



## COVER SHEET

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# AN EXAMINATION ON THE SUSTAINABLE COMPETITIVE ADVANTAGE OF PRIVATE FINANCE INITIATIVE PROJECTS

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**ABSTRACT:** The Private Finance Initiative (PFI) is a long-term concession of services used by the UK government to capture private capital to fund public projects. This model is being increasingly applied in Portugal and the assessment of its competitive advantage is very important to Portugal. The empiric study undertaken both in Portugal and the UK has permitted to draw already some conclusions. PFI has developed the way the construction industry is managed, and has increased the competitive advantage of UK construction industry acting in the four vectors of competitive advantage: Innovation, Quality, Efficiency and Attention to the Client. Innovation occurred, through new designs more efficient and cost effective through the project's whole life cycle. There is the widespread use of management tools: whole life cycle costing, risk management and benchmarking. PFI also improved communication in the UK construction industry, forcing the interaction and feedback from all stakeholders in a project.

**KEYWORDS:** PFI, Sustainable Competitive Advantage, Construction Companies, Innovation, Quality, Efficiency, Attention to the Client.

## 1. INTRODUCTION

The PFI was formally launched (Lemos, Betts, Eaton and Almeida 2000) in the United Kingdom (UK) by the 1992 Autumn Statement (Broadbent 1999) of the then Chancellor of the Exchequer Norman Lamont *"The PFI, like the earlier policies of privatisation and contracting-out, is based on a 'political rationality' that private sector enterprise and discipline can bring gains in efficiency and reduction in costs.."*. The fundamental requirements for PFI projects are therefore that the public sector must secure Value for Money (VFM) obtained by gains in efficiency and effectiveness, transferring the risk to the party best able to manage them (be it the private or public sector) and relating always the revenues for the private partner solely to the performance of a service provision.

A proposed definition for PFI follows based on the UK's Government published regulations, the background of PFI and its implementation procedures: *"PFI is an integrative, holistic, social and economic developing policy of the UK Government. It integrates a hierarchy of four levels of concepts: Government Ideology, Principles, Practices and Tools. In its essence is a public-private partnership with the specific purpose to deliver a service of publicly managed assets using private capital"*.

- At the first conceptual level are the Governments' fundamental beliefs on the monetarist political and economical ideology;
- Monetarist's principles are at the second conceptual level and condition the government's policies, which for PFI are: the

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establishment of a free competitive market, the control of public expenses, and that VFM must be obtained by gains in efficiency and effectiveness (fostering innovation) and transferring the risk to the party best able to manage them (be it the private or public sector);

- At the third level are the Practices (regulations) to implement the PFI projects: Free-Standing Projects (where all revenues stems from the final users), Joint Ventures and DBFO (where the public sector pays for all the services provided);
- Finally, at the fourth and last level are the main tools used in PFI projects: VFM-performance Auditing, Public Sector Comparator, Benchmarking, Project Finance, Risk Management, Value Management and Total Quality Management (TQM).

PFI has opened to the private sector a variety of areas that previously were outside of the scope of concessions such as schools, prisons, accommodation, hospitals. Taking into account the development of PFI, it is a key issue for strategic decisions on PFI projects to evaluate if this procurement model is indeed more competitive than other procurement models. The competitiveness is translated in the delivery of better VFM ensuring that there is a better utilisation of public funds supplying services more efficiently and effectively.

The purpose of this study is two-fold: First, to assess the PFI competitive advantage and the conditions for its sustainability based on the experience gained by all stakeholders in dealing with these projects, and second to draw some conclusions on the effect PFI has had on UK construction companies.

