

**An Extension of Transaction Cost Economics with Political Governance;  
for the Execution of Major International Projects**

**By**

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## **DECLARATION**

**This thesis and the research undertaken to produce it are entirely the results of my own efforts. This thesis has not been submitted in any previous application for a degree. All sources of data have been specifically acknowledged.**

**P.R. DAVID**

## **ABSTRACT**

The objective of this research was to resolve an academic challenge to extend the predictive capabilities of the transaction cost economics (TCE) model to address the theoretical issues of governing high value, complex industrial projects executed across international borders. This extension of TCE has been achieved by political governance and indirect vertical integration to complement governance mechanisms for international transactions. The propositions for an extension of the TCE model and its applicability were explored by field investigation using three case studies complemented by interviews of industry professionals.

The comparative institutional analysis of the three case studies examined the outcome of transactions which were subject to varying levels of political hazards and property rights safeguards. The empirical evidence demonstrated that the relative hazards created by the behaviour of the host country government and institutional regimes will have an overriding impact on transactions for major international projects. In this case, compelling political requirements may require firms to select governance mechanisms in a non-transaction costs economising way.

The contribution made to knowledge by this research is to demonstrate support for the potential of an extension to the basic TCE model developed for predicting optimum governance mechanisms for transactions of major international projects.

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## LIST OF ABBREVIATIONS

AOD	Angola Offshore Development
AOD FPSO	Angola Offshore Development Floating Production Storage and Offloading Unit
AT	Agency Theory
BOE	Barrels of Oil Equivalent
CAPEX	Capital Expenditure
E&P	Exploration and Production
EPCI	Engineering, Procurement, Construction and Installation
FOC	Field Operating Company
FPSO	Floating Production Storage Offloading Unit
GUM OD	Gulf of Mexico Offshore Development
GUM FPSO	GUM Offshore Development Floating Production Storage and Offloading Unit
IOGCs	International Oil and Gas companies
IVI	Indirect Vertical Integration
NOC	National Oil Company
PAT	Principal Agency Theory
PEST	Political, Economic, Sociological and Technological
PIB	Petroleum Industry Bill
TCE	Transaction Costs Economics
NIE	New Institutional Economics
NOD	Nigeria Offshore Development
NOD FPSO	Nigeria Offshore Development Floating Production Storage and Offloading Unit

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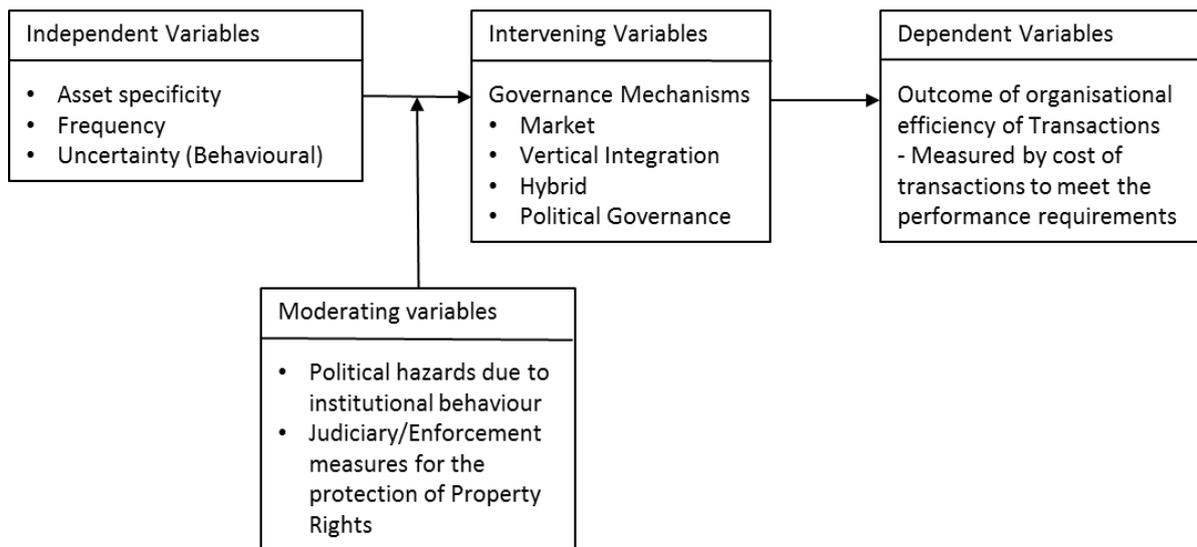
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## **Chapter 1 INTRODUCTION, OBJECTIVES AND SCOPE OF THE RESEARCH**

### **1.1 Introduction and Research Issues**

#### **1.1.1 Introduction**

This chapter introduces the research by outlining the research issues, defining objectives of the research, scope and format of the research process. This research focuses on the academic challenge of developing an applicable extension to the new institutional economics (NIE), and specifically to the transaction cost economics (TCE) theory. The purpose of this extension is to address theoretical issues of the challenges of governing high value, complex industrial projects executed across international borders. For this purpose, governance mechanisms advocated by new institutional economics were examined. The result was concentration on TCE in order to develop this extension. The justifications for this selection are given in this chapter. The proposition of the basic TCE model originates from the discriminating alignment hypothesis, according to which characteristics of transactions that differ in their attributes of asset specificity, frequency and uncertainty (i.e. independent variables) need to be aligned with the intervening variable of governance mechanisms in a discriminating (mainly transaction cost economising) way. The governance mechanisms which differ in their costs and competencies are the market, vertical integration or a hybrid of the two. The outcome (i.e. dependent variable) is the efficiency of transactions (Williamson, 1991). To counter the criticism that this proposition is a static concept taking impact of the moderating variable of institutional environment as neutral, this research explored the argument (illustrated in Figure 1.1) that the TCE reasoning should be extended. The introduction of moderating variables of political hazards, enforcement measures for protection of property rights, and the addition of political governance mechanism as an intervening variable, resulted in an extended TCE model for prediction of governance mechanisms for international transactions. This model is illustrated in Figure 1.1.



**Figure 1.1 - Variables of an Extended TCE Model**

A review of the causes and consequences of the failures of transactions of major international projects highlighted the need to rethink the process of managing such projects. For this, it was found necessary to move beyond neoclassical economics which considers the firm as a production function (i.e. a technological construction) to new institutional economics (NIE), which considers the firm as a governance structure. The word ‘governance’ originates from the Greek word ‘kubernaein’, which means ‘to steer’. Based on its etymology (i.e. the study of the true and original sense of words), governance refers to the manner of steering or governing with authority for directing and controlling a group of people or a state.

The new institutional economics emerged from neoclassical economics combining economics, law, organisation theory, political science and sociology. NIE proposes that the combination of institutions and organisations can reduce transaction costs and also achieve a higher efficiency in economic performance. In the context of NIE, institutional environment is composed of the rules of the game, that is to say, the humanly devised constraints that structure political, economic and social interaction. Institutional arrangements are the guidelines that facilitate exchanges, contracts and governance mechanisms including the market, vertical integration by firms and a hybrid of the two.

These governance mechanisms are implemented by organisations as the collective players of the game (Coase, 1960; Williamson, 1985; North,1990).This conceptual model (illustrated in Figure 1.1)provides an extension (i.e. a shift parameter) to the TCE theory for the prediction of governance mechanisms for international project transactions.

### **1.1.2 Research Issues**

Major international projects are normally carried out by a consortium of firms by executing several transactions in successive steps that are required to achieve set objectives. In this case, the desired outcome is a large infrastructure of very high capital asset which is required to function as stated, to generate revenue for a few decades as discussed in the research conducted by Morris (1986) and Winch (2002,2008). As discussed later in this section, historically many of these projects fail to meet their set objectives resulting in excessive capital cost, inadequate performance standards and long delays in their completion schedules. A common way to measure the success of executing such projects is by determining whether the project stayed within budget, was completed as per the schedule and met specified performance standards. This is commonly known as the iron triangle of project management (Dewitt, 1988; Caniels *et al.*, 2012; Sanderson, 2012). Many existing explanations for these failures focus on procedures and techniques used to execute projects, and are thus operationally focused with insufficient focus on behaviour of the participants and their relationships (Olsen *et al.*, 2005).

The argument is made that the need for governance exists every time a group of people come together as a transient organisation to accomplish an end goal, such as executing a major project. In addition to participation of several actors, these major project transactions can be subjected to high levels of novel technical challenges and commercial complexities indicated in the studies conducted by McKenna *et al.* (2005). In the case of international projects, behaviour of the host country's political and legal institutions may cause additional

challenges. This creates the requirement for including specialised (i.e. political) governance mechanisms to cope with the hazards associated with transactions between the host country institutions and investors (Dixit and Pindyck, 1994 ; Olsen *et al.*, 2005). There is also the possibility that these challenges can be compounded by the opportunism that may arise due to the high value nature of the transactions, causing conflicts and failure in relationships between participants in the transactions ( Dixit, 2007 ;Winch, 2008).

The growing number of failures in the management of large complex international project transactions to achieve their targets leads to an intellectual problem (Miller and Lessard, 2000; Atkinson *et al.*, 2006; Mellow, 2012). This is whether there are limitations to the way in which projects are managed that need to be resolved in order to minimise the ex-post execution regret of such transactions. In this case, it could be considered whether there should be rethinking of project management with a greater focus on the implementation of appropriate governance mechanisms (Williamson, 1995; Sanderson, 2012). Operationalising governance entails two processes: decision-making and implementation of the decision. In broad terms, decision-making refers to the process by which a person or group of persons, guided by socio-political structures, arrive at a decision involving their individual and communal needs and wants. A governance mechanism is the implementation that logically follows the decision; it entails the actualisation or materialisation of the plan or decision. Governance is not just decision-making because decision without implementation is self-defeating. Neither is it just implementation because there is nothing to implement without a decision or plan. Thus, the two processes necessarily go hand-in-hand, and are constitutive of governance (Williamson, 1985; North, 1990; Atkinson *et al.*, 2006).

This approach of advocating governance mechanisms for managing transactions is rapidly becoming a powerful concept to resolve challenges faced by major international complex and high value transactions. In this case, a theoretical framework is required for the

prediction and application of the most appropriate governance mechanisms aligned with the characteristics of the transactions (Miller and Lessard, 2000; Winch, 2002; Atkinson *et al.*, 2006; Sanderson, 2012). The above arguments make the case for investigating governance mechanisms created by new institutional economics (NIE) and other forms such as relationships and trust.

The remainder of this chapter presents the following sections. The causes of failures of major international project transactions are examined in Section 1.2. From the findings, the need for rethinking the management of project transactions (i.e. application of governance mechanisms) is introduced. Section 1.3 then discusses the main alternative governance mechanisms of principal agency theory (PAT) and TCE advocated by NIE for transactions. The limitations of PAT for the economic governance of major transactions are identified, reinforcing the justification for focusing on TCE for developing the theoretical framework to comply with the research objective. Finally, Section 1.4 presents the sequence of the research process and the format of this research thesis.

## **1.2 Execution of Major Project Transactions**

### **1.2.1 Introduction**

The capital costs to execute major international projects such as offshore oil and gas production developments are measured in billions of pounds, and achievement of the end result can take about eight to ten years (Barlow, 2000; McKenna *et al.*, 2005; Olsen *et al.*, 2005). A common way to measure the success of executing such projects is by determining whether the project stayed within budget, was completed as per the schedule and met specified performance standards. Publicly available statistics of project performances vary dramatically in their estimates and do not include confidential data from private corporations, and therefore are not an entirely reliable guide to performance of many major projects. Yet, there are some common causes of project failure found in industry literature. These can be

summarised as poorly defined project objectives and scope, ineffective leadership, inadequate competency of project management personnel due to lack of experience and training, lack of effective communication, lack of comprehensive project plans with inaccurate time and effort estimates and lack of detail in the progress monitoring. These causes of poor project performance are related to operational causes, with inadequate attention to strategic considerations (Chapman and Ward, 2003; McKenna *et al.*, 2005).

Historically, it has been found that despite well-set objectives, diligently planned project execution activities and experienced project management teams, a significant number of major projects have failed to meet their objectives. The project completions come in late, over budget with underperformance, thus failing to meet the objectives set by the project management (Morris, 1986; Hamel, G. and Prahalad, C.K., 1989; Winch, 2002). These difficulties have been illustrated by the performance of many major project executions over the years. A representative global cross industry project performance survey of 438 projects covering private and public industries indicated that only 27% of all projects met their original budget, 22% were on time, while 51% met the desired specifications (Morrow, 2012). These findings and results support the findings of the International Program in the Management of Engineering and Construction (IMEC) survey carried out in 2007 which found that of 60 engineering and construction projects with an average capital value of \$1 billion undertaken between 1980 and 2000, 18% had severe budget overrun and 40% had to be restructured or abandoned. These surveys also found that larger first-of-a-kind and one-of-a-kind projects exhibited worse performance (Wood Mackenzie, 2010; Morrow, 2012).

In management literature, the role of project management is essentially to execute a set of processes in an effort to ensure that a project meets its predetermined objectives, assuming that these processes can be executed without any impediment (Miller and Lessard, 2000; Winch, 2002). In this case, the question is, whether failures in executing projects can

be attributed to the deficiencies in the present processes for executing such projects? The literature and empirical records were reviewed by the researcher to ascertain whether the traditional project management process including formulation of objectives, concept definition, planning, execution and monitoring alone can be expected to cope with the consequences of hazards faced by major projects or not? If not, are there any fundamental strategic issues that need to be explored? (Miller and Lessard, 2000; Winch, 2002, 2008; Chapman and Ward, 2003; Turner, 2005; Misund and Mohn, 2009; Merrow, 2012). The findings of this literature review identified some fundamental causes which can lead to performance failures of traditional project management processes. The findings of this literature review are summarised in the next section.

### **1.2.2 Causes of Failures of Project**

In the case of long term major projects, information about the future state of affairs can often be limited, usually unreliable and predictions available regarding possible alternatives and their consequences can be inaccurate. Project actors are unable to provide a sufficiently flexible and robust response to inevitable turbulence (Anderson, 1999; Chapman and Ward, 2003; Atkinson *et al.*, 2006; Misund and Mohn, 2009;). Such limitations can be compounded by bounded rationality of managers as the human mind has only limited capacity to evaluate and process the information that is available. In several cases the amount of time available to make crucial strategic decisions may be constrained. Therefore, even individuals who intend to make rational choices are bound to make satisficing (rather than maximising or optimising) choices in complex situations (Simon, 1960,1982; Chapman and Ward, 2003). This can result in attempting to manage transactions without envisaging challenges due to political, economic, sociological or technological (PEST) hazards that are typically associated with these major long duration projects. Incomplete information can result in underestimating the causes and consequences of uncertainties and risks caused by

these hazards impacting transactions (Morris, 1986; Miller and Lessard, 2000; Winch, 2002, 2008). In such situations, the term 'risk' which can be quantifiable can be used interchangeably and without differentiation with the term 'uncertainty' which is a subjective probability. Decision-makers see project outcomes as risks, but only in the sense that they lack the necessary reference data to undertake a calculation of the statistical probability of the uncertainty (Keynes, 1921, 1937; Knight, 1957). These limitations can make it nearly impossible to draw up contracts that cover every contingency therefore necessitating reliance on rules of thumb (Chapman and Ward, 2003; Atkinson *et al.*, 2006; Misund and Mohn, 2009).

Another underlying root cause of project underperformance is the pre-planned opportunistic behaviour by key vested interests leading to the approval of non-viable projects with unrealistic objectives. The actors with a vested interest in seeing such projects undertaken are corporate management and/or politicians who have strong influence and motives to get these projects approved. The corporate management resort to such intentional short-term behaviour for personal gains including enhancing their position with shareholders of the firm and other stakeholders. The political actors expect to gain significant political and personal capital from the contracts that will materialise from such project approvals. Such project sanctions may be done without ex-ante consideration of the human and material resources required to execute the tasks to meet the set objectives. This behaviour can also encourage under-estimating project costs, over-estimating project benefits and resorting to unrealistic project planning. Due to the long time period required for the development and implementation of major projects, the corporate management and/or the political actors involved in the project sanctions are often no longer in office when the outcome of the project can be assessed. As such, these participants in the sanctioning of non-viable projects can no longer be held accountable for the underperformance of the project execution (Flyvbjerg, 2003; Misund and Mohn, 2009; Sanderson, 2012).

In some cases, such behaviour of the corporate management can be compounded by the inadequate expertise of the project management team to execute the transactions to meet unrealistic demands (Olsen *et al.*, 2005; Misund and Mohn, 2009). The cumulative outcome of these actions can result in deficient technical specifications and incomplete commercial contracts. In this situation, the established procedures and practices of outsourcing the execution of main project activities, such as engineering and construction, using contracts may no longer be sufficiently comprehensive enough to handle the complexities of major long term projects (Winch, 2002, 2008; Chapman and Ward, 2003).

Another significant cause of the underperformance of major project transactions is that important strategic issues such as impact of relationships between the project participants can be underestimated in the execution of the activities. In this situation, the argument can be made that conventional project management is too concerned with operational planning and fails to adequately address the relationships between the participants of the project, and whether there is potential for opportunism, guile and behavioural uncertainty (Atkinson *et al.*, 2006; Dixit, 2007; Sanderson, 2012). Major projects are typically characterised by several and diverse participants with conflicting motives rather than by a singular shared objective. This means that the different actors within a project understand the requirements and expectations from the project in very different, incomplete and often competing ways. An example observed in practice is that the contracts and agreements used to define and coordinate the roles and responsibilities of the project actors are often lacking clarity in their intentions. This situation requires an expansion of the focus from the purely technical and operational tasks that need to be executed to achieve the project objectives. A much greater effort is required in formulating and implementing relationship arrangements between the various actors responsible for executing the project tasks. If project participants are not able to construct a relatively stable atmosphere, which encourages constructive co-operation

between different participants, there is a greater chance of project underperformance. This is due to projects being subject to often competing objectives, and motives of the participants can cause insurmountable difficulties in implementing management activities (Clegg *et al.*, 2002; Flyvbjerg *et al.*, 2003; Atkinson *et al.*, 2006).

In addition to causes of project transactions discussed above, it has also been found that potential for such failures is more prevalent when project transactions have to be conducted across national boundaries (McKenna *et al.*, 2005; Wood Mackenzie, 2010). The internationalisation of project transactions brings new actors into play. This can cause new challenges in the form of potential opportunistic intervention by the host government and inadequate institutional arrangements for protection of property rights of organisations responsible for execution of the project (Olsen *et al.*, 2005; Scott *et al.*, 2012). An example of this is transactions required to execute offshore oil and gas exploration and production (E&P) projects by international oil and gas companies (IOCGs) as indicated by industry journals (Wood Mackenzie, 2010; KPMG, 2011).

The conclusions to be drawn from the discussions in the earlier sections are that in addition to technical and operational complexities, the causes for project failures can be summarised as incomplete information on the future state of affairs causing non-quantifiable uncertainties, bounded rationality of the decision-makers and opportunistic behaviour of participants in transactions. In the case of international projects, additional challenges can be posed by the political and institutional context of the host country. The failure of major projects to meet their targets can be due to inappropriate or undeveloped governance arrangements that are incapable of mitigating the emergent turbulence inevitably connected with the exogenous and endogenous challenges associated with these projects. Conscious design and creation at the front-end of the project of governance capacity or ‘governability’ appropriate to the particular context of the project is required to mitigate turbulence that

emerges over the life of the project and to ensure co-ordinated behaviour of the participants (Miller and Lessard, 2000; Flyvbjerg, 2003; Atkinson *et al.*, 2006). In general, these governance mechanisms are required to formulate and implement stronger, more co-operative and more flexible relationships between project participants. There is also an explicit recognition, however, that the governance mechanisms selected and designed must be appropriate to the particular context and characteristics of a project (Atkinson *et al.*, 2006; Winch, 2008).

In the case of major international projects there is the need for the identification of the required governance mechanisms to ensure that the relationships between the host country institutions and participants of the project are organised and managed effectively (Dixit, 2007; Misund and Mohn, 2009).

### **1.2.3 Rethinking Management of Major International Projects**

Orthodox project management has typically focused on those with a direct and formal role and responsibility for managing the project. This is because the project is given a priori status as an object, a property of the organisations carrying it out, with pre-specified content (objectives, designs and methods). It is therefore a thing to be managed by a discrete group of actors, called project managers, who are deemed to have the necessary knowledge, wisdom, experience and expertise (Atkinson *et al.*, 2006). However, the underlying causes of failures of major international complex projects support the proposition that there is a requirement for rethinking management of such projects. This is in line with the proposition that companies will be required to change their strategies if the industry in which they are operating experiences significant structural changes, as is the case with internationalisation of major projects (Porter, 1980, 1996; Ansoff, 1990). This rethinking of the management of international projects requires appropriate governance mechanisms to provide the dimensions of authority, decision-making and accountability, taking into account specific characteristics

of the transactions to be executed. In addition, such governance mechanisms will be required to steer and direct the different actors to encourage an alignment of objectives and behaviours (Williamson, 1995; Miller and Lessard, 2000; Dixit, 2007; Sanderson, 2012;).

Williamson defined a governance structure as an “*Institutional framework in which the integrity of a transaction or related set of transactions is decided*” (2005, p. 11). Thus, governance structures need to determine who has power, who makes decisions, how other players make their voice heard and how the account is rendered specifically. Governance thus consists of formal structures and rules that enable project transactions to be carried out in an economising manner (Williamson, 2005).

In a broad sense, all main causes of project failures require that actors should prepare with farsightedness for the future. This is only possible if actors are sufficiently farsighted to consciously design an ex-ante collaborative project culture that will effectively handle likely events in a project. Thus, the ex-post transaction problems can be more effectively addressed if the experience and judgment of the actors is farsighted enough to know the range of possible future events, to rank them based on subjective probability, and prepare appropriate governance mechanisms ex-ante to manage those events during the transactions. In this case the emphasis on project governance is as a form of organisation that can be consciously designed ex-ante and the performance problems are a result of misaligned or underdeveloped governance mechanisms. These propositions provide some vital insights for building organisational infrastructure, capabilities and culture, what might broadly be called governance capacity, to facilitate trusting and collaborative behaviours in the face of uncertainty to enhance project performance (Williamson, 1985, 1996; Clegg *et al.*, 2002; Atkinson *et al.*, 2006).

The arguments presented above provide the basic requirements of a conceptual model for predicting governance mechanisms for managing major transactions across national

borders. The predictive capabilities of this model are required to align the most appropriate governance mechanisms with the economic and political characteristics of the international transactions. To develop this framework an evaluation was carried out of the alternative governance mechanisms discussed by new institutional economics and mechanisms required to manage political hazards caused by host country institutions.

### **1.3 Development of the Research Approach**

#### **1.3.1 Theory of the Firm and Governance Mechanisms**

The focus of this research was developed in the earlier sections as the formulation of an extension to existing theory on governance mechanisms to manage the transactions of large international projects subject to PEST challenges. For this purpose, it is necessary to evaluate the competing theories of NIE to examine the strengths and limitations of governance mechanisms proposed by them to minimise ex-post regret due to the potential failures of transactions identified in Section 1.2.

The new institutional economics (NIE) is an interdisciplinary approach combining research from the fields of economics, law, social and political sciences, organisation theory, and strategic management. As such, NIE goes beyond the conception of the firm as a black box production function and considers the firm as possessing an internal governance structure (Coase, 1937, 1960; Klein, 1989). NIE focuses on institutions which define the rules of the transactions and on how institutions interact with organisational arrangements. Thus, the theoretical framework of the new institutional economics introduced and combined the concept of transaction costs with the role of institutions, to propose that institutions are a medium not only for reducing transaction costs but also for achieving increased efficiency in economic performance. For this, NIE has used two approaches: one to develop a micro analytical approach to the nature of organisations and another to generate a macro analytical approach that investigates the relationships between institutions and economic performance,

as well as institutional change processes. The new institutional economics has utilised these approaches, which are mutually inter-related, to investigate institutions and how institutions interact with organisational arrangements within an economy to carry out all such transactions that would result in social efficiency gains (Coase, 1960; Williamson, 1975; North, 1990; Milgrom and Roberts, 1992). The firm is thus understood by NIE as an institution created by economic actors in order to reduce market failures and transaction costs (Coase, 1937, 1960).

The microanalytical approach in NIE has two main strands. The first is the principal agency-theoretic (PAT) component, which views the firm as a nexus of contracts between a principal and several agents to produce value. Second, the transaction cost economics (TCE) component which considers the firm as a set of institutional and contractual arrangements (Williamson, 1984; Cheung, 1987; Eggertsson, 1990). In the discussion that follows, the strengths and limitations of each of these components for understanding the management of complex international project transactions are examined. The key underlying assumptions of each theory are discussed. The thesis is interested in how far each of these approaches to transaction governance might be useful for interpreting the challenges of managing complex projects across borders and for suggesting potential solutions to these challenges.

### **1.3.2 Principal Agency Theory and Major Transactions**

Principal agency theory (PAT) defines the economic exchange relationship between two parties: the principal and the agent, where the principal hires the agent to carry out a task. The principal-agent relationship, in which the principal delegates work to the agent, is based on contracts, which is the focal point of agency theory. The PAT has separated ownership and control and has extended the neoclassical model by adding agents to the firm. The agency theory objective is to determine optimal contracts between the principal and agents. For this, PAT assumes that participants in the transactions possess the necessary expertise,

capabilities and facilities to handle the scope and activities of the transactions with which they are faced. The agent tries to maximise personal gains by satisfying the principal's economic objectives and the agent's commitment level is the function of perceived reward value for satisfying those objectives (Jensen and Meckling, 1976; Eisenhardt, 1989; Hendrikse, 2003).

A basic feature of PAT is the assumption that the two parties to a contract can have different motives which could be in conflict; it thus assumes diverging goals of the cooperating parties. The principal always wants more for less and the agent wishes to deliver the minimum possible effort that he or she can get away with. The principal wants to maximise his/her benefits while minimising reward to the agent who also wants to maximise his/her benefits. In a situation where the principal delegates work to the agent, level of reward to the agent usually depends on the principal's interest in realisation of the assigned mission. A benefit to the agent, in the form of reward, represents cost to the principal, while the agent's effort brings benefits to the principal (with an assumption that higher effort is directly related to better results), and at the same time cost to the agent. The problem here is that the principal cannot verify that the agent has behaved appropriately and cannot monitor every action that the agent undertakes. The collection of this information by the principal may also be costly, if at all possible (Wieland and Ulbrick, 1973; Jensen and Meckling, 1976; Stiglitz, 1987; Eisenhardt, 1989; Hendrikse, 2003).

Overall, the domain of agency theory is based on relationships that relate to the principal and an agent who are engaged in cooperative behaviour, despite differing goals and differing attitudes toward risk. Because the unit of analysis is the contract governing the relationship between the principal and the agent, the focus of the theory is on determining the most efficient contract governing the principal-agent relationship. In this case, the principal uses a contract either as a basis for monitoring the agent's behaviour or, if monitoring is too

costly, to incentivise the agent to reveal what they are doing (Wieland and Ulbrick, 1973; Jensen and Meckling, 1976; Eisenhardt, 1989).

The assumptions in market transactions are that economic agents seldom have full information about the goods or services being bought or sold, and full information about each other. These assumptions describe a market where there is imperfect information for reasons such as accurate information being too costly, or impossible to obtain, for important decision characteristics. This imperfect information in a market transaction may be only one sided, or may impact both parties. Therefore, information can be seen as a valuable economic factor in contracts and the level of uncertainty that can ultimately determine the outcome. In this situation, imperfect information can be due to information asymmetry, and/or incomplete data. Information asymmetry occurs when one party knows more than the other about their capabilities and behaviour. The incomplete data results in uncertainty when both parties are to some extent unsure about what might happen in the future (Stiglitz, 1987; Eisenhardt, 1989; Nicholson and Bigelow, 2008).

Asymmetric information is a situation in which economic agents involved in a transaction have different information. In such situations, information that is distributed asymmetrically between economic agents will influence economic behaviour and operation of the market. Two forms of asymmetric information are categorised as ex-ante (pre-contractual of the transaction), or ex-post (post-contractual of the transaction). In the analysis, ex-ante asymmetric information can lead to adverse selection, and ex-post asymmetric information can result in moral hazard (Stiglitz, 1987; Eisenhardt, 1989; Nicholson and Bigelow, 2008).

Adverse selection is a situation where one party in a transaction knows something about its own characteristic that the other party does not know. Adverse selection is often referred to as a hidden information problem in a market, where the agent may know more

about the requirements of the transaction than the principal and vice versa. Adverse selection also refers to the situation where the principal is not able to determine ex-ante if the agent has the expertise and resources to carry out the activities in line with the contractual terms (Shapiro, 1989; Eisenhardt, 1989; Hendrikse, 2003;).

Moral hazard refers to situations where one side of the market cannot observe the actions of the other is sometimes referred to as a hidden action problem. Moral hazard occurs under a type of information asymmetry where the risk-taking party to a transaction knows more about its intentions than the party paying the consequences of the risk. In such situations moral hazard occurs when one party makes the decision about how much risk to take or takes more risks because the other party bears the consequences if things go badly (Krugman, 2009). Thus, a moral hazard may occur where the actions of one party may change to the detriment of another after a transaction has been initiated. Moral hazard also arises in a principal-agent relationship where one party usually has more information about his or her actions or intentions than the other party. Thus, moral hazard can occur when the party with more information about its actions or intentions has a tendency or incentive to behave inappropriately from the perspective of the party with less information. An example is when the agent may have an incentive to act inappropriately (from the viewpoint of the principal) if the interests of the agent and the principal are not aligned and the principal cannot completely monitor the agent. Thus, the results of moral hazard are an increased probability of undesired outcomes for one party, post-contractual (Wieland and Ulbrick, 1973; Eisenhardt, 1989; Shapiro, 1989; Hendrikse, 2003).

When the contracts are complete and enforceable, the transactions can be executed in the most economical way with minimum intervention by the principal, as discussed by different researchers (Eisenhardt, 1989; Klein, 1989; Whittington, 2001).

However, potential contractual hazards can arise due to information asymmetry. Thus, when there is information asymmetry, problems of adverse selection and moral hazard are inevitable. In such situations, the PAT resorts to managing the risks in the contract by utilising resources to control the price, output and incentives (Wieland and Ulbrick, 1973; Eisenhardt, 1989; Shapiro, 1989; Hendrikse, 2003).

The imperfect alignment of the agency contract due to information asymmetry inherently leads to an encouragement of moral hazard. In such situations, in order to curb moral hazard, the principal has to supplement PAT arrangements by the use of monitoring and incentive contracts. As a result, the principal will incur additional transaction costs in order to monitor the agent's performance and ensure compliance with the contract, as once the contract is signed the principal's monitoring availability may be limited. In such cases, the principal will not know whether the agent is acting in accordance to the principal's interest once the contract has been entered. It can be expected that the self-interested agent will shirk on the contract and carry out actions that are not in the interest of the principal (Eisenhardt, 1989; Klein, 1989; Shapiro, 1989; Hendrikse, 2003).

Where it is not possible to monitor the agent effectively, it may still be possible to assess the agent on the basis of outcome. Under these circumstances, the principal may need to adjust the agent's reward or impose penalties according to performance. However, rewards and penalties for transactions can only be adjusted according to the relative power of the participants (Klein *et al* 1978; Hendrikse, 2003). Thus, existence of asymmetric information explains why the principal offers incentive and reward contracts to agents in addition to monitoring the behaviour of agents to ensure return on their capital. The extent of the monitoring and incentives required will depend on the potential of the agents for opportunistic behaviour and the costs and benefits related to its implementation. Contractual conflicts need to be mitigated by introducing a compensation scheme, in the form of a risk

premium, where rewards are based on outcome. These strategies try to alleviate the effects of adverse selection and moral hazard problems from informational asymmetries, where costs to address these information deficiencies are too expensive or impossible (Klein, 1989; Shapiro, 1989; Hendrikse, 2003). The increases in the agency costs for major transactions to curb the impact of information asymmetries will depend on the ability of the principal to find mitigating solutions to measuring performance of the agents and determining effective incentives to limit opportunistic behaviour (an inclination in the human) and moral hazard. These mitigation measures by the principal often turn out to be grossly expensive arrangements, since each possibility cannot be adequately determined for long term contracts or even known, and it will be costly to resort to legal means (Klein, 1989; Hendrikse, 2003).

In the case of major complex international transactions, there are many unknown contingencies that either cannot be determined in advance at all or cannot be determined efficiently, due to asymmetry of information (Klein, 1989; Whittington, 2001). Also, there is the possibility that in this case either future contingencies cannot be probability mapped or, at the very least, possibility sets cannot be identified or assigned in the contractual arrangements. Consequently, faced with such a dilemma, it is not always possible to draft complete contracts for transactions, and it is possible that whatever actors cannot envisage before making a choice, later becomes an issue and causes contractual conflicts (Raiffa, 1968; Dixit and Pindyck, 1994). Based on the limitations of the PAT and the consequences discussed in this section, the proposition can be made that principal agency contractual arrangements are not the most economical way of managing the increasing commercial and technical hazards faced by major long duration projects. The challenges faced by the international projects can be dominated by the political hazards and issues of property rights protection of the host country. These challenges represent more known uncertainties than

risks to the transactions and will require specialised governance mechanisms, as discussed in Chapter Three.

### **1.3.3 Research Focus on Transaction Cost Economics**

The causes for the underperformance of major international project transactions when carried out by several participants in a joint venture were discussed in Section 1.2. The identified causes of failures of major projects support the proposition for rethinking management of international projects. In this case, the focus is on appropriate governance mechanisms proposed by NIE to provide necessary dimensions of authority, decision-making and accountability for such international projects, taking into account host country institutional arrangements ( Chan and Hwang,1992). This will be required to steer and direct the different actors to encourage an alignment of behaviours and objectives. In order to achieve this aim, a theoretical framework is required for the prediction and application of the most appropriate governance mechanisms aligned with the characteristics of the transactions (Williamson, 1995; Miller and Lessard, 2000; Atkinson *et al.*, 2006; Sanderson, 2012).

As discussed in Section 1.3, PAT (one major component of NIE) is based on assumptions of rationality and quantifiable risks and uses contracts as the vehicle for governance of transactions. However, limitations of the PAT may cause information asymmetry and the consequences (including incomplete data as discussed in Section 1.4) led to the proposition that agency contractual arrangements are not the most economical way of managing major long duration projects.

Transaction cost economics (the second major component of NIE) revises the traditional definition of a firm from a generation capacity to an organisational form of governance arrangements. The TCE model advocates use of characteristics of the transaction as the criterion to predict appropriate governance mechanisms.As transactions incur costs,

these transactions must be governed based on the characteristics of the transactions to be executed; some governance arrangements lead to better outcomes than others.

In order to develop this TCE framework, Williamson proposes two assumptions which can cause conflicts in transactions and classifies these as: human and environmental (Williamson, 1975, 1995). For the human factors, the first cause is bounded rationality when human behaviour has only limited knowledge, even though at times it is considered to be completely rational. As such, people do not have complete knowledge or have limited data available to predict and plan with reasonable confidence for all the different possibilities that may emerge (Simon, 1960; Mintzberg, 1994). The second human factor is opportunism where self-interest is practiced with guile. The role of opportunism in the context of TCE is that some participants to transactions might try to further their gains by their opportunistic behaviour, either with guile or with stealth, or more aggressively in a blatant manner. The problem is that such opportunistic behaviour cannot be anticipated before contracts are agreed because it is not easy to determine who among the transaction participants are opportunists (Williamson, 1981,1996; Hart and Moore, 1999). Among environmental factors, uncertainty and complexity refer to conditions, unlike known risks, where it is not possible or becomes very expensive to predict the events that can impact transactions and the outcome. It will be extremely difficult to negotiate and draft contracts that include contingencies allowing for events which the contracting parties do not expect or have not experienced before (Raiffa, 1968; Williamson, 1981, 1996). It was identified that the factors that contribute to the underperformance of long duration major international projects include bounded rationality, limited data available to predict and plan all the different eventualities, opportunism, uncertainty and incomplete contracts that can impact transactions and the outcome. As such, it was deemed that TCE, which addresses all these issues, is more related than PAT to this

research, which is to formulate a conceptual governance prediction model to manage the transactions of large international projects.

For this, Chapter Two presents the findings of the literature review carried out to ascertain the theoretical basis, capabilities and limitations of TCE to predict governance mechanisms for the execution of such projects.

#### **1.4 Format of the Thesis Report**

The research process and format for the thesis is illustrated below in Figure 1.2. The objective and scope of the research (covered in this chapter) is the extension of the basic transaction cost economics (TCE) model for the prediction of governance mechanisms in managing the commercial, technical and political challenges faced by major international projects.

Chapter Two presents a summary of the capabilities and limitations of the basic TCE model. This TCE model, developed by Williamson (1975, 1981, 1985), advocates the use of characteristics of the transaction as the criterion to predict appropriate governance mechanisms. The limitations of this basic TCE model to address the impact of political hazards and property rights issues on transactions are discussed.

Chapter Three examines how the challenges faced by major projects multiply in the international context with unpredictable institutional environments. These are due to potential hazards caused by behaviour of the host government, issues due to protection of property rights and increasing demand for local content in transactions. It then focuses on the theoretical explanation of these challenges to project governance arrangements. Political governance mechanisms identified by comparative institutional analysis are developed to mitigate the consequences of the challenges posed by politically motivated hazards.

In Chapter Four, findings of the earlier chapters from the examination of related literature are used to develop an extension to the TCE basic model. This extended TCE

governance model is developed to show how the consequences of the hazards caused by political context of the host country and the level of protection of property rights might be mitigated. Research exploratory propositions are defined to explore the applicability of this extended TCE governance model to address the theoretical limitations of the basic TCE model for managing major projects executed across international borders.

Chapter Five presents the research philosophy and design for the field investigation to explore the applicability of the extended TCE governance model. This investigation evaluates three case studies which are all based on major offshore oil and gas projects. Semi-structured interviews were held with industry project management specialists and their responses were used to develop the case study findings.

Chapter Six presents the scope, specific features and execution aspects of a major offshore oil and gas development project, which is the common basis of the three case studies.

Chapters Seven, Eight and Nine present the findings of the three case studies augmented by the interview responses. The case studies are oil and gas developments of equivalent economic scale and with similar technical issues but carried out under varying conditions (i.e. low/medium/high) of political hazards caused by government intervention and protection of property rights. The changes to the ex-ante governance mechanisms that were required to successfully complete the project transactions and the theoretical implications of the empirical evidence are discussed.

Chapter Ten summarises the findings on the applicability of the extended TCE governance model to predict the governance mechanisms for high value, complex industrial projects executed across international borders. Conclusions are drawn as to how the extended TCE model addresses the critique that the basic TCE theory is a static concept and is not sufficiently sensitive to differences in political and institutional context. From the

outcome the contributions to academic knowledge and industry practice are formulated. The thesis concludes with proposals for further research on the subject.

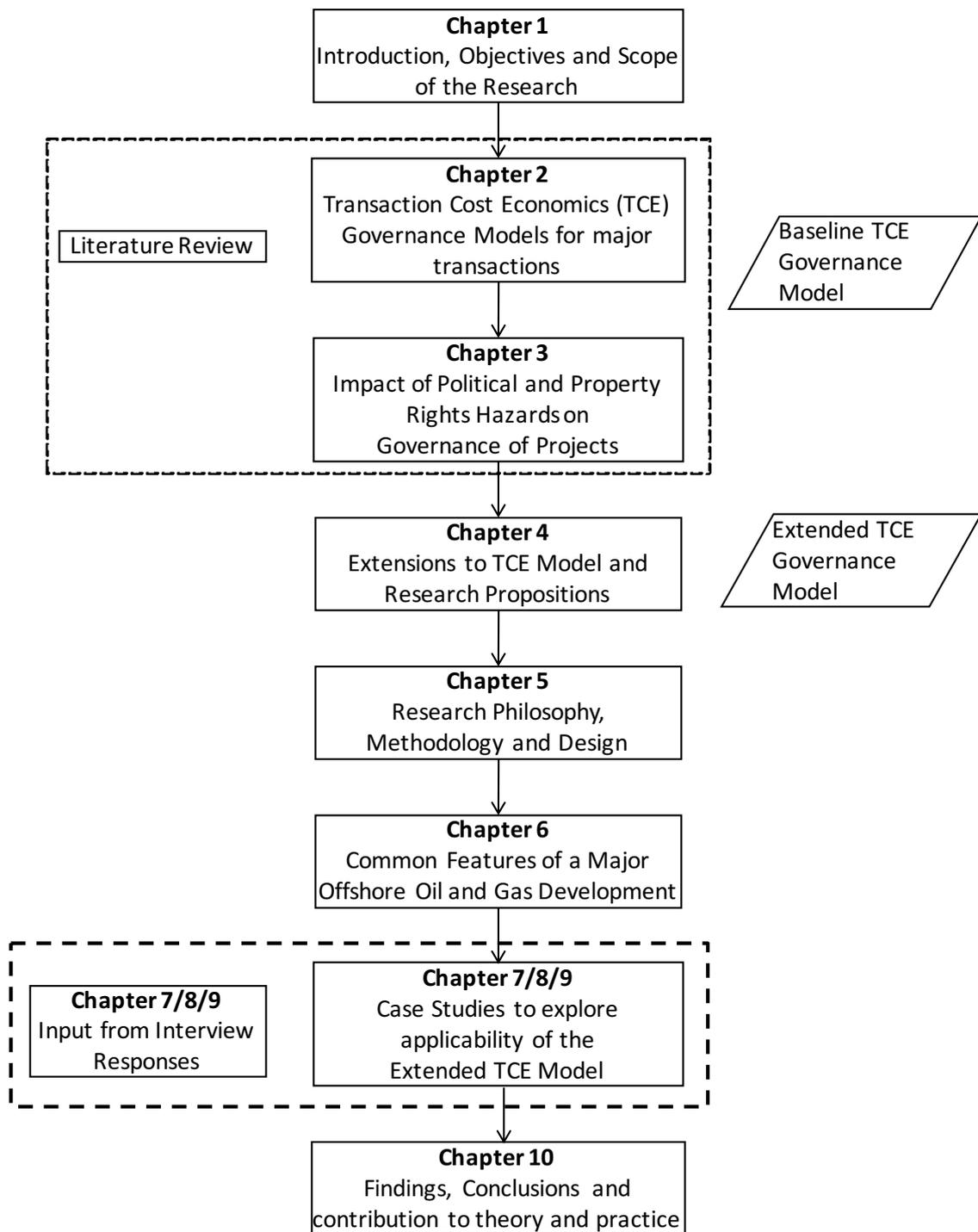


Figure 1.2 - PhD Thesis Process and Report Structure

## **Chapter 2 GOVERNANCE MECHANISMS FOR MAJOR PROJECT TRANSACTIONS**

### **2.1 Theoretical Concepts of Transaction Cost Economics (TCE)**

This chapter presents the findings of the literature review carried out to ascertain the theoretical basis, capabilities and limitations of TCE to predict governance mechanisms and manage the execution of major projects. Such a project is executed by several transactions over the project life cycle. The transaction cost economics approach was developed by Williamson (1975,1981) expanding on the foundation laid by Coase (1937). The term ‘transaction cost’ was initially proposed by Coase as relating to the costs incurred in obtaining a product or facility using the market facilities instead of having it created within the firm, i.e. vertical integration. Coase (1960) explains in his article “The Problem of Social Cost” the costs of executing transactions. According to Williamson “the transaction is the appropriate unit of analysis, is that the unit of analysis needs to be dimensionalised, and that a discriminating alignment between transactions and governance structures plays a central role in the economics of organizations” (Williamson,1995, p.162). In order to execute a transaction using the market, it is necessary to find out who the contractors are, then negotiate with them to obtain favourable terms, finalise the contract and then monitor the transactions to ensure compliance with conditions of the contract.

In essence, the fundamental concept is that the transaction cost consists of the cost for arranging a contract ex-ante and then monitoring and implementing it ex-post which does not include the production costs (Williamson 1981,1996, 2005). As such, the transaction costs as include the following:-

- Search and information costs which are required in establishing the product are available at the most minimal cost for the desired quality within the market considered.

- Bargaining costs which are required to negotiate acceptable terms with the agent, drawing up an agreement, and setting the agreement for execution.
- Policing and enforcement costs which are the expenses incurred in verifying the compliance of the agent with the conditions of the contract and monitoring implementation of the necessary remedial measures.

Coase emphasises that the impact of the above costs must be understood to comprehend how the costs of transactions operate and the economic logic that drives them (Cheung, 1987). There are at least three main factors underlying the need for the above transaction costs.

The first point is that people can be constrained by bounded rationality as they do not have complete knowledge or have limited data available to predict and plan for all the different possibilities that may emerge (Mintzberg, 1994). The second issue is that it is not possible to predict with reasonable confidence all the possible scenarios. It will be extremely difficult to negotiate and draft contracts that include contingencies allowing for events which the contracting parties do not expect or have not experienced before. Finally, even after protracted negotiations, the contract may be ineffective to such an extent that it cannot be implemented even by resorting to legal means. Thus, the overall conclusion reflects that contracts for major transactions can neither be completely drafted nor implemented in full (Alchian and Woodward, 1987; Klein, 1989).

In addition to the above issues, Williamson (1985) identifies the problem where transaction partners might deliberately exploit the weakness of other partners in a calculated opportunistic manner to enhance their rewards. Although everyone will not act in this blatantly opportunistic manner, the prevalent state of bounded rationality discussed above will make it extremely difficult to identify such dishonest behaviour. In order to protect against such blatant dishonesty, it is necessary to select transaction governance mechanisms

that can prevent excessive cost escalation in completing the transactions. In view of these contractual pitfalls, the governance mechanisms must be selected which can vary in their organisation arrangements with regard to the required flexibility, procedures, and contract laws. The coordination of such governance mechanisms required for specialised transactions can become extremely challenging (Klein *et al* 1978, Williamson, 1985, 2000; Klein, 1989).

In order to overcome the limitations of market mechanisms, TCE theory expands on the foundation laid by Coase (1937) and models internalising the transactions within the firm, i.e. vertical integration as an alternative to using the market. In this manner, markets and firms are substitutable for executing transactions (Williamson, 1975, 1995). The TCE theory concentrates on asset specificity which is inevitable in major transactions. The requirement for the firm is justified by TCE on the grounds that it effectively minimises costs by using vertical integration and purchase expenses by utilising accessible markets. In this case, of greater asset specificity of the products, there is higher probability that the firm would generate them inside or obtain them through joint ventures and partnerships (Williamson, 1975, 1981).

An argument of Coase (1960), based on the proposition by Knight (1957), is that uncertainty and human behaviour are the reasons for increased cost resulting from market transactions. This leads to the argument that when we find that using the market for transactions turns out to be more expensive compared to internalising these arrangements, then such transactions need to be internalised. However, internalising transactions within a firm also involves costs such as management and coordination costs. Thus, we find a significant contribution made by TCE is to revise the traditional definition of a firm from a generation capacity to an organisational form of governance arrangements. As transactions incur costs, these transactions must be governed based on the characteristics of the transactions to be executed; some governance arrangements lead to better outcomes than

others (Hart, 1988; Hart and Moore, 1990). This is a situation where boundaries of the firm are determined by the need to economise on transaction costs between using the market and those of internalising transactions, i.e. vertical integration (Williamson, 1975, 1981). Thus, TCE emphasises that governance is the mechanism to ensure minimisation of conflicts in the transaction, in order to maximise the efficiency of the transaction.

