OVERCOMING SUSTAINABILITY ISSUES THROUGH FINANCIAL RISK MANAGEMENT IN PRIVATE FINANCE INITIATIVE PROJECTS

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ABSTRACT

The sustainable procurement is the process in which the sustainable needs are achieved by balancing against the business needs while considering enhancing the values through entire lifecycle of the product, waste reduction and recycling. Among the sustainable procurement approaches, Private Finance Initiative (PFI) is one of them, which is bringing together the public and private sectors to work together in partnerships to best utilize the assets and skills of both sectors with the aim of creating better value for money for taxpayers while initiating the projects with funds of private sector. However, the risk which is in adverse and uncertain by nature leads to sustainability issues in PFI procurement. Project finance (PF) refers to situations where the loan for the project is repaid from the future cash flows of the project. Project finance has been used wide for financing infrastructure and public sector facilities like hospitals, power stations, prisons, etc. Financial risk as the impact on the financial performance of any entity exposed to risk. Therefore, there is a need to minimize the financial risk in PFI projects. Accordingly, the aim of the study was to emphasis on overcoming sustainability issues on project financing through better financial risk management for PFI projects in construction sector. Comprehensive literature review was conducted to identify the tools and techniques. The study was developed to provide step by step details in identifying and analyzing the key risks and mitigation procedures in sustainable way at particular project phase. Then the gaps were identified and the opinions to improve the sustainability were identified.

Keywords: *Construction Industry; Private Finance Initiative; Risk Management; Sustainable Procurements.*

1. INTRODUCTION

Private finance Initiative (PFI) is a type of Public-Private- Partnership (PPP) where project financing rests mainly with the private sector. It seeks to combine the resources of the private sector with the public sector in order to provide a more efficient service to the public (Akintoye *et al.*, as cited in Yatanwala *et al.*, 2009*)*. Involvement of private sector skills has been able to brought great advantages for developing economies by providing better value for money. According to Ogunlana (as cited in boussabaine, 2007) the major attraction in using private financing is that developing economies can meet their infrastructure needs without having to pay for the projects. As such, it is perceived in many quarters as a great solution to the infrastructure problem of the developing economies.

The long term and high value nature of PFI contracts leads to an increased focus, commitment and rigor to the application of good procurement practice such as governance models; contract management processes and the adoption of output specifications. This increased focus also spreads to sustainable procurement practice (CIPS, 2008). Green Alliance (2004) stated that The Private Finance Initiative (PFI) can and should be used as a lever to transform the construction sector in the UK towards greater sustainability of its products and practices.

Risk by its nature of adverse can be linked with the sustainability issues causing imbalance to the Social, Economic or environmental aspects and prevent achieving each parties objectives. The environmental risk like pollution, destruction can cause harm to the society and the environment as well. Many of the other risk in construction such as Time overrun cost overrun, quality issues, political risks, financial risks, natural disasters, market and the operation risk leads to the economic unbalance

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and the waste of important resources.

Merna and Njiru (2002) have defined financial risk as the impact on the financial performance of any entity exposed to risk. Horcher (2005) stated that Financial risk arises through countless transactions of a financial nature, including sales and purchases, investments and loans, and various other business activities. The economic climate and markets can be affected very quickly by changes in exchange rates, interest rates, and commodity prices. Counterparties can rapidly become problematic. As a result, it is important to ensure financial risks are identified and managed appropriately.

2. SUSTAINABLE PROCUREMENT

Sustainability refers to meeting the needs of present without compromising the ability to meet the future generations. It depends on how well it is achieved the balance of social, economic and environmental objectives when making decisions on today. The sustainable procurement is defined as "A process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole-life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment". The definition emphasize the environmental, social and economic aspects of process including the design, material used, manufacturing, logistics, logistics; service delivery; use; operation; maintenance; reuse; recycling options; disposal; and suppliers' capabilities to address these consequences throughout the supply chain.

Kennard (2006) identified that the sustainable procurement taking into account the following factors

- Entire life cycle cost of the product. We need to get away from the cheap throwaway society. You only need to look at the number of electrical/electronic commodities which you possess where the cost of repair makes it easier to replace and take up landfill space
- Quality required by the specification, bearing in mind the sustainable issue. These need to be both client driven and through the ethical procurement values of the suppliers
- Availability of the product
- Functionality of the product in the environment to which it is to be applied
- Effect the product will have on the environment when in service. We need to reduce the impact of our actions on future generations by radically reducing our use of resources and by reducing environmental impacts.
- Labor conditions of the producer and the human rights of the workforce. We should have regard for others who do not have access to the same level of resources and wealth generation.
- Use of sustainable or recycled materials and/or products.
- Reduction of waste. This not only helps to minimize the use of valuable resources, but also drives better business economics

2.1. PFI AS A SUSTAINABLE PROCUREMENT

Many arguments can be illustrated as strengthening the point that PFI meets sustainability standards also with the conflicting views. The long term high value nature of the PFI along with the consideration of the whole life aspects, the aim of providing better value to money, good contract management process increase the sustainable practice. CIPS (2008) stated that following points strengthen the argument

- The rigorous business case and review process required for PFI leads to a clear focus on the projects objectives including sustainability
- PFI encourages a focus on the whole life cost of the asset. With payments being linked to performance over the life of the contract the private sector must consider costs over the whole life of the contract to obtain funding and provide an acceptable return

- Given that the cost of running most assets over a 25 year period will be many times the capital cost it makes financial sense to invest at the front end in design solutions that will be efficient and result in lower running costs
- PFI's greater focus on risk identification, assessment and allocation results in sustainability issues being accurately identified and managed by the party most able to effectively manage the sustainability issues

PFI's are inflexible and once set on their course are difficult, and expensive, to change thus providing an obstacle to the introduction of more sustainable technologies as they emerge over the course of the contract. For example a study produced by the London Assembly in December 2007 argued that rigid PFI contracts had resulted in on-site renewable energy systems not being installed on schemes. Including the £600m Barts and Royal London hospital project

- There is often little incentive for the private sector to consider energy efficient systems as the payment for energy used frequently remains the responsibility of the public sector
- The PFI bidding process may not encourage innovative solutions that deliver sustainability. It is often commented upon that even where it is stated in the tender that innovative solutions are encouraged the belief amongst bidders remains that in practice innovation will not be rewarded in the tender evaluation process
- There may be reluctance on the part of the private sector to use new technology which they have none or limited experience of as they do not start to receive payment until the facility is operational and they may be fearful of delay.

