

CRITICAL FACTORS THAT MAKE KNOWLEDGE TRANSFER SUCCESSFUL IN PFI ENVIRONMENTS

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Abstract

Although PPP/PFI projects play an important role in the UK construction industry, there is still considerable debate on several aspects concerning PFI. The complexity of the PPP/PFI structure, different number of stages involved and the length of the PPP/PFI project (usually it spans across 25 – 40 years) make it difficult for the parties involved to make it successful and profitable. One way of improving PFI performance is to transfer knowledge from previous projects on to future projects and to other PFI teams. The main aim of the paper is, therefore, to study the process of knowledge transfer in PFI environments. The findings presented in the paper mainly focus on identifying the factors that can make process of knowledge transfer successful in PFI projects. This is achieved using a robust case study methodology. Altogether four case studies were conducted using semi-structured interviews. A broad range of factors that can influence the success of knowledge transfer was identified from the case study findings. Out of the range of factors, avoiding cost overruns, avoiding time overruns, communication and collaboration and strategic planning were identified as critical in all four case studies. Further analysis of these factors illustrated notable relationships between and within each of the CSFs, which meant that all CSFs, either directly or indirectly, influence one another. This gives the notion the coordination between each of these CSFs (also the non-critical factors) is very significant to make a knowledge transfer successful.

Keywords: Communication, collaboration, critical success factors, knowledge transfer, public finance initiatives

1. Introduction

Although PPP/PFI projects play an important role in the UK construction industry, there is still considerable debate on several aspects concerning PFI. The complexity of the PPP/PFI structure, different number of stages involved and the length of the PPP/PFI project (usually it spans across 25 – 40 years) make it difficult for the parties involved to make it successful and profitable, unless they have a clear set of strategies to collaborate and communicate with each other. One of the strategies could be to introduce appropriate mechanisms for capturing and transferring expertise and lessons learned in order to facilitate innovation. As Carrillo et al. (2006) affirm both government and the construction industry recognise that there is tremendous scope for improvement in the

execution of PFI projects. One way of improving PFI performance is to transfer knowledge from previous projects on to future projects and to other PFI teams. Since PFI is a costly commitment, any mistake made because of lack of current knowledge can be critical for the length of the service period of the contract. Therefore, as Carrillo *et al.* (2006) suggests, knowledge transfer will, as the PFI matures, make the organisations better equipped to cope with the increased and more complex demands expected from PFI projects. Knowledge transfer could also be an effective mechanism for mitigating risks, a key issue in an increasingly complex PFI environment.

The main aim of the paper is to study the process of knowledge transfer in PFI environments. This paper is based on an empirical research, which was set up to investigate the process of knowledge transfer in PFI environments. The research is titled as '**Procurement for Innovation and Knowledge Transfer (ProFIK)**'. The findings presented in the paper mainly focus on identifying the factors that can make process of knowledge transfer successful in PFI projects.

2. Knowledge Transfer and Critical Success Factors

The transfer of knowledge within organisations is widely considered to be a key to effective management of knowledge, and an enabler of the innovation that is necessary to enhance organisational capability (Nonaka, 1998). However, successful knowledge transfer is considered difficult (Nonaka, 1998); and the sharing of knowledge is perceived as risking a loss of power by some individuals (Scmetz, 2002; as cited in Cranefield and Yoong, 2005). For these reasons, organisations need to actively work to create a knowledge sharing culture, and to facilitate practices and processes that promote effective knowledge transfer. In order to do this, it is necessary for them to understand the factors that are critical for a knowledge transfer process that apply to their organisational context (Cranefield and Yoong, 2005).

According to Jefferies (2006), the concept of "Critical Success Factors" (CSF) was developed by Rockart and the Sloan School of Management with the phrase first used in the context of information systems and project management. Rowlinson (1999) states that CSFs are those fundamental issues inherent in the project, which must be maintained in order for team working to take place in an efficient and effective manner. They require day-to-day attention and operate throughout the life of the project (Jefferies, 2006). Saraph *et al.* (1989) viewed them as those critical areas of managerial planning and action that must be practised in order to achieve effectiveness. In terms of knowledge transfer, as Wong (2005) describes, CSFs can be viewed as those activities and practices that should be addressed in order to ensure its successful implementation. These practices would either need to be nurtured if they already existed or be developed if they were still not in place. Based on the above definition, CSFs in this study are treated as those internal factors which are controllable by an organisation. External factors such as environmental influences are not taken into account since organisations have little control over them when implementing knowledge transfer (Wong, 2005).