In order to develop this framework, Williamson proposes two assumptions which can cause conflicts in transactions and classifies these as: human and environmental (Williamson, 1975, 1995). For the human factors, the first cause is bounded rationality when human behaviour has only limited knowledge, even though at times it is considered to be completely rational (Simon, 1960). The second human factor is opportunism where self-interest is practiced with guile. Among environmental factors, uncertainty and complexity refer to conditions, unlike known risks where it is not possible or becomes very expensive to predict the events that can impact transactions and the outcome (Raiffa, 1968; Williamson, 1981). These assumptions and their outcomes are discussed in the next section.

## **2.2 The Applicability of Transaction Cost Economics (TCE)**

### **2.2.1 TCE Assumptions and Variables**

The main contribution of TCE is that it is an influential effort to define a hypothesis that relates the structure of firms to their transactions. Literature has a tendency to regard the firm as a mechanism which turns inputs into outputs and the internal processes of which are not thought to be critical (Cheung, 1987). In this situation, the basic principle adopted in TCE is that mechanisms of governance must be capable of handling any potential contractual hazards that can be encountered by the transactions. Thus, if we use a straightforward governance mechanism to deal with a complex exchange this would risk contractual breakdown. However, using a specialised governance mechanism to deal with a basic exchange would cause additional costs without any increase in benefits (Williamson, 1981,

1996; Hart, 1988). As such, for the prediction of governance mechanisms for difficult and complex transactions, the governance mechanisms of market, vertical integration, and a hybrid of the two need to be considered. These should not be analysed alone but should remain constantly in connection to each other for the purpose required (Hart, 1988; Caniels *et al.*, 2012).

Williamson's efforts are well within the envelope of economic logic as it assumes that firms are profit maximising and that profit maximisation is achieved by minimising the costs while producing the output. Thus, TCE can be classified as an equilibrium theory that assumes participants of the transactions are subject to a prevalent state of bounded rationality and highlights transaction costs in addition to production costs.

The production costs according to Williamson are equivalent to the costs of constructing and operating a perfect machine. An analogy to this is that any engineer would confirm it is not always possible to achieve a machine which complies one hundred percent with the required performance specifications. There can be operational defects such as friction between the components of the machine. If we use this analogy for commercial transactions, an ideal machine would be a market in which all the necessary information is available to all parties with perfect competition to enable the market to function with maximum efficiency. However, any variations from the ideal market, which are normally termed as 'market failures', will result in additional transaction costs to firms when they have to purchase or sell goods and services (Williamson, 1981, 1995; Dixit and Pindyck, 1994).

Considering the inevitable case of market failures, a theoretical approach has been developed (by Williamson) to make TCE operational in three steps. The first step is to consider a transaction as a basic unit of analysis and define the characteristics of the transactions and their differences. Williamson defines three variables of frequency, uncertainty and asset specificity that should be considered when deciding whether market,

hierarchy or a hybrid arrangement of the two will have the lower transaction costs in various circumstances. The next step is identifying the strengths and limitations of alternative governance mechanisms. Finally, the development is completed by the application of a discriminating alignment hypothesis, that transactions can be executed in the most economising way by aligning the governance mechanisms to the characteristics of the transactions. There are two main assumptions that Williamson makes which underpin this theory: bounded rationality and opportunism (Williamson, 1981, 1996).

Bounded rationality refers to the fact that people have limited ability to store, retrieve and process all information and knowledge potentially relevant to decision-making. This can be compounded by inadequate data for evaluation to resolve issues that confront them in making decisions. Participants to major transactions face this situation of limited rationality despite the fact they may have extensive experience and a high level of expertise. However, they still cannot predict the potential outcome of alternative courses of action (Simon, 1960; Mintzberg, 1994).

The role of opportunism in the context of TCE is that some participants to transactions might try to further their gains by their opportunistic behaviour, either with guile or with stealth, or more aggressively in a blatant manner. In this case, these participants are not transparent with their intentions and tend to take advantage of unexpected developments to the detriment of other participants to the transactions in order to enhance their own benefits (Winch, 2002, 2008; Dixit, 2007). The problem is that such opportunistic behaviour cannot be anticipated before contracts are agreed because it is not easy to determine who among the transaction participants are opportunists (Williamson, 1981, 1996; Hart and Moore, 1999). Based on the above assumptions, the impact of the variables of frequency, uncertainty and asset specificity on transactions are addressed in the next section.

### 2.2.2 Variables Impacting Transactions

The real explanatory power of TCE is derived from the three variables of frequency, uncertainty and asset specificity. We find that transactions can be continuous or uncommon, subject to low or high uncertainty and include specific or non-particular resources. The argument is that these variables should be used to determine whether transaction costs will be significantly reduced in a market or using vertical integration or a hybrid of the two, as a mechanism of governance (Williamson, 1975, 1985,1996).

Frequency is the most effectively managed variable. We do not envisage a scenario in which a firm would need to coordinate vertically in order to generate in-house the provision of items and expertise that are seldom utilised (Williamson, 1975, 1985). For example, oil and gas firms will not want to create their own facilities for production of complex and costly project components because they rarely purchase these projects, i.e. once in four or five years (Scott *et al.*, 2012).

Uncertainty, the second variable, is more complex to handle. The issue with this variable is the difficulty involved in predicting the consequences that may occur during the transaction. One undeniable element that can cause uncertainty is the period of time over which the transaction will occur. Transactions that occur on ‘spot markets’ will have generally little uncertainty in light of the fact that there is no need to predict the future. Transactions like EPCI contracts for the main components of a major project include an arrangement lasting three to four years which has varying degrees of commercial and technical uncertainties built in. Both the clients and contractors are required to plan for the long-term duration of the contract (Chapman and Ward, 2003).

However, a long-term arrangement adds to the uncertainty. The contractor may go bankrupt amid the life of the agreement, subsequently putting the completion of a major project in danger. Uncertainty can be caused due to the difficulty in predicting all conceivable

consequences that may arise during the long project execution ( Morris, 1986; Mintzberg, 1994; Olsen *et al.*, 2005). Problems due to uncertainty can also be caused because of the danger of opportunism on the part of the contractor during the project execution. The client may not be able to trust the figures that the contractor presents. These factors raise the question as to whether uncertainty will be lessened by vertical integration of the transactions. In deciding this, it is important to evaluate the benefits and additional efficiency that can be expected, which will justify the incremental expenses of having large project management teams (Morris, 1986; Williams, 1997; Winch, 2008).

The third variable of a transaction is asset specificity which deals with the question as to whether physical and human investments made for a particular transaction can be redeployed to other uses without limiting their functional value. Four main types of asset specificity have been identified which involve 'site specificity', 'physical asset specificity', 'human asset specificity' and 'dedicated assets'. If the specificity of an asset is high, the lesser is the possibility of it being redeployed for other uses which would also make sunk costs high. In the case of major projects, significant long-term investment is required in specialised physical facilities and to provide necessary professional skills. For long-term transactions with a high level of high asset specificity, the partners to the transactions are locked into the contract even if the transaction is impacted by adverse developments. Also, asset specificity variables can create issues, due to the bounded rationality and opportunism associated with the long duration of such contractual arrangements (Williamson, 1975, 1985; Alchian and Woodward , 1987). In this situation, there is the potential for the parties to the major transactions to be 'tied-in' in a two-way or multiple-way relationship in an unbalanced manner due to two possible causes (Ellingsen and Johannesson, 2004). The first cause is when parties to a future transaction must make non-transferrable significant investments before the transaction takes place (Dixit, 2007). The second cause is that specific

requirements for the optimal transaction such as the complete scope, quality levels required and time of delivery cannot be determined with certainty beforehand for long-term contracts with a high level of asset specificity. In this situation, formulating a complete contract is not often feasible for reasons of unforeseeable external factors, lack of trust, and asymmetric information. Such incomplete contracts can lead to the requirement for post-contract renegotiations. When both these causes materialise in transactions, i.e. incomplete contracts and the high asset specificity of the investments, this makes the investors vulnerable to ex-post exploitation. Thus, an unbalanced handling of asset specific investments generates a hold-up problem (Ellingsen and Johannesson, 2004).

In the situation of a hold-up problem, two parties may be able to work most efficiently by cooperating, but refrain from doing so because of concerns that they may give the other party increased bargaining power, and thereby reduce their own profits. When the initial contract does not cover the long-term situations and is incomplete, contract renegotiation will be required. In this situation, the party with lower sunk costs tries to use this as leverage and is able to threaten to hold-up the other and stop executing the contract to renegotiate more favourable terms (Klein, 1989; Ellingsen and Johannesson, 2004).

According to Williamson's theory and *ceteris paribus*, when asset specificity is high, the potential for hold-up can be expected to be reduced by utilising vertical integration rather than using the market. This is because when contracts for high asset specific transactions are incomplete, the hazard of opportunism on the part of participants may likewise increase, advocating the need for more vertical integration (Williamson, 1975, 1985; Alchian and Woodward, 1987).

The next section presents the alignment predicted by TCE between transaction variables of asset specificity, frequency, uncertainty and the governance mechanisms to address the issues discussed in this section.

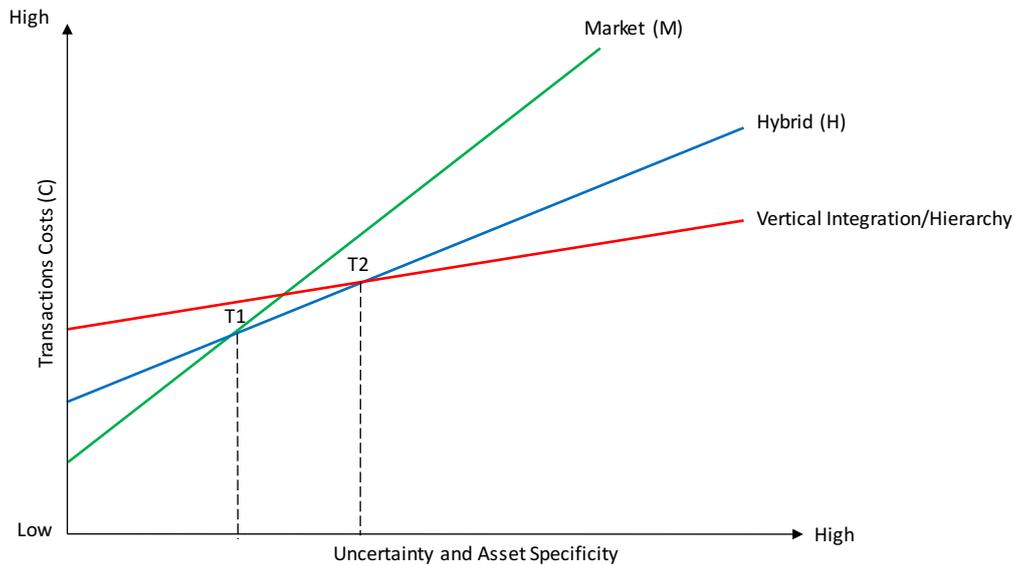
### 2.2.3 TCE Governance Predictions

As discussed earlier, the application of the different organisational forms of the governance mechanisms classified as market, vertical integration or hybrid modes, has to be determined on the basis of the characteristics of the transactions to be managed. Hybrid governance can be considered as the mode between the use of the market and vertical integration for specific transactions and can include joint ventures and relational contracting (Williamson, 1975, 1981; Heide and John, 1990). Williamson (1975, 1995) formulated a theoretical concept for predicting the optimum governance mechanism to align with the characteristics of transactions.

The fundamental issue is the contractual problems which can arise when some opportunistic agents participate in transactions with technological complexities and commercial challenges that breach the limits of bounded rationality (Simon, 1982; Mintzberg, 1994). This scenario of some opportunistic agents using asymmetric data to their advantage will potentially lead to commercial disputes. The potential for these contractual hazards is higher in market environments with high levels of uncertainty (Williamson, 1995; Hart and Moore, 1990). For such situations, vertical integration is one mitigating reaction to this shortcoming of market contracting. Thus, a basic premise of transaction cost economics is that the particular governance mechanism chosen to implement the market arrangements or the strategy of vertical integration is mainly to prevent hold-up and achieve economic efficiency objectives (Williamson, 1981, 1995; Hart, 1994; Caniels *et al.*, 2012).

Major projects are subject to encounter all the issues of uncertainties and asset specificity as discussed above. For such projects, TCE theory would propose that costs and problems associated with executing the transactions sometimes favour vertical integration or in-house production as the governance mechanism and at other times favour the markets. The intermediate mechanism of 'hybrid' between these two extremes has now become more

applicable due to transactions for major projects becoming more complex and thus requiring increased flexible governance mechanisms. The basic model for predicting the optimum governance mechanisms based on the TCE theoretical arguments discussed above can be illustrated as shown in Figure 2.1 below.



**Figure 2.1 - TCE Model - Predictions of Governance Mechanisms**

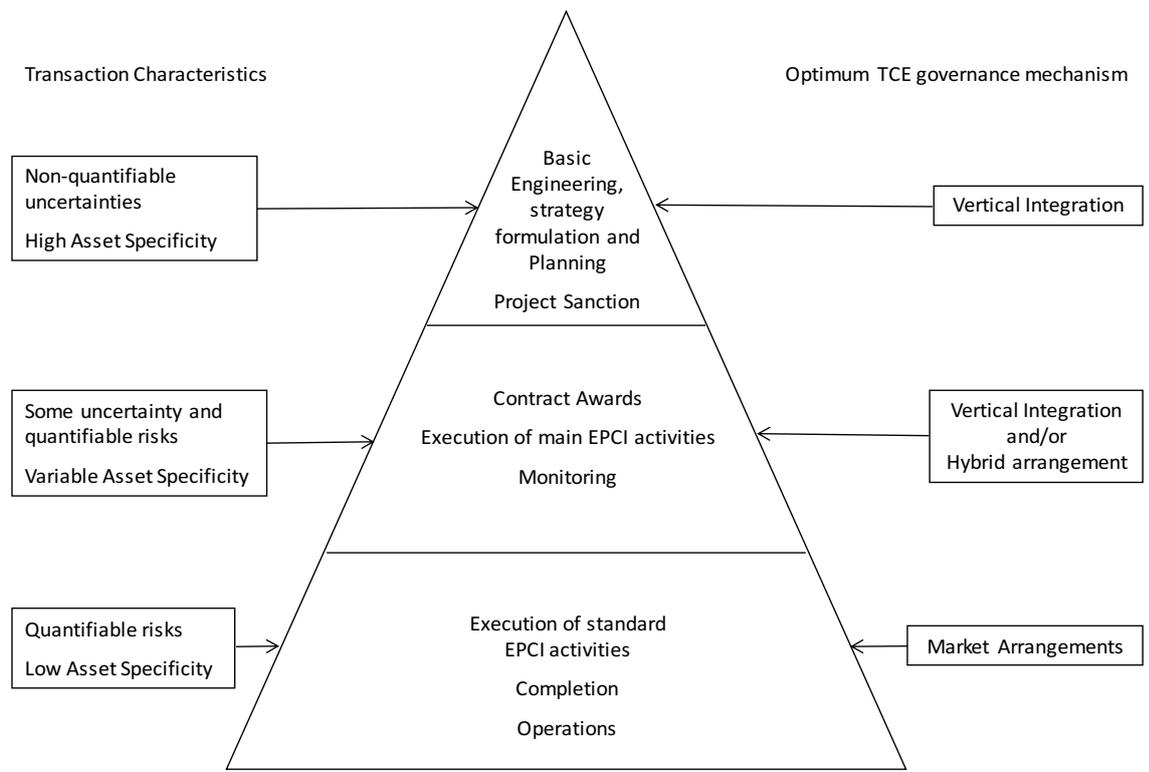
Figure 2.1 shows that as uncertainty and asset specificity increases, and the potential for hold-up therefore increases, the demands of transaction cost economising mean that market coordination gives way to hybrid governance (at T1) which is in turn replaced by hierarchy at T2 (Williamson, 1981, 1996). The basic proposition developed from the review of the transaction cost economics is that all forms of governance arrangements, i.e. vertical integration, market and hybrid, require transaction costs that can be expected to increase with rising levels of asset specificity and uncertainty associated with the transaction. In this context, we can expect firms to choose the most optimum mode of governance mechanism providing the minimum transaction costs for the given level of asset specificity and uncertainty, which depends on the properties and complexities of transactions (Williamson, 1981, 1996). The application of this basic TCE model to predict the governance mechanisms for the life cycle transactions of a major project is presented in the next section.

### 2.3 Application of the Basic TCE Model

The earlier sections reviewed the capabilities of the governance mechanisms to cope with uncertainties and asset specificity associated with the transactions of a major project. This raises the question as to whether a coalition of governance mechanisms may be required to manage project execution, if the degrees of uncertainties and asset specificities of the transactions vary over the project life cycle (Raiffa, 1968; Nutt, 1997; Nickerson and Bigelow, 2008)). The asset specificities of the various transactions of a major project have to be evaluated on a case by case basis. As such, in order to develop the basic TCE model for the governance of transactions for a major project, variations in the commercial and technical uncertainties and asset specificities of the main transactions over the project life cycle need to be evaluated. For this purpose, the life cycle of a major project like an oil and gas development can be considered to consist of three main successive phases of front-end, execution and operations. The front-end activities are connected with engineering and economic feasibility studies, project scope definition, formulation of project execution strategy, and sanction. This is followed by the execution of contracts for engineering, procurement, construction and installation (EPCI) of the major components by contractors, selected after a tendering process. The final phase is the completion of the project execution and operation of the facilities to produce oil and gas ( Miller and Lessard, 2000; Olsen *et al.*, 2005

A review of major projects reveals that overall uncertainty of the project is very high during the front-end phase as the end product to be achieved is still in the development stage. In the next stage, when the EPCI contracts for main components are executed, information is still incomplete and the parties have to deal with known risks and some uncertainties (Miller and Lessard, 2000 Olsen *et al.*, 2005;). The asset specificity of the transactions over the project lifecycle can vary according to the specification and function of the components in

the overall project infrastructure. In this case, it may be necessary to resort to a hybrid governance arrangement for this phase. In the final phase, when more information is available and the more complex activities have been completed, the transactions have known risks and low asset specificity. As such, the application of the market mechanisms will be cost economising for these end of project transactions. The decline in the overall uncertainty and asset specificity over the project life cycle makes the case for a coalition of governance mechanisms for the transactions of a major project (Winch, 2008). Recent research into use of a coalition of alternative governance mechanisms in complex projects, such as an oil and gas field development in Norway, supports this argument (Caniels *et al.*, 2012). The application of the TCE governance model based on this concept for successive phases of the lifecycle of a major project is illustrated in Figure 2.2 below.



**Figure 2.2 - Application of Basic TCE Governance Model for Major Projects**

The optimum governance mechanism is predicted by the TCE governance model depending on the level of uncertainty and asset specificity associated with the particular transaction. However, the question now arises as to the applicability of the basic TCE model in predicting the economising governance mechanisms of major international projects when unpredictability is caused by political and institutional factors in the host country. To answer this question, the critiques of TCE found in the literature are addressed in the next section to ascertain these limitations and identify any extension required to the basic TCE model.

## **2.4 Requirements for an Extension to the Basic TCE Model**

### **2.4.1 Introduction to Critiques of TCE**

The basic proposition of TCE originates from the discriminating alignment hypothesis, according to which transactions that differ in their characteristics of asset specificity, frequency and behavioural uncertainty must be aligned with alternative governance mechanisms, in a transaction cost economising manner (Williamson, 1975, 1996). The claim is made that this micro-analytical proposition is an empirical success story (Williamson, 2000; Ruester, 2010). More than 900 studies including published articles, book chapters and empirical papers test the propositions based on TCE. Most of them support the theoretical basis and predictions of TCE, thus providing considerable support for its central discriminating alignment hypothesis (Ruester, 2010). However, several multi-disciplinary scholars have raised some fundamental critiques of TCE so that “the field continues to offer many opportunities to plant, grow, and harvest new and value-creating research” (Nickerson and Bigelow, 2008).

This research is about extending the capabilities of the TCE model for predicting governance mechanisms for transactions of major international projects. Such transactions can be impacted by the host country’s political and legal context.

The standard TCE model is not without its critiques, and it has been challenged by a number of researchers (Hodgson, 2003; Foss and Klein, 2010; Nickerson and Bigelow, 2008). Such critiques can loosely be categorised as sins of commission and sins of omission. Section 2.4.2 concentrates on the sins of commission, i.e. micro-economic critiques of the basic TCE model, for the prediction of governance mechanisms for maximisation of economic efficiency of transactions. Section 2.4.3 then focuses on the sins of omission, i.e. additional critiques of TCE relevant to this research with regard to its applicability for major international transactions.

#### **2.4.2 Micro-Economic Critiques of TCE**

The TCE model concentrates on an economic organisation generically in terms of minimising transaction costs related to incentive conflicts usually involving hold-up. A significant limitation of TCE is that it is focused on outcomes of economic processes, and assumes that production costs are given and do not vary according to the governance mechanisms utilised. Thus TCE fails to address comparative costs for producing the output of transactions using the market or utilising in-house resources and facilities. As such, TCE generally disregards coordination type problems; the problem is to align incentives rather than to coordinate actions. It can be argued that coordination type problems in major projects can give rise to different production costs, and these cost differentials may crucially influence the choice of governance mechanism (Hodgson, 2003; Foss and Klein, 2010; Nickerson and Bigelow, 2008). In addition, complexity of the product can lead to the need for competence development in the production process. As such, TCE can also be criticised for the neglect of differential capabilities of the participants, which can give rise to different transaction costs. These cost variations may have an overriding influence on the decision to use the market or internalise the transactions. The argument is made that firms can build specific capabilities and engage in learning efforts that markets may fail to do.

Thus, firms may internalise activities if they can carry out these activities with a significantly lower production cost even if this is done in a non-transaction cost economising manner (Hart, 1988; Kogut, 1991; Lipshitz and Strauss, 1997).

Operationalisation of TCE does not provide a methodology for the direct measurement of transaction costs but focuses on the variables of the characteristics of the transactions. This lack of measuring transaction costs means it is necessary to depend on estimations of the relationships between observed characteristics and the governance mechanisms. If researchers succeed in measuring transaction costs, structural form models can be developed to better estimate the costs associated with failing to align transactions and governance mechanisms (Hart, 1988; Lipshitz and Strauss, 1997; Hodgson, 2003).

A significant criticism of transaction cost economics is its pre-occupation with uncertainty caused by opportunistic behaviour of the participants to the transaction exploiting asset specificity. In this case the uncertainty found in transaction cost economics does not reflect all dimensions of uncertainty (Argyres, 1996; Dixit, 2007; Ruester, 2010). There is another critical strand in the literature which focuses on the gaps in TCE (sins of omission) notably the failure of the model to address the institutional context; by which we mean how the rules of the game and norms of acceptable behaviour will differ across national contexts. It is this gap (particularly as it relates to institutions) that this thesis seeks to address. These issues are developed in the next section, as they have a direct bearing on this research.

### **2.4.3 Sins of Omission in TCE: the Institutional Deficit**

The research focus was an academic challenge to extend the predictive capabilities of the transaction cost economics (TCE) theory to address the theoretical issues of governing high value, complex industrial projects executed across international borders. As such, the impact of the behaviour of the host country's political and legal institutions and the relationships between them and the investors has a primary impact on transactions.

Hence, in this context, the main and well established criticism of the TCE proposition is that it is a static micro-analytical self-enforcing proposition, taking the impacts of institutional environment and institutional arrangements as neutral (Acemoglu, 2003; Ruester, 2010). This is despite the extensive research literature generated on the impact of institutions on economic activities, led by North, who is considered as a pioneer of the NIE (Acemoglu, 2003; Dixit, 2007). The argument made by North is that the role of the institutions and the way they operate shapes economic performance of transactions. Institutions are the rules of the game and are formally devised constraints that impact human interactions. As a consequence, they structure incentives in exchange whether political, social or economic. Institutions, together with the technology employed, determine the cost of transacting and producing. A set of political and economic institutions that facilitate low cost transacting makes possible efficient factors. In addition, when political constraints are absent, the free market process restructures behaviour rules, reduces constraints, increases institutional incentives and so encourages the exchange. In the case of international transactions, political and legal institutions generate rules and constraints that can shape economic performance of transactions in different countries (North 1990; Dixit, 2007; Acemoglu, 2012).

A significant criticism of the TCE proposition is that uncertainty presented in TCE does not cover exogenous uncertainties that can impact transactions (Dixit, 2007; Acemoglu et al, 2004; Ruester, 2012). Uncertainties can be caused, in particular to international transactions, by the political and legal environments of the host country (Dixit and Pindyck, 1994; Chapman and Ward, 2003; Acemoglu, 2003). In this context, environmental uncertainty refers to unanticipated political, economic or social developments in the host country in which the transaction is carried out. The quantification of these uncertainties is another factor causing problems in the application of the TCE model. This can be due to the fact that environmental uncertainty is a two-dimensional concept that entails elements of both

unpredictability and changeability (Klein, 1989; Dixit and Pindyck, 1994; Lipshitz and Strauss, 1997). The potential for unpredictability and changeability will depend on the nature of the political regimes of host countries (Scott *et al.*, 2012).

A further criticism made of TCE is its apparent lack of consideration of property rights issues for the prediction of governance mechanisms for transactions. The allocation and enforcement of property rights can become a major concern, particularly if the role of the state in the transactions is not neutral. The costs of delineating property rights for major transactions are high and can be incompletely specified. As a consequence, other variables in the cost of transactions become important. Well defined and confirmed property rights are much easier to exchange than those that are insufficiently defined and uncertain. As can be expected, ex-ante failure in delineation of property rights of the participants can lead to enforcement problems and ex-post transaction regrets. For international projects, these causes can have the overriding influence on outcomes (Milgrom and Roberts, 1992; Acemoglu, 2003; Kim and Mahoney, 2010)

#### **2.4.4 Considerations for an Extended TCE Model**

Despite the critiques, the TCE hypothesis that transaction characteristics must be aligned with governance mechanisms which differ in their costs and competencies in a discriminating manner, remains the solid foundation for predicting governance mechanisms (Foss and Klein, 2010; Ruester, 2012). To counter the criticisms discussed in earlier sections, Williamson introduced the 'shift parameter framework' in 1991, proposing the need for extensions of the TCE model. This extension is to investigate the optimal choice of governance arrangements in response to dynamics in the institutional environment (Williamson, 1991). In addition, Williamson (2000, 2005) admits that human behavioural factors must be integrated with institutional exogenous factors to understand failures of transactions. Researchers have proposed that complementary theories are required to extend

the predictive capabilities of the basic TCE model for international transactions. These complementary theories need to have an interdisciplinary approach to extend the universal application of the TCE theory (Milgrom and Roberts, 1992; Acemoglu, 2003; Dixit, 2007; Ruester, 2010; Foss and Klein, 2010;). In this situation, investigation is required to reveal how the impact of institutional arrangements, the multi-dimensional nature of uncertainty and property rights issues may bring about the requirement for specialised governance mechanisms for international transactions (Henisz, 2002; Caniels *et al.*, 2012).

In conclusion, the basic TCE model examined in this chapter for the selection of the governance mechanisms for successive phases of a major project requires an extension because of the limitations of TCE discussed in this chapter. This extension to the TCE theory is required to address the impact of the political context, institutional arrangements and the property rights issues of the host countries. As a pre-requisite to develop an applicable extension to the basic TCE governance model, the literature on political hazards and property rights is reviewed and discussed in Chapter Three.

## **Chapter 3 IMPACT OF POLITICAL AND PROPERTY RIGHTS HAZARDS ON GOVERNANCE OF PROJECTS**

### **3.1 TCE and Challenges of International Transactions**

#### **3.1.1 Limitations of TCE**

As discussed in Chapter Two, the basic proposition of the TCE model is that transactions that differ in their characteristics of asset specificity, frequency and behavioural uncertainty must be aligned with governance mechanisms which differ in their costs and competencies, in a discriminating (mainly transaction cost economising) way (Williamson, 1975,1981). Based on the critiques of TCE discussed in Chapter Two, the TCE model can be criticised for being a static concept that ignores the impacts of the political context, behaviour of institutions and the environmental conditions (Acemoglu, 2003;Dixit, 2007;). In addition, uncertainty is limited to behavioural uncertainty (Dixit and Pindyck, 1994; Ward and Chapman, 2003). A further criticism of the TCE model is its lack of consideration of delineation and enforcement of property rights for the prediction of governance mechanisms for the execution of transactions. As can be expected, ex-ante failure in delineation of property rights of the participants can lead to ex-post transaction regrets. The requirement for an extension to overcome the limitations of the basic TCE model to predict governance mechanisms for managing such hazards is identified in Chapters One and Two.

In order to develop this extension to the TCE model, the challenges faced by international projects are summarised in the next section. This is followed by an examination of the nature of the political systems in Section 3.1.3, as this will have significant impact on the political and property rights issues faced by international projects. The impact of the political hazards and property rights issues on international transactions are then examined in Sections 3.2 and 3.3 respectively.

The findings of these reviews are used in Section 3.4 to formulate mitigation measures in the form of political governance mechanisms to counter the consequences of these hazards.

### **3.1.2 Challenges to International Projects**

Historically, the main challenges facing major infrastructure projects such as oil and gas field developments have primarily been technical and commercial. These issues cause co-ordination and integration challenges which are influenced by the scale and complexity of the project. These challenges can also be compounded due to the large number of participants involved, the project's visibility and its innovativeness. The length of time required for project development and anchoring can also increase the project's exposure to uncertainties. These can be due to international economic factors and a partner organisation encountering financial difficulties and restructuring (Dixit and Pindyck, 1994; Winch, 2002,2008).

In several cases these major projects are carried out on a fast-track basis with high asset specificity producing a unique challenge. In addition, management of these major projects can become more challenging than ever in the face of the requirement for a joint venture arrangement of several organisations to execute such projects. This arrangement for unitisation in major projects has become an increasing requirement to ensure economic feasibility and to spread financial risk. This is often achieved through shared ownership where two or more firms contribute financial resources, personnel expertise and facilities in the formal arrangement of a joint venture. However, these arrangements can create basic conflicts due to variations in the principles and practices of participating organisations. In the case of international projects, another issue to consider is that contracts for major components of the projects are drawn up to be executed in different locations (Winch, 2002, 2008; Olsen *et al.*, 2005; Kim and Mahoney, 2010).

As such, these contracts need to be extremely specific and comprehensive to meet the demands of different legal systems, regulatory requirements and specific site conditions. These issues lead to problems with property rights which could manifest in the form of internal uncertainties (Williams, 1997; Winch, 2002, 2008; Olsen *et al.*, 2005). For major ventures, economic logic suggests the division of resource between the parties can be carried out in the form of a packet of property rights, which can be divided among the partners. This can be a commercially efficient arrangement, provided the property rights are delineated (Kogut, 1991; Kim and Mahoney, 2010).

In the case of international projects where contractual transactions need to be executed across national borders, these challenges can be overshadowed by hazards that may be caused by the behaviour of the state and political institutions of the host country (Dixit and Pindyck, 1994; Scott *et al.*, 2012). A number of institutions and firms of the host country will be participants to the execution of the project. In this case, the relationship between the actors is very rarely a binary one between a single project sponsor and a single governing body; instead, there will be coalitions within networks of relations (Libecap, 1989,1998; Olsen *et al.*, 2005; Merrow, 2012). In addition, project parties and local institutions will be required to interface with other stakeholders, some of whom may be supportive of the project and others who may not (Milgrom and Roberts, 1992; Williams, 1997). These interactions can be considered as a dynamic social network with differences in motivation and preferences among the participants causing increased issues regarding property rights (Haugland and Reve, 1994; Kogut and Kulatilaka, 1994). As major projects become increasingly international, it is inevitable that the effectiveness of existing management arrangements can weaken based on the level of political and legal hazards (Miller and Lessard, 2000).

In literature and in practice, inadequate regulatory guidelines exist for adherence to foreign countries' laws and political regimes.

This unregulated environment, within which billions of dollars change hands, leaves the project management teams struggling to manage the day-to-day project activities in a difficult environment. Given the sums involved, opportunism, corruption, greed and misconduct all appear to further complicate the environment (Misun and Mohn, 2009). This has created a wide gap in the project governance spectrum. Hence, the requirement is a reliable platform for forming and establishing relationships among political authorities, stakeholders and foreign investors (Acemoglu *et al.*, 2004; Scott *et al.*, 2012). The new challenges discussed above impose significant constraints for major projects when complex technological issues have to be managed in a foreign country with limited resources (Scott *et al.*, 2012). An assumption made by the TCE model is that it will always be prudent to use the market because of extra costs required for vertical integration. We can expect this assumption to become invalid when institutional regimes and legal institutions are too weak to prevent opportunistic behaviour and ensure protection of property rights of the investors (Kim and Mauborgne, 1993; Scott *et al.*, 2012). The intervention of the government and its institutions in favouring loyal providers of political support can be a source of considerable uncertainty to investors seeking to do business in these markets. In this situation, the nature of the host country's political systems and self-interested behaviour of the political elite, including the demand for increased local content, can impact the transactions as discussed in the next section.

### **3.1.3 Nature of the Political Systems**

Segmentation of political systems is as old as political theory itself, perhaps the best early example being Aristotle's division between government by many, the few and the one. Modern taxonomies, particularly those which adopt a political economic approach, draw

heavily on this early work (Barker, 1995; Lord, 2013). An example of this would be Olson's distinction between democratic, authoritarian systems (government by few or one) and systems of anarchy, which precede the formation of states or arise where political authority crumbles or cannot be efficiently exercised. In anarchies and in pre-civil society there is no state and no law, except for certain natural precepts discovered by reason (laws of nature). As this research is about the impact of political and legal institutions on transactions, only established political systems are considered further. In this context, not all political systems are alike when it comes to their approach to the regulation of the markets and the activities of the firm, particularly to foreign firms. Political theory literature proposes that some political systems are more challenging to the firm than others. This can be summarised in the context of three regime norms that are relevant to the modern era (Olson, 2000; Dixit, 2007; Kamrava, 2008, Engdahl, 2009). These norms are: -

1. The democratic state which is characterised by an established constitution, rule of law, representative political parties and regular elections for the population to make their choice of government. In this case, a democratic state's interests in ensuring stability in the markets and promoting economic growth are aligned with those of civil society through the mechanisms of electoral competition (Olson, 2000).
2. An authoritarian democracy is a governing system in which, although elections take place and a constitution limiting government powers exists, those in power ignore its requirements, because an adequate legal constitutional framework of civil liberties does not exist. As such, authoritarian democracies are democracies only in appearance, not in substance, as all the window dressings of democracy of constitution, political parties and regular elections are present. Typically, in an authoritarian democracy, the separation between state and the general population is so wide to allow the state to operate without any attention to the population. Because the

press is heavily regulated and due to the lack of civil liberties, citizens are cut off from knowledge about the activities of those who exercise real power. Thus, an authoritarian democracy sits somewhere between democracy and authoritarian systems and has characteristics of both. Like full democracy, it shares some of the trappings of popular participation, most notably competition between parties and the use of periodic elections. However, competition between parties does not proceed on a level playing field and voters seeking alternatives have only imperfect access to information on the alternatives. Thus, the political forum for the state and society interaction is in the form of a few dominant political parties based on personalities and not on ideologies. Under authoritarian democracies, freedom and individual liberty are lauded in theory, but derogated in practice. The state is portrayed as freedom-loving and a 'beacon of democracy'. However, when forces threaten the status quo, there is no hesitation about implementing institutionalised violation of the rights of the people and individual liberties under the pretext of preserving freedom and security. In this case, unmitigated elitism permeates the political system and judiciary to dominate the social and economic institutions (Olson, 2000; Acemoglu, 2003; Dixit, 2007; Kamrava, 2008).

3. An authoritarian state is a form of political system in which the state power and political authority is concentrated in the hands of the ruling elite whether elections are held or not. The ruling elite might be distinguished by nobility, religious ideology or military control and monopolises political power using it in a blatant manner. The authoritarian state is only concerned with political power and as long as that is not contested it gives society a certain degree of liberty. As such, an authoritarian state accepts exclusive territorial sovereignty as its right. It retains full power of expropriation and full power of imposition (i.e. the right of control over everything

and everyone). Maintenance of such power, in the absence of full support of the citizenry, requires the forceful suppression of any dissenting element except that which the government purposely permits or organises (Talmon, 1960; Olson, 2000; Acemoglu, 2003;; Kamrava, 2008). In an authoritarian democracy, the state institutions and the judiciary are not neutral and are instruments of the regime. There is an absence of the influence of civil societies and the collective desires of the population are not part of the equation. This is to further the selfish interests of the ruling elite at the expense of shrivelling any opposition such as civil societies or political parties. The state institutions provide protection to firms and individuals only insofar as they increase the return to the ruling elite. This is the case where the state behaves like a resident bandit plundering the society in a selective and calculating manner (Olson, 2000; Acemoglu, 2003; Kamrava, 2008).

In a democracy, a continuum of ideal types of relationship between the state and the market ranges from socialism at one end to extreme laissez-fairism at the other end. In between these two extremes, there are forms of demand management by the state including Keynesian economics for economic planning designed to overcome potential instability inherent in market economies, or to make market economies function properly in a desired fashion. This continuum reflects the changing levels of state involvement both in terms of ownership of organisations and control over the activities of these concerns. The nature of intervention will broadly depend on the political and economic ideology. Many socialists and social democrats are inclined to support interventionism, as an agent of social change, and seeing state economic interventions as an important means of promoting economic advancement and greater social welfare. Political conservatives who advocate free market or laissez-faire economics generally view government interventions as harmful, due to their lack of confidence in the state's ability to effectively manage economic problems and their

consequences. That said, even politically conservative industrialists and financiers do sometimes support state economic interventionism as a means of protecting the power and wealth of a country, particularly via advantages granted to industries seen as nationally vital (Cox *et al.*, 1997; Karagiannis, 2001; Lord, 2013).

Moreover, the state, irrespective of its political system, tends to be highly partisan in that it favours those groups and interests from which it draws its core support. Such state behaviour could be expected to be more blatant and opportunistic in non-democratic countries. In such countries, those perceived as being political and economic outsiders may expect to face discrimination, but in particular from the perspective of this research, economic discrimination. This includes foreign firms, which may find it difficult to gain access to the markets unless they are prepared to contribute to the sustainability of the regime. International insiders, by contrast, may enjoy all of the advantages and protection of local firms (Karagiannis, 2001; Lord, 2013).

The discussion on the nature of political systems in this section leads to the proposition that major projects carried out in countries with authoritarian democratic or authoritarian political systems can be subject to unpredictable political intervention. The basis for this argument is that institutional behaviour and operation of regulatory structures in these countries can be far more unpredictable and liable to change to a greater extent than in democracies. The state intervention in transactions in these non-democratic countries is often to benefit the narrow interests of the ruling elite and their supporters, as discussed in the next section. These challenges are in addition to the state's intervention in markets to implement their economic and fiscal policies (Acemoglu *et al.*, 2004; Scott *et al.*, 2012).

### **3.2 Impact of Political Hazards to International Projects**

The nature of the political system of the host country and the extent of the state intervention in transactions will determine the magnitude of hazards faced by international

projects. These hazards could lead to delays in completing the project and might adversely affect its commercial viability. These concerns apply to projects in both economically advanced democratic countries as well as non-democratic countries. In both cases, state intervention in the markets can be exercised using several fiscal instruments, excessive taxes and stringent environmental protection requirements. In authoritarian and authoritarian democratic countries, there is the greater probability for the host country government to impose an adverse taxation regime, demand conciliatory payments for approving project plans, or limit repatriation of revenue. The states in these countries can resort to corrupt practices in sanctioning projects and approving licenses, and as such the foreign firms will be required to make monetary concessions to authorities for approving project plans. This state behaviour may be done by stealth or in a blatant fashion without any regard to the agreed arrangements. The adverse behaviour of the non-democratic governments can also take the form of creeping expropriation that can reduce the anticipated profit from the project transaction or affect the costs of the project's activities (Kobrin, 1979; Kim and Mauborgne, 1983; Dixit and Pindyck, 1994, Kim and Mahoney, 2010). In such countries, historically, the worst case scenario is the host country government nationalising the project where the project partners lost all their investment. Although there are some recent examples of such events (i.e. nationalisation of oil and gas projects in Venezuela and Congo) the potential for this hazard has receded significantly (Kobrin, 1979; Anderson, 1999; Wood Mackenzie, 2010).

Under all political systems, the strength and efficiency of the host country's bureaucracy will be an important aspect of the state intervention in the markets, as the state is inseparably connected with bureaucracy (Weber, 1919). It is beyond the capacity of the politicians to manage the state structure without bureaucrats. The political system can condition the motives and behaviour of the country's bureaucracy in exercising the desires of the state in the relationships between the state and the market. In a democracy, the

bureaucracy can be expected to abide by the rules and regulations established by the state to benefit the general population. The bureaucracies in non-democratic countries may not have these checks and hence have greater propensity to resort to adverse behaviour and corrupt practices to further the entrenched interests of the ruling elite, than to act to benefit the investors (Wren and Bedeian, 2009).

In non-democratic countries, any opportunistic actions by the host country's government in making changes to the legislation and regulations without any consultations with the investors can invariably have an extremely adverse effect on the profitability and the execution of the project. Such adverse changes may not be adequately defined or practiced with the required transparency to ensure that project transactions can be completed as planned with respect to production or profit sharing arrangements (Acemoglu and Johnston, 2004; Dixit, 2007; Scott *et al.*, 2012). Governmental concessions, licenses and permits need to be obtained to commence and execute the project and must be maintained during execution of the project. In addition, these are required to obtain financing from project partners. In non-democratic countries, the chances are greater, due to economic opportunism, for unexpected unilateral adverse changes by governments to the terms and conditions of concessions and licenses. Such acts can seriously damage the technical and financial performance of the project. Due to these difficulties, companies operating in non-democratic countries can be expected to make concessions above those required to comply with the regulations (Dixit and Pindyck, 1994; Winch, 2002; Wren and Bedeian, 2009; Scott *et al.*, 2012).

In addition to the above concerns, it is more likely that adverse changes in regulatory requirements by the government, irrespective of the country's political system, can be directed at foreign multinationals in industries such as oil and gas production and communications whose outputs are extensively used. This is because the host country's

political authorities are often suspicious of these international firms operating in these high profile industries and their objectives. As such, governments and their agencies are now more directly intervening in major projects that are of vital importance to the national interest in developing the host country's infrastructure and its resources. These interventions in non-democratic countries are typically in the form of introduction of stringent regulations and restrictive controls, without prior consultation, for the economic benefit of the ruling elite rather than for the common good (Henisz, 2000, 2002; Scott *et al.*, 2012; KPMG, 2013, 2014; Woodmackenzie, 2012).

Due to the importance of the economic and public nature of major international projects, the expectation of the host country is that the foreign firms may be profiteering at the expense of local companies or people. As such, the host government intervention, irrespective of the political system, may introduce statutory requirements to demand high local content in the transactions. In order to comply with this requirement, the investors will be required to form joint ventures with local firms. Moreover, in non-democratic countries, especially with an authoritarian government, the foreign firm may be compelled to form joint ventures with local firms which may not have the necessary expertise and facilities to execute the required activities. In these kinds of political regimes, local firms are put forward as joint venture partners on the basis of political patronage rather than commercial and technical competence (Henisz, 2002; Scott *et al.*, 2011).

The conclusion drawn from discussions in this section is that transactions between the government and a foreign private organisation will be subject to varying levels of state intervention. In the case of all types of political regime, democratic or non-democratic, the motives and the expected behaviour of the government and broader polity on which the government relies for support, must be explicitly incorporated into an investor's choices about the appropriate form of governance to manage the transactions. In this case,

consideration must be given to the fact that political hazards may originate once an organisation has committed the capital.

Major international infrastructure projects require large upfront investment that cannot be easily written-off or replaced (Moran and Ghoshal, 1999; Scott *et al.*, 2012). Moreover, in the case of non-democratic regimes, it is more likely that governments may at some point face incentives to renegotiate the terms of an investment in order to redistribute an investor's returns to other groups, such as local suppliers and the workforce, which provide it with political support (Dixit and Pindyck, 1994; Henisz, 2002; Scott *et al.*, 2012). This is a case of public theft replacing private theft which can cause an additional hazard to the transactions by infringing on the property rights of the investors. As pointed out in Chapter Two, a critique of TCE is that protection of property rights in transactions is not part of the equation of the basic TCE model for predicting governance mechanisms (Henisz, 2000; Klein and Robinson, 2011). To address this, the issues of delineation and enforcement of property rights in transactions are discussed in the next sections.

### **3.3 Impact of Property Rights on Transactions**

This section examines the arrangements for the delineation and enforcement of property rights in transactions between private parties and how these arrangements can be impacted if the state intervenes in these transactions. Then, in the next section, the argument is developed that the political regime type of the host country (i.e. democratic or non-democratic) will be an overriding factor in the extent and impact of state intervention on the delineation and enforcement of property rights arrangements in transactions.

#### **3.3.1 Delineation of Property Rights**

Property rights are inherent in transactions which incur economic costs associated with the transfer, capture and protection of rights.

The concept of property rights enforcement used in economics and legal literature is similar, but in the economics literature the focus is on who gets to own and manage the goods. In this context, property rights must be established, use of the goods must be monitored, and control of rights must be enforced. Thus, a broad definition of property rights is the exclusive authority to determine how and by whom a particular resource is used. Thus, property rights may be seen as a bundle of separate and distinct rights over a particular resource, including right of personal use and right to demand compensation as a pre-requisite for its use by other people. Furthermore, property rights include the transfer of any or all of these rights to others either permanently by sale or temporarily through some form of contractual arrangement (Anderson and Hill, 1975; Alchian, 2008; Klein and Robinson, 2011).

Governments, via their designated organisations (public ownership or public property) as well as by private individuals and non-governmental organisations (private property), exercise property rights (Libecap, 1986; Barzel, 1997; Alchian, 2008). In transactions, property rights delineation is essentially formed and enforced by those participating in transactions and reflects the conflicting economic interests and bargaining strength of these participants. In this case, implementation of property rights ranges from formal arrangements, including regulatory instruments and legal rulings, to informal conventions and customs regarding the allocation and use of property. These arrangements can determine decisions regarding use of the resource and hence the economic mechanism and the outcome of transactions. In such situations, enforcement of protection of property rights can become an issue depending on the strength of the judicial system (Libecap, 1986; Eggertsson, 1990; Alchian, 2008).

However, due to the expense of fully defining all the parameters of an asset, property rights are never fully delineated and economic conflicts can arise (Barzel, 1997). As a result,

property is consequently in danger of being misappropriated by other parties due to opportunism and free riding behaviour (Demsetz, 1967, 1988; Barzel, 1997). In this case, as a rule, legal rights enhance economic rights, but legal rights are normally not sufficient for the protection of economic rights. The rights people have over resources are not constant; they are a function of their own direct efforts at protection, of other people's attempts to capture and of government protection (Libecap, 1986).