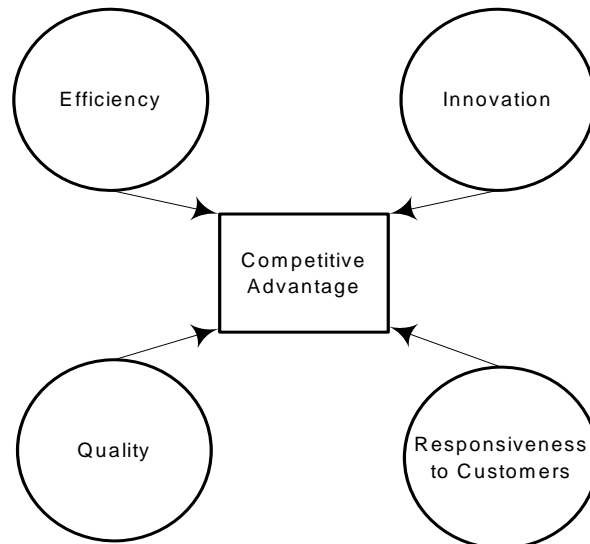
This work presents first, the model utilised to assess the competitiveness of PFI. The assumption was that if PFI (as a procurement model) brings in improvements in efficiency, innovation, quality and attention to the client's needs, then it is more competitive than other methods of government procurement. Included is also a brief literature review on the relation between each factor and competitive advantage. It follows, the description of the empiric study undertaken based on case study analysis of several PFI projects. Finally, the sustainability of the competitive advantage of PFI is discussed together with some insights and recommendations for construction companies.

## **2. THE SUSTAINABLE COMPETITIVE ADVANTAGE**

*'Competitive Advantage'* (CA) is the ability of a company to outperform the other competitors within the same industry. (Jones, George and Hill 2000). There are several models to assess the CA (and its sustainability). Some are organisational theories (Hoyt and Hug 2000) based on the nature of supply chain transactions that occur, such as transactions cost theory, resource based theory (RBT) and strategy structure theory (SST), all of which assess CA based on the type of relations established within the partnerships. Other models analyse the procedures and outcome (products/services) of a company vis-a-vis other companies (competitors). It was considered that this last approach was more adequate as it would permit the comparison between the performance of PFI and other procurement methods with specific metrics.

The traditional models to evaluate CA are applied to companies and it is our proposal to apply these models to evaluate the competitiveness of the procurement model that PFI stands for. The unit of analysis becomes a procurement model (PFI) instead of a company. We consider this a valid assumption as for all four blocks of CA it can be made an evaluation comparing the performance of each one in a PFI environment and in traditional procurement. As such, the empiric study underlying assumption

and guidance was to evaluate the performance of efficiency, quality, etc., related to the fact that it occurred because it was within a PFI framework, simultaneously checking if it would be different in traditional procurement. For example, the question to ask before considering valid some data would be: Would this building have insulated walls (minimising heat losses) if it was not a PFI? If yes, then PFI would be neutral. If not, then PFI would have induced efficiency improvements.



*Figure 1 The '4Blocks' of Competitive Advantage*

The model adopted (Jones, George and Hill 2000) to assess the PFI' CA is the 4 Building Blocks of CA which are: **Innovation, Quality, Efficiency and Responsiveness to Customers** (Figure 1). These are considered to be the main blocks to build a company's CA vis-à-vis its competitors and are derived from the company's competences, resources and capabilities. Each of these blocks is dynamic, as it is understood that is necessary to continuously improve each block to obtain and maintain the CA. Each of the '4Blocks' of CA are closely inter-related. For example, improving the efficiency of a process has clear implications on innovation and quality.

A more detailed explanation on each of these concepts and their relation with the CA follows:

**Increasing Innovation** - Innovation is a process where new goods or processes are developed under incentive as human nature tends to be conservative. If something has worked out why change it? Innovation also requires the creation of a work environment that encourages risk taking.

It is interesting to note that PFI was in itself an innovative product relative to the traditional ways of procurement, but can PFI induce innovation? In PFI there is always a strong incentive for the private sector to innovate to get a better return on investment by reducing costs and/or increasing revenues. Carneiro (2000) demonstrated the linkages between innovation and competitiveness as well as their relationship with knowledge management within the organisations.