3. RISK AND THE SUSTAINABLE ISSUES

Risk by its nature of adverse can be linked with the sustainability issues causing imbalance to the Social, Economic or environmental aspects and prevent achieving each parties objectives. The environmental risk like pollution, destruction can cause harm to the society and the environment as well. Many of the other risk in construction such as Time overrun cost overrun, quality issues, political risks, financial risks, natural disasters, market and the operation risk leads to the economic unbalance and the waste of important resources.

Risk management is an important element of the PFI, given the four inter-related principles at the heart of the UK PFI, i.e.: genuine risk transfer; output specification; whole life asset performance; and performance-related reward to the contractor. PFI demands that as much as possible the risks involved in PFI schemes including the design and construction risks are transferred to the Private sector. The fact that operational risks that traditionally rested with the client are now transferred to the private sector through PFI has implications for how projects are managed. (Akintoye and Chinyio, 2005)

The main advantages of the improving sustainability are in line with the ultimate objectives of the risk management and can be illustrate as below (ECFA, 2001).

- Reduced risks – less likelihood of health, safety and pollution incidents; reduced instances of delay and conflict during construction; reduced risk of public relations problems
- Protected and enhanced reputation – protection or enhancement of the client's reputation; better relationships with regulators; preferential status on bids
- Reduced or avoided costs – reduced operational costs through efficient use of materials, designing for energy efficiency and low maintenance, and good control systems; opportunity to employ flexible building systems capable of accommodating future requirements
- Increased opportunities to generate revenue – possibility of increasing usable floor area as a result of integrated design and reduced building service requirements, resale of demolition materials.

Financial risk in the PFI projects therefore can be considered as issues prevent achieving goals of the PFI project performance. The benefits of the better financial risk management and the

improvement of the sustainability can be offset in same way. Environmental commodity financing, green building development, social responsibility investment funds and environmental risk insurance concerns the environment aspect while the Investing in capital gaps in disadvantaged communities and underserved markets and Micro-credit financing in developing countries can be considered as example for developing social factor. Providing better value for investors and the off take purchasers provide improvement of economic aspect.

4. PRIVATE FINANCE INITIATIVE

PFI is a type of PPP where project financing rest mainly with the private sector. The initiative represents the strategy through which government contracts to purchase quality public sector service on long term basis from the private sector, and includes maintaining and possibly constructing the necessary infrastructure. PFI is fundamentally about the delivery of service rather than the procurement of construction assets. (Hardcastle and Boothroyd as cited in Akintoye *et al.*, 2003)

One of the crucial premises for its adoption is that this new approach delivers better value for money and achieves better risk management. The PFI enables the private partner to build a facility to the output specifications agreed to with the public agency, operate the facility for a specified time period under a contract or franchise with the public sector client and then transfer the facility to the latter party when the contract expires. (Akintoye and Chinyio 2005)

Aziz (2001) stated that there are three categories of PFI projects

1. Financially Free standing Projects: the private sector undertakes the design, build, finance, operation and maintenance of the asset. The revenue streams may comprise fees paid directly to the consortia by users. (E.g. toll road fees).
2. Services sold to the public sector: fees paid by government on behalf of all potential users (e.g. fees per hospital patient serviced).
3. Joint Ventures: PFI projects are met partly from the public funds and partly from the private funds, with overall control of the project resting with the private sector.

4.1. FINANCIAL PLAN OF THE CONCESSIONAIRE IN PFI

Since the project is initiated with private finance, private sector holds the large portion of responsibility of raising the finance to the project. Source of funds to the concessionaire consist of debt and equity supplied by the depositary institutions (e.g banks) investors, insurance companies, mutual funds, pension funds, venture capital government and other agencies.

Each source of funds has its cost and other characteristics such as priority of payment, tax deductibility and so on. Establishes firms tend to fund projects through retained earnings (Atkin and glen, 1992)

A general model of the structure of the project financing is shown in below figure

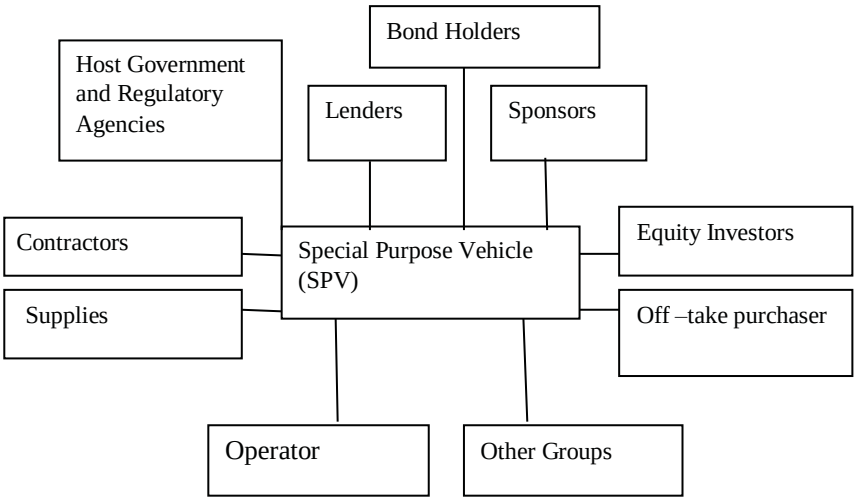

Figure 1: The Structure of the Project Finance
Source: Tan W., (2009, p.213)

There are many variations to this basic model for instance bonds may not be issued in a project, and lenders may include international lending agencies such as the World Bank and Asian Development Bank. Further each party may assume several roles for example, in addition to its regulatory role; the state may also be the supplier of inputs (e.g.: oil) as well as off –take purchaser of the project output through another agency such as State Electricity board in the power projects.

