significant enablers, suggests that firms need to develop leadership qualities as well as seek participation and commitment within all levels of management to enhance successful knowledge transfer processes.

The enabler that least positively affects knowledge transfer processes as perceived by practitioners is Policies relating to knowledge transfer (Table 2, 20%). A reason may be that most organisations do not have specific knowledge transfer policies because it is taken for granted that knowledge is embedded within the organizational structures, processes, procedures, and routines. Generally, knowledge transfer processes are affected by individual

absorptive capacities irrespective of the organisational structure and culture (Cranefield and Yoong 2007, Bresnen et al. 2005).

Conclusions

Although there has been significant increase in the use of PFI to procure public facilities and services in the UK over the years, there are concerns over the level of knowledge transfer, information sharing, innovation and continuous improvement in several aspects of PFI projects. Different knowledge transfer frameworks have been proposed as solutions, but many factors and issues enable or hinder knowledge transfer processes in PFI projects. While, it is possible to identify and rank the relative significance of these factors or issue, there is a lack of knowledge about the relative importance of the barriers and enablers that hinder or enhance the knowledge transfer processes in PFI environments.

This paper has investigated and identified the most significant barriers and enablers to a successful knowledge transfer process in UK PFI projects. Data from questionnaire survey has been used to identify and rank the most significant factors or issues that enable or hinder a successful knowledge transfer process in UK PFI projects. The five barriers that emerged as negatively affecting the knowledge transfer process, in order of descending significance are: time constraints, lack of trust between parties, budget limitations, fear of losing the competitive edge and policies, procedures, rules and regulations attached to the project. Similarly the five most significant enablers that positively affected knowledge transfer processes are identified, in order of descending significance as supportive leadership, participation/commitment from the relevant parties, good communication between the relevant parties, organisational culture, and the willingness to learn from others. Most importantly, the findings of supportive leadership and participation/commitment, as the most significant enablers, suggests that PFI firms need to develop leadership qualities as well as seek participation and commitment within all levels of management to enhance successful knowledge transfer processes. Practitioners and managers can overcome the barriers encountered while enhancing the enablers to improve bespoke knowledge transfer processes.

This paper proposes that PFI participants engaged in knowledge transfer process should pay more attention to the identified barriers and enablers in order to achieve successful transfer process. To improve knowledge transfer processes, senior managers tasked with enhancing or developing knowledge transfer frameworks and boosting innovation can use the identified barriers and enablers to efficiently achieve their knowledge transfer goals.

Reference

- Abjanbekov, A and Padilla, A E A (2004) *From knowledge transfer to knowledge translation: Case study of a telecom consultancy*, Linköping, Sweden: Linköping University.
- Akintoye, A, McIntosh, G and Fitzgerald, E (2000) A survey of supply chain collaboration and management in the UK construction industry. *European Journal of Purchasing and Supply Management*, **3-4**(6), 159-68.
- Akintoye, A, Hardcastle, C, Beck, B, Chinyio, E and Asenova, D (2003) Achieving best value in private finance initiative project procurement. *Construction Management and Economics*, **21**(5), 461–70.
- Bresnen, M, Edelman, L, Newell, S, Scarbrough, H and Swan, J (2003) Social practices and the management of knowledge in project environments. *International Journal of Project Management* 21 (2003), **21**(1), 157–66.
- Bresnen, M, Edelman, L, Newell, S, Scarbrough, H and Swan, J (2005) Exploring social capital in the construction firm. *Building Research and Information*, **33**(3), 235-44.
- CABE (2008) *Artists and places*, London: The Commission for Architecture and the Built Environment
- Carlile, P R and Rebentisch, E S (2003) Into the black box: The knowledge transformation cycle. *Management Science*, **49**(9), 1180-95.
- Carrillo, P, Robinson, H, Al-Ghassani, A and Anumba, C (2004) Knowledge management in construction: Drivers, resources and barriers. *Project Management Journal*, **35**(1), 46-56.
- Carrillo, P, Robinson, H, Foale, P, Anumba, C and Bouchlaghem, D (2008) Participation, barriers, and opportunities in pfi: The united kingdom experience. *Journal of Management in Engineering*, **24**(3), 138-45.