Of the available economic alternatives for major projects such as extracting oil and gas from major offshore fields, unitisation is not merely one of many potential solutions, but rather has become the norm for major projects. In this case, the partners of the project venture provide resources in line with their allocation of the property rights to develop and produce the oil and gas. This allocation is normally until the end of the production life of the field and a share of the revenue is the reward for the partners. In this case, the co-ordination arrangements within this unitised venture must be robust enough to resolve any issues connected with the contract, due to conflicting interests of the partners. In this, considering the permanent nature of the contract, the property rights for project execution and operations to produce oil and gas are allocated to the partner firm with the largest share in the venture and hence the one with the most to gain or lose. The balance of property rights is divided into packages and each package is allocated to the partner firm with the most expertise to manage that particular package. In this case, property rights provide the basic economic rewards arrangement that shapes the division of the resource (Libecap, 1988; Kim and Mahoney, 2010; Klein and Robinson, 2011).

In the case of major projects carried out by a coalition, the main reason for implementing property rights is the aggregate (common pool) losses that may result when rights are not adequately defined. In these circumstances, values of the resources decline for several reasons. First, because property rights to the resource are not defined and participants

need not have to consider the implications of their activities. In this case, participants may use the resource too rapidly without consideration of the costs. In addition, when competitive pressures arise, any inadequate definitions of property rights can encourage short-term thinking in managing transactions. In such situations, the motivation for investment declines as potential participants may not be confident that they will be able to benefit from the expected economic returns due to insecure property rights. Second, values of the resource may decline because alternative use of the resource to obtain higher returns can turn out to be more expensive and less efficient if property rights are not functional. Even when property rights to the resource are defined adequately, the success of the transactions will require enforcement and defence of these rights (Libecap, 1986,1989; Klein and Robinson, 2011).

### **3.3.2 Impact of the State on Property Rights**

In the case of projects carried out across national boundaries, the delineation of property rights discussed above can be significantly impacted by the political context (i.e. regime type of the host country), whether it is an established democracy or not. The intervention of the host country state via their designated agents can have a crucial effect on the initial delineation of property rights and resource allocation. In this situation, negotiation costs and other transaction costs may block the re-assignment of rights (Eggertsson, 1990; Alchian, 2008). Thus, the property rights approach is not complete without a theory of the state, in relation to the delineation and enforcement of property rights. It can be argued that property rights are formed and enforced by political entities and that property rights reflect the conflicting economic interests and bargaining strength of those affected. In a democratic country, the state can be expected, by using its regulatory authority and legal institutions, to enable organisations and private individuals to enforce legitimate contracts, and thus lower the costs of exchange. We cannot expect this in a non-democratic country when the state does not use its power to enforce contracts in a fair and consistent manner. Thus, the

distribution of political power within a country and institutional structure of its legal institutions, are critical success factors in the protection of property rights for transactions (Eggertsson, 1990; Barzel, 1997; Alchian, 2008).

Libecap emphasises that property rights are determined through the political process, involving either negotiations among immediate group members or the lobbying activities that take place at higher levels of government. When the state is non-democratic, the political process of delineating and enforcing property rights can be divisive because of the distributional implications of different property rights allocations. In such situations, if influential parties cannot be sufficiently compensated to win their support, the potential economic gains fostered by the proposed arrangement will be foregone (Eggertsson, 1990; Libecap, 1986, 1989; Hart and Moore, 1990; Alchian, 2008). As a result, the conflicts among the interest groups over the distributional effects of property can negate the agreed property rights arrangement. The outcome that ultimately emerges may bear little resemblance to that which was initially formulated (Libecap, 1998; Eggertsson, 1990; North, 1990;).

A conclusion drawn from the above discussion is that an economic problem arises when property rights in international transactions have not been fully delineated due to the adverse intervention of the state. An example is the division of the rights to the oil and gas reserves in an offshore field between the host country and the international oil and gas company (IOGC) developing the field. In this instance, disputes can arise between the host country and the IOGC over access to a common property resource. Once ownership over the resource is established, the economic problem can be resolved. In the real business world, we often find that rights to valuable resources in international transactions are not fully delineated if the state intervenes in an opportunistic manner ignoring the accepted norms of democracy. Even when property rights to the resource are defined adequately, however, the success of the transactions will still require enforcement and defence of these rights (Hart and

Moore , 1990; Kim and Mahoney, 2010). The issue of enforcement of property rights is discussed below.

### **3.3.3 Enforcement of Property Rights**

When significant resources are involved in transactions, property rights must be monitored and the possession of the rights must be enforced. In the absence of self-enforcement, corruption can impact the transactions because it increases the cost of doing business and distorts markets. In such cases, the reason why ownership and enforcement of property rights becomes important is the incompleteness of contracts, especially applicable for major complex transactions (Grossman and Hart, 1986; Hart and Moore, 1990). The parties to the agreement are forced to rely on legal rules and standard patterns of behaviour, which cannot, for practical reasons, be established or confirmed by detailed negotiation. Typically, each person takes for granted a set of rules and norms, and assumes that the other party does the same (Durkheim, 1984).

The concept of property rights is closely related to the legal apparatus of recognition, enforcement and adjudication of property rights. Legal or quasi-legal apparatus, however rudimentary, is necessary to enforce and defend property rights in transactions. The preservation of property rights requires protection against public and private theft or fraud. Furthermore, in the case of disputes, the contracts rely upon legal systems and the judiciary for adjudication, often using written records of precedents and rules (Hart and Moore, 1990; Hart, 1994). For private property to be relatively secure, a requirement is a pluralistic state with separation of powers, backed up by powerful and multiple interest groups in civil society. Most constitutional theories require that the judiciary is separate from and independent of the government, in order to ensure the rule of law - that is, to ensure that the law is enforced impartially and consistently no matter who is in power, and without undue influence from any other source (Knight and Sened, 1995). In established democratic states,

the doctrine of the 'separation of powers' has traditionally proposed that the state is divided into the separate and distinct arms of Executive, Legislature and Judiciary, whereby each arm acts as a 'check and balance' on the others. With such a balance of power, a framework of constitutional law could be established, in which the interests of both the state and the population of the country could be protected to some degree. Thus, the legal institutions of the state are expected to enable organisations and private individuals to enforce legitimate contracts, and thus lower the costs of exchange. We can expect this in democratic countries when the state does not use its power to prevent the legal institutions from enforcing contracts in a fair, systematic and consistent manner (Knight and Sened, 1995; Hodgson, 2003). In established democratic countries with strong and independent judiciary the rule of law prevails, laws are part of socio-economic reality backed with the powers of the state legal system. The courts can be used to enforce the execution of contracts or to enforce the collection of damages for non-performance (Sened, 1997; Hodgson, 2003).

In both authoritarian states and authoritarian democracies, by contrast, state power will often be used by the ruling elite to control the judiciary. Invariably, the legal enforcement personnel in these countries are dependent on the ruling elite for their survival and progress in office. In an authoritarian state, control of the judiciary is exercised in a blatant manner, while an authoritarian democratic regime will resort to stealth and subtle means to influence the judiciary. As such, legal relations in transactions in these countries can become mere fiction lacking the strength of enforcement (Sened, 1997; Hodgson, 2003).

In conclusion, adequate enforcement of protection of property rights for international transactions will depend on the independence and strength of the legal system of the host country. Thus, the weakness and lack of independence of legal institutions in non-democratic countries are critical factors to be addressed in the protection of property rights for international transactions. Legal relations do not constitute the whole story, but they are

nevertheless vital. As discussed in Section 3.3.1, economics determines the allocation of property rights and the law is used to enforce these rights.

As such, there is a difference between an economist's concept of property rights and the role of the law, but both have to work together to reach the final goal of securing and maintaining property rights (Sened, 1997; Hodgson, 2003).

### **3.3.4 Dimensions and a Measurement Scale for Political Hazards and Property Rights**

The arguments developed in the earlier sections demonstrate that the hazards caused by adverse host country government intervention in the market and judicial process can directly affect the governance of international project transactions. The discussions above lead to the proposition that major projects carried out in countries with authoritarian or authoritarian democratic political systems can be subject to significant unpredictable state intervention and property rights issues. These challenges are in addition to the state's more typical interventions in markets to implement their monetary and fiscal policies (Kobrin, 1979; Acemoglu et al., 2004 ; Scott *et al.*, 2012). An important step in understanding the extent to which these hazards might impact on the governance of international project transactions, is to define the various dimensions of the hazard and to develop a scale for measuring these dimensions. This is presented in Table 3.1 below. The likelihood and potential negative consequences of each hazard dimension are scaled as low, medium and high.

**Table 3.1 - Dimensionalising Impacts of Political and Property Rights Hazards on Transactions**

Nature/Dimension of Potential Hazard	Scale of Hazards and their Consequences		
	<b>Low Hazard: Democratic Regime</b> The state is characterised by an established constitution, rule of law, representative political parties and regular elections with electoral competition.	<b>Medium Hazard: Authoritarian Democratic Regime</b> A governing system in which an adequate legal constitutional framework of liberties does not exist.	<b>High Hazard: Authoritarian Regime</b> The state practices exclusive territorial sovereignty as its right. It retains full power of expropriation and full power of imposition (i.e. the right of control over everything and everyone).
<b>Political:</b> <b>Nature of state-market relations.</b>	<p>Intervention state in the markets for economic planning is to prevent market failures and markets function in the desired fashion. Alternatively, the role of the state can be neutral causing free market conditions.</p> <p>Governments and their agencies may take an approval role in major projects that are of vital importance to the national interest in developing the host country's infrastructure and its resources. Such actions can cause minor delays in obtaining project approvals.</p> <p>High level of proven trust between the state institutions and investors, and promoting economic growth.</p> <p>Established and fair state bureaucracy which can be expected to abide by the rules and regulations established by the state to benefit the general population.</p>	<p>Opportunistic intervention by state institutions in markets to benefit the narrow interests of the ruling elite and their supporters.</p> <p>Unpredictable political intervention by stealth in project transactions due to economic opportunism. State institutions can demand conciliatory payments for approving project plans. Potential for intervention by governments and their agencies in the award of major contracts for projects for developing the host country's infrastructure and its resources.</p> <p>The competency and behaviour of the state bureaucracy is unpredictable. Greater propensity to resort to adverse behaviour and corrupt practices to further the entrenched interests of the ruling elite than to act to benefit the investors.</p>	<p>State exercises exclusive territorial sovereignty as its right. It retains full power of expropriation and full power of imposition. As such, predictable high level of blatant opportunistic intervention by government in transactions to benefit self-interest and the interests of supporters.</p> <p>The adverse behaviour of the host country's government can take the form of creeping expropriation that can reduce the anticipated profit from the project transactions.</p> <p>Blatant corrupt practices by the state bureaucracy and institutions in sanctioning projects and approving licenses to implement the desires of the state. Investors need to make monetary concession to authorities to progress transactions and for approving project plans.</p>

<p><b>Political:</b> <b>Processes by which new legislation and regulatory changes are introduced.</b></p>	<p>Established procedures with consultative process for introduction of new legislation.</p> <p>Intervention in transactions exercised by well-established, fair and clear regulations to maximise the benefits to the population and the environment.</p> <p>Limited and fair introduction of new taxes.</p>	<p>Potential for adverse changes to the rules of the game not necessarily backed by new legislation. This represents opportunistic behaviour by stealth to exploit foreign investors.</p> <p>Probability for the host country government to impose an adverse taxation regime for major foreign investments without warning or consultation.</p>	<p>Blatant opportunistic actions by the host country's government in making changes to the legislation and regulations without any consultations with the investors.</p> <p>Predictable intervention in projects by host country government to impose adverse taxation regime. High potential for unexpected unilateral adverse changes by governments or their agents to the terms and conditions of concessions, and licenses. In some cases, these changes may not be adequately defined or practiced with the required transparency to ensure that project transactions can be completed as planned. This will invariably have an extremely adverse effect on the profitability and the execution of the project.</p> <p>Due to these difficulties, companies can be expected to make concessions above those required to comply with the regulations.</p>
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<p><b>Political:</b>  <b>State behaviour towards major foreign investment in infrastructure projects and local content requirements.</b></p>	<p>Introduction of statutory requirements to demand local content in the transactions. The foreign firms allowed the freedom to select local partners to form joint ventures to comply with this requirement.</p> <p>Governments and their agencies directly intervening in major projects that are of vital importance to the national interest in developing the host country's infrastructure and its resources. This intervention carried out in consultation with the foreign firms.</p>	<p>Introduction of unpredicted legislation or subtle moves to increase local content demands and benefits to local pressure groups.</p> <p>As a result requirement to form joint ventures with local firms to execute some minor transactions.</p> <p>Governments and their agencies may more directly intervene in major projects that are of high economic value. These interventions in the form of restrictive controls without prior consultations for the economic benefit of the ruling elite rather than for the common good.</p>	<p>Opportunistic actions by the host country's government in making adverse changes to the legislation and stringent compliance regulations related to foreign investments without a consultative process.</p> <p>Introduction of statutory requirements to demand high local content in major transactions. The foreign firm may be compelled to form joint ventures with local firms which may not have the necessary expertise and facilities to execute the required activities.</p> <p>The authoritarian democratic governments may at some point face incentives to renegotiate the terms of the investment in order to redistribute an investor's returns to other groups, such as local suppliers and workforce, which provide it with political support.</p>
<p><b>Property Rights:</b>  <b>Role of the state in initial allocation.</b></p>	<p>The government plays no role in the allocation of property rights between the participants in a transaction.</p>	<p>Probability of state intervention by stealth to influence allocation of property rights to ensure that the narrow self-interest of special-interest groups is served.</p> <p>Property rights not fully delineated if the state intervenes in an opportunistic manner ignoring the accepted norms of democracy. Then an economic problem arises regarding the property rights in transactions.</p>	<p>High opportunistic intervention of the state in the initial partitioning of property rights. This will have important consequences for the outcome of the transactions.</p> <p>When the state is authoritarian, the delineation of property rights influenced by the political process, reflecting the conflicting economic interests and bargaining strength of the participants. As a result, the conflicts among the interest groups over the distributional effects of property negate the agreed property rights arrangement.</p>

<p><b>Property Rights: Independence and strength of judiciary for enforcing measures.</b></p>	<p>Established, strong and independent legal institutions to enforce contracts.</p> <p>The state can be expected, by using its regulatory authority and legal institutions, to enable organisations and private individuals to enforce legitimate contracts, and thus lower the costs of exchange.</p>	<p>Established judicial system but may not have been tested by the industry. Hence, could be unpredictable, due to pressure from influential local vested interests. Pseudo democratic regimes will resort to stealth and subtle means to influence the judiciary. As such, the state may not use its power to enforce contracts in a fair and consistent manner.</p>	<p>Established legal system but under authoritarian democracy the state control of the judiciary is exercised in a blatant manner.</p> <p>State power can be used to control the judiciary, as invariably, the legal enforcement personnel in these countries are dependent on the ruling elite for their survival and progress in office. As such, legal relations in transactions in these countries can become mere formalities lacking the strength of enforcement.</p>
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The discussions above lead to the proposition that in a world of positive transaction costs, political hazards and the assignment and enforcement of property rights do affect economic efficiency (as well as income distribution). In this situation, the question arises as to what extent the mitigation of political hazards and ensuring the complete delineation of property rights is of benefit to transactions. The answer depends on the magnitude of common pool losses caused by these factors and the increase in transaction costs for mitigating political hazards and defining and enforcing property rights (Alchian, 2008; Klein and Robinson, 2011). Considering the discussion in this chapter thus far, there are compelling reasons for the extension of the basic TCE model to address political hazards and property rights arrangements for a major international project. The mechanisms for this extension have to be based on political governance theory as discussed in the next section.

### **3.4 Application of Political Governance Theory**

#### **3.4.1 Requirement for Political Governance**

This section examines the theory of political governance that can provide an applicable extension to the TCE model, to address politically motivated institutional hazards and property rights issues. In order to address the difficulties caused to international transactions by the nature of the host country's political and legal system, Henisz and Zelner (2010) advocate applying the logic of comparative institutional analysis to the governance of such transactions. Comparative institutional analysis is pursued by comparing the impact of the hazards due to the behaviour of political and legal institutions and their activities. This analysis considers the host country institutional environments and different levels of national checks and balances available in each case.

The analysis identifies political and institutional hazards that need to be addressed in the selection of specialised governance mechanisms for international transactions. In this context of political hazards, two important parameters are the levels of controls and mitigation measures inherent in the formulation of host country legislation. These parameters will determine the extent to which opportunistic political actors are able to formulate the legislation and rules to benefit the narrow interest groups they serve rather than accommodating the interests of the majority of the population (North, 1990; Grant, 1991,1996; Rajan and Zingales, 1998).

As discussed in Sections 3.2 and 3.3, when the role of the host country state is neutral and the judiciary is strong and neutral, the firm or project coalition can rely on the existing political process and legal institutions for executing the transactions. On the contrary, if the host country political hazards are significant and/or judiciary is weak, the investor or project coalition will be required to resort to additional ‘specialised’ governance (i.e. political governance) (Acemoglu, 2003; Dixit, 2007). In this situation, we can expect the controls and safeguards of the host country’s political and legal systems to determine the extent of specialised governance mechanisms required. These special mechanisms will be required to complement governance mechanisms selected based on the characteristics of frequency, asset specificity and uncertainty that can create contractual hazards (Henisz, 2000; Acemoglu *et al.*, 2004; Dixit, 2007).

We find that when contractual hazards in the transactions are sufficiently low, market arrangements will be adequate without the development of a specialised governance mechanism (Williamson, 1995). Similarly, where political hazards are sufficiently low and with availability of strong property rights, the participants can turn to short-term political arrangements and compromises based on commercial incentives.

However, as political opportunism increases and the protection of property rights becomes weaker, the project organisations need to include in their evaluations current policies of the government and any potential changes in policy, in order to safeguard their interest (Desai *et al.*, 2004; Dixit, 2007; Henisz and Zelner, 2010).

The conclusion to be drawn is that if the available inherent controls and checks against adverse political and institutional behaviour are strong, project transactions less frequently require the added benefits of specialised political governance. Conversely, if the political and institutional hazards can endanger the success of transactions, the project management has to complement project governance with political governance (Acemoglu, 2003; Dixit, 2007). For this, additional governance mechanisms that can be applied as mitigation against political and property rights hazards are discussed in the next section.

### **3.4.2 Transaction Cost Politics and Project Governance**

A crucial insight which distinguishes transaction cost politics from transaction cost economics is the ability of the former to allow for the case of a problem stemming from the broader policy that is not represented in the initial phase of contract negotiations. As a result, if a firm can complement economic governance with political governance, this could be an important source of strategic advantage over its competitors. Based on the propositions in literature, the political governance process for extending the predictive capabilities of the basic TCE model can be defined as consisting of the following steps (Acemoglu, 2003; Dixit, 2007; Henisz,2000; Henisz and Zelner, 2010):

- Search and data gathering to establish the nature and impact of the hazards to the transactions caused by the political and legal institutions functioning in the host country.

- The findings from the search and data gathering to be used to determine how the impact of the hazards on the transactions identified may be mitigated by the following political governance mechanisms:
  1. Negotiations and formulation of agreements with provision of commercial concessions to ensure their acceptance by the local institutions.
  2. Building long-term relationships with host country institutions, lobbying of influential political actors and creating social networks to influence participants to the transactions.
  3. Management of joint ventures with local firms to meet the local content demands.

### **3.4.3 Search and Data Gathering**

According to Weber (1919) the modern state is a public organisation with a system of administration and law which guides the collective actions of the executive staff; the executive is regulated by statute and claims authority over inhabitants and over all activities taking place in the territory over which it exercises domination. Thus, the state is a collective legal body which has the authority to impose coercive power. When project transactions involve political actors it is necessary to ascertain the nature of the host country's regime (i.e. whether it is a democratic state or not and identify the influential political actors).As such, foreign investors in major transactions need to obtain sufficient data to address the following questions and issues to ascertain the nature and behaviour of the host country's political and legal institutions (Acemoglu, 2003: Henisz and Zelner, 2010;):

- (1) Nature of the state and the role of political leaders in performing collective actions to benefit the general public of the community and not for a particular group of people.
- (2) Independence, strengths and weaknesses of the legal systems in administration of law to settle contract disputes with international firms.
- (3) Main political actors and their domination in the decision-making process for selecting preferences and implementation of major investments, and their role in regards to enhancing benefits to local organisations (i.e. local content).
- (4) How and to what extent does the state use force legitimacy? Except for the state, no other political organisation is authorised to use force. Hence the force or violence is an important element of the state.
- (5) The strength and efficiency of the host country's bureaucracy. Weber's theory of the state is inseparably connected with bureaucracy. It is beyond the capacity of the politicians to manage the state structure without bureaucrats. The advance of the state towards more and better administration and efficient organisation is closely associated with the superiority of the bureaucratic organisation. In fact, the bureaucracy becomes more indispensable because without bureaucracy the complex economic structure of society cannot be managed or administered.

If the search and data collection confirms that the host country's regime is democratic with established regulations with the necessary consultative processes in place, the foreign investors can rely on the existing political process and legal institutions for maintenance and enforcement of beneficial relationships in transactions. However, if the nature of the political regime is non-democratic, then we can expect the need to counter the

potential political hazards facing international projects. Thus, the findings from the data collection on the above issues need to determine the additional mechanisms of governance to mitigate the impact of any adverse actions of the state institutions in transactions. In this case, the scope of the specific mechanisms of influence that can be exerted by firms and their costs will differ according to the structure of the political institutions and the motives of the personnel controlling them (Dixit, 2007; Henisz and Zelner, 2010).

#### **3.4.4 Negotiations and Formulations of Agreements**

Irrespective of the nature of the state, the foreign investors have to negotiate and formulate agreements with the state and their agents before commencing the transactions. The formulation of these agreements needs to make allowance for the effectiveness of the host country regulations that can be implemented and strength of legal redress available in case of contractual conflicts. In practice, some firms use professional political risk analysts to evaluate the impact of such hazards and identify possible mitigation measures (KPMG, 2011; Wood Mackenzie, 2011, 2012).

As such, the negotiations between the foreign firms and the host country's government institutions to formulate acceptable agreements and working relationships for execution of transactions can turn out to be a long drawn out affair. In this case, there is a requirement for long-term political strategic measures to address any adverse impacts that the existing or any potential future legislation might have on the transactions (Dixit, 2007). Broadly speaking, the requirement is for a "*management process by which the foreign organization for political purposes, through purposeful communication and action, establish, build, and maintain beneficial working relationships with the government to help its goals*" (Strömbäck and Kiouisis, 2013, p.5). As such, commercial concessions have to be provided by the foreign firms to obtain acceptable terms with the government on

compliance requirements for finalising the agreement for execution. Thus, negotiations need to address the short-term and long-term orientation and motives of political organisations. As a result, foreign firms need to influence governmental and public sector agencies, think tanks, unions, commercial businesses, as well as other interest groups that are engaged in influencing outcomes of the transactions (Strömbäck and Kiouisis, 2013).

When the political regime is not an established and fair democracy, it is a difficult task to identify and mitigate against ex-ante political behaviour and malpractice. In this case, IOGCs investing in major projects in some of the world's fastest-growing oil and gas industries, such as in Nigeria and Angola, need to formulate contingency measures to manage the challenges associated with working in these countries. In such situations, the project organisations may be compelled to expend more resources to influence the political actors to prevent implementation of policies that might affect their transactions. This requires the investors to commission political, legal experts and local 'Godfathers' in their dealings with the government to mitigate the impact of any potential adverse changes in policy and practice (Scott *et al.*, 2012; Wood Mackenzie, 2011, 2012). Thus, for the agreements with host country institutions to function as agreed, the foreign companies are required to budget for transaction costs systematically being higher in political transactions than in economic ones. The reasons explaining the higher level of transaction costs in exchange between the state organisations and firms are: (a) the parties to the political agreements cannot be perfectly defined, (b) many political agreements are neither explicit nor formal and rest on verbal and even tacit agreements (containing vague and uninterpretable terms), (c) property rights are subject to strong constraints and become unsafe due to political interactions, and (d) the world of politics is opaque, unclear and it is difficult to observe the different factors of political performance (Caballero and Soto-Onate, 2006; Henisz and Zelner, 2010; Strömbäck and Kiouisis, 2013). In addition to the

above reasons, we must also add the fact that transaction costs sometimes increase due to the short-term horizons of political actors, who manipulate use of government authority for their benefit (North, 1990; Caballero and Soto-Onate, 2006; Pierson, 2006).

In addition to the challenges discussed above, formulating complete agreements for political transactions can be extremely complex and subjective as situations of asymmetric information are prevalent in political transactions. In addition, political activities lack a measurement formula like the price system in economic markets, as action promises are a fundamental exchange unit in political agreements. Agreements with such promises are typically not subject to a compliance mechanism; there is not an effective ‘third party enforcement’ in politics (Dixit, 2007; Epstein and O’Halloran, 1999).

Considering the above points, the foreign companies must be prepared to expend significant financial resources, technical and legal expertise in the process of formulating and implementing agreements with the host country’s government institutions.

#### **3.4.5 Relationship Building and Lobbying**

In executing projects in foreign countries, relationship building and lobbying the political actors, legislators and members of regulatory agencies have become an essential part of the project management. For this, it will be necessary to commission lobbyists whose business is trying to influence legislation, regulation, or other government decisions, actions, or policies on behalf of a group or individual who hires them. The requirement for such lobbying can be expected to be higher in countries with non-democratic regimes. This is as a result of the political authorities in these countries possibly requiring greater persuasion and encouragement to make decisions favourable to foreign firms (Epstein and O’Halloran, 1999; Pierson, 2006; Caballero and Soto-Onate, 2006).

In addition to lobbying, it will be necessary to build relationship networks with not only the key political actors but also with members of parties and committees, staffers of government agencies, and decision-makers' contacts who all have a say on issues concerning the transactions. This multi-agent relationship network structure implies that it is also necessary to influence political actors indirectly (i.e. through the decision-maker's network of direct and indirect contacts). For this purpose, the optimal strategy should be to determine the key actors to maximise influence in political networks and how to minimise wasteful relationship building efforts in such multi-agent policy environments (Pierson, 2006; Caballero and Soto-Onate, 2006).

The ethics and morality of lobbying and networking are dual-edged and often spoken of with contempt, when the implication is that organisations with inordinate economic power are corrupting the law (twisting it away from fairness) in order to serve their own interests. In contrast, this may not be the case when major infrastructure projects have to be carried out in countries which lack the required checks and balances to safeguard the property rights of the investors. In addition, the successful completion of such projects will benefit the population of the country. Thus, in this case, lobbying and networking are essential for making sure that the interests of the foreign firm and the public good are duly defended against corruption and ensuring that minority interests are fairly defended against vested interests (Pierson, 2006; Caballero and Soto-Onate, 2006).

An additional measure for building relationships with the local population is in the form of welfare measures implementing sustainable development projects. These normally include improving the infrastructure and facilities for local communities like building roads, schools and hospitals. Such developments, which can reduce any antagonism of the

population against major foreign firms, are becoming common for oil and gas projects carried out in countries like Nigeria and Angola (Wood Mackenzie, 2012, 2013).

#### **3.4.6 Management of Joint Ventures and Local Content**

There are a number of economic drivers for forming joint ventures (JVs) for the execution of major projects which can be too capital intensive and where the scope can be too big for a single company. The risk profile of such investments can be so large that no single company may wish to take full exposure. In the case of international transactions, the regulatory requirements of some countries require foreign companies to partner with local entities if they are to enter that market (Chin and Hwang, 1992). Earlier in this chapter, it was suggested that a cumulative impact of host country high political hazards and adverse property rights issues is an ever increasing demand for local content in transactions. An inevitable outcome of this political demand is the need for foreign investors to form JVs with local companies. Foreign firms entering into JVs with local companies can benefit from improving the local resources, reducing the risks due to local logistical issues and easily adapt to the culture and local employees (Meyer and Peng, 2011; Wood Mackenzie, 2012).

Joint ventures are based on long-term contracts such that one of the JV partners cannot simply abandon the relationship. Moreover, any strategic decision in the JV requires mutual agreement between the partner firms. In the case of international transactions, even if a foreign firm owns a substantial majority equity stake, they need the co-operation of the local partner to implement proposed strategic actions (Meyer and Tan, 2011). When JVs have to be formed due to host country political compulsion, the local partner attains influence well beyond what is due through its equity stake. This is due to the patronage of the government and through relationships with external stakeholders (say,

trade unions or government officials). In such situations, the foreign firm has to resort to implementing indirect vertical integration for transactions subject to high levels of uncertainty and/or high asset specificity. To implement this dominating role, the foreign firm will have to make economic concessions to the local partners and their political patrons. Without these measures, the JV becomes a highly inflexible mode of operating, because the foreign firm will be constrained in making strategic changes to react to internal and external challenges (Madhok, 2006; Meyer and Peng, 2011).

Another factor to be considered is that the design and construction of a major infrastructure project invariably requires the use of high and often novel levels of technology, skills and expertise. If the host country partners lack the expertise to meet these requirements, the foreign firm has to provide the necessary technology transfer to the host country firms where they are involved in JVs. The possibility of such situations can be expected to be higher when foreign firms are compelled to form JVs with local partners imposed on them by political authorities (Hennart, 1988; Meyer and Peng, 2011; Wood Mackenzie, 2012).

The idea that a foreign majority firm in a JV enjoys full control is very far from the realities of JVs carried out in countries where adverse government intervention can be high. This situation can apply both in countries with democratic and non-democratic political regimes. Regulatory ambiguity and any corruption in the host country tend to increase costs in operating JVs, as extra management and monitoring arrangements by the client firm are necessary to prevent co-ordination failures (Meyer and Peng, 2011; Lu, 2012).

Considering the above difficulties that can be encountered in JVs for international transactions, there will be an increased requirement for the foreign firm to direct the transaction activities (i.e. vertical integration and provide incentives to the local partner to

prevent poor performance and delays). In addition, the foreign client firm has to implement relational aspects by allowing concessions in the contractual terms and provide financial benefits to the local partners and their political patrons. These measures, along with increased monitoring and expertise transfer activities can be expected to cause significantly increased transaction costs (Kogut,1991; Barlow, 2000, Meyer and Tan, 2011).

### **3.5 Conclusions**

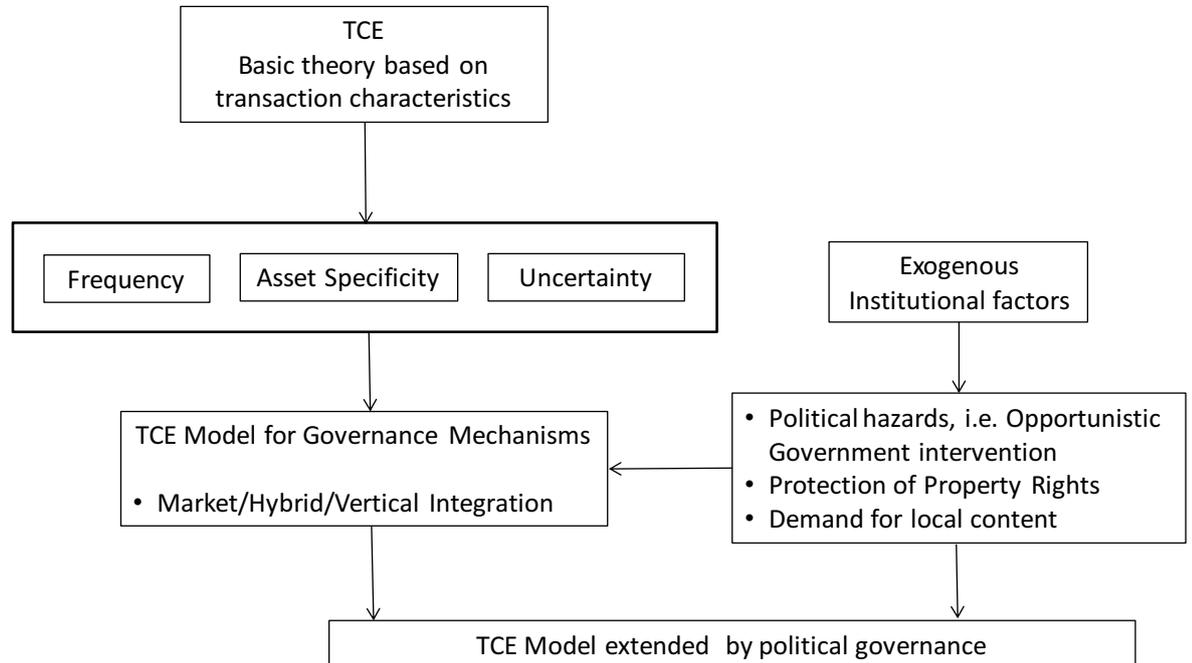
The literature review presented in this chapter leads to the conclusion that major projects carried out across national borders can be subject to significant political hazards and property rights issues. A host country government playing an approval role can take arbitrary action that directly or indirectly influences the outcome of transactions including the imposition of high local content demands. Political hazards created by host country institutional arrangements can determine the extent of risks and uncertainties facing firms undertaking projects in foreign countries. Protection of property rights can become an issue depending on the strength of the judicial system in the host country. Various dimensions of these hazards and a scale for measuring these dimensions are presented in Table 3.1. The likelihood and potential negative consequences of each hazard dimension are scaled as low, medium and high.

In this situation, several questions arise regarding the impact of both political and property rights hazards on the TCE model. To what extent will these factors shift the point at which it is no longer efficient to use a market governance strategy for a given level of asset specificity? Will high political hazards and weak arrangements for the protection of property rights require organisations to resort to vertical integration or hybrid arrangements at lower levels of asset specificity than is suggested by the basic TCE model? Will the

extent to which specialised political governance mechanisms are required depend on the nature of the political and legal environment of the host country and the level of hazards presented by those factors?

These questions suggest the need for an extension to the basic TCE model by incorporation of political governance mechanisms to mitigate the impact of political hazards and weak legal regimes.

A framework resulting from the summary of the literature review and the propositions derived in Chapters Two and Three is illustrated in Figure 3.1 below. This framework is used as the basis in Chapter Four to develop an extension to the basic TCE model. This extension is for the incorporation of specialised political governance mechanisms to mitigate the impacts of political hazards and weak property rights.



**Figure 3.1 - Research Proposition Representation**

## **Chapter 4 - Extending the TCE MODEL TO INCORPORATE THE IMPACT OF POLITICS**

### **4.1 Introduction and Synthesis of Literature Review**

#### **4.1.1 Introduction**

This chapter initially synthesises and then integrates the findings of the literature reviews and theoretical arguments made in Chapters One, Two and Three. The argument is then developed to show that political governance mechanisms are required to mitigate the consequences of the political hazards and property rights issues on major international transactions. Theoretical propositions of the political governance mechanisms are used to extend the predictive capabilities of the basic TCE model. For this, the political governance mechanisms to be implemented, depending on the dimensions and scale of political hazards and strength of property rights protection that impact the project transactions, are examined. The extended TCE model developed and the exploratory research propositions derived from these arguments are presented. Exploratory research to investigate the applicability of the extended TCE model is proposed to provide the scope and direction for conclusive research aimed at providing final answers to the research problem. This field investigation is an exploration of how different levels of political hazard are handled in international oil and gas production projects, and whether the approach used is consistent with the reasoning of the basic TCE model or whether an extension to TCE, as proposed by this research, is justified.

#### **4.1.2 Synthesis of Literature Review**

The growing number of failures of large complex international project transactions, subject to PEST challenges to achieve their targets, leads to an intellectual problem.

Thus, the focus of this research was to develop an applicable extension to the transaction cost economics (TCE) theory to address theoretical issues of predicting the governance mechanisms for such projects.

The conclusions to be drawn from the discussions in the earlier sections are that in addition to technical and operational complexities, the causes for failures of major projects can be summarised as incomplete information on the future state of affairs causing non-quantifiable uncertainties, bounded rationality of the decision-makers and opportunistic behaviour of participants in transactions. In the case of international projects, additional challenges can be posed by the behaviour of the political institutions and the role of the judiciary of the host country. These identified causes of failures of major projects support the proposition for rethinking management of international projects. In this case, the focus needs to be on appropriate governance mechanisms proposed by NIE to provide necessary dimensions of authority, decision-making and accountability for such international projects. These mechanisms are required to mitigate the political as well as economic turbulence that can emerge over the life of the project and to steer and harmonise the behaviour of the participants.

To achieve this aim, a theoretical conceptual model was found to be required for the prediction of the most appropriate governance mechanisms for managing major international transactions. The predictive capabilities of this model are required to align the governance mechanisms with the economic and political characteristics of the international transactions. For this purpose, the two main strands of the micro-analytical approach component of NIE, the principal agency-theory (PAT) and transaction cost economics (TCE), were evaluated.

Based on the limitations of the PAT and the consequences identified, the argument was made that agency contractual arrangements are not the most economical way of

managing the increasing commercial and technical hazards faced by major long duration projects. TCE makes two assumptions for the causes of conflicts in transactions and classifies these as: human and environmental. The human factors are bounded rationality of the participants and opportunism where self-interest is practiced with guile. Among environmental factors, uncertainty and complexity refer to conditions where it is not possible or becomes very expensive to predict the events that can cause incomplete contracts. These are factors that were identified as contributing to the underperformance of long duration major international projects. As such, it was deemed that TCE, which addresses all these issues, is more related than PAT to formulate a conceptual governance prediction model to manage the transactions of large international projects. However, in addition to the micro-economic critiques of TCE, the main criticism of TCE in the context of this research is that it is based on the concept of self-enforcement and considers the role of institutions to be neutral in transactions. In addition, uncertainty presented in TCE does not cover exogenous uncertainties due to political, economic or social developments in the host country that can impact transactions. A further criticism made of TCE is its lack of consideration of the allocation and enforcement of property rights which can become a major concern, particularly if the role of the state in the transactions is not neutral.

Chapter Three examined how the challenges faced by major projects multiply in the international context. The proposition was that major projects carried out in countries with authoritarian democratic or authoritarian political systems can be subject to significantly higher hazards than those carried out in liberal democratic countries. These are due to opportunist intervention of the host government and inadequate protection of property rights due to a weak judicial system. In addition, an inevitable requirement for international projects would be the need to form joint ventures with local companies to comply with the increasing demand for local content in transactions.

Political governance mechanisms were identified to mitigate the consequences of these challenges. These measures were construed to provide the required theoretical basis for extending the predictive capabilities of the basic TCE model. The argument to develop the extended TCE model and the exploratory research propositions to examine its applicability are presented in the following sections.

## **4.2 Argument for an Extension of the TCE Model by Political Governance**

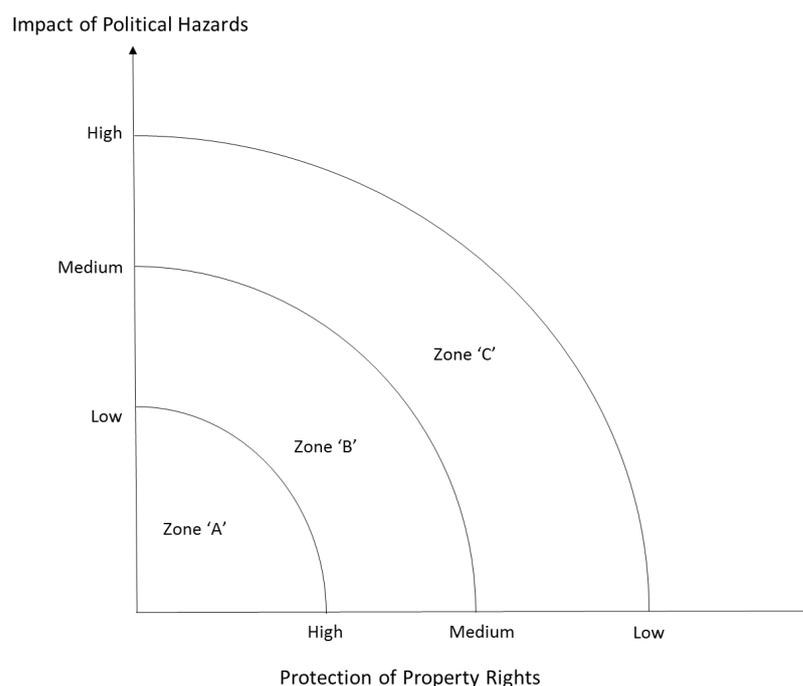
### **4.2.1 Impact of Regime Types on Political Governance Requirements**

Incorporation of political governance for extending the predictive capabilities of the basic TCE model was defined as consisting of the following steps:-

- Search and data gathering to establish the nature and impact of the hazards to the transactions caused by the political and legal institutions functioning in the host country.
- The findings from the search and data gathering to be used to determine how the impact of the hazards on the transactions identified may be mitigated by the following political governance mechanisms:
  4. Negotiations and formulations of agreements with provision of commercial concessions to ensure their acceptance by the local institutions.
  5. Building long-term relationships with host country institutions, lobbying of influential political actors and creating social networks to influence participants to the transactions.
  6. Management of joint ventures with local firms to meet the local content demands.

A conclusion drawn from Chapter Three is that the scope of the political governance mechanisms to be implemented will depend on the dimensions and scale of

political hazards and strength of property rights protection that directly impact the governance of the project transactions. The dimensions of the political hazards are defined in Table 3.1 as the nature of the host country regime, processes by which new regulatory changes are introduced and how demand for local content requirements can increase due to political pressure. Protection of property rights is dimensionalised in Table 3.1 as the role of the state in initial allocation of these rights and the independence and strength of the judiciary in enforcing the protection of property rights. The dimensions of these hazards that directly impact the project transactions are scaled as low, medium and high. This dimensioning and scaling of political hazards and protection of property rights is integrated to generate Figure 4.1 below.



**Figure 4.1 - Relationship between levels of Political Hazard and protection of property rights under three different Regime types**

Zone A represents transactions carried out in countries with a low level of political intervention and a high level of protection of property rights. This can be the case of strong, established, democratic countries with stable and known political conditions.

There will be a high level of proven trust between the state institutions and investors. State intervention in foreign investments is exercised by well-established and fair regulations with reasonable demand for local content. The state bureaucracy functions efficiently and in a fair manner. The government takes no part in the allocation of property rights between the participants in a transaction. Established, strong and independent legal institutions are in place to enforce contracts. For transactions carried out with such low political intervention and safeguarded by strong independent judiciary, the basic TCE governance model as discussed in Chapter Two should suffice for the prediction of economising governance mechanisms.

Zone B represents transactions subject to a medium level of political hazards and medium level of protection of property rights. This represents transactions executed in an authoritarian democratic state with the potential for adverse political intervention by the state with stealth in transactions, due to increasing economic opportunism to exploit foreign investors. There is the potential for changes to the rules of the game by subtle moves made by the state institutions. These can include influencing the award of contracts and increased demands for local content in transactions to benefit local pressure groups and political supporters. The state can also be expected to interfere in the allocation of property rights due to narrow self-interest. This can cause substantial output losses to the investor. Even though judicial systems are present, they may not have been tested by the foreign investors. Hence, they could be unpredictable due to pressure from local vested interests.

Zone C represents transactions subject to predictable high levels of opportunistic political intervention and a very low level of protection of property rights. These will apply mostly to transactions carried out in a country with an authoritarian regime, with the state power concentrated in the hands of the ruling elite. The state can be expected to

exercise its authority in a blatantly opportunistic manner with corrupt practices to benefit self-interest and the interests of its supporters. These corrupt practices by the state bureaucracy and institutions require monetary concessions to be made by the investors to these authorities in order to progress transactions. The host country's government could be expected to make adverse changes to the legislation and regulations related to foreign investments. In some cases, these changes may not be adequately defined or practiced with the required transparency. Stringent legislation backed by arbitrary direct actions of the authorities can result in the demand for high local content in transactions. Opportunistic intervention of the state in the initial partitioning of property rights may have important consequences for the investors. The delineation will be controlled by influential political actors restricting the bargaining strength of the investors. The judiciary is not independent or fair due to the blatant intervention of the government.

#### **4.2.2 Application of Political Governance for an Extension of the TCE Model**

The theoretical propositions developed in Chapter Three would dictate that for transactions represented by Zones B and C, the basic TCE model needs to be extended with the incorporation of the necessary political governance mechanisms.

In the case of transactions carried out under Zone B conditions, data gathering on the expected behaviour and motives of the host country political and legal institutions may produce unreliable and often conflicting evidence. This will be due to the difficulty in distinguishing between honest behaviour and opportunism with stealth on the part of the host country authorities. As a result, the outcome of the negotiations and formulations of agreements with the host government may turn out to be as not agreed ex-ante. Building long-term beneficial relationships with host country institutions and the influential political parties may turn out to be laborious if the selfish expectations of the host country actors

should increase during the transactions. As such, contingency planning is required by the foreign firms to address any possible changes in the behaviour of these institutions and how their impact on the transactions may be mitigated.

In the case of transactions carried out under Zone C conditions, data gathering will confirm without any doubt the blatantly opportunistic intervention of the state institutions in transactions and their corrupt practices to benefit self-interest. In this case, negotiations and formulations of agreements will be dominated by the state bureaucracy and institutions and the foreign firms will be required to make significant commercial concessions to them. In addition, the foreign firms may have to resort to unethical practices to form and maintain mutually beneficial long-term relationships with the host country institutions and the influential political actors. Implementing such mitigating measures and the resulting increases in the transaction costs will not be registered in the project reports, due to reasons of confidentiality.

In Chapter Three, it was identified that a cumulative impact of host country high political intervention and adverse allocation of property rights is an ever-increasing demand for local content in transactions. Hence, for transactions represented by both Zones B and C the investors will be compelled to form joint ventures (JVs) with local firms, which may not necessarily have adequate expertise and facilities to execute the required activities. This can lead to complex project transactions being carried out in difficult environments, both literally and politically. In such cases, the foreign firm responsible for the transactions must take into consideration the need for relational aspects with the JV partner firms and how these are to be developed to ensure trust and more information sharing to reduce opportunism. Thus, the extension to the TCE basic model must incorporate these additional relationship building arrangements and monitoring mechanisms.

### **4.3 An Extension of the TCE Governance Model**

The conclusions drawn from the literature are that challenges created by political and institutional hazards will prevent project transactions being carried out in an economising manner. This is due to firms requiring either to incur higher transaction costs for the market arrangements for a given level of asset specificity, or requiring them to select hybrid governance with higher vertical integration arrangements at lower levels of asset specificity. In this case, the TCE governance model cannot be implemented in its pure form to predict which transactions could be handled by market contracts and which would require additional safeguards in the form of vertical integration or hybrid arrangements.

The findings presented in earlier sections support the proposition that an extension to the TCE model is required with a coalition of political governance for these projects. This extension of the TCE governance model must also make allowance for the fact that weak contract enforcement causing property rights issues will affect transaction costs with non-self-enforcing exchanges.