In pure non- recourse project financing, only project assets and cash flows are used for loan repayments this makes non-recourse lending risky. Lenders are often compensated by the opportunity to lend substantial sums of money on lucrative projects. In limited recourse financing parent companies of project companies provide some form of contingent financial support over and above their equity share as well as other forms of credit enhancement and third-party guarantees (Willie, 2007). The financial flow of the PFI project can be identified as flows.

4.2. METHOD OF FINANCING THE PFI SCHEME

Project finance (PF) refers to situations where the loan for the project is repaid from the future cash flows of the project. Project finance has been used wide for financing infrastructure and public sector facilities like hospitals, power stations, prisons, etc. Project finance originated from America where these schemes were introduced to finance the exploitation of Texan oil reserves (Leeper, 1979). These schemes were set up because project sizes were growing larger and entrepreneurs could not provide sufficient collateral for any bank loans.

Finnerty (1996) noted that the specific features of the PFIs allow SPV members to finance their projects by reference to the ultimate service purchaser's credit rating. This possibility positively impacts on the financing structure of PFI as well as the degree of leverage involved in the respective financial setups. However, the possibility for low cost finance can be offset is there are high contractual costs and, in particular high legal expenses (Beck and Darinka, 2005). In order to satisfy the capital requirements PFI project usually has to depend on several source of financing while the main source being external financers, sponsors provide some portion of equity to show their commitment.

(Akintoye *et al.*, 2001) has carried out survey on PFI financial structure. A total of 48 elite interviews were conducted with PFI participants from the public sector, the private sector and independent consultancy companies (incl. legal, technical, insurance, etc.). Among the private sector companies 10 leading financial organizations. Findings emphasized that the financial structures of PFIs depended very much on the type of the operational ‘envelope' and the interaction between the main parties.

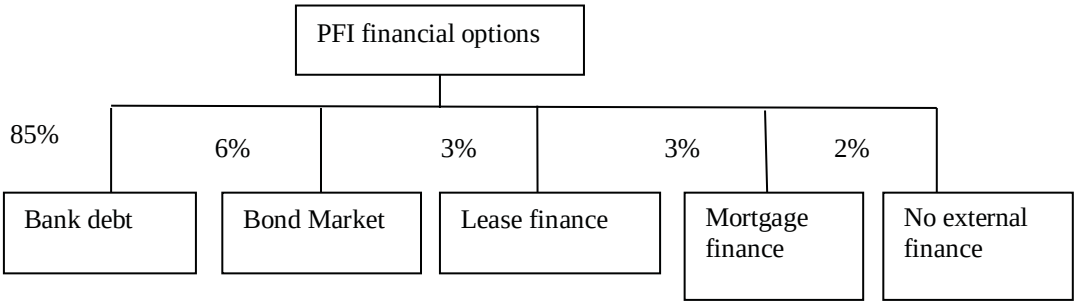

Figure 2: Sources of Project Finance
Source: Akintoye *et al.* (2001)

According to the experience of our respondents the main financing options for PFIs included, i.e. bank debt (85%) and bonds finance (6%). These were usually combined with sponsors' equity (Figure 1). More rarely, respondents noted the use of lease finance (3%), mortgage finance (3%) and financing without external contributions (2%).

The capital comes with associated costs. Equity is the lowest ranking capital layer of the PFI project and, in case of project failure, the equity investor therefore likely to bear the highest risk of loss. Due to the high risk equity carries highest rate of return where as the debt holders have the priority over the equity investors when the payment is made. Spate, (As cited in Akintoye *et al.* 2003) has identified the number of factors which determines the ability of SPV s to limit their equity contribution to the total capital requirement. The main factors include economic consideration, cost attached to the equity, requirements of the jurisdiction of the SPV, government requirement and the lenders requirement.

Initially, at the emergence of the PFI market, the financing options were very limited and the major capital requirements were met by the traditional PF methods, i.e. through of bank debt. However the market demand and the affordability issues required the creation of alternative approaches. In recent years more sophisticated capital market products have been developed to provide long term debt at competitive conditions in respect of credit terms and margins (Morrison 1998; Middleton and Richardson 1999). Thus the popularity of fixed income products such as bonds has grown significantly. Banks, meanwhile, have responded to the new challenges by extending the maturities beyond the traditional20-23 years and lowering the margins (Ellis, 1999)

Different financial institutes such as pension funds and life insurance provide fixed rate financing for PFIs while commercial banks often provide floating rate financing. In addition to the equity there are number of financing options available such as bond market, commercial lending through bank debt, leasing, mezzanine debt and mortgage finance, etc(Sapte, 1997; Ellis, 1999; Pickering, 1999)

Finnerty (as cited in Akintoye *et al*, 2005) distinguishes between four alternative types of bank credit, which include revolving credit, term loan, standby letter of credit or performance bond and bridge loan. Revolving credit provides the sponsor with the opportunity to use a line of credit repeatedly within certain limits as project needs arise. The term loan is a fixed time loan over more than one year, which is used to cover the capital costs during the project's construction period. The stand by letter of credit or performance bond imposes an obligation on the issuing bank to make payments to commercial paper holder. Finally a bridge loan is a form of interim financing covering the time lag before the expenditures are covered.