There can be a number of factors that can influence the success of knowledge transfer in general. For example, an attractive approach to foster knowledge transfer and knowledge sharing is to develop communities of practice within companies (Disterer, 2001). As

Wong (2005) states, training and education is another important consideration for successful knowledge transfer. In a basic sense, organisational members need to be aware of the needs to manage knowledge and to recognise it as a key resource for the viability of a company. Another central aspect for knowledge transfer is the development of an appropriate organisational infrastructure. This implies establishing a set of roles and teams to perform knowledge-related tasks (Davenport *et al.*, 1998). One of the other means for driving the success of knowledge transfer related activities is to have a clear and well-planned strategy. This provides the foundation for how an organisation can deploy its capabilities and resources to achieve its KM goals (Liebowitz, 1999). Mutual trust is also necessary among all organization members to openly share. Trust results in common expectations of reliability, consistency, and plausibility. Trust reduces the fear that others will act opportunistically (Disterer, 2001). Likewise, a broad range of critical factors that can lead to the success of a knowledge transfer exercise has been mentioned in the literature. Concern and trust (Davenport and Prusak, 1998; Disterer, 2001), Management and leadership (Davenport *et al.*, 1998; Disterer, 2001; Holsapple and Joshi, 2000; Liebowitz, 1999; Skyrme and Amidon, 1997), Rewards and incentives (Davenport *et al.*, 1998; Disterer, 2001; Liebowitz, 1999), to name a few.

Apart from the factors described above, a different type of CSFs can also be found in the literature. These factors are embedded in the knowledge and/or in the knowledge transfer process itself and, therefore, are highly 'knowledge specific' and incline more towards theoretical aspects of knowledge transfer. Knowledge distance (Cummings and Teng, 2003; Libing and Rong, 2007) is one such example. According to Libing and Rong (2007), when there is knowledge distance between the knowledge source and the knowledge receiver, it will obviously increase steps of learning and difficulty of knowledge transfer since the knowledge source is unable to understand the knowledge receiver's demands and barriers in the knowledge transfer process. Few other examples for 'knowledge specific' critical factors are: Absorptive capacity of the recipient (Cohen and Levinthal, 1990; Khamseh and Jolly, 2008), Retentive capacity (Cohen and Levinthal, 1990), Knowledge articulability (Cummings and Teng, 2003), and Knowledge transferability (Libing and Rong, 2007).

Similarly, there are many research studies that present different critical success factors affecting knowledge transfer. Nevertheless, what should not be forgotten here is any of the factors mentioned above vary according to different settings, from industry to industry (Kobetich, 1987), according to different strategy types (Jenster, 1985) and even according to the types and personal traits of the people involved in the knowledge transfer process (den Hertog and Brouwer, 2001). Therefore, the idea of this paper is to identify the CSFs of knowledge transfer in PFI settings in construction.

3. Empirical Study and Analysis

The findings presented in this paper are based on a case study approach. The sample for the case studies was chosen from on-going Private Finance Initiatives (PFI). Altogether four case studies were chosen and semi-structured interviews were carried out as the mode of data collection (refer to Table 1 to identify the type of projects chosen and their current status). The four case studies were chosen from different types of PFI projects, i.e. hospital, military, school and transport. All four cases were some of the largest PFI

projects in the UK and the total duration of projects span across 30 – 40 years. Two of the case studies were at the maintenance stage whilst construction was still on-going in the other two cases. The SPV of the PFI schemes of the four cases generally consisted of a main contractor, an FM contractor and financial institutions (i.e. banks).

Case studies from the four PFI projects inevitably yielded a large amount of data, which was arranged into segments of material, based on the interview schedule and an organising system derived from the issues raised in the interviews. Due to the size of data collected, it was relatively easy to code data using a computer based method (NVivo - QSR7) rather than using a manual method.