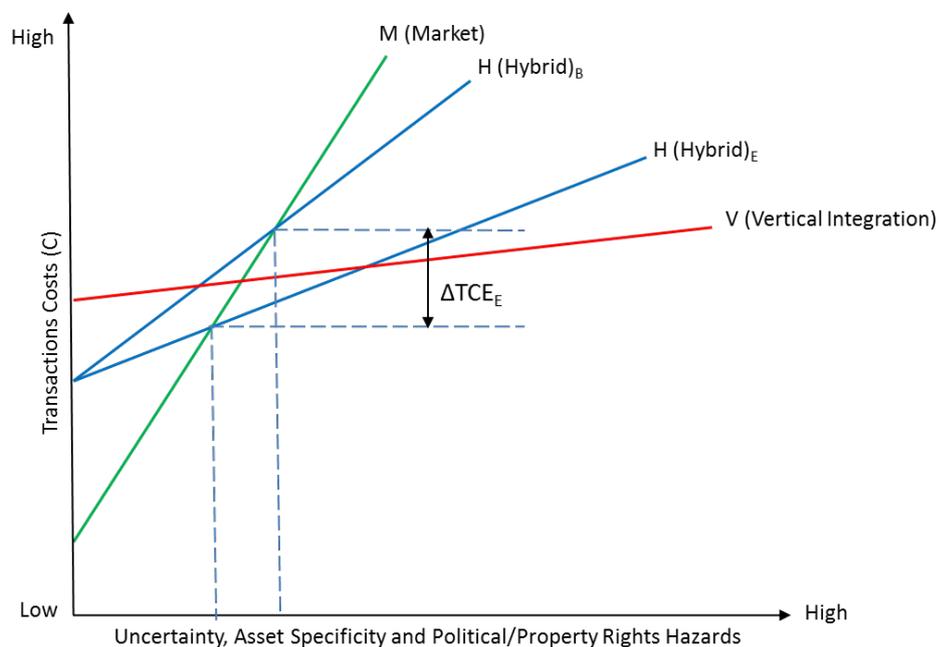
The coalition of TCE and political governance needs to be based on the basic TCE proposition that the client firm must perform the activities they can do best and go to the market for transactions that can be done more cost effectively and efficiently by the market. In Chapter Two, the argument is developed that a coalition of governance mechanisms of the market, vertical integration and hybrid arrangements are required for the successive life cycle phases of a major project. In the case of major international projects, the client firm (e.g. the IOGCs) must handle the transactions subject to political intervention, regulatory issues and high commercial problems.

This will call for the client firm to be responsible for the measures to mitigate the increasing economic demands of the host government, implemented by increased statutory requirements for granting the necessary sanctions for major projects.

Based on the arguments made, the following propositions are used to formulate extensions to the TCE model to predict the governance mechanisms for international transactions:

1. Client firm should be responsible (i.e. vertical integration) for project management, political governance mechanisms, formulating and awarding the engineering, procurement, construction and installation (EPCI) contracts for the major components of the project. This will require higher ‘front end’ loading by the client in countries with non-democratic regimes due to the extra effort and expenses in building relationships and carrying out lobbying of the state authorities.
2. In the case of the transactions subject to adverse host government political intervention or transactions subject to high commercial uncertainty and asset specificity, it would be necessary for the client firm to use hybrid arrangements. This needs to be in the form of joint ventures with the EPCI contractors or local firms. Such hybrid form of governance can be dominated either by the client firm or the contractor, depending on the characteristics of the particular transaction. Dominance and/or direct intervention by the client firm in transactions can be considered to be an indirect form of vertical integration (IVI) required from a TCE perspective to ensure that the resulting hybrid governance was as robust as a pure VI arrangement.
3. Market governance based on standard contracts can be used when the political hazards, uncertainty and asset specificity variables of the transactions are low, known and manageable.

Hence, the need for use of an extended governance arrangement of market, political governance mechanisms and indirect vertical integration for transactions, should be determined on a case by case basis depending on the extent to which the particular transactions are subject to political intervention and property rights hazards. This extended hybrid governance arrangement needs to be introduced at a lower level of asset specificity. The application of this logic leads to the extension of the basic TCE model as illustrated in Figure 4.2 below.



**Notes**

H(Hybrid)<sub>B</sub> =Representation of hybrid governance in basic TCE model

H(Hybrid)<sub>E</sub> =Representation of hybrid governance in extended TCE Model (i.e. political governance, IVI and Market)

**Figure 4.2 - An Extension of TCE Model for International Projects**

In Figure 4.2, the lines M, H and V represent the predictions of the basic TCE model where market governance gives way to a hybrid arrangement and then to vertical integration with increasing uncertainty and asset specificity of the transactions.

The predictions due to the extended TCE model are represented by lines M, H<sub>E</sub> and V, where the line H<sub>E</sub> represents the extended governance arrangement with the requirement

to incorporate political governance and indirect vertical integration mechanisms in the hybrid arrangement. This extended hybrid arrangement represented by  $H_E$  is implemented at a lower level of asset specificity depending on the extent of political and institutional intervention in transactions. In this case,  $\Delta TCE_E$  represents the increase in transaction costs due to the need to extend the TCE model to mitigate the political and property rights hazards.

The extended TCE model thus represents relationships between concepts in areas of study of extremely complex systems dealt with by politics and economics. In such cases, valid hypotheses can rarely be made as an experimental test would be prohibitively expensive or difficult (Sandhursen, 2000). The literature review carried out has demonstrated that research into extending the predictive capabilities of TCE for international transactions subject to intervention by political and legal institutions is very limited (Caballero and Soto-Onate, 2006; Ruester, 2010; Foss and Klein, 2010). In this case, it is necessary to carry out “an exploratory research that tends to tackle new issues on which little or no previous research has been done” (Brown, 2006, p. 45). The exploration of new phenomena in this way may help to ascertain the feasibility of more extensive conclusive research and the best methods to be used. The difference between exploratory and conclusive research is that exploratory studies result in a range of causes and alternative options for a solution to a specific problem, whereas conclusive studies identify the final information and the only solution to an existing research problem (Sandhursen, 2000). The development of exploratory propositions of this research, examined by field investigation, is presented in the next section.

## **4.4 An Exploration of the Extended TCE Model**

### **4.4.1 Exploratory Propositions**

Exploratory research, as the name states, does not aim to provide the final and conclusive answers but is the initial research which forms the basis of more conclusive research. In other words, exploratory research design explores the research propositions, providing the scope and direction for conclusive research which aims to provide final findings for the research problem (Sandhursen, 2000). For this purpose, the research exploratory propositions can be interpreted to be logically conjectured relationships between two or more variables to be examined through an appropriate analysis using industry field investigation (Sekaran, 2000). In the case of this research, the propositions are to examine the applicability of the extended TCE model to predict the governance mechanisms to manage the impacts of political hazards and property rights issues on major international transactions. Thus, the field investigation of this research is an exploration of how different levels of political hazard are handled in international oil and gas production projects, and whether the approach used is consistent with the reasoning of the basic TCE model or whether an extension, as proposed by this research, is justified. Based on the theoretical arguments developed, the exploratory propositions (Ps) for this research are defined as:

P1 – The relative hazards created by behaviour of the host country government and weak institutional regimes will affect governance of project transactions in a non-economising manner. Such non-self-enforcing exchanges cause the firm either to incur higher transaction costs due to the need to implement political governance mechanisms for a given level of asset specificity, or to select higher vertical integration arrangements at lower levels of asset specificity.

P2 – Any adverse state intervention in transactions including increased demand for local content will affect the protection of property rights of the firm. This will require the firm to select governance mechanisms in a non-transaction cost economising way, particularly if there are compelling political requirements to form joint ventures with local firms.

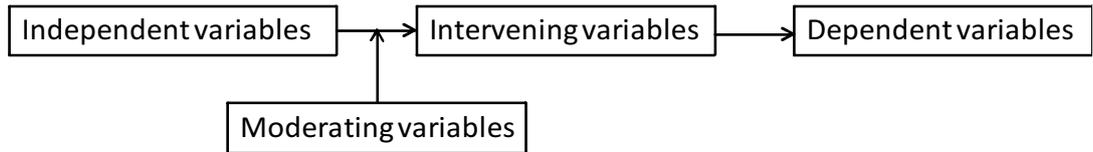
In order to explore these research propositions, model representations of the basic and extended TCE models are formulated and presented in Section 4.4.2. The variables in these models are established based on the contextual issues identified from the review of the literature in earlier chapters. These are:

- The asset specificity, frequency and uncertainties associated with the transaction costs (i.e. characteristics of the transactions).
- The impact of the political intervention in transactions and the strength of the judiciary to protect property rights.
- The mitigating impact of the political governance mechanisms used on the outcome of the project transactions.

The representation of the relationships of the above variables for the TCE model and the extended TCE model are developed in the following sections.

#### **4.4.2 Variables of a Model**

The component variables in a theoretical model can be described as: (i) dependent, (ii) independent, (iii) moderating, and (iv) intervening. The relationship between these four variables is illustrated in Figure 4.3 below.



(Source: Sekaran, 2000)

**Figure 4.3 - Relationship between the component variables of a model**

A dependent variable is one which defines the outcome of the model, and as such is the variable of primary interest as it lends itself as a viable factor for investigation and is influenced by the value of the independent variables. An independent variable will increase or decrease a dependent variable, and as such the variance in the dependent variable is accounted for by the independent variables.

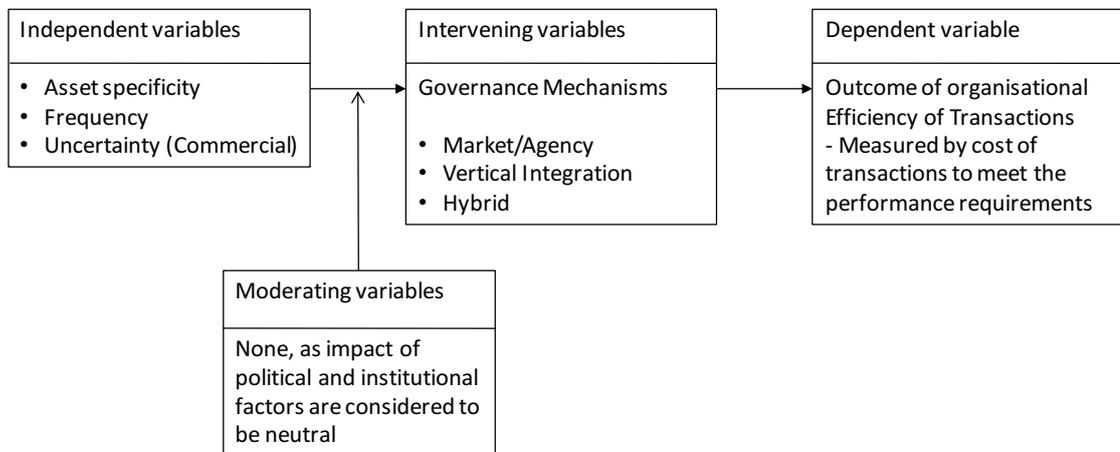
A moderating variable is the one that has a strong contingent effect by modifying the original independent-dependent relationship. Moderating variables include inherent factors that operate in the environment in which the independent-dependent relationship is executed. An intervening variable can be introduced into a model that has a time dimension, and is one that is applicable between the times when the independent variables and moderating variables operate to influence a dependent variable. Thus, the application of an intervening variable can be expected to further influence the final outcome on the value of the dependent variable (Sekaran, 2000).

#### **4.4.3 Variables of the TCE Models**

Transaction cost economics (TCE) proposes that the optimum governance mechanisms must be selected for transactions based on their characteristics. The costs of executing transactions vary based on characteristics of the transaction in question (Williamson, 1981,1996).

Thus, inherent characteristics of uncertainty, frequency and degree of asset specificity particular to the transactions are independent variables. The reason for this is

that these factors are mainly determined by the nature of the project transactions and hence are not within the sphere of control of the firm executing project transactions. The choice of governance mechanisms is the intervening variable, as this choice is made by the firm, normally with the intention of economising on transaction costs. For example, TCE theory suggests that transactions subject to high uncertainties and that occur frequently with requirement for transaction-specific investments will be performed most efficiently by vertical integration. The outcome of the execution performance of the transactions is the dependent variable, represented by cost of managing the transactions (not CAPEX of the project) to complete the project to meet specified performance requirements within an acceptable time schedule. These variables are represented as elements of the basic TCE model in Figure 4.4 below.

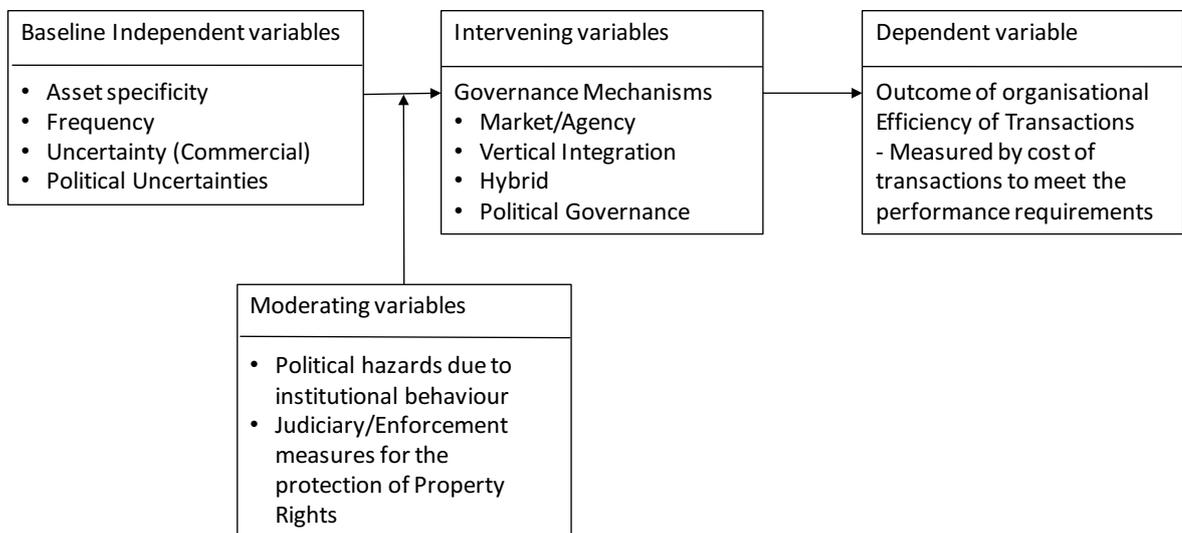


**Figure 4.4 - Variables of the Basic TCE Model**

In the basic TCE model, impact of inherent political context and behaviour of the host country institutions on transactions is considered to be neutral. In this case, the basic TCE governance prediction model has no moderating variables.

In the case of major transactions carried out in a host country with a non-democratic regime, unpredictable political behaviour and a weak judiciary inadequate for the protection of property rights, additional burdens are laid on the transactions.

Hence, these factors due to political and legal contexts of the country where the project transactions are carried out are classed as moderating variables. In this case, an addition to intervening variables of the TCE model will be needed in the form of political governance. This is to mitigate the impact of moderating variables on the independent-dependent variables relationship. The introduction of these moderating variables and an intervening variable lead to the representation of the extended TCE model for prediction of governance mechanisms, as illustrated in Figure 4.5 below.



**Figure 4.5 - Variables of an Extended Model**

To explore the applicability of the extended TCE model based on the research propositions, three case studies were selected to represent the Zones A, B and C of political hazards and protection of property rights spectrum as illustrated in Figure 4.1. These three case studies are major offshore deep water oil and gas projects with similar scope and technical complexities. However, for this comparative analysis each case study represents different ex-ante dimensions of political hazards and enforcement of property rights.

## 4.5 Summary

The argument is developed in this chapter that political governance is required to extend the predictive capabilities of the basic TCE model to mitigate the consequences of the political hazards and property rights issues on major international transactions. The extent of the political governance mechanisms to be implemented will depend on the dimensions and scale of political hazards and strength of property rights protection (i.e. Zones A, B and C in Figure 4.1) that impact the transactions. For this, a theoretical conceptual model was developed for the prediction of the most appropriate governance mechanisms to align with the economic and political characteristics of the international transactions. The outcome was the need for introducing an extended hybrid governance arrangement of market, political governance mechanisms and indirect vertical integration at a lower level of asset specificity, for transactions subject to political intervention and property rights hazards.

Exploratory research propositions were formulated to explore the applicability of the extended TCE model to predict the governance mechanisms for major international projects.

The objective of this research is to formulate the basis of a more conclusive research aimed at providing final findings for the research problem. The field investigation of this exploratory research is a comparative analysis of how different levels of political hazard are handled in international oil and gas production projects, and whether the approach used is consistent with the reasoning of the basic TCE model or whether an extension, as proposed by this research, is justified. The research philosophy, research design and methodology for this exploration are presented in the following chapter.

## Chapter 5 RESEARCH PHILOSOPHY, METHODOLOGY AND DESIGN

### 5.1 Chapter Introduction and Research Philosophy

Most researchers agree that the research questions to be resolved should determine the selection of the paradigm that establishes the research strategy and process to be adopted. The term '*paradigm*' is classified in literature as a philosophical belief that leads and governs an investigation of individuals with regards to their position in the world and the range of possible relationships they have to it and to its parts. The research paradigm or the philosophy employed basically shapes the entire process by providing the direction and principles concerning the approach, methodology and the design for conducting the research (Bryman and Bell, 2007; Sanders *et al.*, 2007). The research philosophy is thus a conviction about the process that should be used for investigating the causes and consequences of a phenomenon and then drawing out conclusions. In this context, the term epistemology is used for what is known to be true in contrast with ontology which is what is believed to be true. The purpose of research, therefore, is the process of converting things *believed* to things *known*; ontology to epistemology.

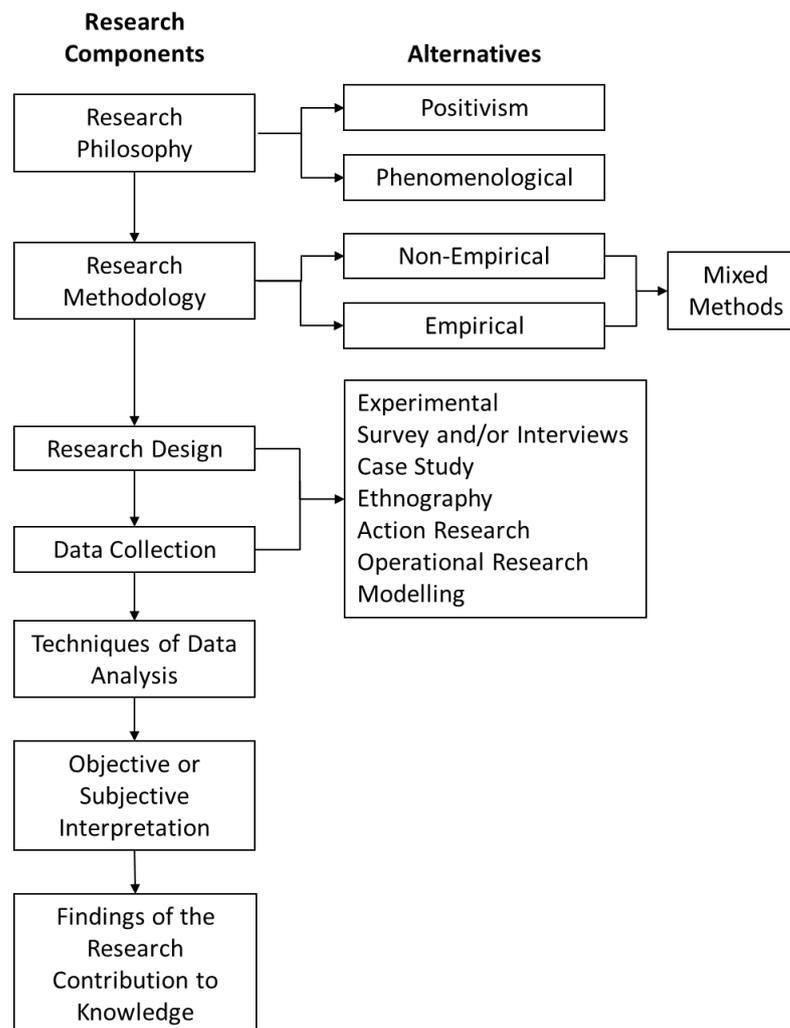
The literature on research methodology and design provides evidence of an extensive and constant debate concerning the best approach. In the main, two approaches have emerged which are defined in the convention as *positivist* (also termed scientific) and *phenomenological* or *interpretivist* (Hussey and Hussey, 1997; Bryman and Bell, 2007). The following general definitions and questions will be used within this chapter to develop the research process:

*Research Methodology* – The process by which the research will be carried out. This will be the centre of the selected research philosophy in order to address the theory, values, cultural protocols and ethics that will inform the methodology.

*Research Design*– The tools that will be used for gathering data and evidence. This will consider the survey measurements, interviews, participant observations and industry (case study) records, all of which will be used to test the research propositions.

This thesis, based on the definitions and the processes advocated by Hussey and Hussey (1997), will conduct the research, for reasons given in this chapter, in a positivist manner using a combination of empirical, non-empirical, qualitative and quantitative methods. This approach allows the process to be considered as applied research. The issues covered by the exploratory propositions to be tested are within the general area of management research and particularly related to governance mechanisms of international transactions.

This chapter reviews the alternative research components and then defines the selection of the research philosophy, methodology and design. Each section will provide a brief justification of the component of the research process and the rationale for the chosen component. The alternative research philosophies, methods and techniques which were reviewed for the purpose of this selection are shown in Figure 5.1.



**Figure 5.1 - The Research Philosophy and the Methodology Selection Process**

### 5.1.1 Formulation of the Research Philosophy

Research into governance mechanisms for major international project transactions subject to political hazards and weak safeguarding of property rights is relatively recent (Acemoglu, 2003; Dixit, 2007). Hence, there could be concern about the validity of the research process used to justify the claim that value has been added to the body of knowledge. As such, the research process used should not be seen as inflexible and solely an objective construct, rather it should be viewed as a framework, the final version of which is determined by the external forces impacting the project transactions (Cresswell and Clark, 2002; Sanders *et al.*, 2007).

There is also extensive acknowledgment that there can be a difference between the methodological approach and the aims formulated at the commencement of a research journey, and those that ultimately materialise. In the quest to reveal the validity and reliability of the collected data and the results offered, it was necessary to critically appraise the actual research process that must be embarked on (Sekaran, 2000). This requires flexibility and as such this research used a blend of quantitative and qualitative research techniques with the intention of evaluating the impact of alternative governance mechanisms on the major project transactions carried out across national boundaries.

Considering the above requirements, an overall research philosophy was established following a review of the primary alternatives, of positivist and the phenomenological schools, and a combination of the two. The works of a number of authors, in highlighting the main strengths, weaknesses and differences between the two alternatives, was used in arriving at a final selection (Sanders, 2002).

Positivists propose that reality is a permanent feature and can be viewed and explained from an objective perspective without impeding on the phenomena being evaluated. They argue that phenomena should be singled out and that observations should be replicated. This often involves manoeuvring reality by changing the values of only one independent variable in order to identify constancy in, and form associations between, certain constituent elements of the phenomena being investigated. In addition, the positivist paradigm, which is rooted in natural science, focuses on using findings of scientific investigations to demonstrate the causes and consequences of events. The positivist school considers that our existence is governed by broad principles and that society and people can be studied scientifically using statistics (Cresswell and Clark, 2002; Leedy and Ormrod, 2005).

On the other hand, the phenomenological philosophy, with its humanistic approach emphasises the importance of gathering overall and qualitative data to explain developments in society.

This offers an interpretivist view to the effect that the social world possesses an uncertain ontological status and the truth is socially formed. This suggests that the best way to understand the social world is from the point of view of the *'Investigated Participant'* that can help in obtaining a full understanding of life and experiences. The study of observable facts in their usual surroundings is key to the interpretivist philosophy, together with the recognition that scientists cannot evade impacting on the phenomena they study. Interpretivists acknowledge that there may be many explanations of reality, but uphold that these interpretations are in themselves a part of the scientific information they are chasing. Interpretivism has a convention that is no less celebrated than that of positivism, nor is it more concise (Sekeran, 2000; Leedy and Ormrod, 2005). The features of these two research philosophies presented in the literature are compared in Table 5.1.

**Table 5.1 - Comparative Analysis of Research Philosophies**

<b>Criterion</b>	<b>Positivist philosophy</b>	<b>Phenomenological philosophy</b>
Basic premise	The world is external and objective.	The world is socially constructed and subjective.
	Observer is independent and makes conclusions on the basis of the data collected.	Observer is part of what is observed and hence may not be independent.
	Science is value-free and objective.	Science is driven by human interests.
Research methodology	Focus on the facts collected.	Focus on the meanings of the events.
	Look for causality and fundamental laws.	Try to understand what is happening.
	Reduce a phenomenon to its simplest elements.	Look at the totality of each situation.
	Formulate hypotheses or exploratory propositions and then test them through field investigations.	Develop ideas through the induction from data.
Preferred methods of evaluation	Formulate concepts so that they can be measured by field investigation data.	Use multiple methods to establish different views of a phenomenon.
Data collection	Take large samples.	Small samples are investigated in depth or over time.

(Source: Easterby-Smith et al., 2002; Sanders et al., 2007)

As is evident from the comparison above, positivism takes a reductionist approach by identifying and simplifying the environment in which variables exist by stripping out some of the complicating features, thereby generating a model that can represent data obtained from field observations (Sekaran, 2000; Sanders et al., 2007).

In contrast, the phenomenologist looks beyond the details to understand the essence working behind the variables in order to construct meaning from them on the understanding that the world is not composed of a single objective reality, but rather a series of multiple realities that should be taken into account holistically.

This results not only in a study of the variables, but also of their context, thus enabling a still-photograph to be taken so that complicated situations may be examined (Remenyi et al., 2002; Sanders et al., 2007).

The literature recognises that positivism and phenomenology can be mixed and matched in the research process, in order to better understand difficult issues and to validate the findings within a single research project (Remenyi et al., 2002; Sanders, 2002). Given the context of the exploratory propositions to be investigated (presented in Chapter Four) it was decided to adopt a positivist approach for this research based on the above comparative analysis. Following this the research methodology and design to be used were investigated.

## **5.2 Research Methodologies and Design**

### **5.2.1 Research Methodologies**

It is usually recognised that the character of scientific research is too varied and as such it is not acceptable to claim an optimum research methodology. In addition, the character of scientific research itself lends to differing classifications and descriptions. The general classification for scientific research methodologies within the social sciences has been the difference between both qualitative and quantitative and empirical and non-

empirical methodologies (Hussey and Hussey, 1997; Easterby-Smith *et al.*, 2002). Miles and Huberman (1984) also stressed the importance of the link between empirical and non-empirical approaches in order to achieve greater validity in the overall results, as well as contributing to theory. Thus, the strategy for gathering evidence is crucial as it determines the methods for collecting and evaluating the relevant data. Consequently, a combination of both non-empirical and empirical approaches has been deemed appropriate for this research for the reasons discussed in the next section. This research selectively used both non-empirical and empirical research approaches.

For instance, the findings of the literature review, which is non-empirical, were used to develop the research exploratory propositions. These propositions were used to structure and execute the empirical research in order to test the applicability of the extended Transactions Cost Economics (TCE) model.

### **5.2.2 Non-Empirical Research Component**

Some research works are dependent entirely on non-empirical methods, and are more usually known as probing and reviewing the existing literature. The starting point of this research is an examination of the pre-existing body of knowledge of previous research and relevant theory concerning governance mechanisms and political economics. This literature review, as the non-empirical research component, has been employed in this research both to develop the research topics and to define the research exploratory propositions, as can be seen in the following chapters:

- The research problem is defined in Chapter One.
- The key academic theories appear in Chapters Two, Three and Four.
- A demonstration of the researcher's knowledge of the subject and the industry for the field enquiry appears in Chapters Two, Three, Four and Six.

- The interaction of the research with earlier available studies is described in Chapters One and Ten.
- An appraisal of the potency and frailty of earlier work, including exclusions and bias perceived in the arguments, appears in Chapters Four and Ten.

Clear referencing to the relevant literature on research issues is provided at the end of each Chapter to enable readers to identify the original work.

### **5.2.3 Empirical Research Component**

In both theory and practice the four classifications of empirical research approaches are employed: Exploratory, Descriptive, Analytical and Predictive. Whatever the purpose of the research, empirical evidence is required and consists of data collected by field investigations or observation or experience. This data collection can consist of several methods, such as case studies, surveys, interviews and discussions (Hussey and Hussey, 1997).

The importance of collecting empirical data by surveillance or experience was also identified by Easterby-Smith et al. (2002), who used the term ‘fieldwork’, which they defined as ‘the study of real organisations or projects’. They also stated that researchers may use a combination of positivist or phenomenological methods. Empirical research, therefore, is dominant in current management research because of the philosophical assumption that evidence based empiricism, as opposed to thought or discourse, will make a greater satisfactory claim to the body of knowledge (Remenyi *et al* 2002). The literature identifies three primary dimensions of empirical research for the collection, analysis of the data and the formulation of the findings in order for conclusions to be drawn from the investigation.

These dimensions which constitute the research design are:

- Qualitative or quantitative.

- Deductive or inductive.
- Subjective or objective.

Due to the interactive character of the issues, these dimensions do not necessarily symbolise simple ‘either/or’ options, rather they should be considered as the degree to which rudiments of each aspect apply to the research process (Sekeran, 2000). Each dimension was reviewed for its particular applicability to this research and the findings are summarised in later sections.

#### **5.2.4 Research Design**

This section summarises the selection of the research design method for the field study undertaken in order to gather and evaluate the data, and provide convincing answers to the research questions posed. Taking into consideration the need for empirical data collection and analysis as an imperative, a selection had to be made as to whether to use a quantitative or qualitative method or a combination of the two methodologies for this research.

Quantitative research approaches, initially developed in the natural sciences and now also accepted in the social sciences, consist of survey methods, interviews, laboratory experiments and the use of mathematical techniques. Qualitative research methods originated in the social sciences in order to make it possible for researchers to study social and cultural occurrences. The qualitative methods include action research and case study research. The data collection methods common to both quantitative and qualitative research include: (a) field surveys, (b) interviews and (c) documentation (Hussey and Hussey, 1997; Cresswell and Clark, 2002). The research design alternatives include methods such as the creation of an experiment or evaluation of case studies. These were reviewed in order to understand their strengths and limitations, and the findings are categorised in Table 5.2.

**Table 5.2 - Research Design Alternatives**

<b>Research Design</b>	<b>Main Features and Application</b>
Experimental	This method is common in pure scientific research and is often used where large volumes of data are involved and quantitative methods of analysis are used to derive the research outcomes.
Surveys and/or Interviews	This method, including questionnaire-based interviews, can be used for social science research and also in pure scientific surveys. It is often employed where data involves quantitative methods of analysis.
Case Study	These can be used to understand social phenomena within a particular setting. They can be built up from several complementary sources of data, including documentation, observations and interviews. This approach, as justified in later sections, best suits this research.
Grounded Theory	This is generated by observations rather than being developed from a review of the literature.
Action Research	The research takes the form of a field experiment, with the participation of the researcher. It is inevitable that it will apply to a certain degree to this study because of the researcher's long-term involvement with the industry.
Operational Research	This evaluates activities and their relationship, often with a particular emphasis on operational efficiency.
Modelling	This represents the relationships between the variables of the phenomenon investigated, where particular models are developed as the focus of the research activity.

(Developed from: Hussey and Hussey, 1997; Leedy and Ormrod, 2005)

The dichotomy of quantitative versus qualitative data as it applies to the research design might not be as incompatible as purists, who support the differentiation of the two approaches, have argued. Studies using mixed-method data gathering have shown that the integration of these traditions within the same study can be seen as complementary. This research seeks to answer questions regarding the governance for the execution of capital projects subject to political hazards. Therefore, it may be considered to be found in the area of social sciences. Consequently, the data collection and analysis were intended to draw some general conclusions on the effectiveness of political governance mechanisms to minimise the consequences of the political hazards on the project execution (Cresswell and Clark, 2002; Leedy and Ormrod, 2005).

Based on the rationale discussed in this and earlier sections, a mixed research design consisting of empirical, non-empirical, qualitative and quantitative methods was adopted. Considering the reasons discussed in the next section, this in turn led to research

design based on case studies and responses to semi-structured interviews used in order to triangulate the findings.

Triangulation, which increases the quality and validity of the results obtained through one method of data collection and analysis, is designed to avoid researcher bias; either through his or her influence on the behaviour of participants or through the conduct of the research. However, it must be admitted that while triangulation reduces bias, it does not totally eliminate it (Yin, 1989; Easterby-Smith *et al.*, 2002). Stake (1995) proposed that the methods that can be used for triangulation include data triangulation from other sources, investigator triangulation through the input of observers (i.e. interview participants) and methodological triangulation by using multiple sample types and sources. Triangulation was used in the analysis of the empirical data in an effort to test the consistency of the case study documentation resulting from different sources involved in the project. As such, it was considered that interviewing industry personnel connected with the case studies would increase the chances of controlling, or at least assessing, potential causes of misinterpretation that can influence the results obtained from the review of the historical documentation (Stake, 1995).

Thus, the decision to conduct semi-structured interviews with professionals and managers involved in the case studies, helped to provide triangulation by correcting errors and reducing uncertainties in the findings from the documentation of the case studies. In this study, data collected from the questionnaire based interviews was also measured using non-parametric statistical analysis, in order to investigate by reduction the impact of PEST uncertainties on major projects and governance mechanisms most suited to manage them. This is discussed in Chapter Ten.

## **5.3 Selection of Research Approach and Design**

### **5.3.1 Rationale for a Case Study Approach**

The case study research approach is defined as an empirical question that examines a modern occurrence within its real life context when the confines between phenomenon and context lack clarity and in which a variety of evidence sources are used. The case study method is deemed as the most suitable approach, when research questions of how and why are raised in formulating management strategy (Yin, 1989,1992). An in-depth assessment of case studies and effective use of the findings is necessary for real improvement in strategic management research. Such is the case with this research, which deals with why enhancements to project governance mechanisms are essential to strategically manage transactions hazards and property rights issues caused by political and economic uncertainties, and how these improvements can be made.

Yin (1989) classified case studies as descriptive, explanatory or exploratory in character. A descriptive case study records a particular action or series of actions, whilst it strives to provide an explanation of the strategy that resulted in a particular action and as such it is an analytical explanatory study. An exploratory study, such as this research, goes a step further in order to provide a rationale for the underpinning strategy. This research may be considered, therefore, to be a combination of all three, as it is a study of how and why particular governance mechanisms have been used for project transactions and how improvements can be achieved.

The case study methodology has a distinct benefit when the researcher has modest or no influence over the research aim and distinguishes it from such strategies as experimental and action research, which demand researcher control or interference (Yin, 1992; Stake, 1995). Several researchers have stressed the advantages that longitudinal research (that conducted over time) has over traditionally focused methods that record

events at a given point. This also allows for the inclusion of operational links and the analysis of corporate project management (Yin, 1992; Sanders et al., 2007). Accordingly, the case study is uniquely suited to examining current events when pertinent actions cannot be influenced, thus allowing a current occurrence to be considered within its real-life circumstance, especially when the confines between observable fact and context are not clearly evident or when multiple bases of evidence are being used within an enquiry.

The explicit importance and amalgamation of a context makes a distinction between the case study method from the experimental and the survey, with the latter seeking to release an occurrence from its context in order to curtail the number of variables to be examined. A further key benefit of the case study method is the precise consideration of related factors and a large number of variables to which other methods may be insensitive to a greater extent (Yin, 1992; Bryman and Bell, 2007). Therefore, due to its comprehensive and versatile nature, as discussed above, the case study is viewed as most appropriate for investigating these multifaceted phenomena, such as the reasons for selecting a particular governance strategy for controlling international transactions in an industry symbolised by high uncertainty and continuous technological transformation (Yin, 1992; Denzin and Lincoln, 2005).

### **5.3.2 Application of the Multiple Case Study Approach with Triangulation**

Selecting the appropriate case study design is most important when using this strategy, due to the effect of the design on the quality of research findings, and it often being influenced by the nature of the investigated phenomenon in relation to the number of units of analysis. Four types of case study design have been proposed: single case (*holistic*), single case (*embedded*), multiple case (*holistic*) and multiple case (*embedded*). In relation to the single case design, it entails the use of one holistic case study, because it involves only one unit of investigation, but if it incorporates more multifaceted subunits,

the case study is deemed to be embedded. However, multiple case designs include several case studies and if they necessitate several holistic cases in which each holistic case contains only one unit of analysis, it is considered holistic. On the other hand, embedded multiple case designs consist of a number of embedded cases with each embedded case including numerous units of analysis. Hence, a case study is termed holistic if only the comprehensive nature of a project is examined, but it is called embedded if it includes numerous units of scrutiny (Yin, 1989, 1992).

Essentially, the single case study design is suitable when the case provides an essential test for conventional theory, the case represents an exceptional or unique event, it is a distinctive or archetypal case, or it provides a longitudinal or revelatory aim. There are two major types of individual studies. In multiple case studies, based on whether single or multiple units of investigations are involved, a pitfall that should be avoided by the researcher is paying too much attention to the subunits, and ignoring the greater holistic features. However, the grounds for using multiple case designs are mainly derived from 'replication logic', where each case study is regarded as a single investigation and the more cases that prove or disprove an existing theory, the more vigorous are the research outcomes.

Hence, '*replication logic*' renders multiple case study designs more compelling and robust, since they are analogous to multiple scientific experiments. However, each case must be carefully selected so that it either predicts similar results (*literal replication*) or produces contrasting results for predictable reasons (*theoretical replication*) (Yin, 1989, 1992). If the findings from an evaluation of all the cases turn out as predicted, then this offers convincing evidence for answering the research questions, but if cases produce contradictory results, then the theoretical propositions should be modified and retested with

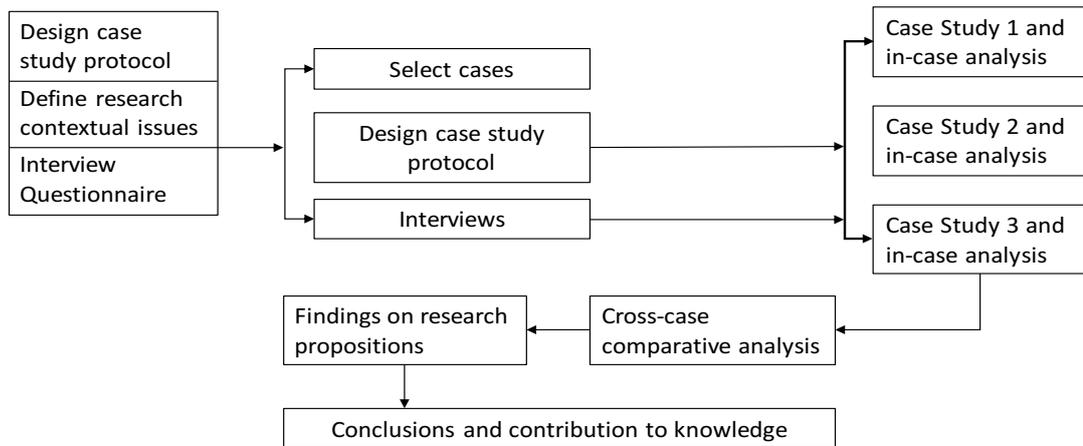
a new set of cases. Accordingly, this approach is a valuable tool to gain insight into how a business deals with complex project transactions.

Multiple cases are more significant and compelling than the single case approach. In addition, triangulation provides the ethical requirement to confirm the validity of a process within a case study, also known as a triangulated research strategy. This approach greatly strengthens the generalisation of the findings which may be achieved by using multiple sources of data and triangulation, which signifies the protocols used to ensure accuracy and alternative justifications (Yin, 1989, 1992; Stake, 1995).

Based on the above literature findings, the conclusion was drawn that the multiple case studies triangulated by industry interview findings would be the most suitable design for this research. In this case the principal aims of this were to mount a series of single investigations in which each study either proves or disproves the exploratory propositions to obtain the most vigorous research outcome possible. This was done using replication logic and triangulation to make the research robust, to take data uncertainties into account as effectively as possible and to reinforce the external validity of the results.

### **5.3.3 Case Study Research Design**

The research design selected actually determined the plan for the process of data gathering, analysis and interpretation (Yin, 1989, 1992). The steps for this process involved (i) clearly defining the exploratory propositions and the research contextual issues and questions (see Chapter Four); (ii) selecting appropriate case studies; (iii) designing case study protocol to include ethical considerations, field procedures and interview questions; (iv) preparing the data collection plan; (v) evaluating the case studies in order to derive empirical findings and preparing the individual case reports, and (vi) carrying out a cross-case comparative analysis to formulate the findings and conclusions. The logical flow of these steps of the research design is illustrated in Figure 5.2.



**Figure 5.2 - The Research Design Process**

(Source: Developed for this research by the author, based on Yin (1989, 1992))

Each case study was considered as an individual investigation providing the freedom to revise the questions being investigated for a particular case study. This approach enabled comprehensive, dependable, valid and precise data to be obtained from the documentation review and the interview process (Sanders et al., 2000). In practice, refinements to the closed questions evolved both during the discussions and when they were prompted by the interviewees' answers to the open questions.

When considering political hazards, semi-structured interviews were used extensively to identify their impact on the project transactions.

### 5.3.4 Case Study Procedure

A case study procedure was devised as follows:-

- Formulation of the objectives of the investigation and issues and topics to be investigated. All the studies were based on major oil and gas projects operating in host countries with varying levels of political and economic uncertainties.
- Field investigations: including obtaining sources for data collection, both qualitative and quantitative, for creating a case study record.

- Case study questions vital to the research were the main focus as they remind the researcher of the data to be collected, and define the interview guideline questions.
- Common format for each case study report for recording the narrative and the findings from the transaction costs economics perspective to support or refute the research exploratory propositions (Yin, 1989, 1992).

The above procedure was used as the basis to carry out a comparative analysis of the three case studies to test the applicability of the research exploratory propositions. The operationalisation of this comparative analysis is presented in the next section.

## **5.4 Comparative Analysis of Case Studies**

### **5.4.1 Analytical Strategy**

As discussed in earlier sections, the research design chosen was multiple case studies triangulated by interview responses with industry personnel. The principle criterion used to select the case studies was that they should be drawn from major projects carried out in host countries where the political context of government intervention and protection of property rights varied (i.e. High/Medium/Low). In this case the selection of the three case studies was made mindful of the need to investigate complex major projects that involved a considerable number of transactions. Additional intricacies of the selected projects arose from their high technological complexities, the large amount of personnel required to execute the project, the significant CAPEX, the lengthy lead times, and the intensity of uncertainty at the start of the project with regards to the expected outcomes due to demanding technical requirements.

Having decided on a comparative multi-case study investigation, the analytical strategy was formulated with the guidance provided within the literature (Yin, 1992; Cresswell and Clark, 2002; Sanders et al., 2007). The first step of this strategy was to

formulate the contextual issues to be analysed and for what reason. This was followed by the collection and evaluation of the data gathered by contextual analysis to derive the findings to answer the research issues.

Finally, the validity of the findings was examined. Formulation of the objectives of the investigation and contextual issues vital to the research were the main focus, as they reminded the researcher of the data to be collected from the project documents and to define the interview questions. The criteria for data gathering were that the data must be directly related to the impact of the variables of the enhanced TCE model on transactions. This was followed by evaluating, classifying, or coding this data in order to test the hypotheses developed. Every effort was made to achieve this in a way that would not create bias in the results.

In the selection of interview participants, purposive sampling was used by the researcher based on his knowledge of the industry and requirements of the investigations (Leedy and Ormrod, 2005). Consequently, the researcher exercised his judgement and experience to 'hand pick' project managers and other project professionals who had intimate knowledge of the projects which were the subject of the case studies. It was deemed that these professionals were most suitable to provide the relevant information to support the data from the project documentation in order to develop the case study narrative. All interviews were transcribed, checked for accuracy and duplicates produced. In an effort to ensure consistency, a common format was used for each case study report for recording the narrative, including the input of the interview responses and for evaluating the findings from the transaction costs economics perspective to support or refute the research propositions (Yin, 1989).

#### **5.4.1.1 Contextual Issues**

The impact of the following variables on the project transactions were defined as the contextual issues for the data gathering:

1. Economic, technological and behavioural uncertainties.
2. Asset specificity of the transactions.
3. Host country political context, including:
  - State intervention in IOGC's project execution arrangements, including the sanctioning of the projects.
  - The behaviour of the host country government and institutions on contract enforcement to safeguard property rights.
  - Increased demand for local content creating the need to form Joint Ventures with local partners.
4. Mitigation measures and contingencies implemented by the IOGC management to complete the project transactions, to cope with the host country's political hazards and property rights issues.
5. The main issues involved in executing project activities with Joint Ventures with host country companies and with EPCI Contractors.

#### **5.4.2 Data Gathering**

The data gathering methods were in line with the guidance provided in the literature, that the case study documentation was the main method complimented by semi-structured interviews. A combination of these was used to constitute an inclusive approach to improving the excellence and soundness of the data by triangulation (Yin, 1992; Sanders et al., 2007; Cresswell and Clark, 2002). For this, data was gathered from an analysis of project documentation and records, including contracts, project kick-off documents, project strategy reports, and monthly progress reports. The details obtained from these projects

and related confidential documents were used to build up the narrative, corroborated by the responses of the interview participants (IPs). This was another reason why triangulation was important for enhancing the validity of the data. The semi-structured interview model was selected in reference to the survey approach and in an effort to triangulate the data gathered from project documents and record analyses. The questionnaire-based semi-structured interviews were held with industry personnel, including senior project managers who have been involved in strategy setting and execution of the FPSO projects in Nigeria, Angola and USA. Consequently, the field investigation consisted of pre-arranged interviews based on a questionnaire (Appendix 1) with industry professionals listed in Table 5.4. The interview questionnaire was discussed with the interview participants to highlight the aim of the study, relevance of each question to the research issues and how the results would be used (in a confidential manner) for the case study evaluations (Stake, 1995; Sanders *et al.*, 2007).

In order to make the responses meaningful and consistent, a contextual analysis classification based on ordinal numbering was used to convert the qualitative data to a form of quantitative data for analysis. This method is justified on the basis that the investigation is a comparative analysis of the case studies and is not an exercise to seek absolute values for the impact of the variables of the enhanced TCE model on transactions.

In research, both quantitative and qualitative analysis uses labelling and coding of the data collected to develop a framework for analysis. In the case of qualitative research, this method needs to be developed as there is no formal system for coding. This leads to the need for content analysis for identifying and specific data coding for each qualitative research. Context analysis enables systematic rule guided text analysis to provide some methodical strength of the quantitative analysis to the qualitative procedure (Mayring, 2000). As such, the context analysis was used in this research with mathematical

aggregation to transform basic qualitative evidence into a form of credible quantitative evidence which provides a framework for structuring and analysing the data (Remenyi et al., 2002). This helped to ensure consistency in the analysis of the responses, as well as what may have been inferred or implied to draw the findings on the contextual issues of the research. In order to utilise the contextual analysis, an ordinal measurement scale of High/Medium/Low was developed using the method for dimensioning of hazard levels presented in Table 1.1 (Chapter One).

This measurement coding is presented in Table 5.3 and was explained to the interview participants (listed in Table 5.4) at the commencement of each interview to maximise the consistency in their responses to the questions.

**Table 5.3 - Measurement of the Impact of Variables on Transactions**

Context of Variable	Dimensioning of Hazard Level		
	Low (with an ordinal scale of 1) Defined as known risks – A priori probability.	Medium (with an ordinal scale of 2) Unknown risks – A statistical probability.	High (with an ordinal scale of 3) Known uncertainty – Subjective Probability
Commercial, Technical and Behavioural Uncertainty	High level of proven trust between participants. Technical and commercial specifications defined to ensure complete contracts.	Potential for opportunistic behaviour of participants. Contracts required to make allowances for technological and behavioural uncertainties and potential commercial problems.	Proven high level of opportunism of participants. Requirement for novel technology. Contracts incomplete due to deficient specifications.
Assets Specificity	Standard design. Not site specific. No limitation of Contractors. Re-deployable.	Significant design work to suit particular application. Re-deployable, with changes.	Specific and sometimes complex design to suit application. Non re-deployable. Limited Contractors with expertise.