**Increasing Quality** - Quality means that there is the right adjustment between process and output, or between what is offered and the needs. It aims at getting the right service (product) to the customers reducing losses or unnecessary high standards. It is not subjective. There must exist a correct adjustment between the service provided and the degree of satisfaction of the stakeholders, i.e., that their expectations are fulfilled.

Operational and measurable parameters have to be stated a priori to enable the understanding of what is understood by quality, and most important, to measure and control the quality. Good quality products 'Do the job they are designed for, do it well and give customers what they want' (Jones 2000). The best known managerial technique to improve quality is TQM that focuses on improving the quality of a company's products and services and stresses that all the organization's functional activities should be directed to this goal, like Lean Construction philosophy that aims at improving quality in the construction industry.

Douglas and Judge (2001) demonstrated the relationship between Total Quality in management practices and the achievement of CA, as higher quality is closely related to improved efficiency and better VFM. A more comprehensive study was presented by Tena et al (2001) discussing TQM initiative on resources and competencies as sources of CA.

**Increasing Efficiency** - Efficiency is key in today's competitive environment. It aims at reducing the resources needed to produce a specific output, or conversely, with the available resources increase the output. Efficiency gains can be obtained either recurring to new technologies and/or to new ways to manage the procedures/organisations.

**Improving Customer Responsiveness** (or Attention to the Client) - It is about giving to customers what they want and need, promoting the organisational strategies that respond to those needs. It is important for clients to have the notion that they have correctly 'invested' their money, i.e., that they are getting 'good value for money', or VFM, meaning good quality low cost product (efficiently produced). Gomolski 2001 demonstrated that the improvement of efficiency and responsiveness to customers are believed by many companies to be sources of CA.

These four blocks of CA are inter-related as Fullerton (2001) and Vokurka (2002) research demonstrated that manufacturing strategies like Just-In-Time build and sustain a company's CA by improving simultaneously efficiency, quality and the customer responsiveness.

Having achieved a CA the next step is to keep it by the continuous improvement of the four blocks of CA. The key issue in the current uncertain and dynamic environment is the **Sustainable Competitive Advantage** (SCA). The main pitfalls to avoid depend on the existing Imitation Barriers, the Capacity of Adjustment to Change and the Industries' Dynamics:

- The raising of Imitation Barriers depends upon which factor the CA is based. It can be on tangible or intangible factors. The tangible factors are the easiest to imitate since they are largely based on technology, so it is important to focus on intangible assets like know-how, procedures, etc, that are more difficult to imitate.
- The two major factors that hinder the Capacity of Adjustment to Change are: Inertia and the Icarus Paradox. Inertia is very easily installed in an organisation that is doing well, but it is very important to resist it and instead to adopt a more proactive attitude, as competitors are always improving. The Icarus Paradox occurs when a company becomes focused on one particular factor of CA at the expense of other equally important factors.
- The Industries Dynamics depends on the particular industry, but the surrounding environment is constantly changing and that also has to be accounted for. A continuous attention to the environment and a strong focus on innovation are key to attain a Sustainable Competitive Advantage.

The following are examples drawn from the empiric data collected for the purpose of supporting the conclusions on the PFI' CA and its Sustainability.

### **3. EMPIRIC STUDY**

The data was collected during the fieldwork undertaken to develop several PFI case studies: Lusoponte (Lemos, Betts, Eaton and Almeida 2002) a PFI to build and operate two bridges in Lisbon, Portugal, the Victoria Dock Primary School in Hull UK a PFI to build and operate a primary school, a similar PFI from the JSCSC in Watchfield UK, Indáqua Feira the water and wastewater systems construction and operation in Santa Maria da Feira in Portugal and the Manchester Fire Station. Some evidence was also drawn from interviews with experts in the various functional areas of PFI and from secondary data, mainly documentary. The issues that permitted the evaluation of improvements in efficiency, quality, innovation and attention to the client very often can be analysed from more than one perspective, as the blocks of CA are inter-related, but the examples are presented according to it was considered to be more illustrative.