The loans are popular in PFI projects as the repayments are covered by the profit of the SPV. In large transaction borrowing requirements are often financed by several banks through a syndication agreement. In this context, the underlying financial structure is usually arranged by a single bank, which subsequently sells parts of its loan to other banks. Syndicate banks are often long –term partners, which lend at the same conditions and have the same priority for repayment. The syndicator,

meanwhile, is usually a lead banker and investment manager who keeps a small amount of the whole loan (Akintoye *et al*, 2005).

Mezzanine debt is relied upon the cases where there is a gap between senior debt and sponsors equity. The situation typically arises when senior debt providers are not prepared to increase the level of debt and the sponsors cannot invest more equity. This can be due to the small size of equity provided by the sponsors or specific project circumstance (Morrison, 1998). In such cases, mezzanine finance provide by other parties outside the SPV can bridge the short fall by providing a third layer of capital in the range of up to 20%, in the form of subordinated debt (Morrison, 1998). Normally, Mezzanine finance is exposed to greater risks and higher returns compared to the senior debt. It also ranks ahead of equity n terms of payment distributions, and is therefore more akin to equity than to senior debt. However, due to the higher risk being carried by equity, equity typically provides for the highest potential returns. Therefore the attractiveness of Mezzanine finance to the investor thus arises from the fact that it provides for the possibility of achieving good commercial returns with excessive risk being taken.

A PF lease involves fixed term lease contracts between large financial institutions (lesser), which own the assets for tax purposes, and the SPV (lessee), which pays the agreed series of payments. The lesser is entitled to depreciation allowances, which are normally not available to the SPV due to the lack of trading income (Sapte, 1997). Mortgage finance refers to situation where the asset is owned conditionally by the SPV. The borrower has the rights to use the property while the mortgage is in effect and agrees to pay on a regular basis towards the principle and interest.

In addition to these sources there are other organizations by their nature collect and manage capital. These include life insurance companies, public pension funds and private pension funds. Public placement funds utilize funds which are collected from the retirement funds of the public sector employees in projects which meet set standard in terms of risk and return.

There is a direct relationship between the risk and the return for the financial components. Risk and return for main financial component used in PFI is illustrated in the figure.

Bonds are long term interest bearing documents of debt, issued by public sector as well as the private sector organizations, which oblige themselves to pay the principle amount after a specific period of time called maturity (Fitch, 1997). Banks, insurance companies and individual investors comprises the bond market in fact not all the organizations can issue bonds.

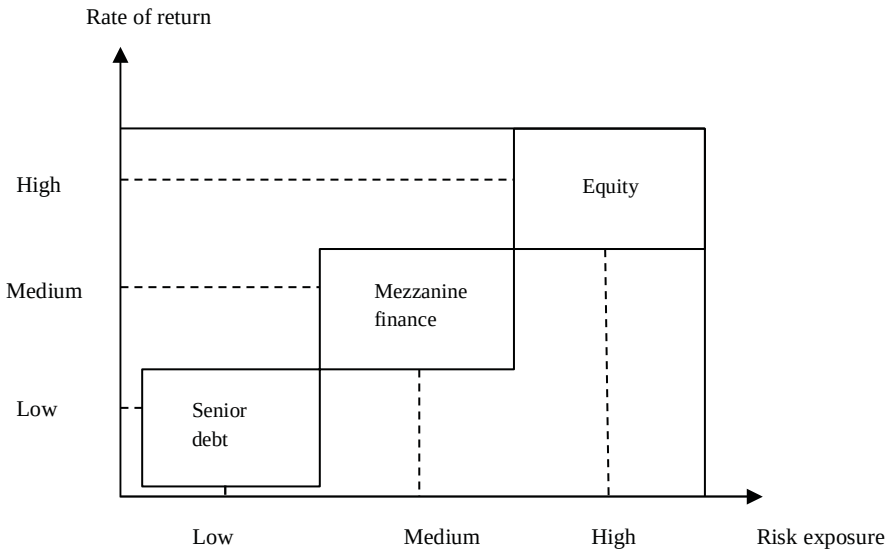

Figure 3: Relationship between the Risk Profile and the Rate of Return for Main Financial Components in PFI
Source: Akintoye *et al.* (2003, p.133)

4.3. REFINANCING PFI PROJECTS

The refinancing of projects involves changing the conditions on which a loan was initially provided. Refinancing of PFI projects has become possible only recently, due to the increased confidence in the financial markets towards PFIs. The refinancing is suitable for some earlier projects, where the construction had been completed and successful operation has been demonstrated. Therefore the risks to the project are substantially reduced. The key components of the refinancing may include changes in interest rates, repayment dates, margins and the level of senior debt (TTF, 1999), etc. Refinancing brings higher profits to the shareholders, but does not necessarily mean that the public sector can share the benefits. Capital markets are expected to play a significant role in the refinancing of PFI projects by providing efficient resources in terms of longer repayment periods, cheaper, and more highly geared debt.

5. FINANCIAL RISK OVERVIEW IN PFI

Risk management is an important element of the PFI, given the four inter-related principles at the heart of the UK PFI, i.e.: genuine risk transfer; output specification; whole life asset performance; and performance-related reward to the contractor. PFI demands that as much as possible the risks involved in PFI schemes including the design and construction risks are transferred to the Private sector. The fact that operational risks that traditionally rested with the client are now transferred to the private sector through PFI has implications for how projects are managed. (Akintoye and Chinyio, 2005)

Financial risk arises through the countless transaction of financial nature, investment and loans and other business activities. It can arise as a result of legal transactions, new projects, mergers and acquisitions, debt financing, changes in the market condition the energy component of costs, or through the activities of management, stakeholders, competitors, foreign governments, or weather.