Context of Variable	Dimensioning of Hazard Level		
	Low (with an ordinal scale of 1) Defined as known risks – A priori probability.	Medium (with an ordinal scale of 2) Unknown risks – A statistical probability.	High (with an ordinal scale of 3) Known uncertainty – Subjective Probability
Impact of political hazards and opportunistic behaviour of the host government.	Intervention of government limited to well-established regulations. Stable and known political conditions.	No history of opportunistic intervention by government. However, potential for adverse political behaviour due to economic opportunism.	Strategic intervention by government to benefit self-interest. Corrupt practices by institutions. Need to make concession to authorities to progress transactions.
Judicial/enforcement measures for the protection of property rights.	Strong and independent judiciary. Well established legal protection, for the industry.	Established judicial system, may not have been tested by the industry and hence could be unpredictable.	Established legal system but not independent or fair. Costly to obtain redress.

**Table 5.4 - List of Interview Participants (IPs)**

IP	Project/Organisation position held	Experience (years)	Input to relevant case study
1	Project Director, Shell Expro (UK)	>30	Nigeria
2	Project Manager, Shell International	>30	Nigeria
3	Project Manager, Shell International	>30	Nigeria
4	Project Services Manager, Shell Expro (UK)	>25	Nigeria
5	Director, Risk Management, formerly Shell (UK)	>25	Angola
6	HSE & Risk Management, Shell International Ltd	>15	USA
7	Project Risk Manager, TOTAL E&P	>20	Angola
8	Project Services Manager, Total E&P	>25	Angola
9	Academic and Project Management Consultant	>30	USA
10	Ex-Vice President Halliburton Energy Services	>35	USA
11	Project Manager – several IOCs	>35	USA
12	Managing Director, Risk Management Consultants	>30	USA
13	HSE & Risk Manager, TOTAL A.S.	>30	Angola
14	Project Manager, TOTAL A.S.	>25	Angola
15	HSE & Risk Manager, TOTAL A.S.	>25	Angola
16	Risk Management Consultant, TOTAL A.S.	>25	Angola
17	Risk Management Consultant, TOTAL A.S.	>15	Nigeria
18	HSE & Risk Manager, TOTAL A.S.	>25	Angola
19	Project Flow Assurance Manager	>15	Angola
20	Risk Manager – Subsea Seven Limited	>20	USA
21	Director, Risk Management, Consultants	>20	USA
22	Project Manager, Risk Management, Consultants	>20	Nigeria
23	Senior Consultant, Risk Management, Consultants	>10	Angola

IP	Project/Organisation position held	Experience (years)	Input to relevant case study
24	Local Content Management, TOTAL A.S.	>20	Nigeria
25	Director, Risk Management, ARC Consultants	>30	USA
26	Project Assurance Manager, TOTAL A.S.	>30	Nigeria
27	Project Services Manager, TOTAL A.S.	>25	Angola
28	Project Services Manager, Total E&P	>30	Angola
29	Corporate Audit – TOTAL A.S.	>30	Nigeria
30	Project Manager, TOTAL A.S.	>30	Nigeria

IP = Interview Participant identification

The names and other details of the IPs are held by the researcher.

The project cost figures, particularly the increases in costs of project transactions, were extracted from project records but could not be quoted. Instead the estimates of these values confirmed by interview participants were used in the case study analysis to maintain the confidentiality of the organisations.

### 5.4.3 Recording and Analysis of Data

As stated earlier, the data collected from the project documentation was used to develop the narrative of the project transactions subject of the case studies. The responses of the thirty interview participants listed in Table 5.4 were recorded, analysed and used as discussed in this section.

1. Responses from all participants to the closed questions in the questionnaire (Appendix 1) were entered into an Excel spreadsheet using the code High (3) / Medium (2) / Low (1) (reference – Appendix 5). This spreadsheet has the necessary mathematical aggregation formulae built in to convert the responses into the average score of all the respondents to the particular questions. The results are presented in Appendix 2 and were used to draw general conclusions on the impact of the contextual variables, as discussed in Chapters Six and Ten.

2. Summaries of the responses to the open discussion questions were grouped according to the host country of the case study in Appendix 3. These responses were used to support the data collected from the project documentation to develop the narratives of case studies and for formulating the findings (Chapters Seven, Eight and Nine).

Several individuals involved in projects bring together a larger pool of experience, knowledge and creative insights. The synergy of individuals may make the overall quality of the input to the group judgement greater than the sum of the parts. The role of juries, panels and cabinets to make judgements can be seen to be based on this premise (Ferrel, 1985). In this case the logic used is that a number of experts may combine in order to deliver an assessment superior to that which might be attained by merely accepting an individual recommendation. In order to implement this method, the technique of mathematical aggregation can be considered to be the most suitable for combining individual judgements to substitute the quantitative methods (Ferrel, 1985; Goodwin and Wright, 1998). In this context, with ordinal scales such as high, medium and low, it is the order of the values that is important and significant, even though the quantitative difference between each one is not really known (Goodwin and Wright, 1998; Grabisch *et al.*, 2009). For example, as discussed in Chapter Seven and confirmed by the interview responses to closed question E1 (reference -Appendix 2), the relative political hazards in Nigeria are considered very high, but we cannot quantify how much higher than in Angola or the USA. Ordinal scales are thus typically measures of non-numeric concepts like happiness, failures and discomfort.

In this case a credible way to determine central tendency on a set of ordinal data is to use the average value defined in percentage terms from an ordinal set as follows:

$$\text{Average Score} = \frac{\text{Total score of all respondents (30)} \times 100 \%}{\text{Maximum possible score (3) of all respondents (30)} = 30 \times 3 = 90}$$

(Source: Grabisch *et al.*, 2009)

The results for the average score for each interview question are tabulated in Appendix 5.

#### **5.4.4 Techniques for the Comparative Analysis**

In the process of comparative analysis, within-case analysis was the first analysis used for each case study, where written documentation and interview response data were examined in order to identify relationships between variables. Detailed individual case study write-ups were prepared, summarising the history of the transactions and examining the data for matching the research questions and answers against the enhanced TCE conceptual model. This was followed by comparative analysis of all the cases by evaluating, categorising the similarities and differences (in Chapter Ten). The core available analytical techniques for such comparative analysis are pattern-matching, explanation-building, and time series analysis (Yin, 1989).

In this research, the selection of the analytical techniques relied on the theoretical propositions that led to the choice of the comparative analysis of case studies. As such, pattern-matching can be considered to be a very effective strategy for analysis, in comparison with an empirically based predicted and postulated outcome. If the patterns of the findings of the case studies match, the validity of the study would be enhanced, even though the comparison between the predicted and the actual pattern might not possess any quantitative criteria. As patterns begin to emerge, certain evidence may stand out as being in conflict with the patterns. In this case the judgement of the researcher, therefore, is required in the interpretation of the results (Yin, 1989). Explanation-building is considered a form of pattern-matching in which the analysis of the case study is carried out by

building an explanation of the case. Explanation-building is an iterative process that begins with a theoretical statement which is refined and the proposition revised, and then the process repeats itself from the beginning. However, the technique is known to be fraught with problems, one being a loss of focus due to the iterative process and hence it may not be possible for the researcher to continuously bear in mind the direction of the research (Denzin and Lincoln, 2005). Time series analysis is a mathematical technique applicable in experimental analysis, but is not relevant to case study methodology that is based on evaluating events (Hussey and Hussey, 1997). Hence, time series analysis was not considered for this research. As this research is intended to test the theoretical model with empirical evidence from multiple case studies, pattern-matching was considered to be the most suitable analytical technique for examining the findings of the field investigation.

A choice had to be made between deductive and inductive paradigms with which to evaluate the evidence from the comparative analysis and to derive valid findings to answer the research hypotheses posed. Deductive research is a study in which a conceptual and theoretical structure is developed which is then tested by empirical observation. In this case, particular instances are deducted from general influences and hence it is referred to as moving from the general to the particular. By contrast, inductive research is a study in which theory is developed from the observation of empirical reality; thus general inferences are induced from particular instances, which involves moving from individual observations to statements of general patterns (Hussey and Hussey, 1997). Based on these definitions, it was believed that this investigation would use the deductive model, as the conceptual and theoretical structures were developed from a review of the literature and tested against the field evidence derived from the findings of the case studies and interview responses. From the deduction of the evidence, findings and conclusions of the research were formulated and are discussed in Chapter Ten.

#### **5.4.5 Selection of Case Studies**

In order to explore the applicability of the extended TCE model, three case studies were selected to represent the Zones A, B and C of political hazards and protection of property rights spectrum as illustrated in Figure 4.1. These three case studies are based on major offshore deep water oil and gas projects with similar scope and technical complexities. The field investigation was based on evidence collected from the case documentation of these projects, complemented by results of semi-structured interviews with industry project management and technical specialists. These are major oil and gas projects carried out in Nigeria, Angola and United States of America (USA) and are presented in Chapters Seven, Eight and Nine respectively.

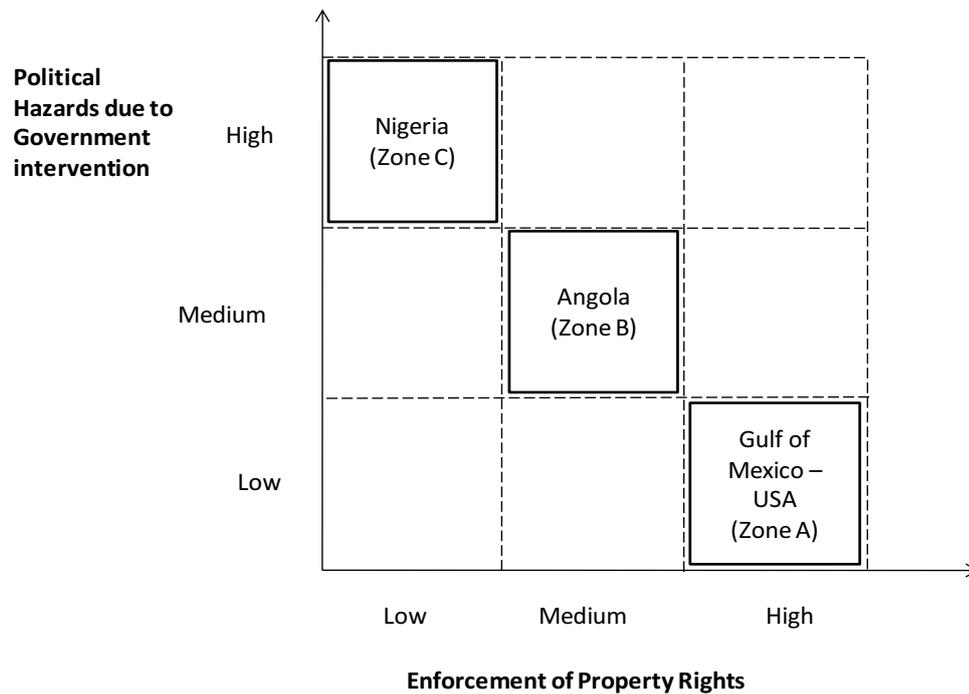
As discussed in these chapters, each case represents different ex-ante dimensions of political hazards and enforcement of property rights. These dimensions for the case studies were identified by evaluation of the data on the political and legal context of these countries presented in the following industry reports:

- Wood Mackenzie Oil and Gas Africa Reports 2009, 2010, 2011, 2012 and 2013.
- KPMG Oil and Gas Reports 2010, 2011 and 2012.

In the case of Nigeria, which had a mature oil and gas production industry, it was found that there was a high level of government intervention with selfish motives mostly in a blatant manner ignoring the constitution. In addition, the judicial institutions did not provide an adequate form of protection of property rights for the foreign investors. Thus this case study can be considered to be transactions carried out in a near authoritarian state, even though elections are held. Two main parties dominate the political arena and each behave in an authoritarian manner when they capture power.

In the case of Angola, oil and gas production became a major industry only in the past fifteen years. Based on the past behaviour of the government towards the relatively young oil and gas industry, the IOGCs expected some degree of self-interested behaviour with stealth on the part of the government but not significant enough to impact the outcome of major project transactions. An established judiciary system is present in Angola, but there have not been any known cases where IOGCs had to resort to legal redress to resolve contractual failures. The host country regime in this case study can be considered to be an authoritarian democracy. On the other end of the spectrum, the USA has the oldest major oil and gas industry in the world. This industry is regulated by government Bills and Statutory Instruments and adverse intervention by the government in major projects is not an issue. The enforcement of property rights is very strong, even though the costs of legal actions if required will be very expensive. In this case study the role of the state can be considered to be neutral.

Taking into consideration the above facts, the ex-ante scaling of political hazards due to host country government intervention and strength of the enforcement of property rights for the case studies selected are as shown in the matrix below in Figure 5.3. The scaling of these parameters as low, medium and high for the case studies are the same as those presented in Figure 4.1. As a result, the Gulf of Mexico USA can be considered as the bench mark case study for the comparative analysis to explore the applicability of the extended TCE model.



**Figure 5.3 - Ex-Ante Dimensioning of Case Studies**

The case studies are presented in Chapters Seven, Eight and Nine.

The generic and common features of major offshore oil and gas projects, their execution and the challenges faced by them, are presented in Chapter Six.

#### **5.4.6 Behavioural and Ethical Considerations**

An important issue connected with the adoption of the research paradigm is the extent to which the researcher is, or can be, subjective or objective.

The traditional assumption is that in science the researcher must maintain complete independence if there is to be any validity in the findings produced. However, the phenomenological research paradigm is, by its very nature, subjective, since it necessarily requires the involvement of the real world-circumstances of the researcher. It is accepted that such an approach requires the recognition of any influence or limitation, as this may have an effect on the conduct or findings of the research. Additionally, phenomenological research inevitably involves subjectivity in its analysis and data interpretation (Miles and Hubermann, 1984; Hussey and Hussey, 1997).

However, this research is based on a positivist philosophy and the researcher, in spite of his long and close association with the oil and gas industry, made every effort to maintain objectivity during the research.

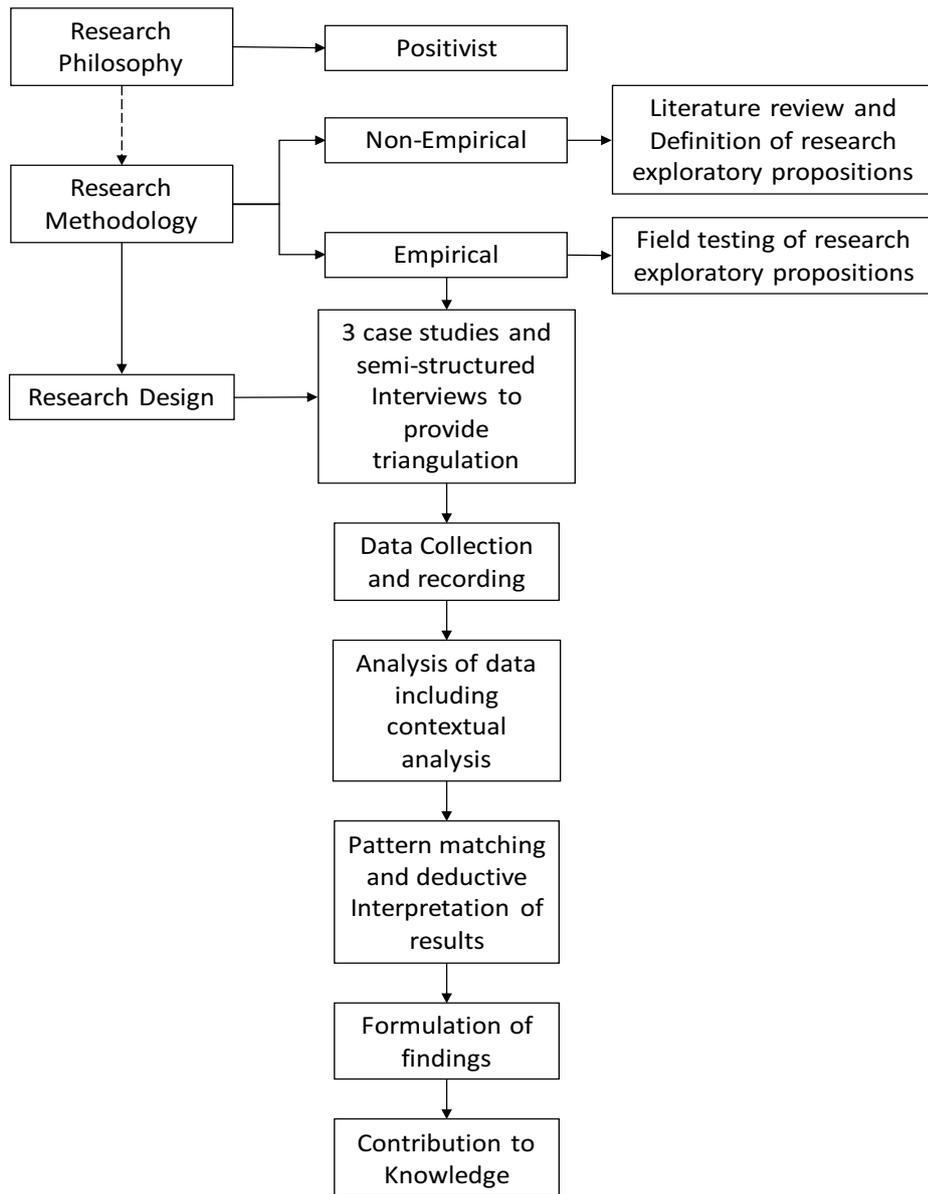
In this research, ethical issues were also taken under consideration and respected, particularly in the data collection and interviews. The most important consideration was to explain to the interview participants in detail about their input to the research and giving them the assurance of complete confidentiality and anonymity. In addition, the researcher explained to the participants about the nature of the research project and how the findings and conclusions would be used to enhance the industry practices, still respecting the confidentiality assurance given to the interview participants. Assurances concerning the right to withdraw from the process at any time, without having to explain the reasons were emphasised. As a result, informed consent was obtained after fully advising participants of the proposed uses of the data, the identity of the researcher and his professional position, the participants' roles, the degree of anonymity and confidentiality, the methods to be employed, and the anticipated length of interviews. Finally, the researcher offered to communicate the findings of the study to the participants within the bounds of established ethical and confidentiality considerations (Miles and Huberman, 1984).

## **5.5 Summary**

This Chapter has explained the alternative research philosophies and methods that were considered for the execution of research and field investigation. It has also explained the justification and logic behind selection of the adopted methods, which were based on a positivist philosophy. The research approach used is multi-method, with a combination of non-empirical method to develop the research propositions and empirical approach to test them.

The empirical approach uses qualitative methods and employs case studies as the primary research strategy. This methodology of using a comparative analysis of multiple case studies was supplemented by interviews with selected industry professionals. This approach provides an exploratory, longitudinal examination through the data gathered from the three case studies. As a result, this approach was considered to be the most credible field investigation choice in order to justify the generalisation of the results. The research is unbiased, in spite of the researcher being heavily involved in the oil and gas E&P industry.

The alternative research philosophies and research methods were reviewed and the options selected for the research process are summarised in Figure 5.4.



**Figure 5.4 – Selection of the Research Philosophy, Methodology and Design**

## **Chapter 6 COMMON FEATURES OF AN OFFSHORE OIL AND GAS DEVELOPMENT**

### **6.1 Introduction and Objectives of the Chapter**

The literature reviews and theoretical arguments made in Chapters One, Two and Three were synthesised and integrated in Chapter Four to develop enhancements to the Transactions Cost Economics (TCE) Theory. This is to manage the challenges of governing high value, complex, industrial projects executed across international borders. The internationalisation of project transactions as discussed in Chapter Three can cause new challenges in the form of potential opportunistic intervention by host governments and inadequate institutional arrangements for the protection of property rights of the organisations responsible for the execution of the project. Exploratory propositions and an extended TCE model based on them were defined as to how the incorporation of political governance mechanisms will impact the predictive outcomes of the basic TCE model to cope with these new challenges.

In order to test the applicability of the exploratory propositions and the extended TCE model, three case studies of major oil and gas projects carried out in different host countries were selected to represent the Zones A, B and C of ex-ante dimensions of political hazards and enforcement of property rights spectrum as illustrated in Figure 4.2. As explained in Section 4.5, these are case studies of projects carried out for Nigeria, Angola and the United States of America (USA) and are presented in Chapters Seven, Eight and Nine respectively.

This Chapter summarises the overall scope, technical features and common practice of the execution of major offshore deep water oil and gas projects. Common risks and uncertainties associated with the execution of these projects which are the subject of the case studies are also examined. This chapter is provided to avoid repetitions within each

case study. The increasing exogenous challenges in the form of political hazards faced by these international projects are also examined.

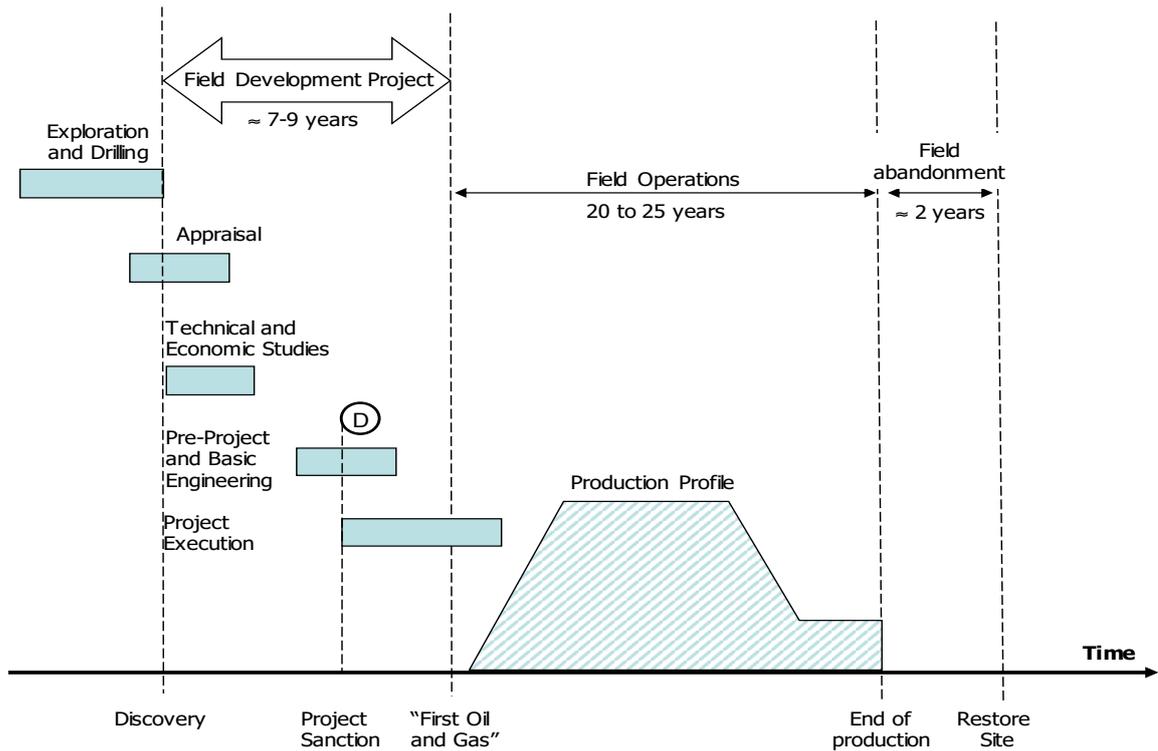
This Chapter has been developed by the researcher from the project execution procedures used by TOTAL A.S. for the offshore oil and gas projects. The researcher has participated as a risk management consultant for the execution of several of these projects. It should be noted that project cost data used are approximate values based on data from typical projects of this nature. Reports from WoodMackenzie, KPMG, published in industry journals and papers presented at annual Offshore Technological Conferences (OTC), are all listed in the References section of this thesis and used to develop this chapter. This is in order to protect the commercial and technical confidentiality associated with the projects presented in the case studies.

The development of an offshore oil and gas field is usually carried out by a joint venture of two or more international oil and gas companies (IOGCs) with the host country national oil company (NOC). The NOC owns the oil and gas reserves on behalf of the host country government. These reserves are leased to IOGCs who conduct the exploration work in order to discover the reserves.

The IOGC with the largest share of the leased reserves is normally appointed the field operator company (FOC) by the partners of the venture. The FOC is responsible for the project execution activities from exploration to achieve first oil and gas and for subsequent production operations. Even though the investment contribution by a NOC is minimal, it has significant authority, acting on behalf of the host government. Hence, NOC has an overriding influence on project transactions, including approving the selection of the main EPCI contractors, which can be termed as a major strategic decision for project execution. The activities of the main phases to operationalise an oil and gas field are:

- 1) The offshore exploration and drilling phase. If oil and gas reserves are discovered in commercially viable quantities, the production and water injection wells are drilled and completed by the drilling contractor on a contract to the FOC.
- 2) The development of the offshore field infrastructure to enable the production of first oil and gas. This phase covers the technical and economic feasibility studies up to sanctioning the project. The planning, preparation and execution of these project phases is made up of successive distinct stages which form the project life cycle. The stages are interconnected and are carried out in a logical process. The main stages of the life cycle are the formulation of the parameters of the project, its basic design, evaluation of the feasibility and execution once the investment decision-making activity has been completed. This is followed by the engineering, fabrication, installation and commissioning of the systems and facilities to produce and transfer hydrocarbons from the wells to the shore (Barlow, 2000; Scott *et al.*, 2012).
- 3) The operation of the field facilities for the production, processing and transport of oil and gas to shore in order to generate the revenue for the project returns.
- 4) Decommissioning of the facilities to abandon the field and restore the site.

The above phases and their typical durations are illustrated in Figure 6.1. The decision point for the sanctioning of the project and the selection of the option for development is indicated by (D) in this figure. The execution transactions required from the decision point 'D' to achieve first oil and gas, i.e. the activities as given in item (2) above define the boundaries of the project for the purpose of this research.



(Source: Developed by Researcher)

**Figure 6.1 - Oil and Gas Field Life Cycle**

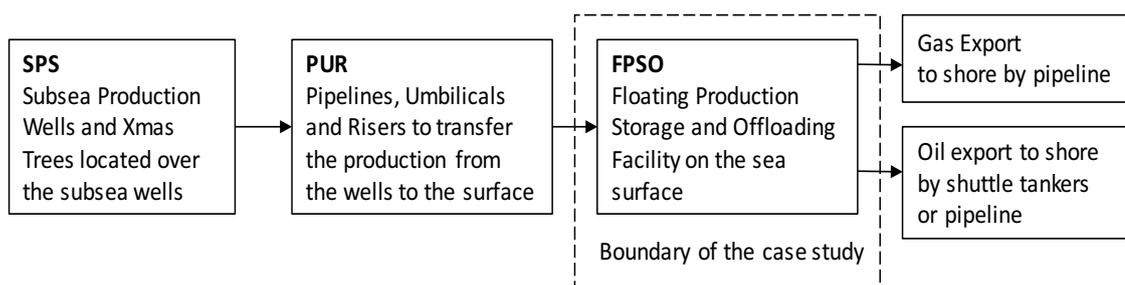
Section 6.2 of this Chapter describes the main components of an offshore project. It describes the scope of the components and highlights the complexities involved. In Section 6.3 the project activities required from the conceptual stage of the project to achieving oil and gas production from the offshore field are described. For this purpose, the steps of the project life cycle are examined to demonstrate how the uncertainty and asset specificity associated with the transactions can vary over the duration of the project execution. Section 6.4 examines how increasing industry and exogenous uncertainties can impact the outcome of project transactions.

## 6.2 Main Components of an Offshore Oil and Gas Development

### 6.2.1 Field Layout

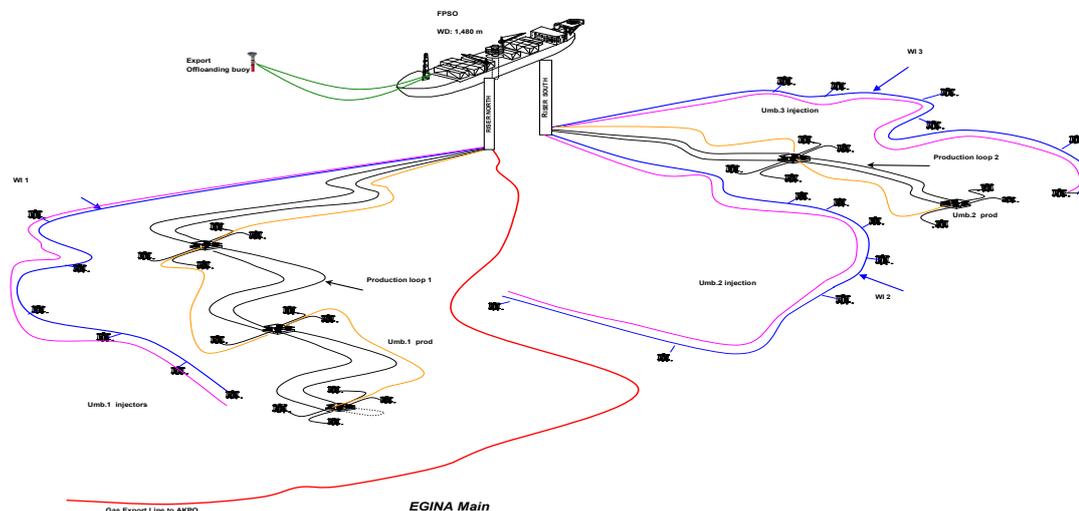
This section summarises the main components of an offshore deep water oil and gas field development using the example of the development of offshore fields Egina South, Egina Main and Preowei fields off Nigeria. This data is presented in order to illustrate the scope, complexity, and the asset specificity nature of such a project. Major offshore deep water oil and gas projects such as the Egina project, which extract, process and transport oil and gas from a deep water offshore field to a land terminal require several interconnected project components after the wells have been drilled (see Figure 6.2). Based on current practices in the industry for project execution and contracting strategy, the development is divided into the following components:

- Subsea production system (SPS) comprising of production wellheads and manifolds.
- Pipelines, umbilicals and risers (PUR) from SPS to a floating production storage and offloading (FPSO) unit.
- The floating production storage and offloading (FPSO) unit contains the hydrocarbon processing facilities. It also contains the facilities for the management of the field operation.
- Tie-ins and transfer of oil and gas export by pipelines to existing onshore refinery facilities.



**Figure 6.2 - The Components of a Deep Water Offshore Project**

The above components are illustrated and described in the following sections in order to appreciate their scale, their capital costs and the extensive engineering construction and installation activities required to operationalise them. The components after completion are installed and integrated offshore to form the infrastructure to extract oil and gas and transfer them to the shore. The overall field layout development project comprising of the above components is illustrated in Figure 6.3.



(Source: Egina Project, TOTAL A.S.)

**Figure 6.3 - An Offshore Integrated Oil and Gas Project**

In the case of the Egina development, as shown in Figure 6.3, the subsea network comprises two production loops connected to five manifolds with four slots to twenty production wells. In addition, there are three water injection lines connected to 19 water injection wells to maintain the pressure in the subsea reservoirs. Table 6.1 provides the typical characteristics of the design basis for an offshore oil and gas field development using the example of the Egina development.

**Table 6.1 - Egina Design Basis**

Water depth at FPSO location	1480m
Water depth range over production site	1150 – 1750 m
Oil and gas Producer Wells	10
Water Injection Wells	19
FPSO Total Fluids Rate (Capacity)	420 kbd
FPSO Oil Rate (Capacity)	208 kbopd (200 kbopd at plateau)
FPSO Gas Processing Capacity	9.2 MSm <sup>3</sup> /d
FPSO Crude Oil Storage Capacity	2,300,000 bbls
FPSO Dimensions – Length x Width x Depth	320 metres x 62 metres x 27 metres

The components of oil and gas field development illustrated are described in the following sections in order to appreciate their scale, their capital costs, and the extensive engineering construction and installation activities required to operationalise them. The completed components after completion are installed and integrated offshore to form the infrastructure to extract oil and gas and transfer them to the shore. The project transactions required to convert the basic engineering into an operational FPSO constitutes the scope of the three case studies.

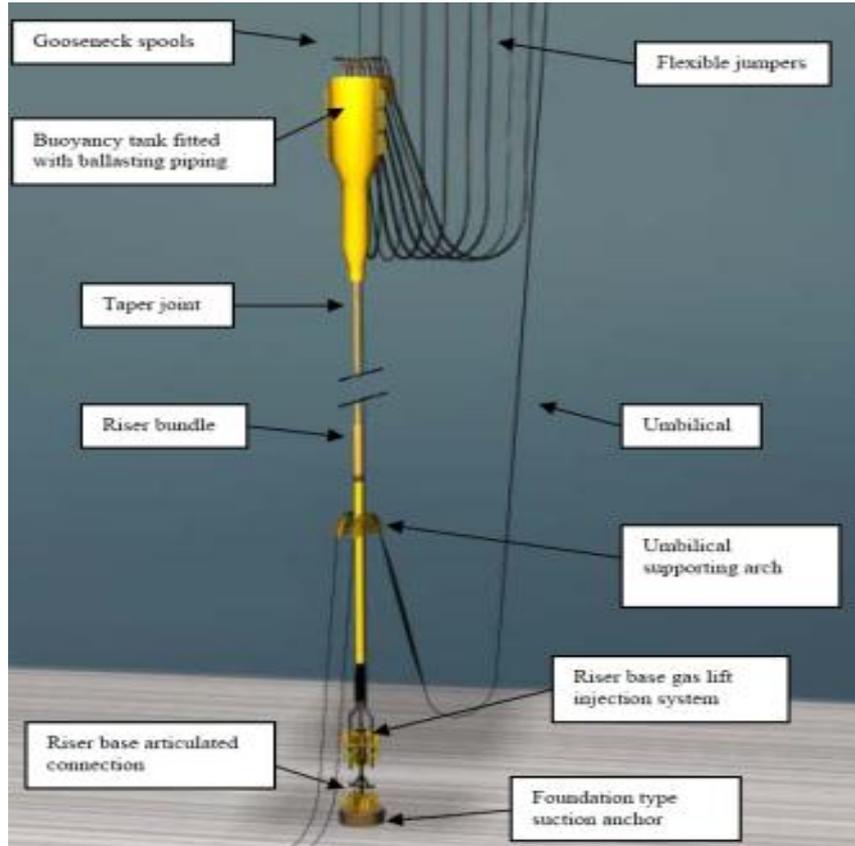
### **6.2.2 Subsea Production Systems (SPS)**

The SPS network is composed of drilling centres with hydrocarbon production and water injection wells. Wells are drilled into the subsea reservoirs with oil and gas reserves and are ‘completed’ on the sea bed by ‘Xmas trees’ and associated control systems to manage the production flow of hydrocarbons. In the case of the Egina development, the subsea network comprises two production loops connected to five manifolds with four slots to 20 production wells. In addition, there are 19 water injection wells to maintain the pressure in the subsea reservoirs. The components of the SPS system are, in most cases, standard items. Any technical variations due to particular site conditions can be managed by technical specifications. The contracts for these items are normally of the frame

agreement type and the transactions are managed by market arrangements. Hence the technical and commercial risks associated with the SPS are mostly known and considered to be manageable by contractual arrangements.

### **6.2.3 Pipelines, Umbilicals and Risers (PURs)**

PURs (as shown in Figure 6.4) are installed for the transfer of production fluids and water injection water between the subsea wells and surface production facility, the FPSO. The PUR package has inherently complex technical and manufacturing issues due to the technical challenges of deep water operations. These challenges are flow assurance issues due to the formation of hydrates in the pipelines, and the stringent design and fabrication issues to be resolved to meet the required performance. Hence, the design of the PUR package components and their method of manufacture have to be completely site specific, and several technical uncertainties have to be managed to ensure the correct functioning of the PUR systems to ensure assurance of the hydrocarbon flow. In addition, the EPCI contractors capable of handling the design, fabrication and installation of the PUR are limited to three or four, which can cause commercial challenges.



**Figure 6.4 - Pipelines, Umbilicals and Risers**

The cost of the PUR package for a deep water project can be expected to be in the region of US \$3.0 to \$3.5 billion.

#### **6.2.4 Floating Production Storage Offloading (FPSO) Unit**

The surface production FPSO installation is a ship-like unit with topsides and a hull (see Figure 6.5). It is moored to the seabed by a spread moored arrangement.



**Figure 6.5 - A Typical FPSO of 200,000 BPD Processing Capacity**

The FPSO unit contains all the utilities and processing equipment required for processing the hydrocarbon flow directed from the wells. The hydrocarbon flow is separated into oil, gas and water streams by the process systems. The facilities for this include gas/liquid separation, gas compression, gas lifting, oil metering and a flare tower. These are located on the topside of the FPSO unit above the main and hull decks. Stabilised oil from the separation process is stored in the FPSO unit storage tanks within the hull. The hull also contains water ballast tanks, machinery spaces, and equipment for mooring the FPSO unit to the seabed. The water produced is treated and re-injected into the reservoir. An accommodation block on the FPSO unit is provided for the personnel working and living on board, which can be up to 300 persons. The FPSO unit design, particularly the topside process facilities and its mooring arrangement, are highly site specific and there will be design variations and uncertainties depending upon the

production capacities. In addition, the number of construction contractors for large FPSO units are limited due to the size of the FPSO hull.

An offshore oil terminal (OTT) system with moorings is located at a minimum distance of one nautical mile from the FPSO unit. Oil offloading lines are installed to transfer oil from the FPSO unit to the OTT. The oil is transferred from this OTT to shuttle tankers, which will then take the oil ashore. Alternatively, a subsea pipeline from the FPSO to the shore can be used for this purpose. Produced gas is partly used as fuel gas for the gas turbine driven power generation units (normally about 80 MW total capacity) on the FPSO unit. The major part of the produced gas is exported through a pipeline system to an onshore terminal for refining. The cost of a FPSO for a deep water project can be expected to be in the region of US \$4 to \$5 billion.

### **6.3 Project Execution and Contractual Hazards**

#### **6.3.1 Project Execution Activities**

The strategy formulation, preparation and execution of a project comprises several distinct stages, commonly collectively referred to as the project life cycle. The concept of the project life cycle is very important in both theory and practice to understand how projects are executed and to identify causes of project failures. Current practice for the execution of an offshore oil and gas project is to split the scope into the following major components or ‘packages’ for the purpose of engineering, procurement, construction and installation (EPCI) (Barlow, 1997; Olsen, 2005):

- SPS – installation of wellheads and manifolds;
- PUR from SPS to FPSO unit;
- FPSO and associated mooring system; and
- Tie-ins and transfer of oil and gas export to existing onshore facilities.

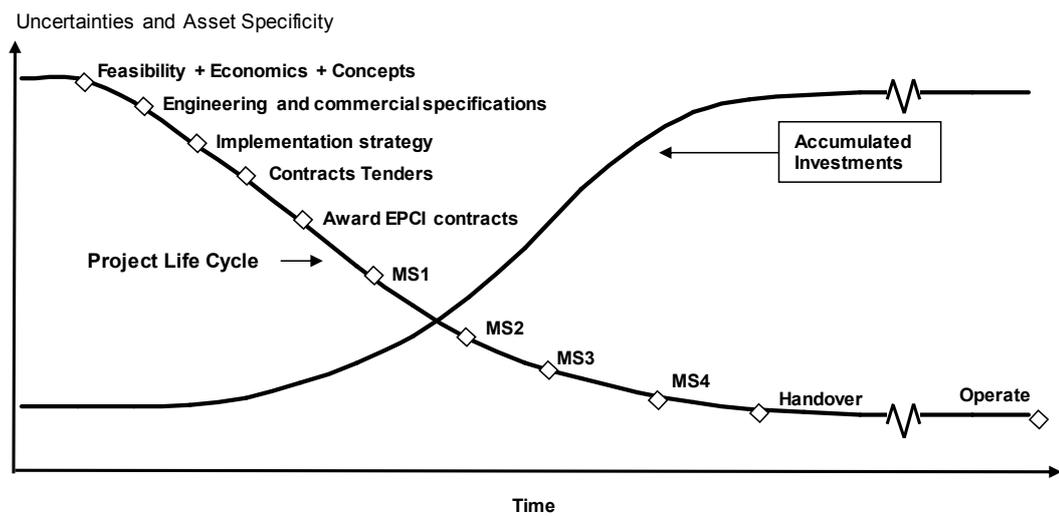
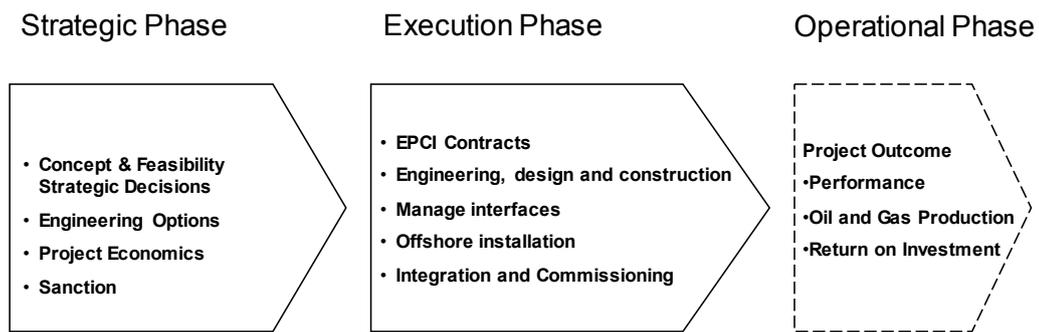
Standard practice in the Oil and Gas E&P Industry is to use the market arrangements and parcel out the management and execution of EPCI of the above major project components to major EPCI contractors (Olsen et al., 2005). This approach is in line with the core competence philosophy that has underlined much modern management thinking (Porter, 1985). In this case the belief is that firms differ substantially in terms of resource-endowment and capability and firms apply the principles of competitive advantage to their business. It is a case of those players most suited to undertake an activity undertake it. Within this model, the large oil and gas companies are focussed on overseeing the EPCI contractors to carry out the engineering and construction activities, using the principle of Agency Theory (Eisenhardt, 1989).

If the oil and gas companies are sufficiently diligent prior to the signing of any agreements, then the types of contracts necessary to exercise effective control can be put in place. In this situation the glue that has held these transactions together was the use of contracts as the main governance method. Drawing up contracts for the major components of the international projects has now become extremely challenging because their execution involves relationship of contracts between the EPCI Contractor, the national government and the client organisation (Olsen *et al.*, 2005). There might be difficulties for the client organisations such as managing and monitoring the performance of a large array of autonomous actors who are involved in major projects (Emery and Trist, 1971). However, in spite of well-set objectives and diligently planned project execution activities, some project transactions fail to meet their objectives (Morrow, 2012).

As discussed, major projects are composed of main EPCI contracts and each of these contracts will have several subsets of transactions. The characteristics of frequency of ordering, asset specificity and uncertainty of these transactions can vary over the project execution phases (Olsen *et al.*, 2005). The literature suggests that as the project progresses

through the successive stages of the life cycle, commercial and technological uncertainties are reduced. The argument for this, which is backed by industry experience, is that as more data becomes available, technical and commercial issues are progressively resolved and compliance is achieved with approval requirements of the regulatory authorities (Winch, 2002, 2008; Olsen *et al.*, 2005). In the same way, some of the smaller components which are not project specific can be redeployed if required and the multiple dependency between the participants become less, resulting in the asset specificity of such components decreasing over time (McKenna *et al.*, 2005).

A framework has been developed by the researcher using the concept of dynamic uncertainty and reducing asset specificity over the life cycle as discussed above. This framework, as illustrated in Figure 6.5 is based on the logic that technical and commercial uncertainties decrease as the required knowledge and data to execute the project activities increase over time. In this case, the area to the left of the s-curve highlights the data still to be acquired, i.e. uncertainty, whilst that to the right reflects what is known, i.e. certainty. The relative level of uncertainty at any particular point in the project life cycle may be thought of as the level of dynamic uncertainty on the project (Miller and Lesard, 2000; Winch, 2002, 2008; Chapman and Ward, 2003, Ward and Chapman, 2003).



**Notes:**

**EPIIC = Engineering, Procurement, Installation and Commissioning of Project Components**

**MS1 = Engineering Phase**

**MS2 = Construction Phase**

**MS3 = Installation Phase**

**MS4 = Commissioning**

**Figure 6.6 - Variation of Uncertainty and Asset Specificity over Project Life Cycle**

In Figure 6.6, the strategic phase activities include the engineering and economic feasibility studies, project scope definition, formulation of project execution strategy and sanction.

This is followed by the execution phase of contracts for engineering, procurement, construction and installation (EPCI) of the major components. In this phase the activities can be subject to uncertainties due to incomplete data on technical and commercial issues. When the EPCI contracts for main components are executed, data is still incomplete and the parties have to deal with known risks and some uncertainties. The asset specificity of

the transactions will vary according to the specification and function of the component in the overall project infrastructure. A demonstration of this is provided in Section 6.3.2. During this execution phase, it may be possible for some project components and services to be specified to take into account the known and quantifiable uncertainties (Olsen et al., 2005).

After the completion of the construction phase, the FPSO is towed to the offshore site and moored. The SPS and UFL components are transported to the offshore site and installed. The interconnections between the FPSO, UFL and SPS components are made to form an integrated system by contractors commissioned by the IOGC. Finally commissioning and start up activities are completed to achieve ‘first oil and gas’ by FOC’s operations personnel. The execution of the EPCI contracts as explained above is summarised in Table 6.2.

**Table 6.2 - Execution of Project Components**

<b>Project Component</b>	<b>Activity</b>	<b>Location of Activity</b>	<b>Schedule</b>
FPSO	Detailed Engineering (MS1)	Europe	4 years
SPS and PUR	Detailed Engineering (MS1)	Europe	2 years
FPSO hull	Fabrication and Construction (MS2)	South Korea	2 years
FPSO topside modules	Fabrication and Construction (MS2)	South Korea or other locations including home country	3 years
FPSO integration of topside modules and hull	Fabrication and Construction (MS2)	Normally South Korea	1 year
SPS	Fabrication (MS2)	Europe	2 years
PUR	Fabrication and Construction (MS2)	Europe and home country	3 years
SPS, PUR and FPSO unit	Offshore installation and commissioning (MS3 and MS4)	Offshore site	1 year

In all cases the project management, liaison with the host government and monitoring of the EPCI contractor’s performance are normally carried out by the IOGC’s project management teams based in all locations where the project activities are being carried out. The variation of the uncertainties and asset specificities of the above transactions over the project execution phase, as discussed earlier, provides justification for

the selective use of governance mechanisms as proposed in Chapter Two. However, progressive reduction in uncertainty may not apply to unpredictability caused by political factors in the host country where the project transactions are carried out.

### **6.3.2 Contractual Hazards and Governance**

The above project execution activities face several commercial and technical hazards that depend on a number of factors such as the extent to which the features of the project transactions are similar to previous ventures and the extent of the requirement for novel technologies to solve new problems (Williams, 1997; Atkinson et al., 2006). At the initial stages project decisions have to be made on the execution strategy and the governance methods for the necessary transactions. Also, the choice of the mode of governance for the project transactions has to take into account the hazards associated with the venture, by considering possible alternative scenarios (Winch, 2008; Scott et al., 2012).

The high uncertainty and asset specificity associated with these project transactions, and the traditional practice of ‘turn-key’ contracts are vulnerable to delays because neither party can foresee all the future contingencies that may arise and hence the contracts are not sufficiently comprehensive and must be amended, causing further delay (Mintzberg, 1994; Scott et al., 2012).