#### **3.1 Does PFI improve Innovation?**

The Authority, which is mainly concerned with an adequate service output, gives great freedom and flexibility to the actual design of the asset. Nevertheless, the attitude of the private sector towards innovation is rather conservative as it is perceived to be a risk factor. The majority of innovations are derived from the need to promote easy and cost effective long-term maintenance (including replacement costs), providing lay-outs that can reduce the construction area (reducing initial cost) and the flexibility for different usages in the future. Another innovative trend has been the increasing introduction of aesthetic criteria, in both design and colours.

The design team and the operator should be involved in early stages of negotiation to foster innovation aimed at reducing future maintenance costs at an early stage. In a PFI the designer is free to innovate in its aim to providing a service in the most efficient and cost-effective way, thus increasing the project's profitability. On a whole life cycle basis, an operator needs to consider the interaction between a more expensive design solution and lower operating and life cycle costs and vice-versa.

The contractors are very conservative in the materials they utilise, the usage of new construction materials is considered too risky in long term projects as they are unproven in the long term and also because the operator links the construction sub-contractor to building maintenance contracts. The liability for latent defects is the contractors unless they clearly specify the conditions of usage. For example: the vinyl floor in a hospital had lifting edges due to the use of incorrect cleaning agents; if the construction contractor hadn't specified the usage conditions he would be liable. Both trends, of innovative design and proven materials, follow naturally from the requirement that the contractor is also the operator. It follows some examples drawn from the case studies.

In Lusoponte innovation was fostered mainly in the conception and implementation of programs to control operations in two areas: Logistics and Monitoring - Maintenance. At the time of construction in Portugal no other organisation in this area had similar systems. The development of a Construction Quality Control program proved to be an opportunity to integrate the information collected in its Data Base in these two systems.

1 - Logistics associated with construction was strongly conditioned by a tight schedule (especially after the delays in the approvals) and the prospect of fines.

2 - Program of Monitoring and Maintenance currently in use by Gestiponte<sup>2</sup>. Consists of three systems:

- Structural monitoring;
- Routine inspection;
- Maintenance management.

The Structural Monitoring System is a contractual obligation and integrates all available structural data in a Data Base. It has the particularity to integrate the routine inspection system reports or data, which in itself is an innovation. The Routine Inspection System integrates the procedures, the operation planning, the maintenance manual, etc.

This program also acknowledges proper Knowledge Management procedures, as it recognises that the experiences gained in Operation and Management (O/M) must be integrated in future norms and procedures. The O/M team was always present during construction, making it possible to retain within the organisation the accumulated knowledge. This proved to be vital for a good performance during the O/M stage making proper use of the created procedures and implemented systems.

The concession contract of the Victoria Dock Primary School had the innovative feature of considering the possibility for alternative usage of the assets after a first period dedicated to educational activities. The land where the school was built was leased to the Sewell group for 40 years. The PFI contract for educational services is only for 25 years. After this period they can use the building for another 15 years and possible options for future utilisations are: continue as a school, disco, nursery, homecare, or any other that will suit the community's needs. The construction and design risks were minimised by adopting conservative design and construction techniques in which Sewell Construction had ample experience. The constructor even supplied all the materials, taking special care to use only those whose behaviour was well proven.

Private companies tend to specialise and bid only for projects within a sector. For example, Kvaerner having identified the prisons market as an attractive market with a continuous flow of projects, and planning to be involved in the forthcoming prisons' PFI, their design teams work in-between projects to innovate replacing existing technology with a new one, improving construction techniques and design from previous projects if it means reducing costs (although it must be based on the modular design supplied by Her Majesty Prison Services). This contrasts with the health sector (where VFM is marginal) with little innovation due to lack of freedom given to the private sector. The National Health Service and the Hospital's Trusts have their own set of standards which have to be included in the bid, leaving little room for innovation. Very often contracts specify too much technical detail, not giving to the private partner freedom to innovate and propose better (usually less costly over the whole life cycle) solutions for the provision of the specified service.