Horcher (2005) identified three main sources of financial risk:

1. Financial risks arising from an organization's exposure to changes in market prices, such as interest rates, exchange rates, and commodity prices
2. Financial risks arising from the actions of, and transactions with, other organizations such as vendors, customers, and counterparties in derivatives transactions
3. Financial risks resulting from internal actions or failures of the organization, particularly people, processes, and systems

Financial risk management is a process to deal with the uncertainties resulting from financial markets. It involves assessing the financial risks facing an organization and developing management strategies consistent with internal priorities and policies. Addressing financial risks proactively may provide an organization with a competitive advantage. It also ensures that management, operational staff, stakeholders, and the board of directors are in agreement on key issues of risk.

Major market risks arise out of changes to financial market prices such as exchange rates, interest rates, and commodity prices. Major market risks are usually the most obvious type of financial risk that an organization faces. Major market risks include:

- Foreign exchange risk
- Interest rate risk
- Commodity price risk
- Equity price risk

Other important related financial risks include:

- Credit risk
- Operational risk
- Liquidity risk
- Systemic risk

5.1. HEDGING AND CORRELATION

Hedging means making an investment to reduce the risk of adverse price movements in an asset. It the business of seeking assets or events that offset, or has weak or negative correlation to, an organization's financial exposures.

Correlation measures the tendency of two assets to move, or not move, together. This tendency is quantified by a coefficient between –1 and +1. Correlation of +1.0 signifies perfect positive correlation and means that two assets can be expected to move together. Correlation of –1.0 signifies perfect negative correlation, which means that two assets can be expected to move together but in opposite directions (Horcher, 2005).

5.2. DIVERSIFICATION

An asset's risk in isolation is greater than its portfolio risk whenever the asset's cash flows and the portfolio's cash flows are less than perfectly correlated. In this common place situation some of the assets cash flows variability in the portfolio's cash flows and the effective risk the investor bears is reduced (Higgins, 2000).

For many years, the riskiness of an asset was assessed based only on the variability of its returns. In contrast, modern portfolio theory considers not only an asset's riskiness, but also its contribution to the overall riskiness of the portfolio to which it is added. Organizations may have an opportunity to reduce risk as a result of risk diversification. In portfolio management terms, the addition of individual components to a portfolio provides opportunities for diversification, within limits. A diversified portfolio contains assets, whose returns are dissimilar, in other words, weakly or negatively correlated with one another. It is useful to think of the exposures of an organization as a portfolio and consider the impact of changes or additions on the potential risk of the total.

5.3. INTEREST RATE RISK

In contrast, interest rate will affect the project in terms of borrowing and debt payments. Any fluctuation in the interest rate will definitely affect the lenders. An appropriate interest rate should be agreed upon the project. The lenders have to pay extra cost if the interest rate is far high or benefit them if the interest rate is low (Bakar *et al.*, 2010).

Horcher (2005) found that Interest rate risk arises from several sources, including:

- Changes in the level of interest rates (absolute interest rate risk)
- Changes in the shape of the yield curve (yield curve risk)
- Mismatches between exposure and the risk management strategies undertaken (basis risk)

5.4. FOREIGN EXCHANGE RISK

Foreign exchange risk arises through transaction, translation and economic exposures and also from the commodity based transactions where the prices are trade in foreign currencies. Bakar *et al.* (2010) stated that Fluctuations in foreign exchange are considered another major risk which might affect the BOT project during the construction and operation. Foreign companies who are interested to invest in another country should aware of the opportunities and threats associated with international currency transactions before they proceed.

5.5. COMMODITY RISK

Exposure to absolute price changes is the risk of commodity prices rising or falling. Organizations that produce or purchase commodities, or whose livelihood is otherwise related to commodity prices, have exposure to commodity price risk. The revenues generate by SPV in the PFI contracts

arises from the delivery of commodity or services while the most of the time commodity being energy products ex: Electricity, Gas, crude oil.

Commodity Price Risk

Commodity price risk arises when there is a possibility of changing the commodity price. Commodity exposure can also arise from the non-commodity business if the input or products and services have a commodity component. The risk can be offset by using fixed rate contracts commodity futures or forwards. In many projects government tend to assure the commodity prices by several ways. Tan (2009) stated that the price may be fixed beforehand, indexed or based on prevailing market prices. Price floors and caps may also be applied in hedging agreements.

Commodity quantity risk

This is relates to the demand for the services provided by the facility. In more recent PFI schemes public sector tend to bears the risk, so the private sector is less concern about the level of usage of the service. Thus, for example, in a prison project, the SPV will not be concerned if all the cells are filled or not, as that risk rest with the HM Prisons Service. However, some PFI schemes, by their peculiar nature, still tilt the demand risk to the private sector, as it is best placed to bear that risk in such circumstances (Akintoye *et al*., 2005).

5.6. CREDIT RISK

Credit risk or counterparty risk is one of the most prevalent risks of finance and business. According to Lam and Chow, credit risk as the risk that the counterparty (partner of the joint venture) to any financial transaction is not being able to fulfill its commitment on the due date. Horcher (2005) stated that the failure of counterparty is less of an issue when the organization is not owed money on a net basis, although it depends to a certain degree on the legal environment and whether funds are owed on a net or aggregate basis on individual contracts.

In a concession contract, transactions between two or more parties contain a risk that one party will default on an obligation of the commitment. Failure in financing the required cash flow for the BOT project is the most common issue that arises (Bakar *et al*., 2010).

5.7. SOVEREIGN OR COUNTRY RISK

Sovereign risk encompasses the legal, regulatory, and political exposures that affect international transactions and the movement of funds across borders. It arises through the actions of foreign governments and countries and can often result in significant financial volatility.

5.8. CONCENTRATION RISK

Concentration is a source of credit risk that applies to organizations with credit exposure in concentrated sectors. An organization that is poorly diversified, due to its industry or regional influences, has concentration risk. Many banks and organizations used investment from different sectors to diversify the risk.