In addition, the contracts for the engineering, procurement, construction and installation (EPCI) are of about three to four years’ duration and need to allow for the technical and commercial complexities associated with such ventures. In such cases the EPCI contracts can be incomplete as the scope and extent of allowances to cover for technical complexities and their consequences cannot be adequately quantified using historical data as the data can be significantly different between major projects. An outcome of these shortcomings can be the difficulties in defining technical specifications

and operational requirements with sufficient accuracy as often the novel technology may be required for the operation of these major projects.

As discussed in Chapters One, Two and Three, these execution difficulties can be compounded for international transactions. This was found to be due to the high levels of political behavioural uncertainty and the pressure from host countries to increase local content (see Chapters Three and Four). As such, there are significant increases in the political hazards and resultant economic uncertainties that threaten successful execution (Scott *et al.*, 2012). These issues can be compounded if inappropriate management and governance arrangements are used (Alchian and Demsetz, 1972; McKenna *et al.*, 2005; Mullins, 2013). The governance mechanisms represented in the literature differ in their approach to managing economic and commercial transactions (Hart, 1988). As the objective of the research is to extend the TCE model to predict governance mechanisms to manage host country political hazards, the focus must be on the transactions most subject to such hazards.

In this context, the transactions for the FPSO compared to other transactions are the most vulnerable to host country political hazards. This is because FPSO transactions are the most visible revenue generation activities with the potential for highest local content. As an industry project manager (IP11) stated “*All other components of the production infrastructure are under water and are not seen by the beady eyes*”.

Before venturing on to the political hazards, the governance mechanisms that would be predicted by the basic TCE model to manage the EPCI activities for the FPSO are evaluated. For this the components of the FPSO and activities to complete them are defined. The commercial uncertainties and asset specificities associated with these components/activities for a FPSO are then determined from the records of similar projects, provided by the interview participants.

Then the predictions of the basic TCE model are used to select the most economising governance mechanisms, (i.e. Market, Hybrid or Vertical Integration) for the sub-transaction of each FPSO component. The outcome is presented in Table 6.3.

**Table 6.3 - Prediction of Basic TCE Model**

Transactions/ Components	Activities	Location	Asset Specificity	Uncertainties (PEST)	Basic TCE Governance Model
FPSO Engineering and Design to define the technical requirements	ED	E	High	High	VI
Hull Tanks and Machinery	DD	SK	Low	Low	MA
	FC	SK	Low	Low	MA
Topsides Main Process Systems	DD	SK	High	High	Hyb1
	FC	SK	Medium	Medium	MA
Topside Utilities and Power Generation	DD	SK	Medium	Medium	MA
	FC	SK	Low	Low	MA
Flare Tower	DD	HOS	Low	Low	MA
	FC	HOS	Low	Low	MA
Minor Utilities	DD	HOS	Low	Low	MA
	FC	HOS	Low	Low	MA
Risers and Manifolds	DD	SK	Medium	Medium	Hyb2
	FC	SK	Medium	Medium	Hyb2
Accommodation Block	DD	SK	Low	Low	MA
	FC	SK	Low	Low	MA
FPSO Integration	DD	SK	Med	Med	Hyb2
	FC	SK	Med	Med	Hyb2
FPSO Mooring	DD	E	High	High	Hyb1
	FC	SK	Medium	Medium	Hyb1
Oil Export Buoy	DD	SK	Medium	Medium	Hyb1
	FC	SK	Low	Low	MA
Offshore Installation and Integration	DD	SK	Medium	Medium	Hyb2
	IN	OFF	Medium	Medium	Hyb2
Offshore Commissioning	DD	EU	High	High	VI
	COM	OFF	High	High	VI

**Notes:**

**Activities**

- ED = Engineering and design before award of contracts for detailed design and fabrication
- FC = Fabrication and construction
- DD = Detailed design
- IN = Installation of the unit offshore
- COM = Commissioning of the installation offshore

**Governance Mechanisms**

- MA = Market
- VI = Vertical Integration/Hierarchy
- Hyb 1 = Joint Venture – Hybrid with IOC dominance
- Hyb 2 = Joint Venture – Hybrid with EPCI dominance

**Locations**

- EU = Europe
- SK = South Korea
- HOS = Home Country (Onshore/Dry docks)
- OFF = Offshore

In the next section the increasing exogenous challenges facing the oil and gas international projects are examined. This is as a prelude to the field investigation using three case studies and industry interviews to test the applicability of the extended TCE model.

## **6.4 Main Hazards Facing an Offshore Oil and Gas Project**

### **6.4.1 The Project Risk Management**

In Chapter One it was discussed that the execution of major project transactions can be subjected to various levels of risks and uncertainties associated with the political, economic, sociological and technological (PEST) hazards (Barlow, 2000; Olsen *et al.*, 2005). In several cases these hazards faced by the transactions cannot be avoided, but instead they must be identified and managed. Thus the uncertainties and risks associated with the transactions, and the cost of managing them, must be taken into consideration in the selection of governance arrangements for the project execution activities, i.e. market or vertical integration or hybrid options.

The oil and gas industry invests heavily in understanding, researching and evaluating the nature of the risks they face in project transactions. They resort to extensive use of decision analysis and risk management techniques (MacMillan, 2000). However, this does not seem to work, or works imperfectly, which poses the question of whether this failure is because of a lack of skill at assessing risk and uncertainty, or whether there is a more fundamental issue. Research indicates that, in the case of oil and gas projects, risks are managed quite well, but uncertainty is not (Chapman and Ward, 2003; Olsen *et al.*, 2005).

This thesis is developed on the proposition that there are conceptual and practical differences between impacts of uncertainties and risks and the way they have to be

managed by appropriate governance modes. Thus a distinction needs to be drawn between risk and uncertainties facing major international oil and gas projects, which are the case studies for the research field investigation (see Chapter Five).

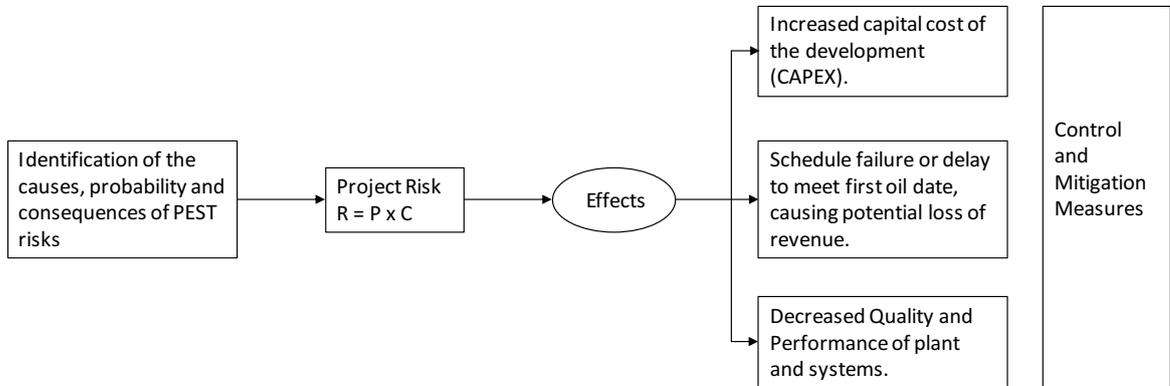
For this purpose, the main technical and economic risks which are common to the three projects and subject of the case studies are identified and discussed in the next section. Then in the following sections, the main exogenous uncertainties facing the international oil and gas industry are examined. These uncertainties, as discussed later, are mainly due to the host country political context and can be considered to be applicable in varying degrees to the three case studies.

#### **6.4.2 Project Risk Management (PRM)**

Project risk is defined as an event or situation which will have a detrimental effect on the schedule, cost (CAPEX) performance of the outcome and revenue objectives of a project. Each risk is characterised by its probability of occurrence (P) and its potential consequences (C) on a project's transaction. The industry project risk management (PRM) process is normally implemented in the following steps for each major project contract or transaction (MacMillan, 2000). The process is executed by brainstorming sessions to capture the knowledge of individuals who have a close involvement with offshore oil and gas projects and also the documented evidence from other such projects, by using the experience of other such projects:

- The identification of causes and occurrence of risks.
- Evaluation, including sensitivity analysis of the consequences of identified risks.
- Identification of risk reduction measures to be specified in the project management procedures and contracts.

The above formal project risk management procedure is carried out for projects as per the process presented in Figure 6.7 (Barlow, 2000; Winch, 2002,2008).



(Source: Barlow, 2000 and Winch, 2002)

**Figure 6.7 - The Project Risk Management Process**

The causes of PEST hazards are:

P = Political, including legal and statutory issues.

E = Economic, including commercial threats.

S = Sociological, including cultural and environmental issues.

T = Technological, including logistics, communication and quality.

Risk control and mitigation measures identified are included into contracts to prevent cost or schedule overruns. The main risks, their consequences and measures to mitigate the consequences of a major FPSO project identified by the Risk Management Process facilitated by the researcher are summarised in Table 6.4.

**Table 6.4 - The Outcome of the RMP for a FPSO Project**

Main Risks	Consequence and Impact	Mitigation Measures
FPSO hull construction slot needs to be secured in a very competitive market. The FPSO manufacturing, at present monopolised by four international marine construction companies in South Korea.	Shortage of fabrication capacity and limitations in engineering can cause escalation of FPSO CAPEX costs. This can also cause problems of delay in the fabrication and construction activities.	Stringent contractual clause and technical specifications need to be included in the contracts to minimise CAPEX cost increases and delays. Engineering of critical FPSO systems to be handled by FOC.

<b>Main Risks</b>	<b>Consequence and Impact</b>	<b>Mitigation Measures</b>
Interfaces between FPSO topsides and hull storage tanks are complex and require careful management, as these two components are normally constructed in different yards.	Performance of FPSO production systems can be impacted. Issues of delay, due to remedial measures to be implemented offshore.	Stringent technical specifications included in the contract to prevent loss of performance and CAPEX cost increases. Engineering of interfaces between the topsides interface engineering between the topsides and hull to be undertaken by the FOC.
Technical interfaces between FPSO unit and PUR components may fail. In addition, hydrocarbon flow assurance issues associated with low reservoir temperature and high water depth need to be resolved before finalising design.	Technical issues causing loss of performance of the FPSO unit and PUR.	Technical specifications included in the contract to prevent loss of performance and CAPEX cost increases. Interface engineering to be undertaken by the FOC. Use of the existing and increasing worldwide experience to mitigate the risks associated with deep water reservoirs. Flow assurance engineering undertaken by the FOC.
Failure of engineering and design work to meet the required stringent specifications.	A major challenge faced by the project is that the design work will only be seen to be correct once the installation of the FPSO is complete. Hence, the FOC's commissioning logistics of 70% onshore and 30% offshore may turn out to be extremely costly if the quality of the design and construction activities is defective. Offshore remedial work can take three times as long due to the logistical issues of the limitation of facilities and technical expertise.	Increased FOC guidance for the engineering and design to achieve a fit for purpose design in the first place.

(Source: RMP outcome table prepared by Researcher for a TOTAL A.S. FPSO project)

The data presented in Table 6.4 is equally applicable to all three case studies, which are offshore oil and gas projects with similar technical characteristics. The above findings on the main risks faced by FPSO projects and their consequences dictate that the complex transactions that can significantly impact the project outcome must be directed by the FOC.

### **6.4.3 Challenges to Oil and Gas Industry Projects**

Having identified the main inherent technical risks faced by major international deep water FPSO projects, the attention now turns to the exogenous challenges faced by them, particularly due to the political context.

The major oil and gas industry projects represent large capital expenditure and long duration execution activities required to be carried out under conditions of extreme uncertainty due to the new challenges facing the industry (McKenna et al., 2005; Atrill, 2000). A main cause of this is the reduction in the new major oil and gas projects in traditional production regions in the United States and the North Sea between 2000 and 2009. This has been replaced by increased activities and new projects in frontier deep water areas such as offshore of West Africa and the Asia-Pacific region. The investments in these areas grew at rates ranging from 25 to 40 percent in 2000 to 2010 (KPMG Report, 2012, 2013; Wood Mackenzie, 2012).

Managing transactions in these frontier regions presents new challenges to the IOGCs as the behaviour of host governments in these countries can often be unpredictable with adverse consequences. This will in turn impact on project transactions and can lead to significant schedule delays and capital expenditure (CAPEX) overruns (McKenna *et al.*, 2005; Misund and Mohn, 2009; Wood Mackenzie, 2011, 2012).

Increased supply chain risks also occur for projects in these frontier regions. Host governments can demand that international partners use local suppliers to increase local content. The problem is that oil and gas companies do not have an established track record with the local companies to execute complex project transactions.

This increase in the demand for local content necessitates more and more of the project engineering and construction activities to be carried out in the host country. Acute shortage of relevant expertise and limitations on the fabrication and construction capacity in the host country can cause additional CAPEX escalation and significant project delays causing E&P projects failing to meet their performance targets (McKenna *et al.*, 2005; Wood Mackenzie, 2012; KPMG Report, 2013).

Extensive surveys of the international oil and gas industry have confirmed that at least forty percent of major international projects since 2005 have exceeded the original budget by twenty percent. In addition, more than fifty percent of these projects experienced more than ten percent completion schedule delay and/or experienced reduced operational reliability of the plant (McKenna *et al.*, 2005; Wood Mackenzie, 2010, 2012). These findings confirm the proposition in the literature that, in many instances, major projects have significantly exceeded cost and completion schedules due to the project execution process failing to anticipate and evaluate the impact of exogenous challenges and the complex commercial arrangements on project transactions (Ward and Chapman, 2003 ;Atkinson *et al.*, 2006;).

While the involvement of joint venture partners in unitisation (i.e. IOGC in partnership) help operators mitigate market risks, such partnerships clearly complicate execution due to conflicts of interest. These new challenges to the execution of major oil and gas projects create significant problems in the form of additional risks and uncertainties for the IOC managing the project execution on behalf of the joint venture partners. These include risks and uncertainties to be resolved in the dealings with the host country government during the project execution to resolve regulatory and commercial issues. In the past, oil and gas companies have been strongly influenced by core competence philosophy and have focused on key value adding activities, outsourcing the remainder of the project execution activities such as engineering, fabrication, construction and installation.

In this case the key to getting things to work is co-ordinating partners and contractors. This requires the IOGC to clearly specify the mechanisms of governance and to specify contracts accordingly, taking into consideration the new uncertainties in addition to known risks (DeWit, 1998;McKenna *et al.*, 2005; Olsen *et al.*, 2005). In order to

examine the changing nature of the hazards faced by the oil and gas industry projects, the researcher carried out a comparative analysis of industry surveys carried out by Consultants over a period of ten years since 2005.

The empirical evidence by the findings of surveys of the industry carried out by McKenna *et al.* (2005), Ernst & Young (2007, 2013) and Wood Mackenzie (2012, 2014) was used as the source to develop Table 6.5.

**Table 6.5 - The Main Hazards impacting Oil and Gas Projects**

<b>Cause of Hazard</b>	<b>Consequences and Impact on Projects</b>
<p>Political Hazards</p> <p>Host government opportunistic behaviour</p> <p>Political constraints on access to reserves for extraction</p> <p>Control reserves from national oil companies</p>	<p>Increasing government intervention for self-interest and worsening fiscal terms is a top threat driven by the macro-environment. In some cases, this is a consequence of energy nationalism, although in others this might be due to political opportunism.</p> <p>Political constraints imposed by host country government on access to reserves are a significant threat to supply. It is felt that IOGCs that will win in the future may be those that excel in establishing political partnership deals and operating them on advantageous terms for the host country.</p> <p>Increasing control of oil and gas reserves from NOCs is a major strategic uncertainty that can cause property rights issues.</p>
<p>Economic Hazards</p> <p>Escalation of development cost due to engineering and/or construction faults</p>	<p>Operationally, the oil and gas sector faces severe problems to prevent escalation of CAPEX.</p> <p>The main cause is a lack of capacity in the fabrication and construction facilities and is compounded by increases in the price of raw materials, such as steel.</p> <p>Escalation of costs can be significantly higher for project components with high asset specificity such as the FPSO and PUR.</p>
<p>Technical Hazards</p> <p>Requirement for novel technology required compounded by limitations of human capital and technical expertise.</p>	<p>Potential for failure of untested technology and severe shortage of required technical expertise.</p> <p>With the growing human capital and technical expertise deficit in the sector, the challenge of recruitment, development and deployment has become a significant strategic threat to the industry.</p> <p>As a result, the ability of the oil and gas production sector to expand sufficiently to meet future demand growth is questionable due to the shortage of required technical expertise and experience.</p>

(Sources: McKenna *et al.*, 2005; Wood Mackenzie, 2010, 2012; Ernst & Young, 2011)

Table 6.5 shortlists the major hazards impacting the execution of major international offshore deep water oil and gas projects. The shortlisted hazards ranked in

order of their influence demonstrate the changing nature of the hazard faced by these projects.

The consequences of the above hazards are considered for the three case studies presented in Chapters Seven, Eight and Nine to determine how they impact the project. The host country political hazards and the behaviour of the institutions have now become the main hazards facing these projects overtaking the challenges of novel technology required to develop the deep water fields.

## **6.5 Summary**

This chapter presented the common features of an offshore oil and gas development project, the subject of the case studies for the field investigation. The major components and the method of project execution are described to minimise their repetition in the case study chapters. The main risks and uncertainties faced by the execution of these projects are identified by industry surveys. Political hazards and institutional behaviour of the host country have now become the main hazards facing international oil and gas projects. This confirms the propositions developed in Chapters One and Four about the new challenges to international projects, requiring the need for re-thinking the project management of these projects, with the incorporation of political governance. The need for this requirement is examined by the case studies presented in the following chapters.

## **Chapter 7 CASE STUDY 1 – AN OIL AND GAS DEVELOPMENT OFFSHORE NIGERIA**

### **7.1 Introduction and Scope**

#### **7.1.1 Core Argument**

In Chapter Four, an extended TCE model for the selection of governance mechanisms for international projects and the exploratory propositions to test its applicability has been presented. The extension was to address the impact of host country political and property rights protection hazards when transactions are carried out across national borders. This case study is based on the EPCI transactions for a FPSO for a major offshore deep water oil and gas development in Nigeria (NOD). The responsibilities for the development and operations of the NOD were assigned by the venture partners to the IOGC with the largest stake in the venture. As discussed in Chapter Six, this IOGC, called the Field Operating Company (NOD FOC), was responsible for all project transactions.

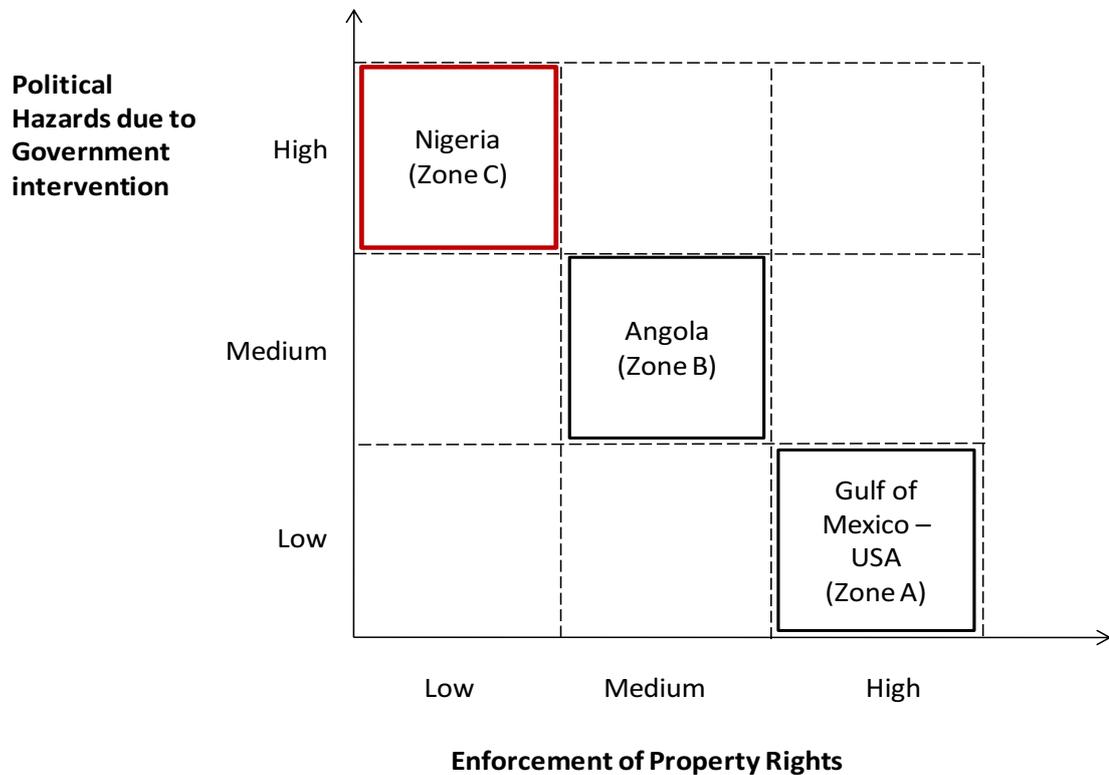
The cumulative responses to the interview closed question E1 (recorded in Appendix 2 and repeated below), provide evidence that the relative political and institutional hazards in Nigeria are considered very high, compared to those of Angola or the USA.

**Table 7.1 - Potential Impact of Host Country Political Context**

	<b>Factor</b>	<b>Average Score</b>
E1.1	Nigeria	85%
E1.2	Angola	72%
E1.5	USA	40%

This case study examines the applicability of the enhanced TCE governance mechanisms for project transactions carried out under conditions of high levels of political hazards caused by government intervention, and compounded by weak safeguards for

property rights. Hence, this case study reflects the scenario given in Zone C of the matrix of government intervention (high/medium/low) versus enforcement of property rights (low/medium/high) presented in Chapter Four and repeated below.



**Figure 7.1 Political Hazards and Enforcement of Property Rights for Nigeria**

Nigeria has an established oil and gas (O & G) production industry with an abundance of hydrocarbons reserves and participation of several IOGCs in the extraction of these reserves. Over the years, the political regimes have mastered the art of high level opportunistic intervention by stealth in the O & G industry. Following the political lead, judicial institutions do not provide an adequate form of protection rights for foreign investors as the legal system is slow, partisan and expensive to access (Lawal and Lugman, 2011). Therefore, protection of property rights has become a serious concern for investors (KPMG, 2011). In the case of Nigeria, we can expect the government to behave like the resident bandit, who would opportunistically plunder maximum possible benefits with little respect for property rights arrangements, but without killing the golden goose which

creates the benefits (Olson, 2000). Accordingly, by arbitrary actions, the government would strive to gain economics benefits beyond any ex-ante arrangements and to further the interests of groups providing it with its political support base. An outcome of these actions, without any consultations with IOCGs, is the requirement for IOGCs to comply with increased local content in transactions (Wood Mackenzie, 2011).

However, there are limits to this adverse intervention and preferential treatment by the national government; the Nigerian government needs the oil and gas projects to succeed if the country is to continue to benefit from the oil and gas revenue. On the other hand, the IOGCs are fully aware of the abundance of oil and gas reserves present in offshore Nigeria (Wood Mackenzie, 2011). Thus, as explained by IP3, “This is a situation of a forced marriage in which neither party wants a divorce, due to the heavy financial gains each party stands to lose”. In relation to the case of transactions, those being analysed in this case study are high value/high complexity activities, however, IOCGs operating in Nigeria need to compromise in terms of how they align their governance strategies, not only to the properties of the transaction, but also to the political context as discussed in Chapter Four. As discussed in Chapters Three and Four, this situation will need the project’s economic governance to be complemented by political governance mechanisms as a means of mitigating the increased hazards caused by the behaviour of the host government and weak institutions. Any adverse state intervention in transactions and increased demand for local content will impact the protection of property rights of the firm by impeding the efficient use of resources for productive purposes. This needs the firm to select governance mechanisms in a non-transaction costs economising way. The impact of both these political and institutional hazards, which constitute the intervening variables in the extended TCE model, is to shift the point at which it is efficient to use a market governance strategy for a given amount of asset specificity and uncertainty. In addition,

the outcome of the specific hazards will increase the need for implementing specialised arrangements such as joint ventures with local firms. In this case the logic of the situation would suggest that there is an even more pressing need for NOD FOC to resort to hybrid governance with an indirect form of vertical integration (IVI) for the main transactions of the Nigeria Offshore Deep-water (NOD) FPSO project.

Therefore, executing projects in Nigeria meant that the IOGCs could not expect to be allowed the discretion to align their governance strategy in a transaction costs economising way. In addition, the stringent requirements to use local design and build teams to carry out a number of significant parts of the contract meant there needed to be changes in how the transactions were managed. In this case, as discussed in Chapter Four, the strategy to be utilised could expect an increase in the level of ‘indirect vertical integration’ both in political transactions and project transactions. In some cases, this meant duplicating what was already being undertaken by the local providers. The execution of the NOD FPSO transactions (scope as summarised in Section 7.2) is examined to determine the applicability of the extensions to the TCE model for international transactions, as proposed by the research exploratory propositions.

### **7.1.2 Data Sources**

NOD FPSO project documents were examined to collect the data to develop the narrative of the case study. As the contents of these documents cannot be divulged due to their confidentiality, the following multiple sources were used to corroborate and encompass the data collected from the project documents. As such, these sources were used for the evaluation of the outcome of NOD FPSO transactions and to formulate the findings to provide justifications for the conclusions:

- Offshore Technology Conference (OTC) proceedings papers OTC 16680, OTC 20249, OTC 20287, OTC 29287, OTC 20996, OTC 21336 and OTC 21858 on some of the completed Nigerian offshore projects.
- Wood Mackenzie– Africa deep water oil and gas reports (2009, 2010, 2011, 2012 and 2013).
- KPMG reports on the oil and gas industry (2013).
- TOTAL A.S. Presentation – Local Content Management in Nigeria, MCE Deepwater Development Conference, 28 March 2012, Paris.
- Analysis of the responses of the interview participants (IPs) listed in Table 7.2 (extracted from the complete list in Table 5.4) to closed and open questions of the semi-structured interviews used in this chapter as primary evidence.

**Table 7.2 - Interview Participants for NOD FPSO Project**

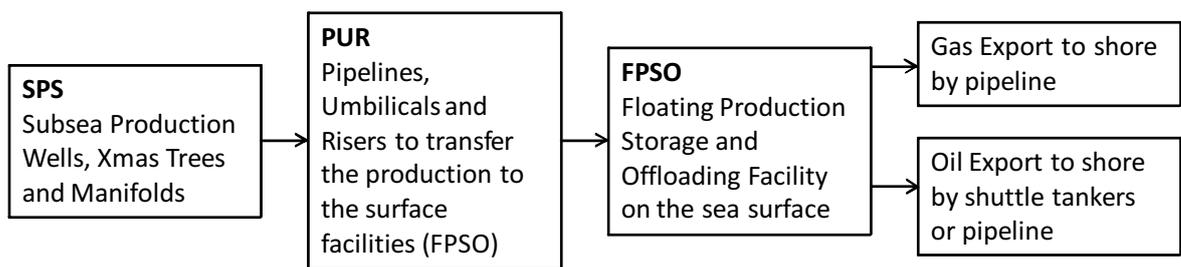
<b>IP</b>	<b>Project/Organisation Position Held</b>	<b>Experience (years)</b>
1	Project Director	>30
2	Project Manager	>30
3	Project Manager	>30
4	Project Services Manager	>25
17	Risk Management Consultant, TOTAL A.S.	>15
22	Project Risk Management	>20
24	Local Content Management	>20
26	Project Assurance Manager	>30
29	Project Services Manager	>30
30	Project Manager, TOTAL	>30

The rest of this section summarises the scope of the NOD FPSO project and the contractual strategy used in line with the transactional characteristics. In Section 7.2 the background data of the case study including causes of the specific hazards due to the political context of Nigeria and their impact on project transactions are examined. From the outcome of this examination, the predictions of the extended TCE model for the transactions of the project are developed and presented.

In Section 7.3 the outcome of project transactions both in South Korea and Nigeria are discussed. The requirement for increased NOD FOC participation in the transactions in the form of indirect vertical integration to implement hybrid governance is explained. Sections 7.4 and 7.5 examine the empirical findings to discuss the applicability of the enhanced TCE model to the NOD FPSO project and the validity of the research exploratory propositions. The escalation of transaction costs resulting from the increased NOD FOC participation and use of political governance is tabulated to provide a measurement of the extension of the TCE model.

### 7.1.3 Summary of the NOD Project Scope

Technically, the components of the Nigerian Offshore Development (NOD) project (as illustrated in Figure 7.2), are similar to the other two cases considered in this thesis. It is a major offshore deep water project to extract, process and transport oil and gas from remote subsea wells off Nigeria by pipelines to a moored FPSO. The generic technical, commercial and project execution arrangements and the uncertainties associated with these projects were presented in Chapter Six.



(Source: Offshore Technology, 2011)

**Figure 7.2 - Main Components of NOD**

As defined in *Section 7.1.1*, this case study covers only the transactions of the contract to convert the basic engineering of the FPSO (done by FOC) to an operational

FPSO by an Engineering, Procurement, Construction and Installation (EPCI) contractor. HXY, one of the major South Korean contractors, was awarded the EPCI contract for the FPSO.

The FPSO is a monohull ship-shaped facility, anchored to the seabed by a station-keeping mooring arrangement. Process systems and utilities are provided on the FPSO topside to separate the hydrocarbon into oil, water and gas and then export them to shore. The FPSO hull contains stabilised oil storage tanks, water ballast tanks, machinery spaces and mooring equipment. The FPSO hull is of a standard design and construction but the mooring arrangement for the station keeping of the floating FPSO is highly site-specific and there will be design uncertainties depending on the site conditions. In addition, the topsides production systems and module designs are highly project-specific with design variations depending upon the hydrocarbon processing system (Offshore Technology, 2011).

The issue of physical asset specificity is also very high as the IOCGs and EPCI parties to the transaction invested in equipment and machinery involving specific capabilities due to product complexities. The human asset specificity was another important factor in that the major EPCI contractor was required to accumulate specific human expertise in an effort to construct and install the facility more efficiently than companies that do not possess such an asset (Wood Mackenzie, 2012).

#### **7.1.4 Contractual Strategy and Supply Chain**

The NOD project was the second of the FPSO deep water projects carried out in this region. The first, Akpo, took seven years to execute and cost \$7.2 billion. As Akpo had preceded the Petroleum Bill (2009), project management arrangements were different from the NOD, in that there was less government intervention and local content

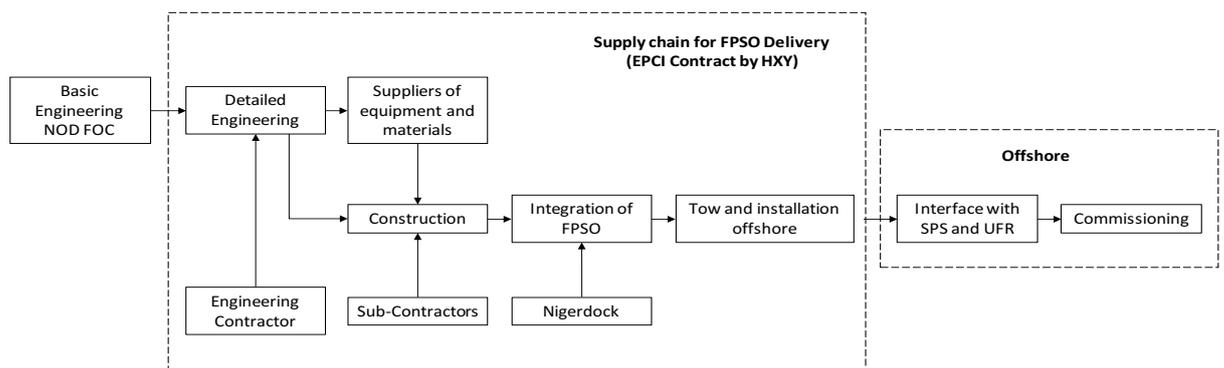
requirements were limited to below 15% (Wood Mackenzie, 2011). However, in the case of the NOD FPSO project, IP30 explained “*We, (i.e. the management of the NOD FPSO project) benefitted from previous experience, but the problems we encountered were politically inspired intervention*”. The initial project budget had been \$8.7 billion, which included estimated \$4.0 billion for the FPSO and the total project execution timescale was to have been nine years. In the first three years the NOD FOC undertook the basic engineering and award of contracts for the FPSO (Offshore Technology, 2013). However, as pointed out by IP1, “*These activities took longer because the Nigerian government authorities wanted to sanction all field development plans and contracts for the major project components*”. The second phase of detailed engineering and construction, from basic to finished design, lasted nearly four years. The final phase, transporting the FPSO from Korea to Nigeria, assembling the final elements, towing the completed FPSO out to sea and installing it, took a further year and a half; a reflection of the challenges of installation at sea (Offshore Technology, 2013). Based on the FOC’s Project Management Procedure (Project Management Guide, TOTAL A.S., 2010) NOD FPSO transactions were divided into the following categories:

1. Project management activities such as basic engineering, preparation and implementation of specifications for compliance was done by NOD FOC who also had to take control of the complex engineering of some key process systems, notably the oil and gas separation and the gas compression systems. In addition, NOD FOC also handled all transactions with government agencies on regulatory matters as they required a high level of hierarchical intervention due to the political uncertainties.
2. The EPCI contract for the FPSO awarded to HXY of South Korea included the hull, topside process modules for oil and gas separation, gas compression, utilities,

power generation, gas and export systems and their integration. The EPCI contractor HXY was also responsible for the offshore installation.

3. The detailed engineering of small and medium sized components, such as minor utilities, a flare tower, together with the oil export buoy, were fabricated in Nigeria by HXY on a joint venture arrangement with Nigerdock, a Nigerian company. The integration of the FPSO topsides with the hull was carried out in South Korea, while the integration of the components fabricated in Nigeria was carried out shown in Nigeria.

Figure 7.3 shows the supply chain process of a sequentially organised set of the above activities to convert the basic design to an operational NOD FPSO.



(Source: Offshore Technology, 2013)

**Figure 7.3 - Supply Chain for the NOD FPSO**

The outcomes of these transactions are discussed in Section 7.3.

## 7.2 Case Study Background, Issues and Expectations

### 7.2.1 Main Specific Hazards

Chapter Six has already presented the main components and transactions of a FPSO EPCI contract and the foreseeable generic hazards associated with such transactions.

This section addresses the causes and consequences of the hazards posed by the political context of Nigeria and the resultant challenges of executing major transactions in the country.

The cumulative responses to the closed interview questions E1 and E2 recorded in Appendix 2 confirmed the main specific hazards associated with the NOD FPSO transactions. As explained in Chapter Five, these responses were converted to average scores by mathematical aggregation.

Political uncertainties caused by the unilateral opportunistic behaviour of the Nigerian government were considered high as compared to Angola and the USA. This behaviour is empowered by the approval authority of the government for the sanctioning of the projects and awarding of major contracts, which can be of the order of \$4 to 5 billion.

Increasing demand for local content propelled by political motives requiring more transactions to be done by local companies was another major concern. Also highlighted is the escalation of CAPEX and schedule of the major FPSO topside components due to the significant shortage of technical expertise and skilled management within the EPCI organisation to handle the design and construction of these components. Causes for the above hazards, particularly politically motivated hazards, are examined in the next sections. This examination is carried out using both primary and secondary evidence. Then, enhancements to the governance mechanisms advocated by the extended TCE model are predicted, in order to cope with the consequences of these hazards.

### **7.2.2 Political Context of Nigeria**

Nigeria's economy is based on hydrocarbon production with oil exports accounting for 97% of total export receipts, and contributing nearly 50% of its GDP. Nigeria is now the sixth largest oil producer in the world and occupies the number one position in Africa.

Despite this, it remains a country with high levels of poverty and civil unrest. It is a major area of exploration and production for major international oil and gas companies (IOGCs), including Shell, Exxon Mobil, TOTAL, Texaco, Agip and Chevron (Wood Mackenzie, 2008).

The first and most obvious of Nigeria's political peculiarities is associated with its stability, or rather, instability. The country consists of a Muslim north, with 49% of the population and a Christian south, with 51%. Historically, the reins of political power rotated with the ethnicity of the President. However, in 2010 the sitting Muslim President died and was replaced by his Christian Vice President, causing political antagonism. Resources are disproportionately concentrated in the south, where a small number of oligarchs derive their wealth from the main export – petroleum. Consequently, the politically disaffected, led by militant groups, are currently waging a campaign involving attacks on oil company installations and property together with a series of kidnappings. Between 2010 and 2012, there were more than twelve such attacks and these have had a major impact on the protection of assets and strategies for staff safety. In this situation, IOGCs provide their personnel and installations with military protection, which is paid at exorbitant costs. They also maintain secure “Fortress Camps” incorporating hotels, family housing, restaurants, schools and conference rooms (Wood Mackenzie, 2012,2014). Interview participant IP26 described these camps as *“high security, luxurious prisons with good quality food and no restrictions on liquid refreshment”*.

This state of affairs can be attributed to the political and economic history of Nigeria since return to democratic rule in 1999. The economic and social welfare activities implemented have not resulted in improving social services nor generated sufficient employment to reduce the level of poverty that characterises the lives of most Nigerians.

In this context, the revenue from the large reserves of oil and gas and other precious minerals available to successive Nigerian governments have not been used in the course of national development. Instead, this windfall revenue in billions has accelerated the promotion of unbridled corruption and mismanagement of funds in the spending on industrialisation and implementation of infrastructure projects. In addition, policies of poverty reduction and economic restructuring introduced have not worked to improve the economic situation of the poor in Nigeria. Instead, poverty has continued to grow without dedicated intervention by the state to promote development (Kura, 2008; Wood Mackenzie, 2012).

Most of the reforms that have been initiated so far have lacked depth in their conception while the regimes have also failed in their implementation. Thus, the economic activities of the state only resulted in widening the inequality gap between the populations. The observation by the UNDP (2006) that in Nigeria “*Poverty has become a way of life*”, provides corroboration of the State’s failure in improving the living conditions of Nigerians. The egoistic and habitually arbitrary decisions have resulted in the wasteful spending of oil and gas revenue rather than productive creation of wealth in Nigeria. Therefore, the economic development aspirations of Nigeria continue to be that of unfulfilled potential (Joseph and Kew, 2008; Kura, 2008). In this matter IP3 was explicit about the level of corruption practised by the state institutions which was of gigantic levels. He said “*since the year 2000 more than \$1 billion per year of funds from the oil revenue meant for infrastructure building for the industry were siphoned off to the pockets of leaders of the ruling elite and their loyalists and this is according to a statement made in 2013 by the then Governor of the Central Bank of Nigeria*”. In this context, a lament of IP4 was that “*instead of providing the financial bastion for the implementation of development projects, the massive infusion of oil and gas income has generated corruption*

*and promoted patronage in the dispensing of favours”*. The main concern expressed by IP1 was that *“our top management (of IOGCs) did not adequately consider the lessons from previous Nigerian projects about the ever increasing adverse political intervention that could adversely impact execution of the projects. Their attitude was that these are issues that can be managed by us behind closed doors with people who really matter”*.

In addition, there is a lack of political will to eradicate official and unofficial corruption among political actors. After more than two decades of democratic rule, the ruling political groups have failed to implement programmes and policies to ensure the growth in the economy to benefit ordinary Nigerians. This has created a growing inequality gap and continuing deterioration of public infrastructure. Faced with increasing political unrest due to acute economic problems, the Nigerian government had to resort to measures to increase the revenue from the oil and gas industry (Joseph and Kew, 2008). In this situation, based on experiences of the unilateral behaviour of the successive Nigerian governments, IP30 expressed his concern that *“Consequences of new regulations can be tough as the government was avaricious with regard to obtaining more income from new oil and gas developments. I am sure that the government agencies armed with additional powers can be expected to implement new regulatory requirements in an opportunistic manner to benefit their political masters”*. In order to facilitate these near unilateral changes, legislation was introduced by the Nigerian government as discussed in the next section (Joseph and Kew, 2008; Wood Mackenzie, 2008, 2011).

### **7.2.3 Increased Regulation of the Industry in Nigeria**

The oil and gas industry in Nigeria has become a challenging environment due to the ever increasing government intervention. IP30 stated *“our (i.e. IOGCs) lobbying of the Nigerian government to get reasonable terms was a case of water off a duck’s back”*. As

explained by IP22 *“The political opportunism of the ruling elite was dictated by their desire for increased financial benefits. This led to an increase in government legislation”*.

These legislations which were designed to maximise the benefits to the State include the Profit Sharing Contracts Act (2008), the Offshore Minerals Licensing Act (2001) and the Local Content Bill (2009). In addition, a key piece of legislation, enacted by the Nigerian Parliament, is the Petroleum Industry Bill (PIB), which significantly reformed the industry and affected the progress of the deep water oil and gas developments (Wood Mackenzie, 2011, 2013; KPMG, 2013).

These regulations are exercised by state run organisations, the principal one being the Nigerian National Petroleum Corporation (NNPC), which has around a 60% share in the upstream oil and gas sector profits through joint ventures with IOGCs. In this arrangement IOGCs may recover their capital cost before the profit-share arrangement commences (Wood Mackenzie, 2011). Apart from the NNPC, the National Petroleum Investment Management Service (NAPIMS) approves oil contract and tender processes and is charged with optimising government investments in the oil industry.

The Department of Petroleum Resources (DPR) is the regulatory body of the government responsible for, and has the authority for, granting oil mineral licenses (OMLs) for the development of oil and gas fields.

According to IP1 *“All the new regulations were cunningly devised to increase the stronghold of the Government in the oil and gas industry and fleece as much as they can”*.

IP3 expressed the sentiment *“There was no point in challenging the provision of these regulations. We did not even think of resorting to legal action as the courts are an extension of the government”*. The industry reaction was that the cumulative effect of all these regulations is to increase the costs and schedule to obtain project sanctions due to increased bureaucracy. In addition, such delays may also be due to the lack of in-house

expertise in the state institutions compounded by a lack of confidence in lower level authorities, since final approval must now go up the chain of command to presidential level (Wood Mackenzie Africa Reports, 2012, 2013).

Earlier FPSO projects, such as Akpo, were executed at a time when local content (LC) was as low as 10% of the major activities. These functions were primarily controlled and managed on behalf of the FOC companies by EPCI contractors, who awarded only minor contracts to local contractors. The Local Content (LC) Bill enacted in 2010 initially required a minimum of 15% of the total cost of design and construction to rest with local suppliers, rising to 70% by 2013, while for Akpo FPSO the figure was 30%. However, the contracts for the major NOD FPSO components, such as the hull and main topside modules, were allowed to be placed outside Nigeria due to a lack of local fabrication and dry-dock facilities. This was on the condition that IOGCs execute the majority of their detailed engineering, construction and service contracts within Nigeria using local companies. This would considerably increase the costs for activities, such as technology transfers, monitoring and training. Such a move to increase the local content in transactions meant that FOC and EPCI companies positioning their operations in Nigeria for the long term experienced a long learning curve by forming alliances with local companies (TOTAL, 2012).

For NOD FPSO, minor but essential components of the FPSO had to be fabricated locally, resulting in considerable differences in expertise and manufacturing facilities. In this case, the EPCI contractor had to create joint ventures with local firms. They had to invest capital to expand the skill base and production facilities which was a major concern for high value-added activities, such as fabrication of high pressure manifolds and piping (OTC Paper 20989). IP1 explained that the direct impact of the PIB and LC Bills “*was increased government meddling in the project execution activities, to the extent of*

*impeding utilising resources in the most economical ways using our management expertise”. IP30 agreed with this with the sentiment “it was bloody frustrating as we had to make concessions and provide gifts (to the authorities) in order to progress the project activities”. In this context the main concern of IP4 was “the difficult protracted nature of our negotiations with the government authority failed to finalise the arrangements (i.e. property rights) between the government and NOD FOC for the FPSO transactions. In this case, arrangements for efficient use of resources (i.e. property rights issues) were not fully finalised and even the arrangements agreed in principle turned out to be pipe dreams”. This can be construed to be an infringement of FOC’s rights to execute the transactions in a cost effective manner. As pointed out by IP29 “There were many unresolved contractual issues caused by IOGCs’ reluctance to use the courts”.*

#### **7.2.4 Impact of Project Execution Uncertainties**

Considering the political context, the impact of the technical and economic challenges facing the NOD is addressed, before predicting the governance mechanisms for the FPSO transactions. The technical and commercial challenges and hazards faced by large FPSO projects were presented in Chapter Six. In the case of the NOD FPSO, interview participants, particularly 1 and 22, stressed that the main execution failure can be caused by the South Korean EPCI taking on the contract without fully understanding the technical complications surrounding complex process systems and components of the FPSO. IP22 pointed out that *“all the South Korean EPCI contractors’ core expertise was construction of marine tanker vessels they are not sufficiently conversant with the complex technical requirements for the FPSO systems and also lacked the required expertise to execute the work”*. This was confirmed by OTC Paper 20996 that the expertise of the South Korean EPCIs in the design of FPSO topsides modules is very limited and this

activity is subcontracted to a European or USA company. IP26 particularly stressed *“Getting the topsides design and construction correct was the key to achieving the required performance of the FPSO”*. This was corroborated by IP3 who made the point that *“We could not be sure whether the design and construction work done by HXY met the specifications until we started the commissioning activities”*. IP29 explained *“We could not award a turnkey (i.e. 100% Agency) contract to HXY for the complete FPSO due to their technical limitations”*. IP4 pointed out *“We had to incorporate stringent contract clauses with rigid monitoring arrangements to manage this shortcoming”*. A main challenge to the transactions in South Korea, as articulated by IP4, was *“the hand of the Nigerian regulatory authorities was evident even in South Korea in the form of obstacles placed in the approval process for the design and construction activities. This was obviously to gain unjustified payments to remove the obstacles”*.

### **7.2.5 Predictions of the Extended TCE Model**

After examining the impact of the political, economic and execution hazards facing the NOD FPSO transactions, this section applies the logic of the extended TCE model to predict the governance mechanisms to cope with the impact of the intervening variables of the model, i.e. high political hazards and weak protection of property rights. In this case, both the basic and the extended TCE models would predict NOD FOC should apply vertical integration for all the main transactions associated with the FPSO.

This prediction is supported by the input from the interview participants 1 and 30 (recorded in Appendix 2) that the political uncertainties are very high in Nigeria due to the government’s increasingly selfish behaviour. This revealed the need for the FOC to handle the complete EPCI transactions to counter the political manoeuvring, regulatory issues and commercial problems to prevent escalation of costs and delays. However, vertical

integration for the complete FPSO is not feasible as an IOGC orders an FPSO for Nigeria only once in about four years. Therefore, it is neither commercially viable nor technically feasible to build fabrication yards in Nigeria to build the FPSOs (Wood Mackenzie, 2012).