### **3.2 Does PFI improve Quality?**

PFI improves quality essentially through two mechanisms: Directly by the need to abide to the contracted service specifications, and indirectly by allowing technical staff to focus on their core competences relieving them from administrative and managerial jobs, therefore improving the quality of the staff's technical activities. In human resources, staff quality is also a key feature in the SPV' teams. For example, in Lusoponte and Indáqua it was strongly emphasized that staff's qualification and efficiency was much higher than it would be expected especially when

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<sup>2</sup> Gestiponte – The Operation and Maintenance sub-contractor of Lusoponte.

comparing to management teams in projects of a similar nature. It follows some examples drawn from the case studies.

Lusoponte sees its mission as the crossing of the Tagus in the most efficient, effective and safe manner, emphasizing the quality of the service provided. So far, all stakeholders ranging from the shareholders to the users have expressed satisfaction with the project's quality of service. As mentioned an Internal Construction Quality Control Program was implemented during the early stages of the project. As a result construction proceeded with increased safety and speed. As a direct result of being a PFI project, quality was also greatly improved by continuous cross checking as during construction there were three entities always cross checking each other. At the O/M stage this Program evolved to a full quality certification for the company according to ISO 2000.

The head Mistress of the Victoria Dock Primary School seems very pleased to concentrate only on educational activities. Her role in the school management is of a performance monitor. The school built such a good reputation regarding the educational activities' quality, that as a direct result of demands a new building was completed in January 2001 permitting the accommodation of more pupils.. Teachers can concentrate on their core competences therefore enhancing the quality of the educational services provided. Another example is the Manchester Fire Station where firemen can concentrate only in their area of expertise: fire fighting

In the JSCSC the Service Provision Quality Control is seen as key to success of the project. The Self-performance Monitoring Criteria assess the performance of the services provided against a benchmark that was negotiated within the contract with the MoD. The system is considered "fair" by both partners and is based on trust. The MoD has preferred to opt for this solution, utilising the partnering approach, instead of having a team on site to do the "contract monitoring".

### **3.3 Does PFI improve Efficiency?**

Efficiency in PFI is financially translated in better VFM, a measure of efficiency gains from reduced costs versus traditional procurement and management of public services. Reducing costs (ranging from construction costs to O/M costs) also increases the project's profitability.

According to the UK National Audit Office (NAO) the savings generated (or VFM) from PFI vary across sectors. The NAO has evaluated several PFI projects and its summarized findings follow (NAO 2000, 2001a, 2001b). In transports a sector with well proven technology, savings generated were around 13 per cent in the first four DBFO roads contracts. The refurbishment of the Treasury's building generated 7 per cent of savings over the 35 years of the project's life cycle. A survey of NAO to the first 120 PFI projects found that 81% public bodies involved in PFI projects believe that they are achieving satisfactory or better value for money from their PFI contracts. Only 15 per cent rated VFM achievement as marginal, like in the hospitals sector (The PFI Report, 2002) the savings generated are only 1.7 per cent according to the Department of Health that analysed the savings of 23 NHS PFI projects.

All empiric data indicates that efficiency gains are the main key driver in a PFI. One of the most important areas where PFI has improved efficiency is management. Within construction companies involved in PFI projects there is the widespread usage of new managerial techniques sometimes introduced by the public partner' initiative, such as the Zero Defects Initiative (also closely related to quality) imposed on the JSCSC by DETR and the partnering Initiative the political advice from the Construction Best Practice Program.

Construction companies see PFI as an opportunity for providing a continuous flow of work, so to be efficient they have to specialise. In

the early days of PFI projects' teams were involved in different sectors, but that has changed. Specialised teams are involved in only one area, their expertise being built on previous projects. It follows some examples drawn from the case studies.