5.9. LEGAL RISK

The risk that counterparty is not legally permitted or able to enter into transactions, particularly derivatives transactions, is known as legal risk. The issue of legal risk has, in the past, arisen when counterparty has suffered losses on outstanding derivatives contracts. A related issue is the legal structure of the counterparty, since many derivatives counterparties, for example, are wholly owned special-purpose subsidiaries.

5.10. EQUITY PRICE RISK

Equity price risk affects corporate investors with equities or other assets the performance of which is tied to equity prices. Performance of the concessionaire is crucial in seeking for fund to implement a PFI project. Usually, equity risk is related with the performance of the company which is measured by the share price of the company. The higher the share price goes, in definite, benefit the shareholder but the lesser it goes will affect the prestige of the concessionaire. Capability of the company in raising capital for the PFI project is reflected on the share price (Bakar *et al*., 2010).

5.11. LIQUIDITY RISK

It relates to ability to sell or purchase the security or obligation either for hedging purposes or trading purposes, or alternatively to close out an existing position. Liquidity can also refer to an organization having the financial capacity to meet its short-term obligations. Assessing liquidity is often subjective and involves qualitative assessments, but indicators of liquidity include number of financial institutions active in the market, average bid/ask spreads, trading volumes, and sometimes price volatility (Horcher, 2005)

(Bakar *et al*., 2010) identified that Most of the PFI project; the revenues are generated from the operation. To ensure the success of the PFI project, it should able to generate sufficient amount of revenue to settle the debt within the stipulated time frame. An amount of profit that can be generated from the operating facility is determined by conducting analysis on the projected revenue during operational phase. The failure to generate the required revenue will cause to liquidity risk.

5.12. EMBEDDED OPTIONS

Embedded options are granted to securities holders or contract participants and provide them with certain rights. The granting of permission to buy or sell something is an option, and it has value. For example, the ability to repay a loan prior to its maturity is an option. If the borrower must pay a fee to repay the loan, the option has a cost. If the loan can be repaid without a fee, the option is free to the borrower, at least explicitly. The value of the option is likely to be at least partially embedded in the interest rate on the loan (Horcher, 2005).

5.13. SYSTEMIC RISK

Systemic risk is the risk that the failure of a major financial institution could trigger a domino effect and many subsequent organizational failures, threatening the integrity of the financial system. Aside from practicing good risk management principles, systemic risk is difficult for an individual organization to mitigate.

5.14. COMMERCIAL RISK

Commercial risk is described as a risk that can jeopardize the financial performance to the project. In spite of that, commercial risk in BOT project is characterized differently; Merna and Njiru (2002) have classified into three categories, risks related to the completion, during operation and risks related to input or output of the project. Supply and off-take agreement between the supplier and the government is very crucial in mitigating the risk (Bakar *et al.*, 2010).

5.15. FINANCIAL RISK MANAGEMENT IN PFI

Darinka and Beck (2005) has conducted a research to identify financial Risk management techniques were most frequently used by the financial services providers involve in PFIs; the project team conducted 14 interviews with senior financial experts across the UK.

The sample of the financial companies for the survey included 14 leading financial organizations, based on operating in the UK, all of them with substantial records in PFI transactions. Senior representatives from all areas of financial engagement in PFI were interviewed.

Risk Identification techniques

The main risk identification methods used by the practitioners are illustrated in Figure 2.10. The result shows that they relied heavily on their previous experience in forming a broad initial judgment about the feasibility of the project. Furthermore, the later on in the PFI process the employment of consultants to investigate the risk details become more relevant.

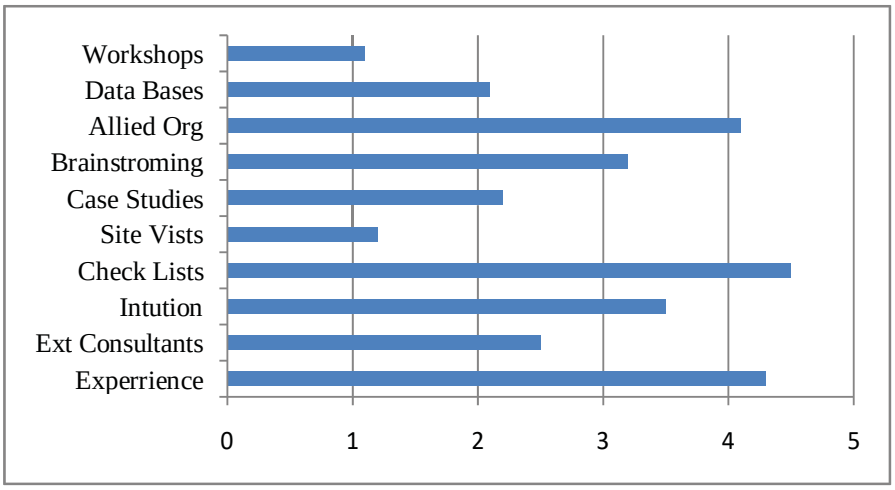

Figure 4: Top 10 Risk Identification Approaches Used by the Financiers in PFI Schemes
Source: Akintoye *et al.* (2003, p.139)

The financial model was their key risk assessment tool. It was a mathematical expression of the project's future cash flows, which included all project revenues and costs, as well as taking account of the risk factors affecting them. One of the principle goals of the model was to estimate financial impact of the different risk through semi-quantitative analysis. The financial model was then used to investigate different 'what if' scenarios, which could include anything from an increase in operational costs, raising inflation, construction delays, and pessimistic life cycle scenarios.

Risk Mitigation Practices

Risk mitigation can be categorized into four different forms: acceptance, reduction, avoidance and transfer (Flanagan and Norman1993). Many strategies can be found to mitigate the financial risk. Darinka and Beck (2005) identified that regardless of their precise function in finance (as debt or equity providers), the risk mitigation practices of financiers were very similar, with the exception of situation where they acted as financial advisers only.