As illustrated in Table 6.3 (Chapter Six), a FPSO consists of several components requiring numerous transactions of varying levels of uncertainty and asset specificity. In the case of NOD FPSO, these transactions will be subject to different levels of political hazards. As such, the TCE basic governance model cannot be implemented in its pure form for this project to predict which transactions could be handled by market contracts and which would require additional safeguards in the form of vertical integration or hybrid arrangements. As discussed in Chapter Four, the prediction of the extended TCE model will be a coalition of transaction governance mechanisms based on the proposition that the NOD FOC must perform the activities they can do best and use the market arrangements for transactions where that would deliver greater cost effectiveness and efficiency. In this case, the following logic based on the extended TCE model needs to be used to predict the governance mechanisms for the different NOD FPSO transactions:

- a) NOD FOC should be responsible for project governance (i.e. providing direction and control, the political transactions with government authorities, primary engineering and the specifications for the complex components of the FPSO).
- b) In the case of the transactions carried out in Nigeria subject to high political intervention and high local content or transactions subject to high commercial uncertainty and asset specificity, it would be necessary for NOD FOC and EPCI companies to use hybrid arrangements. This is to be in the form of joint ventures with high NOD FOC involvement in the design and fabrication of FPSO components subject to stringent performance specifications.

- c) Hybrid form of governance can be dominated either by the NOD FOC or the EPCI contractor, depending on the characteristics of the particular transaction. Dominance and/or direct intervention by NOD FOC in transactions can be considered to be an indirect form of vertical integration (IVI) required from a TCE perspective to ensure the hybrid governance was as robust as a pure VI arrangement.
- d) Market arrangements can be used when the political hazards, uncertainty and asset specificity variables of the transactions are known and manageable.

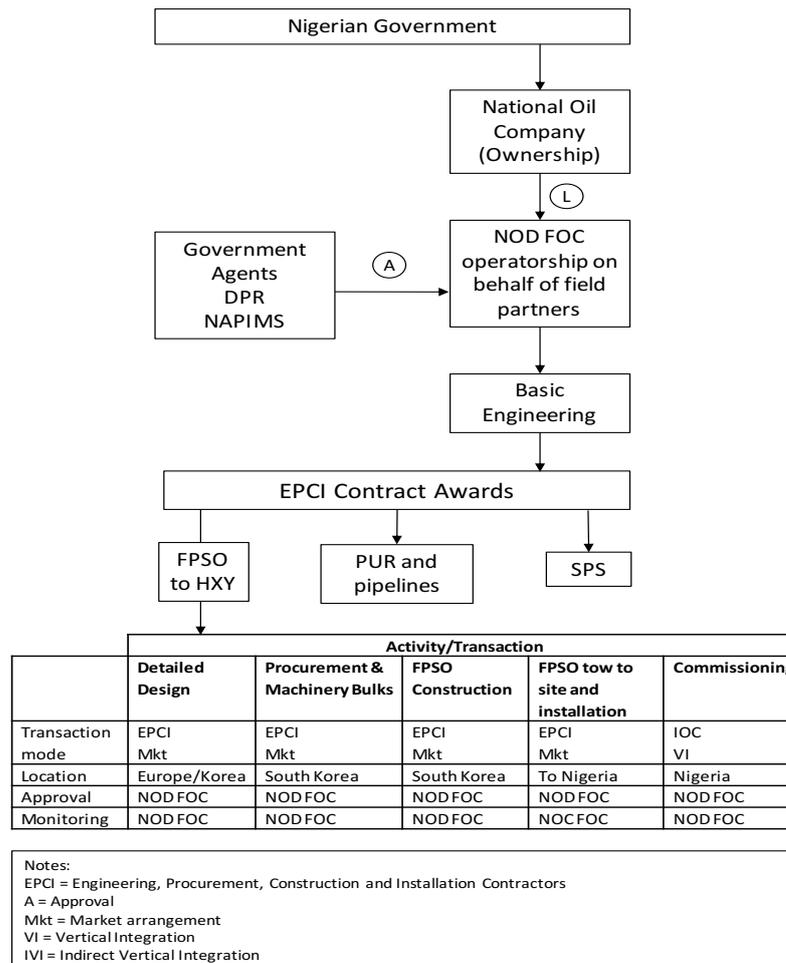
Application of the above logic based on the extended TCE model will lead to a coalition of governance mechanisms. These mechanisms are required to be determined on a case by case basis depending on the uncertainty and asset specificity characteristics of the particular transactions and the extent to which they are subject to political hazards. The next section evaluates the outcome of the NOD FPSO transactions to ascertain to what extent the governance mechanisms used were, or had to be, aligned with the predictions for the transactions based on the above propositions.

### **7.3 Outcome of Project Transactions**

#### **7.3.1 Project Transactional Relationships**

This section analyses the outcome of the transactions in order to determine what went right, the potential for failures based on the governance mechanisms used, and the remedial arrangements used by the NOD FOC to achieve contract completion. The project transactions carried out for the NOD FPSO are grouped into three categories (see Section 7.1.2) for the purpose of this analysis. These categories are: project management and political governance, monitoring of EPCI contract activities in South Korea, and facilitating onshore and offshore project transactions in Nigeria.

Each category is considered to be subject to different forms of hazards. The relationship arrangements and the ex-ante governance mechanisms planned for executing these transactions extracted from the project records are shown in Figure 7.4. Until 2010, as shown in Figure 7.4, the responsibilities for the extraction of oil and gas field resources owned by the NNPC on behalf of the government lay with the FOC responsible for the development of the field and liaising with the Nigerian authorities for approvals and sanctions. In this case of the NOD FPSO, the field operator company NOD FOC prepared the basic engineering, performance standards and execution plans. As stated earlier, NOD FOC awarded the EPCI contract for the FPSO on a market arrangement to HXY, a South Korean company. However, the organisational relationship arrangements and governance mechanisms required for the NOD FPSO project transactions had to change significantly for reasons discussed in the rest of this section.



**Figure 7.4 - Pre 2010 FPSO Organisational Relationships and Governance Mechanisms**

After the introduction of the PIB and LCB legislation, the government, through the Nigerian National Petroleum Company (NNPC), gained additional approval control. In practice, this meant that the Field Development Plan (FDP) sent to NAPIMS and DPR for approval was subject to stringent compliance and had to include more detailed transaction information alongside the objectives of the project. Changes meant there was the need for NOD FOC to increase lobbying and negotiations with these authorities. This meant additional expenditure and led to further delays in obtaining approval for project execution approvals from NAPIMS, DPR and NNPC. Furthermore, the basis for the design, fabrication plans and the programme for the offshore installation of the surface facilities also had to be approved by DPR and NNPC. The awarding of contracts for the major

project components to be awarded by the NOD FOC was also subject to scrutiny and approval by DPR, NAPIMS and NNPC (Wood Mackenzie African Report, 2012; KPMG Nigeria Report, 2013).

Both interview participants 1 and 29 said that, as they expected, the increased requirements of the PIB and LC Bills were enforced by the authorities in an opportunistic manner. IP29 described the situation as “*Authorities sitting on applications for licences for the development of oil and gas fields in the expectation of gifts for their help*”. IP1 also pointed out that “*these expectations were in spite of the lack of in-house expertise within these authorities to understand the complex technical and logistics details of the project plans*”. IP3 described the situation as “*the introduction of the PIB and LC Bills was increased government meddling in our activities, causing an already slow and highly bureaucratic system to become near comatose*”. In this context, a strong sentiment of IP4 was that “*the difficult and sometimes obstinate adherence to stringent requirements by the regulatory authorities was dictated by the political elite, who expected ‘what’s in it for us?’ rewards for their patronage for resolving issues*”. This situation was described by IP3, in desperation, as “*the fish rots from the head*”.

The opportunistic government intervention to implement the clauses of the LC Bill caused a significant increase in concessions to local pressure groups and the need for providing conciliatory measures to keep them happy (Woodmackenzie, 2013). In this case IP24 expected “*the costs of transactions carried out in Nigeria to be higher than similar transactions we have carried out in Europe or South Korea*”. IP24, who specialised in Local Content Management, explained “*this was because the impact of the LC Bill was that we could not use our resources in a cost effective manner. This was an infringement of our rights*”.

IP2 and 24 confirmed that *“the increased political and regulatory difficulties meant we (i.e. a NOD FOC project team) had to take responsibility for all dealings with government authorities and could not leave this to the local guys”*. This included preparation of all specifications and negotiations for project sanctions. IP2 termed this as *“high front-end loading”*. As IP3 confirmed, *“The NOD FOC resorting to these measures (i.e. political governance mechanisms) instead of depending on local agents caused delays in obtaining government approvals for project sanctions, environmental permits and changes in design definitions of the FPSO”*. According to IP30, *“the outcome due to adverse political manoeuvring and interventions by the authorities meant the organisation’s arrangements for the NOD FPSO project transactions had to change significantly”*. IP1 explained that there was *“the need to complement the project management with the addition of political manoeuvring (i.e. political governance mechanisms) to cope with the demands and machinations of the ruling elite and their hangers-on”*. These sentiments were endorsed by IP30, indicating that *“in order to implement (political governance) measures to deal with the relationship difficulties with the government authorities, the NOD FOC had to rapidly increase the project management teams in South Korea and Nigeria with the addition of specialists in political negotiations and environmental affairs”*.

This arrangement was confirmed by IPs 3 and 24. IP30 confirmed *“the additional expertise required had to be provided, at high cost, by expatriate personnel and this was reflected in massively increased transactions costs”*. IP1 summarised this situation as *“the lesson for the IOCGs was that as uncertainty due to political involvement increased, so too did the cost of project execution”*. The above empirical findings confirm the theoretical proposition that it will be necessary to match commercial governance with a symmetric degree of political governance, with an emphasis on building cordial working relationships

with government institutions, in order to mitigate the new forms of hazards faced by the NOD project.

### **7.3.2 Project Transactions Issues in South Korea and Nigeria**

Considering, the requirement for political governance, this section examines the problems that arose with the NOD FPSO engineering and construction activities and how they had to be managed. The detailed engineering of the FPSO was carried out by HXY using subcontractors TEP (a French company) and a Nigerian company Nigerdock. According to the project records, an engineering team comprising of more than 400 persons were based in Paris, South Korea and Nigeria. Progress was slow due to the approval delays of regulatory authorities. In this case, according to IP22, *“the NOD FOC had to supplement their project team of about 130 persons by an additional 80 expatriate personnel to provide the necessary technical expertise and management leadership to deal with the Nigerian Regulators”*. In addition, IP30 pointed out that *“the NOD FOC retained a ‘shadow’ engineering team in Paris to provide the highly skilled expertise required to perform complex engineering and to transfer technology to the EPCI and JVs”*.

As stated earlier, the Nigerian government allowed the FPSO hull and topsides main modules to be constructed in South Korea due to the lack of local capability. As the EPCI contractor lacked the required expertise to execute the work to handle the complex technical requirements for the FPSO systems, the NOD FOC had to incorporate stringent monitoring and approval arrangements in the contract with increased NOD FOC participation to prevent technical failures and fabrication faults. As explained by IP22, *“our main challenge was the politically motivated unjustified demands of the regulatory authorities (seeking financial gain) in the approval process and not the technical challenges”*. He pointed out that this led to a *“near 50% increase in the size of the project*

*team based in South Korea to handle regulatory issues in addition to the technical problems”.*

It was necessary for the EPCI contractor for the FPSO to form a joint venture with the Nigerdock Nigeria plc. This joint venture was responsible for the fabrication of some FPSO components and modules in Nigeria and for carrying out the integration of these on the FPSO at Nigerdock’s shipyard (Offshore Technology, 2012). The measures adopted by the NOD FOC and EPCI (at the NOD FOCG’s expense) for the activities to be completed in Nigeria were:

- a) To implement infrastructure upgrades to fabrication facilities at Nigerdock, and
- b) To establish operations support and associated infrastructure, such as procurement services, shore base to support operations, office accommodation, housing and logistics support services (OTC Papers 20287 and 20249).

NOD FOC intervention in these activities in the form of management leadership and monitoring became necessary because of the fabrication process uncertainties and integration complexities which had been underestimated by the contractors (TOTAL, 2012: OTC Paper 20287, OTC Paper 20249). According to IP22, *“we (NOD IOC) had to provide expertise to develop technical specifications and fabrication procedures to integrate the components fabricated in Nigeria with the FPSO; this intervention was required due to the very limited skill base and the differentials in the capabilities of the participants to transactions in Nigeria”.*

According to IP29, *“one way in which we had to manage the issues of technical competency and relationship trusts associated with JV’s, was to make commercial concessions to minimise the opportunistic behaviour of the JV partners”.* IP24 agreed and said *“these measures prevented the need for legal redress to ensure we did not experience contractual losses (i.e. to protect the property rights of the NOD FOC)”.* The downside,

according to IP24, was “*it was necessary to nearly double the FOC project team with expatriate professionals, at enhanced wages and subsistence expenses, to obtain their services in Nigeria*”. IPs 1 and 4 agreed with the need for the implementation of these measures. The point stressed by IP1 was that “*these JVs had to be led and controlled by us (i.e. NOD FOC) in order to provide these companies with managerial expertise and to implement technology transfer in order to counter product complexities*”. In this case the sentiment of IP30 was that “*we had no choice but to lead these JV organisations by the hand and it was a case of keeping a dog and doing the barking yourself*”.

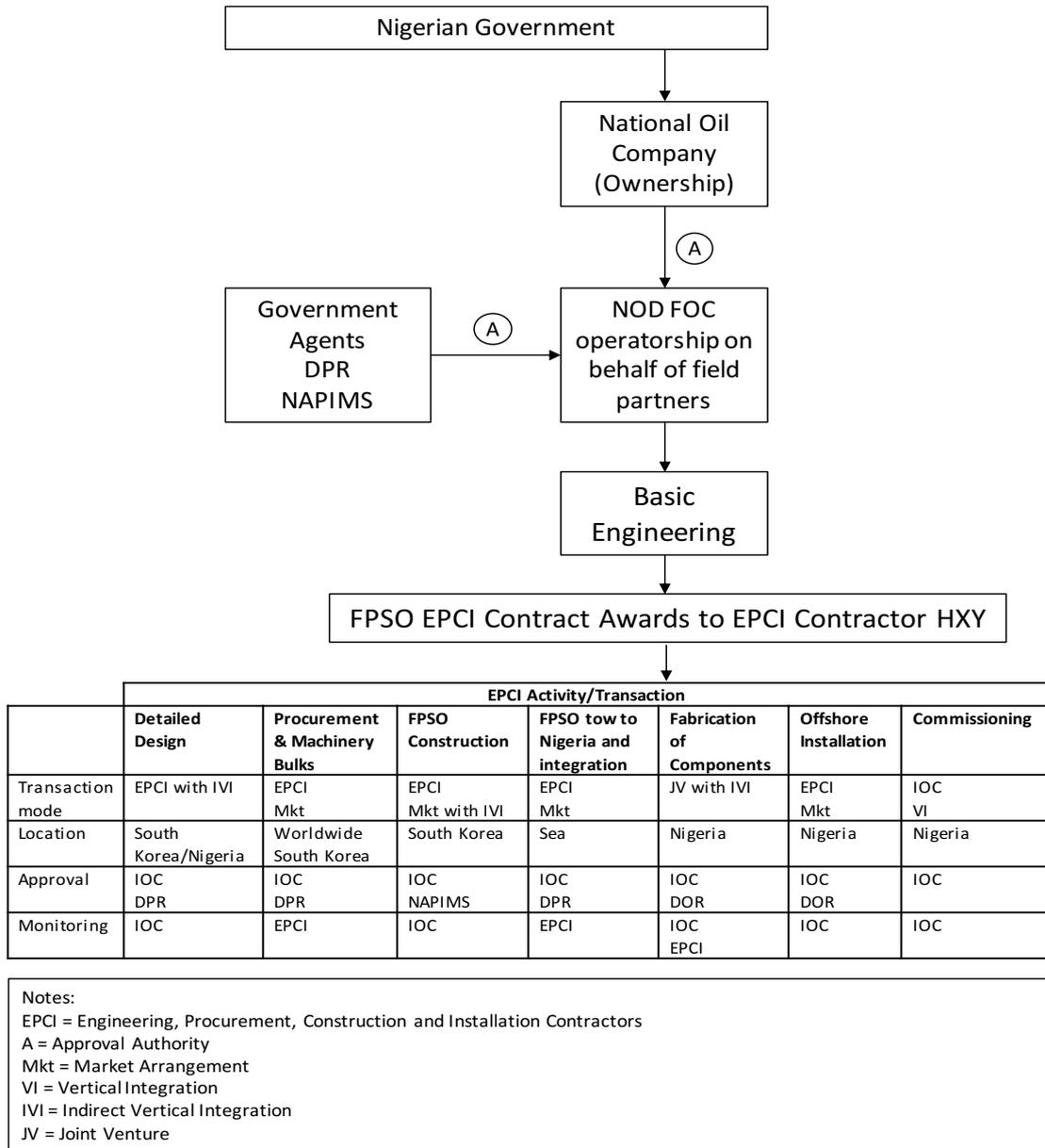
Therefore, the measures implemented by NOD FOC to make the JVs (an outcome of the government demand for local content) to supply the required output turned out to be indirect vertical integration, in action. Offshore installation of the FPSO was done by the EPCI contractor who possessed the necessary expertise and the large installation vessels for such marine work. Final integration of the FPSO, UFR and SPS components and the commissioning of the complete system were carried out by the NOD FOC team with the assistance of the EPCI contractor. This commissioning process was conducted on a vertical integration arrangement, as the management, procedures and the logistics were controlled by the NOD FOC team. IP2 expressed his relief that “*political meddling was absent in these offshore activities*”.

### **7.3.3 Increased NOD FOC Participation and Transaction Costs**

The changes in governance mechanisms and relationship arrangements that became necessary for the NOD FPSO transactions as discussed in Section 7.3.2 are illustrated in Figure 7.5. In comparison with the pre-2010 arrangements, as shown in Figure 7.4, there were significant changes in the government mechanisms to be used.

It can be seen from Figure 7.5 that significantly increased NOD FOC participation was required to ensure the functioning of the hybrid and joint venture governance mechanisms to complete the project transactions. The governance mechanisms which had to be used (as recorded in project documents) turned out to be close to the predictions of using the logic of the extended TCE model given in Section 7.2.5. As such, the strategy used was aligned with the theory in the following areas:

- Interfaces with the government, NNPC and other institutions (Vertical Integration).
- FPSO engineering (Hybrid with IVI).
- FPSO construction:
  - Topside process modules (Hybrid with IVI).
  - Hull tanks and machinery (Market).
  - FPSO offshore moorings installation (Hybrid with IVI).
  - Fabrication and installation of the oil export buoy (Hybrid with IVI).
  - FPSO components fabricated in Nigeria (Hybrid with IVI).



**Figure 7.5 - Post 2010 (NOD FPSO) Transactions Relationships and Governance Mechanisms**

Consequently, the post 2010 situation led to an increased management of transactions by the NOD FOC to implement political governance measures in addition to remedial measures required for the activities carried out in South Korea and Nigeria. This inevitably resulted in significantly increased transaction costs ( $\Delta TCE$ ). These transaction costs and efforts, recorded in terms of hours incurred to complete the project management, political governance, engineering support and monitoring of the EPCI activities, can be considered to be a measure of the extension of the basic TCE model.

## **7.4 TCE Findings of the Case Study**

### **7.4.1 Empirical Findings on the Extension of TCE**

The NOD FPSO and facilities associated with it were installed offshore and commissioned to achieve primary oil and gas. However, in order to achieve this all three groups of transactions, i.e. project management including political governance arrangements, the FPSO engineering, the construction in South Korea and transactions in Nigeria, had to be carried out in non-economising arrangements as evident from Section 7.3. In Section 7.2.5 the logic of the extended TCE model was used to predict the governance mechanisms for the different NOD FPSO transactions. Application of the logic on the extended TCE model was used to predict the governance mechanisms. These mechanisms need to determine on a case by case basis depending on the uncertainty and asset specificity characteristics of the particular transactions and the extent to which they are subject to political hazards.

Both primary evidence (responses of IPs) and secondary evidence (from project documentation and industry publications) provided in Sections 7.2 and 7.3 confirm high levels of political hazards that materialised due to adverse government intervention in the execution of the NOD FPSO project. The consequences of these hazards manifested in the form of excessive demands of the regulatory authorities (on behalf of the ruling elite) for financial ‘rewards’ in return for smoothing the path for the execution of the project activities.

In addition, as postulated in Chapter Three, the property rights issues in the transactions were determined by the political process which was dominated by the government institutions having the prevailing influence on the outcomes. In this situation NOD FOC had to cope with the cumulative impact of high political intervention and

adverse property rights issues which resulted in an ever increasing demand for local content in transactions. These were beyond the reasonable expectations of the IOGCs. As case study evidence presented in Section 7.2 shows, the NOD FOC ex-ante expectations did not include the need for political governance mechanisms to complement project governance in order to counter the ever increasing political hazards and institutional opportunism faced by the NOD project.

In this case, changes to the arrangements for transactions with the government bodies were found to be necessary to manage the impact of the political and legal hazards that materialised. NOD FOC was forced to implement an early and deep liaison with government authorities throughout all project phases to complete the FPSO. The NOD FOC had to implement political governance by providing direction and control for transactions with government authorities. They also had to direct the primary engineering and the specifications for the complex components of the FPSO.

The evidence of this case study supports the proposition made in Chapter Three that discussed when political hazards increase, economic actors have to incorporate in their calculations an analysis of political governance requirements in order to reconsider their current policymaking and the strategy for future transactions. This was borne out by the fact that political governance was required to influence political authorities, directly by lobbying for relationship building, and by indirect means which included financial concessions (and contributions) to political institutions. These formal and informal political governance mechanisms used by the NOD FOC in dealing with the institutions in Nigeria was in the form of ‘hierarchical organisation’ in TCE terms.

In practice, this is a case of complementing the project’s economic governance with the addition of political governance mechanisms to cope with the demands and machinations of the “*ruling elite and their hangers on*” as described by IP2.

The evidence from the case study also highlighted the requirement to prevent inefficient use of resources (i.e. safeguarding the property rights) in complying with the statutory requirement for increased local content in transactions. In order to ensure this, NOD FOC had to alter their normal production processes and project execution arrangements and resort to joint ventures (JVs) with local partners, which can be non-economising arrangements. They had no choice in the matter but to make these JVs work without incurring excessive expenditure in meeting the stringent local content requirements. As shown by the evidence, the mitigation measure was to utilise hybrid governance mechanisms in the organisational arrangements of the joint ventures with Nigerian companies. This was a strategic alliance in an effort to overcome negative economic, performance-related and cultural effects in the functioning of the JV organisation.

In the case of all the transactions carried out in Nigeria, subject to high commercial uncertainty and asset specificity, the NOD FOC and EPCI companies had to use hybrid arrangements. These were in the form of high NOD FOC involvement in the design and fabrication of FPSO components subject to stringent performance specifications. These hybrid forms of governance were dominated by the NOD FOC depending on the characteristics of the particular transaction. This dominant and direct intervention by NOD FOC in transactions can be considered to constitute an indirect form of vertical integration (IVI). This was required from a TCE perspective to ensure the hybrid governance was as robust as a pure VI arrangement.

Consequently, a key finding from the case study evidence is that these hybrid governance mechanisms in the operation of joint ventures required a high level of FOC participation. This amounted to indirect vertical integration (dominant role) by NOD FOC providing the direction and control of the JV activities.

This dominant participation by the NOD FOC, including some duplication in the technical activities, increased the competency and relationship trusts within the JVs to ensure the successful completion of transactions. As such, the case study demonstrates the need for relational governance aspects to be developed to ensure trust between partner firms and reduce opportunism. As can be expected, developing these relational aspects in Nigeria was painfully slow and required additional expertise transfer activities causing increased transactions costs.

The TCE prediction is that market arrangements can be used when the political hazards, uncertainty and asset specificity variables of the transactions are known and manageable. However, the case study evidence also highlighted the fact that transactions considered to be straightforward, such as the construction of the FPSO in South Korea, can go beyond the predictions of the basic TCE model when they become subject to interventions by a third party, i.e. the role of Nigerian regulatory authorities to promote the vested economic interests of the government.

This case study provides overwhelming evidence for the conclusion that, in the case of international projects, the political context of the host country will have the overriding influence on the governance mechanisms required to minimise ex-post regret. This scenario requires an extension of the basic TCE theory, which focuses mainly on the rational features of a transaction and takes the role of institutions as neutral (as discussed in Chapter Two). In the case of this NOD FPSO case study, this extension of the TCE took the form of political governance mechanisms which included provision of economic concessions, lobbying and relationship building with the national political actors and local companies. This supports the proposition made in Chapter Three, that political hazards impacting on international transactions creates the need for implementing specialised

political governance mechanisms in addition to generalised mechanisms for these transactions.

Having reviewed the empirical evidence to support the theoretical arguments for the need for the extension of the TCE model for international transactions, the next section provides a measurement of the scale of this extension required for the NOD FPSO.

#### **7.4.2 Measurement of the Extension of TCE Model**

It can be argued that increase in transaction costs and increase in the effort required (measured in terms of hours expended to complete transactions), can be credible measures of the extension of the TCE model required to manage NOD FPSO transactions. The results of these measurements can be used for comparative purposes with the other two case studies to answer the question as to the extent the strategy of political governance, plus 'Indirect Vertical Integration' had to be used to mitigate the ex-post regret. The initial estimates and the final values for the hours and costs of transactions in Europe, South Korea and Nigeria were verbally provided (in confidence) by IPs 1, 2, 3, 4, 12, 22, 24, 26, 29 and 30. The mean values of these estimates are recorded in Table 7.3. The cost figures are presented in US million dollars (MD). For this purpose the transaction activities are considered to be composed of project management, implementation of political governance mechanisms and the IVI activities.

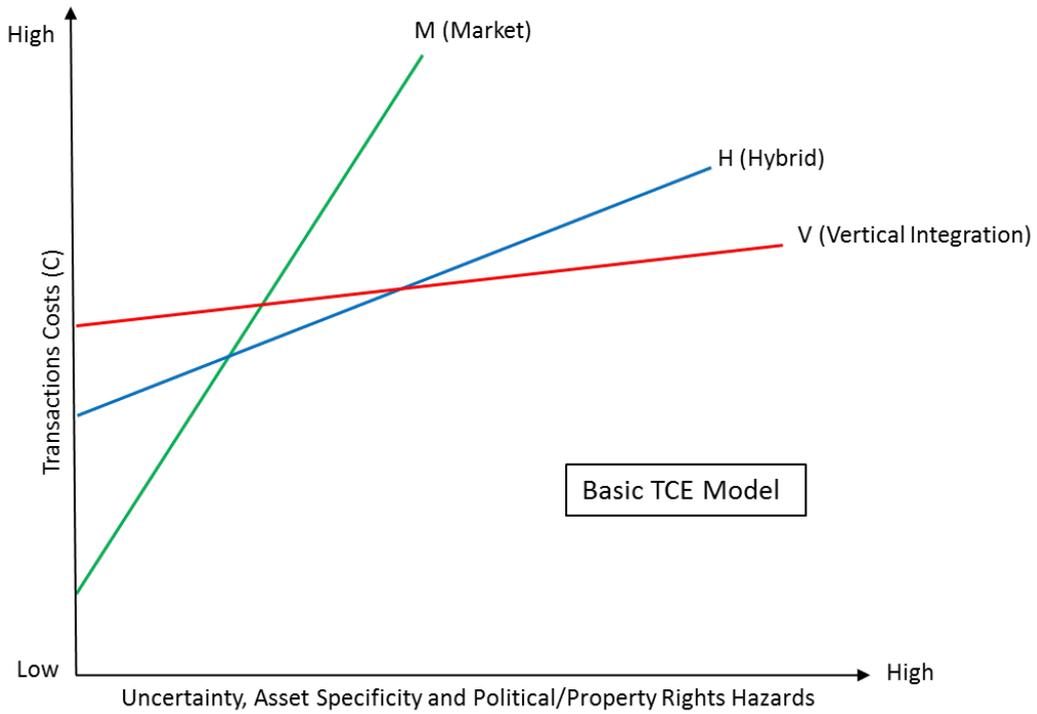
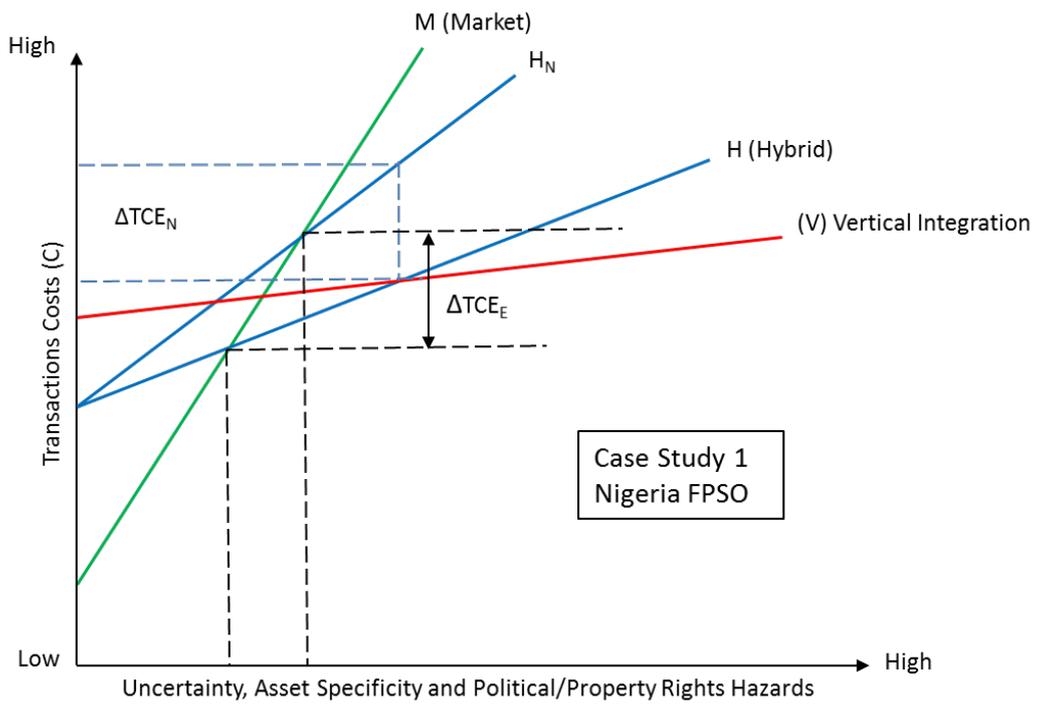
**Table 7.3 – Escalation of Transactions Costs (TC) for NOD FPSO**

Transaction Activities	Location	Estimated hours	Final hours	% Increase in hours	Estimated TC (MD)	Final TC (MD)	Increase in TC (MD)	% Increase in TC ( $\Delta$ TCE)
Project Management and Political Governance	Europe	42,000	54,600	30	119	130	11	9
Project Management and Political Governance	South Korea	18,600	25,200	35	51	69	18	38
Project Management and Political Governance	Nigeria	32,400	51,840	256	91	69	64	71
Project Management and Political Governance	Europe, Nigeria and South Korea	93,000	163,000	75	255	354	99	39
Engineering Support and Monitoring	Europe	84,000	109,000	29	93	111	18	19
Engineering Support, Monitoring and IVI	South Korea	56,000	81,000	14	62	81	19	31
Engineering Support, Monitoring and IVI	Nigeria	140,000	212,800	51	157	246	89	57
Engineering Support, Monitoring and IVI	Europe, Nigeria and South Korea	280,000	428,000	53	312	438	126	40
TOTAL TRANSACTION COSTS					567	730	163	30

As recorded in Table 7.3, the increase in the overall FPSO transaction costs ( $\Delta$ TCE) was approximately 30% of the initial budget, from \$567 million to \$729 million. The percentage increase in the transaction costs for NOD FPSO project management and political governance measures turned out to be 71% with an increase of 62% in the hours expended, which proved significantly higher than anticipated. The increase in the transaction costs in Nigeria for implementing the IVI measures required to ensure technical

performance of the completed FPSO and building relationship trusts in JV arrangements turned out to be 57% with an increase of 52% in the hours expended.

These measurements, representing the extension of the basic TCE model argument, support the proposition that the relative political hazards created by the behaviour of the host country government and weak institutional regimes will determine the extent to which the project transactions have to be carried out in a non-economising manner. Therefore, for the NOD FPSO transactions, these intervening variables of the enhanced TCE model shifted the point at which specialised governance strategy was needed for managing high institutional and political hazards. The ex-ante prediction was use of vertical integration (V) for the pre-EPCI contract award and the market (M) for the post-award transactions. This changed to vertical integration for the pre-award transactions and for political governance. Hybrid mechanisms with IVI and political governance were required for the post-award transactions. This hybrid governance represented by  $H_{NIG}$  had to be implemented at a lower level of asset specificity, as shown in Figure 7.6. The resulting increase in transaction costs is identified as  $\Delta TCE_N$ .



**Figure 7.6 - Impact of High Political and Property Rights Hazards on Project Transactions**

The overall conclusions drawn from the findings are summarised in the next section.

## 7.5 Conclusion

Hence, from the in-depth analysis of this case study, the impact of the high political hazards created by intervention of the Nigerian regime and the weak institutions for the safeguarding of property rights in project transactions has been examined. In this case the NOD FOC had to extend the governance mechanisms for the NOD FPSO project transactions as predicted by the extended TCE model. This had to be done by using political governance mechanisms to handle the high level of government intervention in transactions. In addition, indirect vertical integration was required in order to manage the differentials in competences of the partners to the transactions. Another conclusion from the NOD FPSO case study is that the basic TCE model, which is focused on outcomes of economic processes, must be extended to take into account the co-ordination of the production processes and the complexity of the product. This is required particularly in situations where complex transactions have to be carried out when external uncertainties are high, such as opportunistic behaviour of the host country institutions. Williamson's (1990) focus is on the end product of the transactions, while taking for granted the production processes and resources required to produce the output. This has hitherto made it difficult to visualise how product complexity and production uncertainties, caused by the use of inefficient suppliers due to the demand for local content, have to be managed.

The unanimous verdict of the interview participants (as recorded in Appendix 2 and Chapter Ten) was that the problems caused by the intervention of the Nigerian government and its regulatory authorities completely overshadowed the challenges caused by technical and commercial issues for completing the NOD FPSO. However, all the IPs were resigned to the fact that the IOGCs must live with these hazards if they want to secure future offshore mineral licences and exploit the vast hydrocarbon resources of offshore Nigeria. The main conclusion drawn from the NOD FPSO case study is that the extension of the

transactions economics model with political governance is inevitable to manage the impacts of high government opportunistic intervention compounded by weak protection of property rights protection. The impact of these intervening variables for the NOD FPSO project is an increase in the project's transaction costs due to the need to execute transactions in a non-economising manner to minimise post-execution regret.

## **Chapter 8 CASE STUDY 2 - AN OFFSHORE DEVELOPMENT FOR ANGOLA**

### **8.1 Introduction**

#### **8.1.1 CoreArgument**

Case study 1 examined the impact of project transactions subject to known high level of hazards caused by government opportunistic intervention compounded by weak property rights protection. Case study 1 provides evidence that in countries with authoritarian regimes, the host governments can be expected to cause hazards in the execution of a major project if they resort to selfish behaviour. It also supported the proposition that the delineation and safeguarding of property rights are the outcome of the political process. In this case, influential parties need to be sufficiently compensated to prevent adverse changes in the transactions that would cause potential economic gains arising from project investment to be at risk.

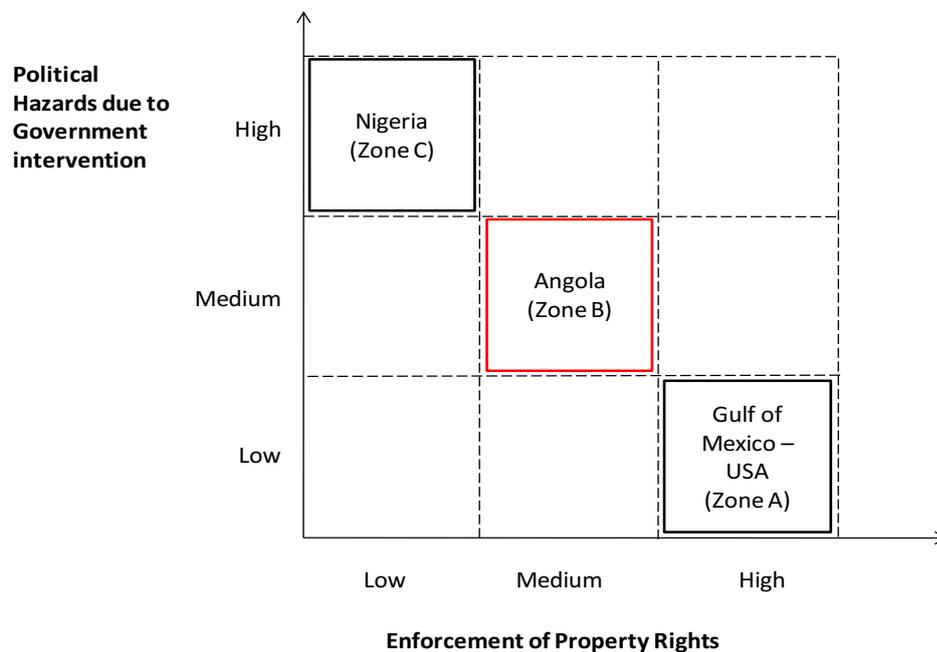
This case study examines the applicability of the extended TCE governance mechanisms for the EPCI transactions for a FPSO for a major offshore deep water oil and gas development in Angola (AOD). The responsibilities for the development and operations of the AOD were assigned by the venture partners to the IOGC with the largest stake in the venture. As discussed in Chapter Six, this IOGC, called the Field Operating Company (AOD FOC), was responsible for all project transactions.

The cumulative responses to the interview closed question E1 (recorded in Appendix 2 and repeated below), provide evidence that the relative political and institutional hazards in Angola are considered medium compared to those of Nigeria (high) or the USA (low).

**Table 8.1 - Potential Impact of Host Country Political Context**

	<b>Factor</b>	<b>Average Score</b>
E1.1	Nigeria	85%
E1.2	Angola	72%
E1.3	USA	40%

As per the dimensionalising provided in Section 4.2, Angola can be considered to be a authoritariandemocratic state compared to the Nigeria regime which is classified as an authoritarian state. Thus, in Angola there is the potential for adverse political behaviour with stealth due to economic opportunism. There is a growing history of opportunistic intervention by state institutions in projects. Hence, this case study reflects the scenario given in Zone B of the matrix of government intervention (high/medium/low) versus enforcement of property rights (low/medium/high) presented in Chapter Four Section 4.2 and repeated below.



**Figure 8.1 - Dimensioning of Political and Property Rights Hazards for Angola AOD**

As discussed in Chapter Four, these “medium level” hazards can be assigned probabilities of occurrence by statistical and/or observed historical data. In this case these risks can be evaluated and taken into account to plan the ex-ante arrangements for the project transactions. The expectations are that there will be adequate checks and balances in the form of established institutional arrangements to minimise political hazards and access to legal redress to enforce contracts in place. Even if these checks and balances are not institutionalised, they may materialise for strategic reasons due to economic necessities of the home country (Henisz, 2002).

In such case the firms may consider their major transactions to be subject to a medium level of political intervention which can be managed by some concessions to the government with acceptable, but possibly expensive, legal arrangements for safeguarding property rights. In this case TCE would predict that increased use of markets can result in major transactions being executed more economically. However, statistical data is based on known and/or observed data interpreted by judgement. An unexpected development in such situations can be the practice of self-interest with guile by the state and its institutions. Any such adverse developments may not be anticipated ex-ante due to the bounded rationality of the participants and appropriate mitigations will not be evident until the circumstances materialise. In such cases, more specialised governance mechanisms may be required to manage the impacts of self-interested behaviour with guile, which are not considered before the event. The changes in the expectations of the risk levels are especially important for idiosyncratic transactions that involve high levels of investment in specialised human and physical capital, as is the case for an offshore deep water FPSO. The question then arises as to whether the existing (or available) checks and balances can be sufficient to cope with such unexpected occurrences to minimise the post execution regret.

To test the above arguments, this case study of a FPSO project off Angola (AOD FPSO) was evaluated. For these projects, the Angolan government's authority is delegated to the national oil company Sonangol, who is responsible for the negotiations and agreements with IOGCs who are the partners for the project venture. In this context, interview participant IP14, a very experienced and astute Project Director, made the comments *"the projects that we have completed in Angola have gone smoothly with little adverse interference by the government, and Sonangol have been very co-operative"*. However, he added *"the question is will this situation last, especially when the Angolans become more knowledgeable about oil and gas projects and possibly more avaricious of the rewards"*. IP27 added *"we have not had any major contractual issues which affected our interests (i.e. property rights). Anyway, the courts are slow to function; legal action would have been our last resort"*. IP8 made the observation *"before NOD project we had no problems with Sonangol or the government. Our thoughts were will this amicable situation last for long?"*.

In summary, this case study tests the validity of the economising governance mechanisms predicted by the extended TCE model for international transactions subject to medium level of political hazards and adequate levels of property rights protection.

### **8.1.2 Data Sources**

AOD FPSO project documents were examined to collect the data to develop the narrative of the case study. As the contents of these documents cannot be divulged due to their confidentiality, the following multiple sources are used to corroborate and extend the data collected from the project documents:

- a) OTC proceedings papers OTC 20021, OTC 21075 and OTC 20201 on some of the completed Angola offshore projects.

- b) Wood Mackenzie – Africa deep water oil gas reports for Angola (Wood Mackenzie, 2009, 2010, 2011, 2012, 2013).
- c) Offshore Journal (August 2010, July 2014).
- d) KPMG Reports on oil and gas industry (2011, 2012, 2013).
- e) Analysis of the responses of the interview participants (IPs) listed in Table 8.2 (extracted from the complete list in Table 5.4) to closed and open questions of the semi-structured interviews, which are used in this chapter as primary evidence.

**Table 8.2 - Interview Participants for AOD FPSO Project**

<b>IP</b>	<b>Project/Organisation Position Held</b>	<b>Experience (years)</b>
7	Project Risk Manager, TOTAL E&P	>20
8	Project Services Manager, TOTAL E&P	>25
13	HSE and Risk Manager, TOTAL A.S.	>30
14	Project Manager, TOTAL A.S.	>25
15	HSE and Risk Manager, TOTAL A.S.	>25
18	HSE and Risk Manager, TOTAL A.S.	>25
19	Project Flow Assurance Manager	>15
23	Senior Consultant, Risk Management, ARC Consultants	>10
27	Project Services Manager, TOTAL A.S.	>25
28	Project Services Manager, TOTAL E&P	>30

The rest of this section summarises the basic AOD FPSO project components and defines the contractual background for the transactions to be executed.

In Section 8.2, the background data of the case study including causes of the specific hazards due to the political context of Angola and their impact on project transactions are examined. From the outcome of this examination, the predictions of the extended TCE model for the transactions of the AOD project are developed and presented.

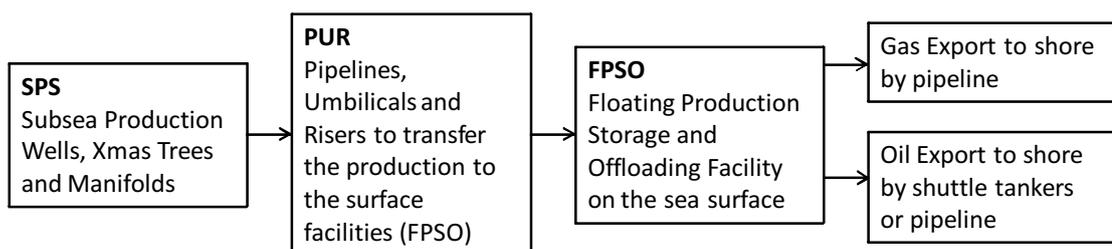
Section 8.3 examines the outcome of the project transactions due to the political hazards and the protection of property rights issues that materialised. The bargaining positions and actions taken by Sonangol, IOGCs and EPCI contractors to protect their economic welfare (i.e. property rights) and how these affected the transaction costs are discussed.

The evidence from the case study is analysed in Section 8.4 to ascertain whether adequate delineation of property rights was ensured, and what TCE governance mechanisms had to be implemented in order to manage any challenges caused by the Angolan government and the EPCI contractor. Justification is provided as to why uneconomical transactions were carried out to complete the project transactions for the AOD FPSO to achieve first oil and gas.

Finally, the conclusions are drawn in Section 8.5 as to what extent the evidence provided by this case study supports the research exploratory propositions.

### 8.1.3 Summary of the AOD Project Scope

Technically, the components of the Angolan Offshore Development (AOD) project, as illustrated in Figure 8.2, are similar to the other two cases considered in this thesis. It is a major offshore deep water project to extract, process and transport oil and gas from remote subsea wells offshore Angola by pipelines via a moored FPSO to onshore. The generic technical, commercial and project execution arrangements and the uncertainties associated with these projects were presented in Chapter Six.



**Figure 8.2 - Main Components of AOD** (Source:Offshore Technology, 2013)

This case study covers only the Engineering, Procurement, Construction and Installation (EPCI) transactions to convert the basic engineering of the FPSO (done by NOD FOC) to an operational FPSO offshore Angola.

The FPSO, as in case study 1, is a monohull ship-shaped facility, anchored to the seabed by a station-keeping mooring arrangement. Process systems and utilities are provided on the FPSO topside to separate the hydrocarbon into oil, water and gas and then export them to shore. The FPSO hull contains stabilised oil storage tanks, water ballast tanks, machinery spaces and mooring equipment. The FPSO hull is of a standard design and construction but the mooring arrangement for the station-keeping of the floating FPSO is highly site-specific and there will be design uncertainties depending on the site conditions. In addition, the topsides production systems and module designs are highly project-specific with design variations depending upon the hydrocarbon processing system (Offshore Technology, 2011).

The issue of physical asset specificity is also very high as the IOGCs and EPCI parties to the transaction invested in equipment and machinery involving specific capabilities due to product complexities. The human asset specificity was another important factor in that the major EPCI contractor had to accumulate specific human expertise in order to construct and install the facility more efficiently than companies that do not possess such an asset (Wood Mackenzie, 2011).

#### **8.1.4 Contractual Strategy and Supply Chain**

The AOD project was the third of the FPSO deep water projects carried out for offshore Angola. The first two FPSOs took eight years to execute and each cost above \$4.2 billion.

IP7 explained that to some extent therefore *“the NOD FPSO project benefited from previous technical experience, but its problems were compounded by increased politically inspired intervention in the project affairs which was not the case before”*.

The initial AOD project budget had been \$8.7 billion, which included an estimated \$4.50 billion for the FPSO and the total project execution timescale was to have been nine years. In the first three years, the AOD FOC undertook the front end phase in Paris, which included the basic engineering and award of the EPCI contracts for the FPSO (Offshore Technology, 2013).

However, as pointed out by IP1, *“Much to our annoyance, the sanction of the project and award of the EPCI contract took longer than expected because the Angolan government authorities against our expectations wanted to approve all field development plans and contracts for the major project components”*.