In Lusoponte a great concern with efficiency was present since the project's inception and this was translated into a very strict cost control regime. Without this philosophy it would have been very difficult to get construction completed on time and budget - avoiding penalties for delays and costs overruns. During construction there were two very difficult winters (especially 1995) and it was necessary to implement a very strict maximization of resources, and minimization of costs. One of the concerns was to find solutions that apart from the technical aspects would also be cost effective. If the concern regarding efficiency was not expressed, solutions would have been found and implemented but certainly at increased costs.

It was critical to involve O/M prior to operations and they were involved from the very beginning of the project. Their task was to evaluate the adequacy of design to simplify O/M, keeping its costs at the minimum possible level. For example, the access to the South Viaduct structure for routine inspections (check sensors, support apparatus, etc), were planned from the start: The existing suspension cables would not permit a cradle installation to access under the deck for inspection. The O/M proposed a project modification: the installation of a small fixed platform for inspection that would run beneath the 800 metres long deck. This resulted in a much more efficient maintenance programme.

Another measure that increased efficiency was a different way to handle the Via Verde<sup>3</sup> receipts. Brisa - the first highways concessionaire - issues automatically receipts for every client and for every vehicle. This contrasts with Gestiponte where Via Verde's receipts are issued only on request, including all the movements for the same company. This reduces costs in mailing and processing, and is more efficient to both Lusoponte and their clients. In addition, many clients (90% of 250 000) are not interested in the receipt (or don't need) and by issuing only on request Lusoponte reduces costs.

The Victoria Dock Primary School was designed to have low maintenance costs which includes reducing potential vandalism. They use external steel shutters (very uncommon in the UK) that although more expensive - higher initial investment and maintenance every six months - prove in the long run to be a good investment reducing (or stopping) the breakage of glass windows. As they pay for their own gas and electricity great effort was applied to design an energy efficient building (also not common in the UK). Other features to reduce whole life cycle costs included: double glazing windows; walls with air in bricks to improve insulation; also they didn't isolate the concrete floor having considered that not much heat would escape thus saving the increased costs. Doors are painted (thus easier to repair) instead of varnished. To reduce vandalism and for security and respective recurring costs they have put thick plywood beneath the roof tiles to prevent people breaking in.

### **3.4 Does PFI improve Attention to Client?**

When analysing attention to the client it is necessary to consider that there are two possible forms of PFI: A free-standing project where the clients (service end users) are paying directly for the service, or a DBFO where the clients needs are predefined and it is the public sector that pays against space, or service availability.

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<sup>3</sup> Via Verde - automatic tollbooth.

Customer responsiveness is clearly improved when dealing with a free-standing project where the clients pay for the service. With a DBFO where the client needs are predefined and it is the public sector that pays for the service, it is necessary that the end users needs are accommodated within the contracted service specifications. It is not a real life market driven situation and it occurs in several sectors like prisons, schools and fire stations. If the public partner that discussed the contract is directly involved in the service provision there is a clear improvement in customer responsiveness.

In conclusion, attention to either the direct client (general public) or to the indirect clients (like the fire-fighters) is improved as a result of the introduction of PFI. It follows some examples drawn from the case studies.

In the Manchester Fire Station the public partner that negotiated the contract was the Greater Manchester Council that had a good sense of what was needed and were very much 'target oriented' with a great deal of commitment as they were dealing with their own business. The end result was that the public got a better service. Besides these requirements Carden and Co, the contractor of the Manchester Fire Station, had also to take into account cultural adjustments in design, as fire fighters (also clients) are very cultural specific. They don't like open space offices (where money could potentially be saved) because they regard their own 'territory' as an important rank mark.