Risk Transfer

Responsibilities of the risk can be transferred to the other party who is willing to bear it, whenever is possible. According to the respondents, a bank can deal effectively with financial risks but, from a senior lender's point of view, the margin in this type of projects is in the range of 1%,i.e. the bank can afford to lose money in 1 of the 100 projects. As a consequence most banks seek to be fairly certain that most relevant risk have been passed on to other parties. In line with the idea of allocating the risk to other parties, financiers transfer all major construction risk to the construction companies, all operational risk to operational companies, while political and some legislation risk are transferred to the public sector (Darinka and Beck 2005).

Risk Retention

Financial organizations normally bear some risks which are related to their core activates as well as some residual project risks ex: Interest rate and inflation risk, the financial organization then used to offset this risk by hedging and derivatives. They also have to retain counter-party risk such as the credit risk, which is normally mitigated through a thorough investigation of the borrower's financial standing.

Risk Reduction

If not eliminated, risk can be reduced by acquiring more information. In view of their adverse consequence, and given that risk are inevitable, attempt should be made to minimize their effect.(Akintoye et al., 2005) Financial exposure can be reduced by interest rate swaps, which provide a fixed rate of loan repayment, as well as other hedging instruments which provide index-linked rates or interest rate caps.

Although basic types of financial derivatives have been known for decades, they have become a major feature of financial markets since the 1970. At that time, the development of derivatives accelerated by increased instability in financial markets in terms of exchange rates, interest rates and price fluctuations. The main types of derivatives include futures, options and swaps. In addition to these, there are numbers of new, more complex off- balance sheet financial instruments. In most cases, the latter can be de-composed to a basket of the main instruments (Akintoye et al., 2003).

The derivative is a contract between two parties that derives its value from some underlying asset price, index, or reference interest rate. Derivatives include forwards, futures, swaps, caps and floors and options (Willie Tan, 2009). The basic idea underlying the use of derivatives is provide protection against adverse price movements and rates by fixing their future transactional values (Blommestein, 2000).

6. CONCLUSIONS

Private Finance Initiative projects are considered as a sustainable procurement practice and have provided great advantages over the other practices in the construction industry in many countries. The long term nature of the PFI projects results that the few projects still have run to their full length and therefore less data available in long run. This and involvement of many parties in the process leads the projects high vulnerable to risk and uncertainty via the sustainability issues special in developing economies with small financial markets the financing for PFI projects need convincing for financial institutions of guaranteed return. However these issues can be overcome by better financial risk management aim towards the achieving sustainability. Incorporating sustainability aspects to existing risk management practices will result in better risk management in PFI projects.

Improving Sustainability of the risk management aims intended to ensure that environmental, social and economic (sustainability) issues are managed, understood and managed in all key procurement decisions that relate to the procurement of products. This involves the identification, assessment and mitigate of key impacts on the environment, society and the economy. Even the PFI procurement with aim to provide better value for money has shown a nature of sustainability procurement practice. The key financial risk embedded in the PFI structure should be identified. Yet there are no risk management framework supports to manage the sustainability risk as a key to achieving goals in financial terms. The innovative financing solutions is required reduce the risk and achieve sustainability in project financing. Financial Strategic planning, income diversification and improvement of financial administration is key to achieving sustainability in financing.

Some points could be suggested to improve the identification of sustainability issues and drive towards better financial risk management.

- Improvement of financial engineering with developing new innovative financial instruments aimed at improving sustainability practices.
- Stress by the legislation or by public sector that the preparation procedures include sustainability
- Instruments and options towards environmental risk and hazard reduction.
- Financiers concern towards the sustainable project development and social responsibility.
- Energy as a commodity can be subjected to commodity based derivatives to achieve better value for money.
- Social involvement in financing

7. REFERENCES

Ackermann, F., Eden, C. and Cropper, S., 1992. Getting started with cognitive mapping. *7th young OR conference*, 13-15 April 1992 Warwick. Warwick: University of Warwick, 65-82.

Ahadzi, M and Bowles, G (2001) The private finance initiative: the procurement process in perspective. *In:* Akintoye, A (Ed.), *17th Annual ARCOM Conference*, 5-7 September 2001, University of Salford. Association of Researchers in Construction Management, Vol. 1, 991-9.

Akbiyikli, R. and Eaton, D., 2004. Risk management in PFI procurement: a holistic approach. *In:* Khosrowshahi, F (Ed.), *20th Annual ARCOM Conference*, 1-3 September 2004, Heriot Watt University. Association of Researchers in Construction Management, 2, 1269-79.

Akintoye, A., Taylor, C. and Fitzgerald E., 1998. Risk analysis and management of Private Finance initiative projects. *Engineering, Construction and Architectural Management*, 5(1), 9-21.

Akintoye, A., Beck, M. and Hardcastle, C., 2003. *Public Private Partnership: Managing Risk and Opportunities*. Black-well, Oxford.

Akintoye, A. and Chinyio, E., 2005. Private Finance Initiative in the healthcare sector: trends and risk assessment. *Engineering, Construction and Architectural Management,* 12 (6), 601–616.

Akintoye, A., Beck, M., Hardcastle, C., Chinyio, E.A. and Asenova, D., 2001. The financial structure of private finance initiative projects. *In:* Akintoye, A (Ed.), *17th Annual ARCOM Conference*, 5-7 September 2001, University of Salford. Association of Researchers in Construction Management, 1, 361-9.

Al-Bahar, J.F. and Crandall, K.C., 1990. Systematci risk management approach for construction projects. *Journal of Construction Engineering and Management*, 106(3), 533-546.

Bakar, N.A., Bokharey, S.K.B.S.A. and Potty, K.V.N.S., 2010. Risks and Mitigation Measures in Build Operate-Transfer Projects. *World Academy of Science, Engineering and Technology*, 39(2010), 217-223.