Content analysis was used as the method of data analysis during the case study approach. During the content analysis of data, initially, any factor that can affect a knowledge transfer process, either positively or negatively, were identified. Using these factors, the critical factors that influence the success of knowledge transfer were then deduced. Herein, the use of 'content analysis' proved to be more helpful to identify the 'criticality' of the factors rather than just using 'textual analysis'. The content analysis method offers a more rigorous approach based on the clarification and formalisation of how the text is read and codified, according to preconceived or built in categories (Belerson, 1954), whereas the purpose of textual data analysis is to analyse the text as a set of words, to make a statistic of their (i.e. the set of words) utterance and of their relationship within the text (Moscarola, 2002).

During content analysis of data, if an interviewee has talked about an issue more number of times compared to other issues, it was identified 'critical'. However, irrespective of the frequency of statements, if an interviewee has specifically mentioned a factor as 'critical', then it was straight away taken as a CSF. To ensure 'reliability' of these, interviewees' confirmation on overall findings was taken by sending a summary of the results to them.

As the case study findings reveal, there are several critical factors that make a knowledge transfer process successful (Table 1: Caption). Interestingly, none of the factors identified in Table 1 appear to be highly 'knowledge specific'. The case study participants' lack of unawareness of theoretical aspects of 'knowledge' may be a reason for this. According to Table 1, altogether, 15 success factors were identified as critical for knowledge transfer in PFI. Even though the interview participants have mentioned PFI specific factors such as 'avoiding risks involved in the PFI scheme', 'partnering arrangement of the SPV' and 'long term nature of the project' as factors that could influence a knowledge transfer process, results of the in-depth analysis did not portray them as 'critical'. Therefore, of the 15 critical factors, only one was related specifically to the PFI context. Therefore, the CSFs identified above can easily be generalised to other types of procurement systems in construction as well.

Amongst the 15 factors, four factors were unanimously identified as 'critical' in all four case studies. They are: avoiding cost overruns; avoiding time overruns; communication and collaboration; and strategic planning. Following quotes taken from the interviews explain the importance of the aforementioned four factors:

"When it comes to deciding things we sometimes have to say, well hang on, the budget does not permit us to do that. It (knowledge transfer) may be a good idea, but

we have to see whether it is within our cost plan? The same thing goes to our work programme, no matter how good the idea is, if it delays our work, then sorry it's a No No, especially because we have penalties for any kind of delays. "

Project Manager, Contractor – Case Study2

"We have multidisciplinary teams in this PFI, or in any PFI I should say. So there are all engineers and architects sitting together. But one thing for sure is you can't assume things are going smooth because they are all sitting together. We have to make sure they are communicating. You do have to bring them together often and have regular meetings to get their views and to know what is going on in the project..."

Project Coordinator – Case Study 1

"Every process you have to plan strategically... we have to spot everything very early on, we have to decide what we are going to do at very early stages.... and you think of different ways and try to weigh the pros and cons like you can do this way because of X, Y, Z and you cannot because of these.."

Project manager – Case Study4

Table 1: Critical success factors for knowledge transfer in PFI

Critical Success Factors	CS1	CS2	CS3	CS4
Avoid cost overruns	✓	✓	✓	✓
Avoid time overruns	✓	✓	✓	✓
Communication and collaboration	✓	✓	✓	✓
Strategic planning	✓	✓	✓	✓
Win-win situation for all parties involved	-	✓	✓	✓
Achieve already set quality targets	✓	✓	-	-
Support from the others partners in the PFI	-	-	-	✓
Support from the client	-	-	-	✓
Client satisfaction		✓		
Meet requirements set out in the legislations	-	✓	-	-
Achieve required project specifications	-	-	-	✓
Adopt tried and test techniques	-	-	✓	-
Good judgement and evaluation	-	-	✓	-
Identify benefits that are worth risking	-	-	✓	-
Evaluate all aspects of an issue (commercial, political, technical, etc)	-	-	-	✓

The importance of the aforementioned factors has also been mentioned widely in construction and knowledge transfer related literature. For instance, there has been a wealth of research discussing the significance of avoiding time and cost overruns in construction in general (Bromilow *et al.* 1988; Chan & Kumaraswamy, 1995; Majid & McCaffer, 1998; Morris & Hough, 1989; Nkado, 1995).