In Lusoponte Attention to the Client was dealt with by both partners: The Portuguese Government that took great care to profit from the opportunity and imposed terms and conditions related to the clients that otherwise wouldn't have existed and Lusoponte whose main concern was to provide a service that would be both satisfactory in terms of safety and convenience. Gestiponte operates two bridges with different characteristics so their concerns regarding the clients differ in the two bridges. At the 25<sup>th</sup> April Bridge their main concern is to reduce traffic congestion and accidents, while at the Vasco da Gama Bridge it is safety. Increasing security reduces the stress levels and fewer accidents happen. Reducing traffic congestion leads to a better service: first, the clients are more satisfied, and the company's image is improved; second the company increases the service' efficiency, reducing costs always associated with accidents.

Lusoponte also take great care that the employees that are in direct contact with the public - manual tollbooth operators - are polite. During regular daytime they are allowed a maximum 2 hours continuous service, not because of a lack of efficiency but because after that period of time they are naturally not so willing to serve the public with the adequate level of politeness (like saying thank you and smiling).

Sewell the concessionaire for the Victoria Dock Primary School considers that their involvement in PFI projects changed their attitude to their business. They feel that now they are more service oriented improving customer responsiveness accommodating the needs of the children. The service provided has proved so good with parents that the school had to build a second building to accommodate more pupils.

#### **4. PFI SUSTAINABLE COMPETITIVE ADVANTAGE**

The research concluded that PFI has a CA versus the traditional forms of governmental procurement as it induces improvements in all '4Blocks' of CA: Efficiency, Quality, Innovation and Customer Responsiveness. The PFI main block of CA is the increased efficiency brought by the need a strict cost control to deliver VFM. PFI has also improved quality and customer responsiveness but its incentive is mainly derived by the necessity to comply with the contracted service provision rather than by the usual

market driven situation to attract clients. Innovation is rather conservative occurring mainly in the design stage to reduce operation and maintenance costs rather than construction costs for which there are very well established project management techniques. For innovation to occur it is important the public sector willingness to consent to enough freedom and flexibility in the contract as to give to the private sector 'freedom to innovate'

According to Porter (1990) lower costs and differentiation are sources of CA for all segments in a industry (in different segments several generic strategies can be pursued: cost leadership, cost focus, differentiation or focused differentiation). This model is not contradictory with the '4Blocks', instead it is a different perspective to look at the same issues. Cost control over the whole life cycle is behind the drive for innovation, efficiency and quality. Also PFI clearly differentiates from other forms of public procurement. So both models acknowledge PFI' competitiveness.

The data collected permitted also to draw some insights as to the assessment of CA from the point of view of supply chain transaction. It was often referred that a climate of trust was key to overcome problems. This is in accordance with the RBT (Hoyt and Huq 2000) that predicts that a SCA can be achieved when the relationship exhibits high levels of trust, i.e., a collaborative instead of confrontational approach. This permits that companies accumulate resources that are valuable and rare, therefore raising the Imitation Barriers that are key to the sustainability of CA. A partnering approach has already been recognised as beneficial in PFI according to McDermott and Charmer (2001). Evidence was also drawn that corroborates the SST that stresses that knowledge management (information flow) is key for a collaborative approach in an uncertain and dynamic environment

In conclusion, currently PFI has a CA versus the traditional forms of governmental procurement. The CA sustainability is going to depend upon the continuing focus throughout the whole life cycle on efficiency gains (cost control), innovation, quality and provision of a better service. It also important to consider 'trust', 'collaborative approach' and 'information flow' the organisational theories 'soft factors' for a SCA.

PFI has also increased the CA of the UK construction industry as companies are now more focused on all four vectors of CA: Innovation, Quality, Efficiency and Attention to the Client. PFI has developed the way the construction industry is managed. There is the widespread use of management tools: whole life cycle costing, risk management and benchmarking. PFI induced communication through an increased functional integration of the traditionally vertically fragmented UK construction industry, forcing the interaction and feedback from all the stakeholders in a project. This is a very positive aspect, as mentioned SST predicts that good knowledge management practices lead to collaborative relationships based on trust, which in turn reduces transaction related risk under conditions of uncertainty and dynamic change. Construction companies to be efficient in PFI have to specialise.

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