Boussabine, A., 2007. *Cost Planning of PFI and PPP building Projects*. Oxon: Taylor and Francis.

Carrick, M., 2000. *Commercial Debt Raising for PFI Projects*. Ernst and Young UK, Corporate Finance, Available From: http://www.budgetnews.co.uk/Template1.nsf/HomePages (Accessed on 19 March 2013).

Chapman, C. and Ward, S., 1990. *Project Risk Management: Process, Techniques and Insights*, Construction Projects, *Journal of Construction Engineering and Management*, 106(3), September: 533-546,

CIPS, 2008. *CIPS Knowledge Works on Sustainable Procuremen.* (online). Retrieved from http://www.cips.org/Documents/Resources/Knowledge%20Now/PFI%20and%20Sustainability.pdf

Eisenhardt, K.M., 1989. Building theories from case study research. *The academy of management review*, 14(4), 532-550.

Ellis, S., 1999. Financing Options. *The Private Finance Initiative Journal*. 3(6), 60-61.

EFCA, 2001. *Project* Financing Sustainability Solutions. (online). Retrieved from http://www.efcanet.org/Portals/EFCA/ELOKET/1429/pr_fin_final.pdf

Fitch, T., 1997. *Dictionary of Banking terms*. Hauppauge: Barron Educational Services Inc.

Flanagan, R. and Norman, G., 1998. *Risk Management and Construction.* New York: Blackwell Science.

Gillham, B., 2005. *Case study research methods*. Noida: Brijbasi art press Ltd.

Golafshani, N., 2003. Understanding reliability and validity in qualitative research. *The qualitative report*, 8(4), 597-607.

Goldsmith, S., 1997. Can Business Really Do Business With Government?. *Harvard Business Review.* 75(3), 110-121.

Green Alliance, 2004. *PFI: Meeting the sustainability Challenge.* (online). Retrieved from http://www.green-alliance.org.uk/uploadedFiles/Publications/PFIMeetingTheSustainabilityChallenge.pdf

Gunathilake, S., Jayasena, S., Liyanage, S. and Yatanwala, S., 2009. Use of PFI as a tool for delivering transport Infrastructure in developing countries: the Sri Lankan context, *13th Pacific Association of Quantity Surveyors Congress* (PAQS 2009). 54-61.

Horcher, K. A., 2005. *Essentials of Financial Risk Management*. New Jersey: John Wiley and Sons, Inc.

Horne, J. and Wachowich, J., 1998. *Fundamentals of Financial Management.* London: Prentice- Hall International Inc.

Hull, J.C., 2009. *Options, futures and other derivatives*. 7th ed. London: Pearson prentice hall.

Hull, J.K., 1990. *Application of risk analysis techniques in proposal assessment.* Canada: John Wiley and Sons, Inc.

Ke, Y., Wang, S., Albert, P., Chan, C. and Patrick, T., 2010. Preferred risk allocation in China's public–private partnership (PPP) projects. *International Journal of Project Management*, 28 (2010), 482–492.

Kennard, M., 2006. *Sustainable procuremen*t, Shaping the Change XXIII FIG Congress Munich, Germany, October 8-13.

King, D., 1999. *Financial claims and derivatives.* Oxford: International Thomson Business Press.

Leeper, R., 1979. Perspective on Project Financing. *The Banker*, 129(643), 77-83.

Martinus, P., Stephen, O. and Ogunlana, P., 2006. Good project governance for proper risk allocation in public–private partnerships in Indonesia. *International Journal of Project Management*, 24 (2006), 622–634.

Merna, T. and Njiru, C., 2002. *Financing Infrastructure Projects.* London: Thomas Telford.

Middleton, N. and Richardson, M., 1999. Surveying the scene. *The Private Finance Initiative Journal*, 4(3), 24-26.

Miles, M.B. and Huberman, A.M., 1994. *An expanded sourcebook – Qualitative data analysis*. 2nd ed. California: Sage publications Inc.

Morrison, N., 1998. *International Financial Law Review.* United Kingdom, (March), 58-66.

Pickering, C., 1999. The Asset Option. *The Private Finance Initiative Journal*, 3(6), 64.

Pipattanapiwong, J., 2000. *Multy-Party Risk Management Process (MRMP) for a Construction project Finance by an International Lender*. Master Thesis, Asian Institute of Technology, Thailand.

Rashed, A., 2012. *Fiscal Risk Management for Private Infrastructure Projects in Sri Lanka.* (online). Retrieved from http://www.cbsl.gov.lk/pics_n_docs/10_pub/_docs/IRC/2012/Fiscal_Risk_Management_full.pdf

Sapte, W., 1997. *Project Finance, the guide to Financing Built-Operate-Transfer Projects.* Essex: Euromoney Publications.

Tan, W., 2009. *Principles of Project and infrastructure Finance*. Oxon: Taylor and Francis.

Tiong, L.K.R. and McCarthy, S.C., 1991. Financial and contractual aspects of BOT contracts. *International Journal of Project Management*, 9(4), 222-227.

Tiong, L.K.R., Yeo, K.M. and McCarthy, S.C., 1992. Critical Success factors in winning BOT contracts. *Journal of Construction Engineering and Management*, 118, 2.

TTF, 1999. *Treasury Taskforce Guidance, Standardization of PFI Contracts*. London: HMSO.

Wang, S., Tiong, R., Ting, K. and Ashley, D., 2000. Evaluation and Management of Foreign exchange and revenue risks in china's BOT projects. *Construction Management and Economics*, 18, 197-207.

Zakrzewski, R.A., 1999. Risk Minimization in Project Finance. *The Poland Library*. http://www.masterpage.com.pl/outlook/risk.html (accessed on 15 March 2013).