Further analysis of the CSFs uncovered that the CSFs, either directly or indirectly, influence one another. This was evident from separate cognitive maps developed for all of the CSFs based on the case study data. The cognitive maps showed notable relationships

between and within each of the factors (Figure 1: Caption, Figure 2: Caption). According to Figures 1 and 2, 'strategic planning' and 'communication and collaboration' relate to many of the other factors such as 'win-win situation for all involved', 'client satisfaction', 'support from the client', 'support from other partners in the PFI', 'identify benefits that are worth risking' and evaluate all issues', etc. This gives the notion that identification of CSFs and development of suitable settings to improve CSFs is not sufficient to make a knowledge transfer successful. The coordination between each of these CSFs (also the non-critical factors) is also significant to make it happen. This was also affirmed by one of the interviewees:

"Coordination is very critical. It is like a clock actually... there are certain big cogs, and there are smaller cogs... every cog has to be turning on the right ways for the clock to work properly.... if one tiny cog breaks down, it doesn't matter how well the others are working, the clock isn't going to work."

Project Manager – Case Study 3

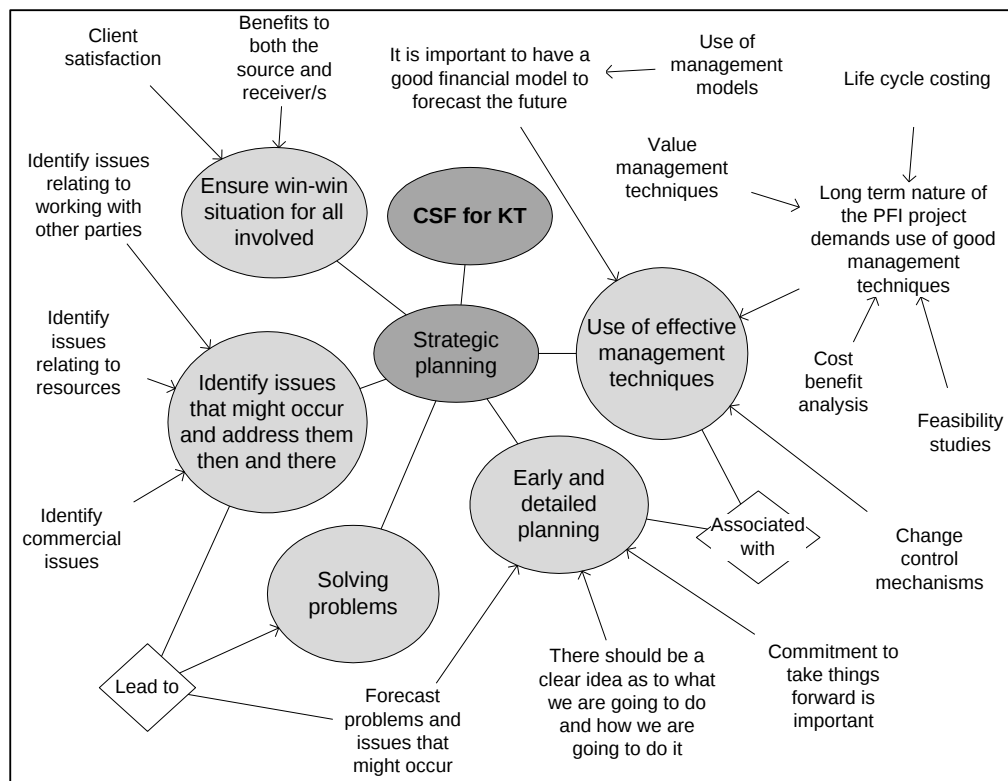


Figure 1: Cognitive map for the critical success factor 'strategic planning'