- Carrillo, P M, Robinson, H S, Anumba, C J and Bouchlaghem, N M (2006) A knowledge transfer framework: The pfi context. *Construction Management and Economics*, **24**(10), 1045—56.
- Cranefield, J and Yoong, P (2007) Interorganisational knowledge transfer: The role of the gatekeeper. *International Journal of Knowledge and Learning*, **3**(1), 121-38.
- Dillman, D A (2000) *Mail and internet surveys: The tailored design method*. Second ed. New York: John Wiley & Sons.
- Eppler, M J and Sukowski, O (2000) Managing team knowledge: Core processes, tools and enabling factors. *European Management Journal*, **18**(3), 334-41.
- Fernie, S, Green, S D, Weller, S J and Newcombe, R (2003) Knowledge sharing: Context, confusion and controversy. *International Journal of Project Management*, **21**(3), 177-87.
- Gann, D M, Wang, Y and Hawkins, R (1998) Do regulations encourage innovation? The case of energy efficiency in housing. *Building Research and Information*, **26**(5), 280-96.
- Goh, S C (2002) Managing effective knowledge transfer: An integrative framework and some practical implications. *Journal of Knowledge Management*, **6**(1), 23–30.
- H M Treasury (2008) Infrastructure procurement: Delivering long-term value. In: H M Treasury, Ed., London: The Stationery Office.
- Harada, T (2003) Three steps in knowledge communication: The emergence of knowledge transformers. *Research Policy*, **32**(10), 1737-51.
- Hellowell, M, Price, D and Pollock, A M (2008) *The use of private finance initiative (pfi) public private partnerships (ppps) in northern ireland*, Belfast: Northern Ireland Public Service Alliance,
- Ko, D-G, Kirsch, L J and King, W R (2005) Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. *MIS Quarterly*, **29**(1), 59–85.

- Li, B, Akintoye, A, Edwards, P J and Hardcastle, C (2005) Critical success factors for ppp/pfi projects in the uk construction industry. *Construction Management and Economics*, **23**(5), 459-71.
- Liyanage, C, Elhag, T, Ballal, T and Li, Q (2008) The process of knowledge transfer and its significance in integrated environments. In, *AACE International's 52nd Annual Meeting & ICEC's 6th World Congress on Cost Engineering, Project Management and Quantity Surveying TCM - Cost Engineering for the Global Community* 29 June - 2 July 2008, Toronto, Ontario, Canada.
- Liyanage, C, Elhag, T, Ballal, T and Li, Q (2009) Knowledge communication and translation – a knowledge transfer model. *Journal of Knowledge Management*, **13**(3), 118-31.
- National Audit Office (2009) *Performance of pfi construction: A review by the private finance practice*, London: National Audit Office.
- Nonaka, I (1994) A dynamic theory of organizational knowledge creation. *Organization Science.*, **5**(1), 14-24.
- Oliver, M L (2009) The transfer process: Implications for evaluation. *New Directions for Evaluation*, **2009**(124), 61-73.
- Renzl, B (2008) Trust in management and knowledge sharing: The mediating effects of fear and knowledge documentation. *Omega*, **36**(2), 206-20.
- Robinson, H S, Carrillo, P M, Anumba, C J and Bouchlaghem, N M (2004) *Investigating current practices, participation and opportunities in the private finance initiative*, Loughborough: Loughborough University.
- Salmi, P and Torkkeli, M (2009) Success factors of interorganisational knowledge transfer: A case of a collaborative public–private r&d project *International Journal of Business Innovation and Research*, **3**(2), 109-25
- Szulanski, G (1996) Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, **17**(10), 27–43.
- Yang, J-T (2007) Knowledge sharing: Investigating appropriate leadership roles and collaborative culture. *Tourism Management*, **28**(2), 530-43.