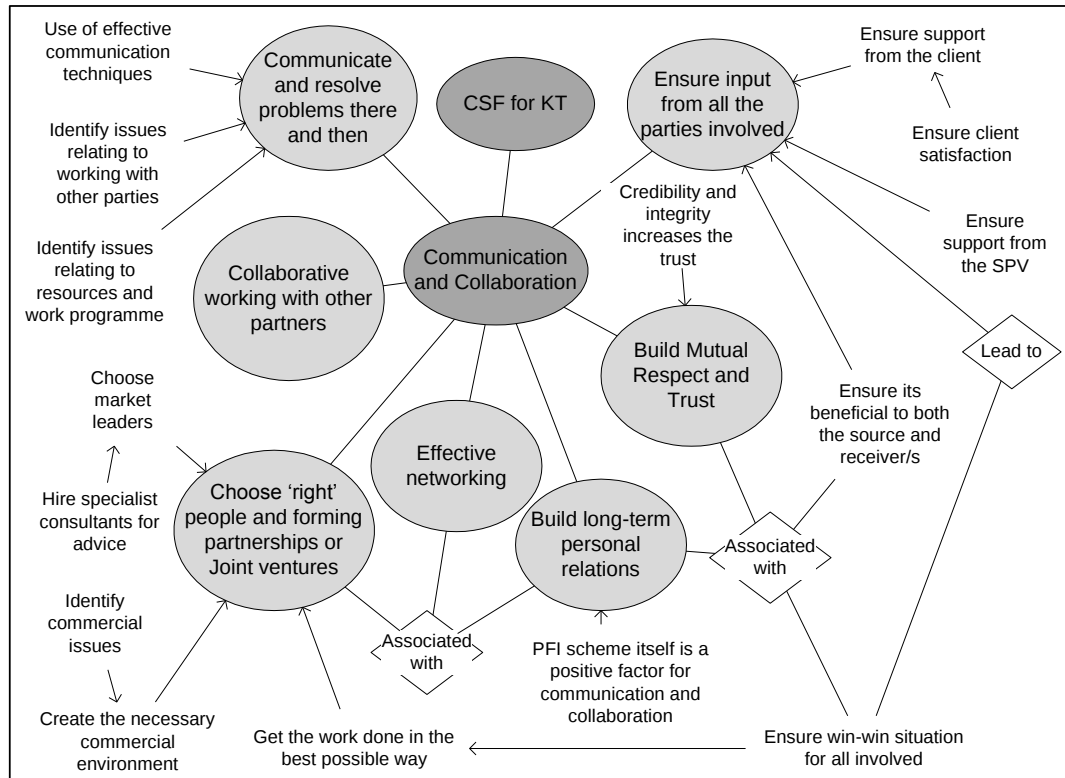


Figure 2: Cognitive map for the critical success factor ‘communication and collaboration’

4. Discussions and Conclusions

Although organisations in PFI projects can realise remarkable benefits by transferring knowledge from one unit to another (as mentioned above) successful knowledge transfer can be difficult to achieve. A key to understanding the success of a knowledge transfer process also depends on the identification of factors that could make an impact on the process. Ignorance and oversight of the necessary important factors will likely hinder an organisation’s effort to realise its full benefit.

A broad range of factors (precisely 15 CSFs) that can influence the success of knowledge transfer was identified from the case study findings. Even though the interview participants have mentioned PFI specific factors such as ‘avoiding risks involved in the PFI scheme’, ‘partnering arrangement of the SPV’ and ‘long term nature of the project’ as factors that could influence a knowledge transfer process, results of the in-depth analysis did not portray them as ‘critical’. Therefore, of the 15 critical factors, only one was related specifically to the PFI context. Therefore, the CSFs identified above can easily be generalised to other types of procurement systems in construction as well.

Out of the 15 CSFs, four factors were unanimously identified as critical in all four case studies. They are: avoiding cost overruns, avoiding time overruns, communication and collaboration and strategic planning. Further analysis of these CSFs based on the development of separate cognitive maps uncovered another significant finding. The cognitive maps showed notable relationships between and within each of the CSFs, which

meant that all CSFs, either directly or indirectly, influence one another. This gives the notion that identification of CSFs and development of suitable settings to improve CSFs is not sufficient to make a knowledge transfer successful. The coordination between each of these CSFs (also the non-critical factors) is also significant to make it happen. Failing to do so, will eventually lead to the breakdown of knowledge transfer.

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