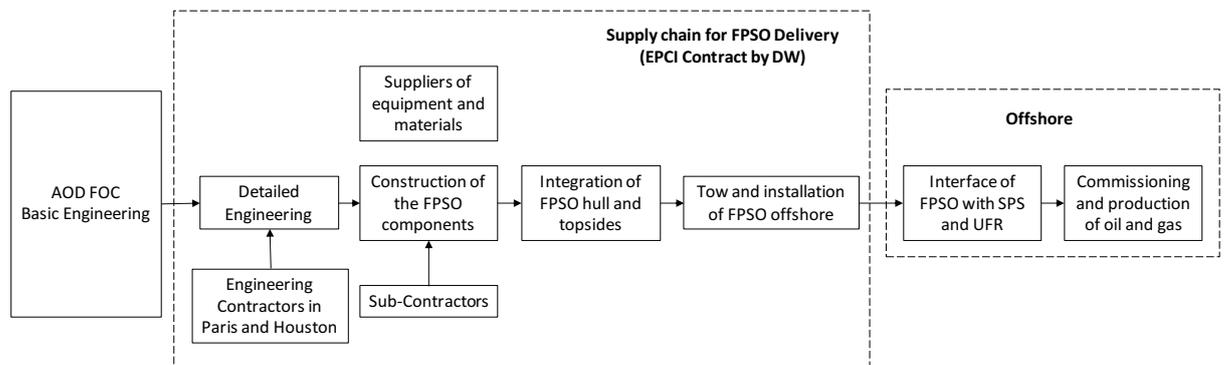
Thus, the project execution phase of detailed engineering and construction, from basic design to the completed FPSO, lasted four and a half years. The final phase, towing the completed FPSO out to offshore Angola and installing it, took a further year and a half; a reflection of the challenges of offshore Angola (Offshore Technology, 2013).

Based on the FOC’s Project Management Procedure (Project Management Guide, TOTAL AS, 2010) NOD FPSO transactions were divided into the following categories:

4. AOD FOC handled all transactions with the Angolan government, Sonangol and other government agencies on strategic and regulatory matters as these involved sensitive political issues.
5. Project management activities, basic engineering and preparation of specifications for EPCI compliance were done by AOD FOC who also had to provide direction for the complex engineering of the key process systems.

6. The EPCI contract was awarded to DW of South Korea for the complete FPSO on a market arrangement. The FPSO hull topside process, utilities modules, a flare tower and the oil export buoy were all fabricated in South Korea. The integration of the FPSO topsides with the hull and pre-commissioning were carried out in South Korea. DW was also responsible for the offshore installation of the FPSO, oil offloading buoy and their moorings.

The supply chain process of a sequentially organised set of the above activities to convert the basic design to an operational NOD FPSO is shown in Figure 8.3.



**Figure 8.3 - Supply Chain for the AOD FPSO**

(Source: Offshore Technology, 2015)

The resultant outcomes of these transactions are discussed in Section 8.3.

## 8.2 Case Study Background, Issues and Expectations

### 8.2.1 Main Specific Hazards

Chapter Six presented the main transactions of a FPSO EPCI contract and the foreseeable risks and uncertainties associated with FPSO contracts, which are common to the three case studies. This section addresses the causes of the hazards posed by the political and institutional context of Angola and the challenges of executing major

transactions in the country. The cumulative responses to the closed interview questions E1 and E2 recorded in Appendix 2 confirmed the main specific hazards associated with the AOD FPSO transactions as follows:

- A major cause for concern was the possibility that the Angolan government may become more opportunistic to reap more financial benefits from the vast investments in the oil and gas industry (Africa Report, 2011). IP7 made the observation “*I would not put it past the (Angolan) government to dictate the award of major contracts in return for benefits (from the contractors) to boost their dwindling funds*”. In such a situation the onerous outcome would be the adverse awarding of the EPCI contracts.
- Significant escalation of CAPEX and schedule of the major FPSO topside components can arise if the EPCI organisation awarded the contract does not have the complete technical expertise and FPSO experience to handle the design and construction of these components.

The impacts of the above hazards are examined by both primary and secondary evidence. Then, enhancements to the governance mechanisms advocated by the extended TCE model are predicted, in order to cope with these hazards.

### **8.2.2 Political Context of Angola**

After Nigeria, Angola is the second largest African oil and gas producer in Africa and its economy is mainly dependent on the oil sector. The long term future outlook is promising and growth was expected to reach 7.5% beyond 2013, buoyed by high oil prices and by the resumption of the government’s public investment programme. It was described in the *Offshore* journal (July 2013) as a “golden decade for Angola’s deep water oil and gas”.

It is a major area of exploration and production for major international oil and gas companies (IOGCs), including Shell, Exxon Mobil, TOTAL, Texaco, Agip and Chevron (Wood Mackenzie, 2011, 2013).

The political power is concentrated in the Movimento Popular de Libertacao de Angola (MPLA) led by President Jose Eduardo dos Santos, who has ruled since 1979 and enjoys complete control over the political system. The political system as defined by the constitution of 1992 functioned in a relatively normal way. The executive branch of the government composed of the President, the Prime Minister and Council of Ministers. The legal system was based on Portuguese and customary law but was weak and fragmented. A Supreme Court served as the appellate tribunal; a Constitutional Court with powers of judicial review was never constituted despite statutory authorisation. In practice, power was more and more concentrated in the hands of the President who, supported by an ever increasing staff, largely controlled parliament, government and the judiciary. The government of President Santos, in power for 35 years, has faced increasing criticism worldwide and in Angola for rampant corruption, lack of governance and authoritarian behaviour. Although the 2012 elections ended in another victory for the MPLA, the government intensified repressive measures, restricting freedom of expression, association, and assembly. The government targets outspoken activists and the police use excessive force to prevent peaceful anti-government protests (Wood Mackenzie, 2009, 2010, 2011; KPMG, 2011).

Angola's oil and gas wealth has made the country an influential power in Africa, attracting business interests from all over the world with very little consideration for the country's poor governance and human rights record. In 2014, for the second time, Angola won a non-permanent seat on the United Nations Security Council and underwent its second Universal Periodic Review at the UN Human Rights Council in October. In

apparent anticipation of such high-level reviews of its human rights performance, in September 2013 Angola signed, but has yet to ratify, four human rights treaties. The 26 year long civil war has ravaged the country's political and social institutions. Daily conditions of life throughout the country and specifically Luanda (population approximately six million) mirror the collapse of administrative infrastructure as well as many social institutions. The ongoing grave economic situation meant any government support for social institutions was minimal. Hospitals are without medicines or basic equipment, schools are without books, and public employees often lack the basic supplies for their day-to-day work. Despite the growth in revenue from oil and gas, there is a widespread lack of qualified workers and significant deficiencies in infrastructure, which act as major constraints to growth (Wood Mackenzie, 2009, 2010, 2011; KPMG, 2011).

However, the oil and gas revenue was used by the government to mitigate large social and economic challenges, just sufficient to prevent any major outbreak of violence or civil unrest (Wood Mackenzie, 2010; KPMG, 2011). In this context a point made by IP14 was that *"It is reaching a stage that the Angolan government must act immediately to improve the living standards of the people"*. IP15 voiced the concern that *"the oil and gas industry is the ideal cash cow for this and the government can milk our (oil and gas) industry not only by regulation but also by direct blatant actions"*. However, IP27 expressed confidentially that *"We do not expect the political hazards to reach the high levels being experienced in Nigeria"*.

### **8.2.3 Increased Regulation of the Industry in Angola**

In 2003, the Angolan government introduced the Basic Law for Private Investment (Law 11/03), which stipulates the main requirements to be complied by foreign investors and also specifies the benefits to such investors. These include provision for equal

treatment, offer of fiscal and custom incentives and simplification of the application process for projects. This law is implemented by the National Private Investment Agency (NPIA) and all foreign investments over \$5 million must be approved by NPIA. However, investments in the energy, diamond and financial sectors continue to be governed by legislation specific to each industry.

In this case directives issued by Ministries take precedence over this law even though the 2003 Investment Law was an attempt by the government to create a more investor-friendly environment (Wood Mackenzie Angola Reports, 2009, 2013). In this situation, as IP7 said, *“the Parliament Acts do not mean a thing as Ministry Directives will have the overriding authority over our (oil and gas) industry”*.

In addition to the 2003 Investment Law, the other regulations in place are the Company Law and the Voluntary Arbitration Law. The first specifies the requirements for the incorporation of commercial companies in Angola. The second law provides the basic legal framework for the resolving of disputes outside of the legal framework. The Angolan government was considered unlikely to directly expropriate the assets of foreign investors. However, an industry concern was that potential for changes in the legislation and more stringent enforcement of existing laws poses some uncertainty about the execution of future major projects in Angola (Wood Mackenzie Africa Reports, 2010, 2011; KPMG Reports, 2012).

Another particular concern of the oil and gas industry is that Angola’s legal and judicial system lacks capacity and is inefficient; legal fees are high and most businesses avoid taking commercial disputes to court (Wood Mackenzie, 2011; KPMG Reports, 2012). These factors relating to the political and legal landscapes were confirmed by IP8, who also highlighted that *“in practice we resolve contractual issues by resorting to compromise, at a cost to us”*.

It is well known that the Angolan government promotes the “Angolanisation” of companies and the greater use of Angolan suppliers for goods and services, but does not impose or enforce specific performance requirements on foreign investments (Wood Mackenzie Africa Report, 2011). In this situation, as IP5 said, “*IOGCs have taken the initiative and are working with the government to establish more local sourcing requirements for the oil and gas industry*”. The oil service companies who provide services to the IOGCs are meeting these requirements by forming joint ventures with local Angolan companies, recruiting more Angolan employees, and substituting local products for imports. In this manner, foreign companies can establish fully-owned subsidiaries in the oil and gas industry, and are frequently encouraged to take on local partners (Woodmackenzie, 2012).

Angola has basic property rights protection and the National Assembly adopted the Paris Convention for the protection of industrial intellectual property in 2005. The licenses for the oil and gas exploration rights are granted for limited periods of time and only as partnerships between IOGCs and the Angola National Oil Company (NOC) which is Sonangol. These licenses are normally granted for ten years. The excessive proliferation of bureaucracy and regulations encourages corruption and malpractices. In this case the complex arrangements and extended bureaucratic delays invariably encourage foreign firms to accelerate the project approval process by paying gratuities and facilitation fees (KPMG, 2010, 2011).

The common concern of the interviewees was that the government is increasingly exploiting the benefits of oil and gas revenues by imposing demands on the sharing of these benefits, without any established statutory instruments. An example quoted by IP27 was “*there is always the potential for opportunistic intervention by government when awarding major contracts, each worth up to \$5 billion*”. However, despite the increasing

political intervention, major IOGCs consider offshore Angola an extremely attractive proposition because of the vast amount of hydrocarbon reserves that can be exploited. They are therefore prepared to accommodate the occasional intervention of the Angolan government in their project transactions (Woodmackenzie, 2012; Offshore Journal, 2013). As explained by IP18 *“The interventions by the government were not according to a planned strategy but sporadic actions to reap short term commercial benefits”*.

#### **8.2.4 Impact of Project Execution Uncertainties**

Having considered the political context, the impact of the specific technical and economic challenges facing the AOD project are addressed, before predicting the governance mechanisms for the FPSO transactions. Significant technical and commercial uncertainties faced by the AOD FPSO were similar to other offshore deep water oil and gas projects. In the case of the AOD FPSO, interview participants, particularly IP27, stressed that *“the main execution failure can be caused by selection of a South Korean EPCI contractor who is not fully conversant in handling the technical complications surrounding complex process systems and components of the FPSO”*. IP13 pointed out that *“all the South Korean EPCI contractors whose core expertise is construction of marine tanker vessels are not fully conversant with the complex technical requirements for the FPSO systems and lacked the required expertise to execute the work”*.

Thus the AOD FOC expected the performance of the selected EPCI contractor to be the main cause of any CAPEX escalation and delay in completing the FPSO to the required standard. The project manager IP14 explained that *“our strategy to manage this concern was to ensure that we prepared a robust design supported by complete technical specifications to guide the EPCI contractor”*.

### **8.2.5 Predictions of the Extended TCE Model**

Having examined the impact of the political, economic and execution hazards, facing the AOD FPSO transactions, this section applies the logic of the extended TCE model to predict the governance mechanisms to cope with the impact of the intervening variables of the model, i.e. medium level political hazards and acceptable level of protection of property rights (i.e. risk levels which can be assigned probability of occurrence by statistical data). The prediction of the extended TCE model will be a coalition of transaction governance mechanisms based on the proposition that the AOD FOC must perform the activities they can do best and use the market arrangements for transactions where that would deliver greater cost effectiveness and efficiency. As presented in Chapter Six, Table 6.3, a FPSO consists of several components requiring transactions of varying levels of uncertainty and asset specificity.

In this case, based on the potential challenges facing the AOD FPSO project, the extended TCE model would predict the use of vertical integration for the project's front-end activities in order to fully define the basic technical and commercial specifications, and for liaising with the Angolan authorities to obtain the necessary project sanctions.

Both the basic TCE model and the extended model would predict the use of the market for the rest of the FPSO transactions, including the following major components:

- The detailed design of process and utility systems.
- FPSO construction in South Korea.
- FPSO moorings installation.
- Detailed design and fabrication of the offloading buoy.
- Fabrication of the flare tower, risers and manifolds.

Thus, in the case of the AOD FPSO, greater use of the market than in the Nigerian case study can be envisaged, as the technical and the commercial specifications formulated by the AOD FOC were expected to be complete enough to enable these transactions to be

executed efficiently. However, there would be the need for hybrid arrangements with AOD FOC providing technical and logistics support to the EPCI for complex engineering and installation activities which can cause delays. As it turned out, as stated by IP14 *“based on our project practice AOD FOC decided to execute the FPSO EPCI activities on a near ‘turn-key’ contract, except for the offshore commissioning of systems”*. The commissioning of the production and utilities systems was to be managed by AOD FOC staff (such as interviewees 14, 15 and 19), who were responsible for the future of the AOD oil and gas facilities’ operations.

The next section considers the outcome of the AOD FPSO transactions in order to evaluate to what extent the governance mechanisms used were, or had to be, aligned with the predictions given in this section.

### **8.3 Outcome of Project Transactions**

#### **8.3.1 Project Organisation and Transactional Relationship**

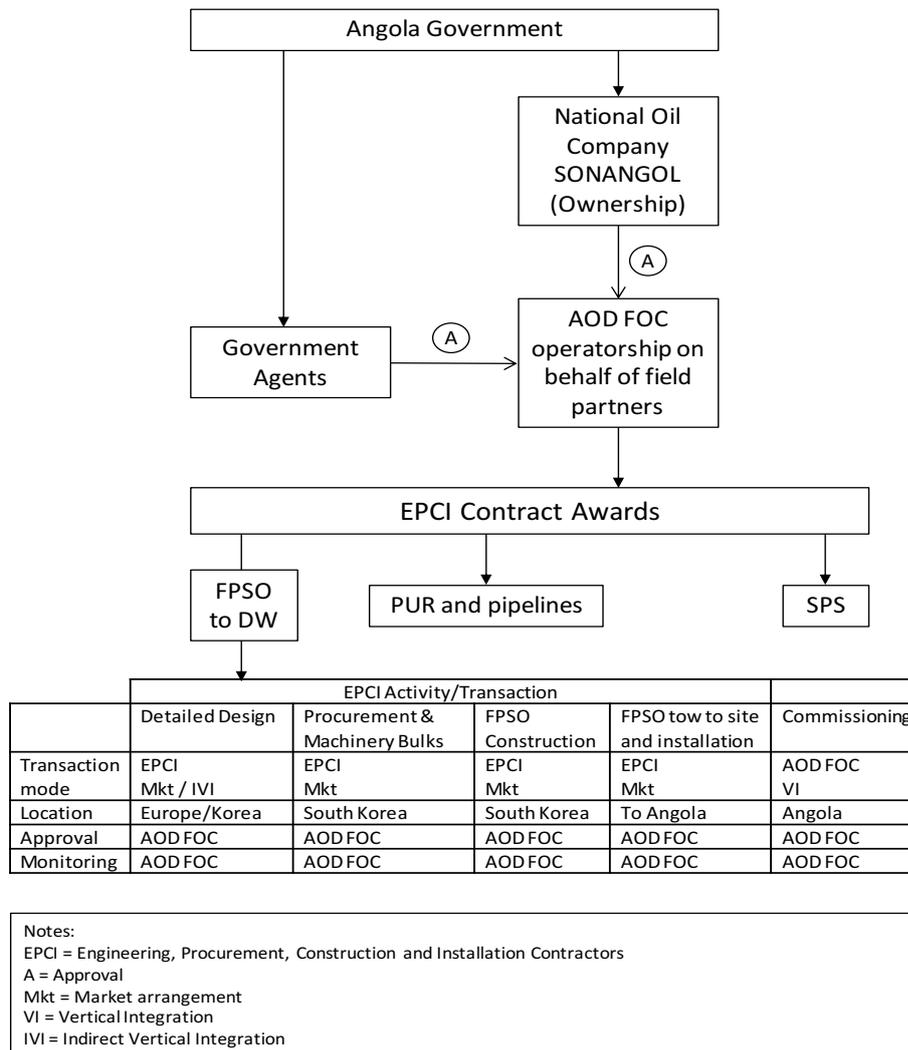
This section analyses FPSO project transactions considered in three main categories: project management, EPCI contracts activities in South Korea, and onshore and offshore transactions in Angola, which are subject to different technical and transactional hazards. The outcomes are examined, taking into consideration the IOC governance arrangements used, any revised measures implemented and their reasons. The relationship arrangements and the ex-ante governance mechanisms planned for executing the FPSO transactions extracted from the project records are shown in Figure 8.4.

The AOD FOC was responsible for the management of the extraction of oil and gas field resources owned by Sonangol.

In addition, AOD FOC was responsible for the development of the field and liaising with the Sonangol and Angolan authorities for approvals and sanctions (Wood Mackenzie, 2011). According to IP14 *“This proved to be more challenging for this project*

than during previous Angolan projects due to the increasingly selfish behaviour of the government and their agents”.

The AOD FOC prepared the basic engineering, performance standards and execution plans for the tender bids for the EPCI contracts. As discussed later, the AOD FOC was compelled by the Angolan government to award the EPCI contract for the FPSO on a market arrangement to DW, a South Korean company.



**Figure 8.4 - AOD FPSO Organisational Relationships and Governance Mechanisms**

IP27 explained that “the AOD field development plan defines the execution strategy and hence has a bearing on the commercial issues. It had to comply with stringent compliance requirements, significantly higher than for previous projects. We had to

*include more detailed transaction information including sensitive cost data for the design, fabrication and offshore installation programmes of the project activities*". In the assessment of IP8 *"We could sense increased opportunism on the part of the government and this significantly impacted the execution arrangements that we had planned"*. According to IP18 *"The increased compliance requirements meant additional expenditure in the form of commercial concessions and a delay of about a year in obtaining the sanctioning of the project development plans"*. These inputs from the IPs were confirmed by the project records that the IOC's field development plans and project execution arrangements, formulated to optimise the use of their resources, were compromised by commercially adverse changes which benefitted the Angolan government. This can be considered an infringement of the FOC's property rights due to the increased economic opportunism of the Angolan government exercised through Sonangol. The IOC Project Manager IP14 lamented about the financial loss that *"during the delay in the sanctioning process the project had to maintain its management and engineering teams so as not to lose our in-house expertise, which would have been extremely difficult to replace"*.

The compliance and project sanctioning process also includes 'signature fees' paid by the AOD IOC and their partners to the host government. The value of these is subject to negotiation, depending on the concessions made by an IOC in their field development plans and project execution activities to the benefit of the government (Woodmackenzie, 2013).

IP15 confirmed that *"in reality, mainly due to the protracted negotiations to resolve the division of the oil and gas revenue and the award of the EPCI contracts, the AOD project sanctioning process took fifteen months instead of the expected five to six, as had been the case for previous projects"*. As the project records confirmed, in order to deal with these delays, the AOD FOC rapidly expanded its project management teams in

Paris and Angola. This required, as a contingency measure, additional specialists in contract negotiations and commercial affairs to deal with the unexpected opportunistic behaviour of the Angolan government and Sonangol. It was confirmed by IP8 that these teams were increased from 120 to approximately 170. Project Services Manager IP28 stated *“We could have run a chamber of lawyers as there were so many legal experts required to resolve the contractual terms and the selection of the EPCI contractors”*. (This is discussed later in this section.)

The project documentation confirmed that the process to award the EPCI contracts took longer than expected because the Angolan government, who had the approval authority, intervened in dictating the award of EPCI contracts for the major project components. As such, the award of contracts for the main project components including the FPSO became subject to mandatory approval by Sonangol. The FOC prepared, as they had for the previous projects, the bid documents and specifications for the tender process for awarding the EPCI contracts on a market arrangement for the main components of the AOD project.

IP14 confirmed *“there was a lengthy and exhaustive tender process for the FPSO involving the four South Korean EPCI contractors including HI and DW”*. According to IP28, *“Based on the results of the stringent bid evaluation process, the AOD project management recommended the award of the FPSO EPCI contract to HI, together with a French engineering subcontractor. This combination had worked successfully for other FPSO projects executed by the AOD FOC”*. However, IP28 corroborated the account by IP14 that *“A major unexpected development was that Sonangol, directed by the government, rejected the selection of the tender process for the award of the FPSO EPCI to HI. The contract award was dictated by Sonangol based on economic benefits to their advantage”*. In this situation, acting on instructions from Sonangol, the AOD FOC had to

award the EPCI contract to DW, with an American company as their engineering subcontractor.

IP14 said that *“The project team was quite devastated by this unfair contract award, despite the formal tender process and the technical specifications having been firmed up by the IOC with HI”*. He said *“the AOD FOC IOC had to make significant commercial and technical compromises before awarding the FPSO EPCI contract to DW”*. The project records confirmed that the AOD FOC became very concerned about awarding of the EPCI contract to DW without resolving technical uncertainties, particularly the issues connected with the topside hydrocarbon processing modules and mooring arrangements. In this situation, *“there would a need for higher AOD FOC involvement than envisaged to resolve the increased commercial and behavioural uncertainties in the FPSO transactions”*, according to IP23 and confirmed by IP28. As in case study 1, this required the application of indirect vertical integration measures in the design and monitoring of the construction of the FPSO to meet the stringent technical specifications.

### **8.3.2 Project Transactions in South Korea**

The project records revealed that the AOD FOC was unable to impose all the technical requirements and contractual terms specified in the EPCI contract with the DW contract. Similarly, DW had insufficient time to become completely familiar with the complex technical requirements and had not mobilised sufficient technical expertise to execute the work as they had underestimated its scope. The detailed engineering was carried out by the DW American sub-contractor with a project team of more than four hundred people in South Korea and Houston.

IP28 pointed out that *“because of the shortcomings of the DW contract proposal, we had to introduce additional provisions, both in the technical specifications and installation procedures for the FPSO”*. The project documentation reported that engineering and construction progress was slow and the quality inadequate as DW had a steep learning curve. This was due to the inadequate clarification and resolution of the technical issues before contract award. IP13 confirmed that *“as contract execution proceeded, the AOD FOC became extremely concerned about the potential quality, technical failures and delays that could materialise due to DW’s inadequate performance”*. The outcome, according to IP27, *“Resulted in the 130-person project team in South Korea being supplemented with an additional 80 expatriate personnel to provide the necessary technical and management leadership”*. According to IP15 *“the AOD FOC personnel had to work with DW and convert detailed engineering into construction methods during the fabrication period. This amounted to implementing indirect vertical integration, as the complex technical activities had to be directly managed by the AOD FOC personnel”*. IP27 described this intervention as *“a rescue operation to prevent a ‘debacle’”*.

The AOD FOC also retained a ‘shadow’ engineering team to provide the highly skilled expertise required to perform the complex engineering for the topside process systems. Consequently, the engineering management and quality control costs more than doubled.

The lesson learned is that if this remedial action had not been taken, there would have been defects in the construction of the FPSO requiring extensive rework (OTC 20123 and OTC 20163). Additionally, as confirmed by IP28 *“There was a lack of contractual trust as this was the first FPSO contract executed by DW for the AOD FOC. It became necessary to make commercial concessions by relaxing some contractual terms and*

*providing incentives to minimise the opportunistic behaviour of the EPCI contractor who enjoyed the patronage of the Angolan government”.*

As pointed out by IP15, *“In order to comply with the strategy to maximise the onshore pre-commissioning and commissioning of the FPSO, additional IOC personnel were required to manage these activities to help DW”.*

The offshore installation was done as part of the AOD FOC contract with DW, as they possessed the necessary large installation vessels. However, according to IP18, *“The IOC had to provide the expertise to supplement the DW’s lack of technical expertise and operational resources in order to manage the complex tasks involved in installing the FPSO and UFR in offshore Angola, an area not familiar to DW”.* Final commissioning of the integrated FPSO to commence oil and gas production was undertaken by the AOD FOC with the assistance of DW. This process was conducted as a virtual vertical integration arrangement, as the commissioning procedures and logistics were all formulated, executed and controlled by the AOD FOC.

### **8.3.3 Increased AOD FOC Participation and Transaction Costs**

The project documents confirmed that the relationship arrangements between the Angolan government, Sonangol, AOD FOC and DW (EPCI contractor) remained nearly the same as illustrated in Figure 8.4. However, as discussed in Sections 8.3.1 and 8.3.2, significantly increased AOD FOC participation was required to implement the hybrid governance mechanisms to complete the project transactions. The governance mechanisms which had to be used (as recorded in project documents) turned out to be not in complete alignment with the predictions of the TCE models summarised in Section 8.2.5.

As such, the strategy used was aligned with the predictions of the extended and basic TCE models for the following transactions:

- Transactions with the government, Sonangoland other institutions (vertical integration).
- Hull tanks and machinery (market).
- FPSO offshore moorings and installation (market with IVI).
- Fabrication and installation of the oil export buoy (market with IVI).

The strategy used was not aligned with the predictions of the TCE models for the following transactions:

- FPSO detailed engineering (hybrid with IVI).
- Fabrication of topside process modules (Hybrid with IVI)

In summary, the AOD FPSO was completed with an increased management of transactions by the AOD FOC to implement political governance mechanisms in addition to measures required to direct the technical and commercial activities carried out in South Korea and Angola.

This inevitably resulted in significantly increased transaction costs and effort measured in terms of hours incurred to complete the project. These transaction costs consist of the costs for management, political governance, engineering support and monitoring of the EPCI activities.

The lesson learned is that an unexpected increase in the political hazards caused by selfish intervention of the host government led to the requirement to extend the governance mechanisms (i.e. the intervening variable) beyond the basic TCE model. The causes and consequences of this extension of the TCE theory are given in the next section.

## 8.4 TCE Findings of the Case Study

### 8.4.1 Empirical Findings on the Extension of TCE

The AOD FPSO and associated facilities were installed offshore and commissioned to achieve first oil and gas. In order to achieve this, all three groups of transactions, i.e. project management including political governance arrangements, the FPSO construction in South Korea and transactions in Angola, had to be carried out in non-economising arrangements. As is evident from both primary evidence (responses of IPs) and secondary evidence (from industry publications) provided in Sections 8.2 and 8.3, it was not possible to rely on extensive market arrangements as in previous Angolan projects.

In Angola, as the economic pressures increased, the government resorted to blatant opportunism to exploit the benefits from the oil and gas projects. IP5 pointed out that *“the adverse government intervention could be attributed to the immaturity of the Angolan government in handling its relationships with the industry, and akin to killing the goose that lays the golden eggs”*. It was confirmed by IP18 that *“problems manifested in the form of excessive demands from the government authorities for financial ‘rewards’ in return for smoothing the path for the sanction of the project activities”*. This forced the AOD IOC, as expressed by IP18, to implement *“relationship building measures with the Angolan government requiring unexpected additional resources for lobbying political leaders directly and indirectly”*. This is a situation when, contrary to ex-ante expectations, it was necessary to introduce increased political governance mechanisms to complement project governance in order to counter the unexpected increased political hazards and institutional opportunism (Woodmackenzie, 2011, 2012). This evidence supports the proposition that it is necessary to implement mechanisms of political governance in the form of economic

and relationship concessions to address institutional-specific political hazards (Henisz and Williamson, 1999).

The evidence of this case study also supports the point that increased political opportunism caused by adverse changes in the economic and social climates can in turn alter the safeguarding arrangements of property rights. As such, this finding (as with case study 1) supports the argument made in Chapter Four, that property rights allocation is determined and implemented by those participating in the transactions and reflects the conflicting economic motives and the relative bargaining strengths of those participants. As the Angolan government's political opportunism increased, so too did the potential threat to FOC IOD's property rights to execute transactions in an optimal manner. The outcome, as stated earlier, was DW being awarded the FPSO contract on the instructions of Sonangol, despite the fact that they were not the successful bidder. Thus, the existing arrangements for safeguarding the IOC's property rights, a modulating variable previously perceived as acceptable, became ineffective because of this opportunistic behaviour.

A result of this adverse selection was that trust and lack of performance issues created by DW during the project transactions, alongside numerous commercial drawbacks, meant that relying on market governance would have led to an escalation of costs and schedule delays. Hence, there was the need for FOC to resort to hybrid arrangements with indirect vertical integration to manage the performance and trust issues to limit the contractor's capacity to create delays. Contrary to expectation, IOC had to resort to retaining control of the engineering of FPSO systems and providing direction for the FPSO construction and offshore activities. The implementation of these remedial measures by the IOC, in the form of contractual concessions and technical expertise support, had the beneficial impact of improving the working relationships and trust

between the FOC and DW and “ironing out” the initial disputes, as mentioned by interviewee 27.

In this case study of AOD FPSO, the property rights were determined and enforced solely by the Angolan government who displayed pre-meditated, selfish, opportunistic behaviour to exploit the benefits from the oil and gas projects. Therefore, the predominant market governance arrangements predicted for the AOD FPSO by the TCE model could not be implemented as the market arrangements required additional safeguards. Therefore, this case study demonstrates that the potential effects of political opportunistic behaviour, which were not evident before the event, can negate the corporate selection of governance arrangements causing adverse selection of the agent when market arrangements are used.

In summary, the opportunistic behaviour of the Angolan government caused delays in the project sanction and an infringement on the method of project execution leading to the adverse selection of EPCI contractor.

As a result, the transaction costs increased to cover the costs of implementing specialised governance mechanisms for the EPCI contract. A measurement of this extension of the basic TCE model is provided in the next section.

#### **8.4.2 Measurement of the Extension of TCE Model**

As for case study 1, the increase in transaction costs and increase in the effort required (measured in terms of hours expended) to complete transactions, are used as credible measures of the extension of the TCE model required for the AOD FPSO transactions to mitigate the unexpected increase in the political hazards. The estimates for the hours and costs of transactions in Europe, South Korea and Angola were verbally provided (in confidence) by IPs 7, 8, 13, 14, 15, 18, 19, 23, 27 and 28. The mean values of these estimates are recorded in Table 8.3.

The cost figures are given in US million dollars (MD). As in case study 1, the transaction activities are considered to be composed of project management, implementation of political governance mechanisms and the IVI activities for the AOD FPSO EPCI transactions.

**Table 8.3 - Escalation of Transaction Costs (TC) for AOD FPSO**

Transaction Activity	Location	Estimated hours	Final hours	% Increase in hours	Estimated TC (MD)	Final TC (MD)	Increase in TC (MD)	% Increase in TC
Project Management and Political Governance	Europe				112	131	10	9
Project Management and Political Governance	South Korea				21	33	12	6
Project Management and Political Governance	Angola				69	96	27	39
Project Management and Political Governance	Europe, Angola and South Korea	145,000	188,000		202	260	58	28
Engineering Support and Monitoring	Europe	104,000						
Engineering Support, IVI and Monitoring	South Korea	119,000						
Engineering Support, IVI and Monitoring	Angola	37,000						
Engineering Support, IVI and Monitoring	Europe, Angola and South Korea	260,000	375,000	44	329	451	122	37
TOTAL TRANSACTION COSTS					607	711	104	17

As recorded in Table 8.3, the increase in the overall transaction costs ( $\Delta TCE_A$ ) for the AOD FPSO was approximately 17% of the initial budget, from \$607 million to \$711 million. The percentage increase in the transaction costs for the AOD FPSO project management and political governance measures turned out to be 28% with an increase of

30% in the hours expended, which proved significantly higher than anticipated. As discussed in Section 8.3, this was due to the extra effort required for negotiations, lobbying and other political governance mechanisms that were required to cope with the increased opportunisms of the Angolan authorities. The increase in the transaction costs for implementing the IVI measures required to ensure technical performance of the completed FPSO and building relationship trusts in JV arrangements turned out to be 37% with an increase of 44% in the hours expended. This highest percentage increase in the total transaction costs was dominated by the transaction costs in South Korea. This was the result of implementing the IVI measures to ensure technical performance of the completed FPSO and building relationship trusts, in order to compensate for the shortage of expertise of DW in executing FPSO contracts. The case study findings provide evidence that the unexpected political hazards created by the opportunistic behaviour of the host country government and inadequate institutional regimes can result in the project transactions having to be carried out in a non-economising manner. Thus, for the AOD FPSO transactions these intervening variables of the extended TCE model shifted the point at which specialised governance strategy was needed. The outcome was political governance and pre-contract award activities were done by vertical integration with indirect vertical integration mechanisms had to be implemented to ensure completion of AOD FPSO activities. The implementation of this hybrid governance ( $H_A$ ) at lower asset specificity is illustrated in Figure 8.5. The line  $H_A$  represents the increased transaction costs of  $\Delta TCE_A$  for the AOD FPSO, representing a measure of the extension of the basic TCE that was required to complete the AOD FPSO transactions.

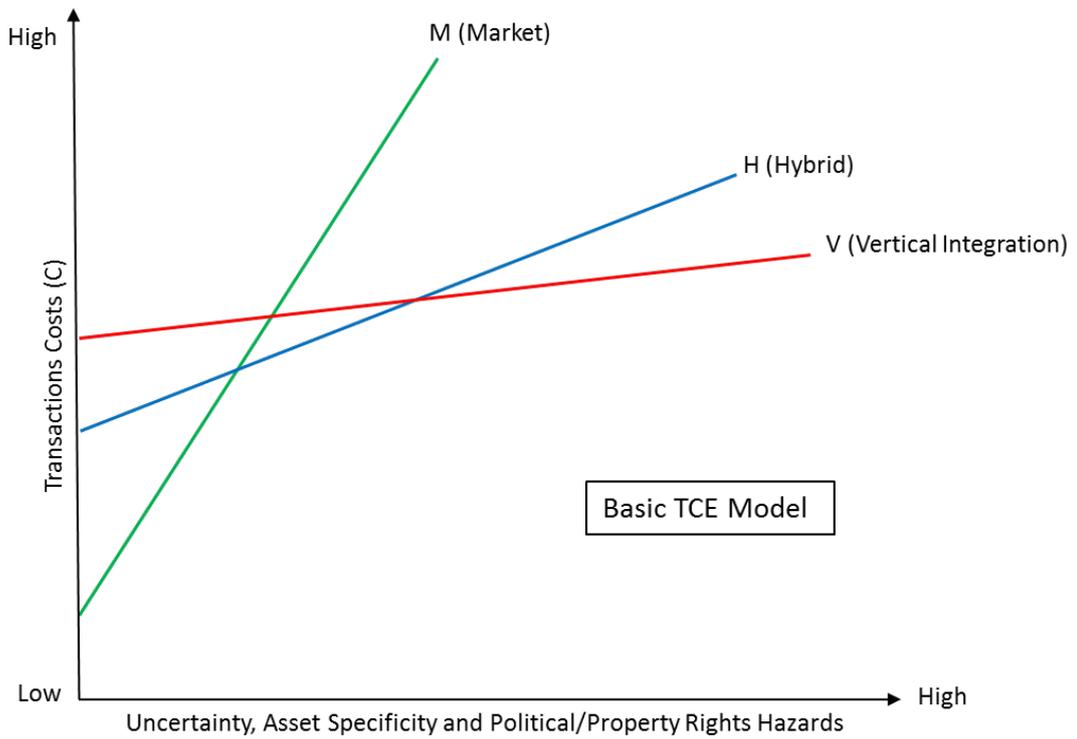
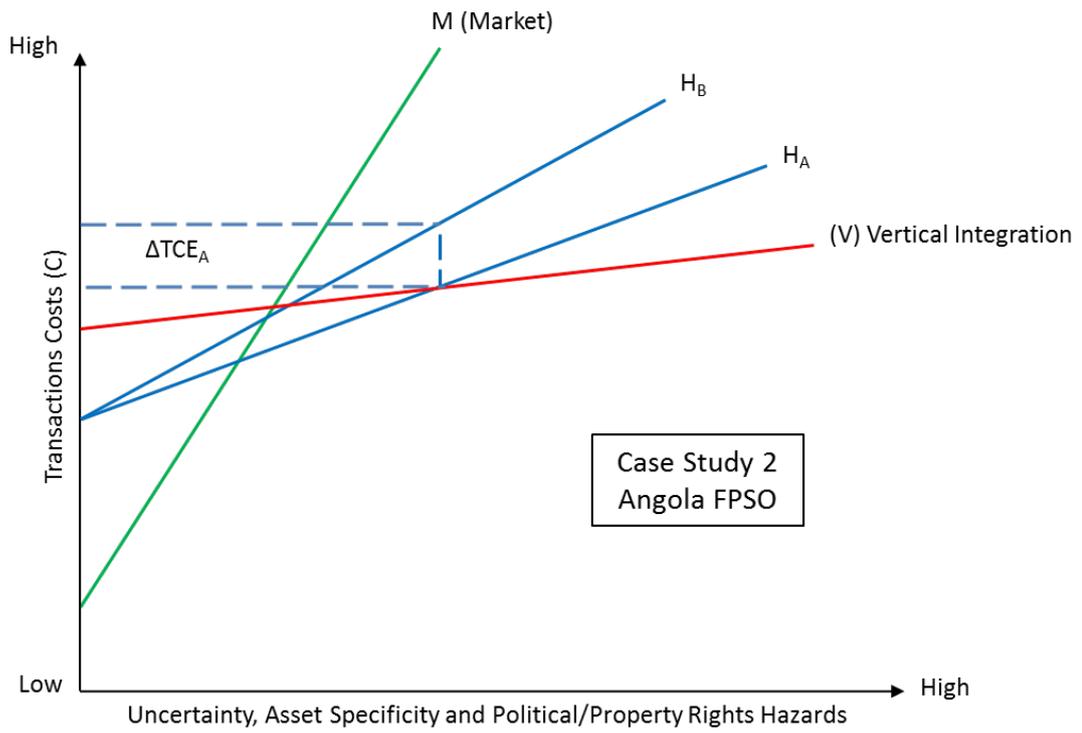


Figure 8.5 - Impact on Medium Political and Property Right Hazards on Transaction Costs

## 8.5 Conclusions

For the FPSO projects carried out in Angola before the AOD FPSO project, government intervention was minimal and there were no major concerns regarding the delineation of property rights. As such, the case study of the FPSO project off Angola (AOD FPSO) examined the scenario where the host country political hazards and protection of property rights present were considered as “medium level” hazards. The expectations were that there would be adequate checks and balances in the form of established institutional arrangements to minimise political hazards and access to legal redress to enforce contracts in place. The extended TCE model predicted the use of vertical integration for the project’s front-end activities including political governance for liaising with the Angolan authorities to obtain the necessary project sanctions. Both the basic TCE model and the extended TCE model predicted greater use of the market than in case study 1, as the expectations were that the complete technical and commercial specifications would enable the EPCI contract to be executed efficiently.

However, the ex-ante expectations of the levels of political hazards and the existing arrangements for the safeguarding of the property rights became ineffective. This was due to the changed behaviour of the Angolan government resorting to self-interest to exploit the revenues from oil and gas production in order to overcome the economic and political problems in Angola. Such practice of self-interest with guile by the government could not be anticipated ex-ante due to the bounded rationality of the participants and hence the appropriate mitigation measures did not become evident until the circumstances materialised.

The Angolan government overruled the EPCI contractor selected by AOD FOC and, for economic reasons, imposed a contractor of their choice on AOD FOC, whose

technical abilities did not match the task. In this case study, the ex-ante expectations of the levels of political hazards and the existing arrangements for the safeguarding of the property rights became ineffective due to the changed behaviour of the Angolan government.

Adverse selection of the FPSO EPCI contractor created issues of inadequate competency, a lack of trust and the potential for delays. As such specialised forms of governance were needed, as market arrangements alone were inadequate. This required indirect vertical integration in the form of greater participation by the IOC in the transactions resulting in increased transaction costs. The case study therefore provides empirical evidence of the relationship between the modulating and intervening variables of the extended TCE model.

Increased government intervention and a reduction in the property rights safeguards resulted in transactions being carried out uneconomically as the market arrangements perceived before the event had to be augmented by remedial measures.

This case study thus provides evidence to support the proposition that property rights are determined through political processes and that political behaviour has an overriding influence on the governance arrangements required to deliver project success. This is in contradiction to the classic TCE theory of frictionless market where the host country government or the regulatory bodies are considered as neutral or even redundant to the execution of the transactions. The conclusion drawn from this case study is that an extension of TCE by political governance may be required, even for situations where the political and property rights hazards faced by international transactions are considered to be manageable.

## **Chapter 9 CASE STUDY 3 – OIL AND GAS DEVELOPMENT IN THE GULF OF MEXICO**

### **9.1 Introduction**

#### **9.1.1 Core Argument**

This research focuses on the academic challenge of developing an extension to the Transactions Cost Economics (TCE) theory, to predict governance mechanisms for high value, complex industrial projects executed across international borders. This extension to the TCE addresses the impact of the political and institutional arrangements and the property rights protection issues of the host countries, where the project transactions are carried out. In this case, the focus is on selection of appropriate governance mechanisms in an effort to provide the necessary dimensions of authority, decision-making and accountability for such international projects. Case studies 1 and 2 provide evidence that countries with authoritarian regimes, when motivated by selfish interests, can be expected to cause hazards in the execution of the major projects. These can manifest in the form of imposition of stringent regulations, implementation of excessive fiscal demands, threats to property rights and expectation of bribes to resolve the challenges of these demands. Evidence has been provided by these two case studies that this adverse behaviour of a country's political institutions, causing hazards and constraints to transactions, requires the application of political governance, both in a direct or subtle manner. Accordingly, selfish government intervention when compounded by relative weak property rights constrains firms' capability to execute transactions in an economising manner.

The subject of this case study 3 is a FPSO project in the Gulf of Mexico (GUM FPSO) off the USA coast with the technological hazards and characteristics of transactions similar to those of case studies 2 and 3. The USA has a well-regulated mature oil and gas industry with minimum intervention by the government in project transactions. In

addition, the institutions provide very high levels of protection of property rights. However, costs for legal enforcements, if ever the need arises, are extremely high and the proceedings protracted.

The responsibilities for the development and operations of the GUM were assigned by the venture partners to the IOGC with the largest stake in the venture. As discussed in Chapter Six, this IOGC, called the Field Operating Company (GUM FOC), was responsible for all project transactions.

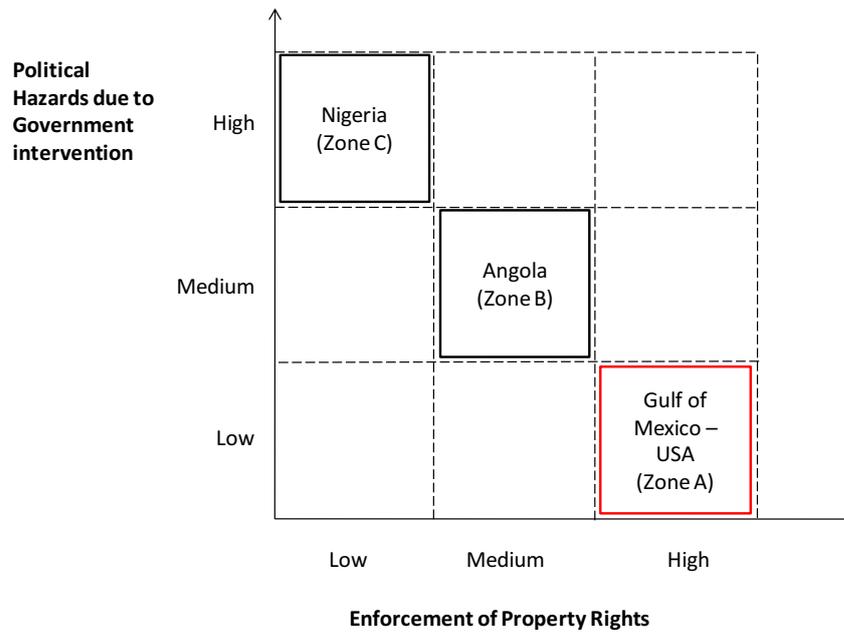
The cumulative responses to the interview closed question E1 (recorded in Appendix 2 and repeated below), provide evidence that the relative political and institutional hazards on transactions with respect to the oil and gas industry in the USA are considered low compared to those of Nigeria (high) or Angola (medium).

**Table 9.1 - Potential Impact of Host Country Political and Institutional Hazards**

	<b>Factor</b>	<b>Average Score</b>
E1.1	Nigeria	85%
E1.2	Angola	72%
E1.3	USA	40%

As per the dimensionalising provided in Section 4.2, the USA is a democratic state compared to the Nigeria regime which is classified as a dictatorship and Angola which is a pseudo-democratic state. Hence, this case study reflects the scenario given in Zone C of the matrix of government intervention (high/medium/low) versus enforcement of property rights (low/medium/high) presented in Chapter Four Section 4.2 and repeated below.

Hence, case study 3 examines the scenario represented in Zone A of the illustration Figure 4.2 (repeated below) where the political hazards and protection of property rights present are both considered as known risks, causing only low levels of hazards.



**Figure 9.1 - Dimensions of Political and Property Rights Hazards for GUM FPSO**

The evidence from the case study is evaluated in order to determine whether the outcome of the project transactions (the dependent variable) was as predicted by the TCE model when the impact of the institutions on project transactions was considered to be neutral.

### 9.1.2 Data Sources

As for other case studies, GUM FPSO project documents were examined to collect the data to develop the narrative of the case study. As the contents of these documents cannot be divulged due to their confidentiality, the following multiple sources (details listed in the References section of the report) are used to corroborate and extend the data collected from the project documents. These multiple sources were used for the evaluation of the outcome of GUM FPSO transactions to formulate the findings to provide justifications for the conclusions:

1. Offshore Technology Conference (OTC) proceedings papers including:
  - a. OTC20400 – GUM Development of Offshore Projects
  - b. OTC21821 – Project Execution for GUM Projects
  - c. OTC21878 – Management of Complex Offshore Projects
  - d. OTC 21075 – Risk Mitigation in International Oil and Gas Projects.
2. Wood Mackenzie– Gulf of Mexico Deepwater oil gas reports (Wood Mackenzie, 2009, 2010, 2011, 2012, 2013).
3. Offshore Technology, August 2010, July 2012, October 2013.
4. KPMG Reports on oil and gas industry (2011, 2012, 2013).
5. Analysis of the responses of the interview participants (IPs) listed in Table 9.2 (extracted from the complete list in Table 5.4) to closed and open questions of the semi-structured interviews, which are used in this chapter as primary evidence.

**Table 9.2 – Interview Participants for GUM FPSO Project**

<b>IP</b>	<b>Project/Organisation Position Held</b>	<b>Experience (years)</b>
5	Director, Risk Management Consultants and formerly Shell Expro	>35
6	Project Risk Manager, a major IOGC	>30
9	Academic and Project Management Consultant	>30
10	Ex-Vice President, Halliburton Energy Services	>35
11	Project Manager – several IOGCs	>35
12	Managing Director, Risk Management Consultants	>30
16	Project Risk Manager, a major IOGC	>25
20	Risk Manager – Subsea Seven Limited	>25
21	Director, Risk Management Consultants	>25
25	Director, Risk Management Consultants	>30

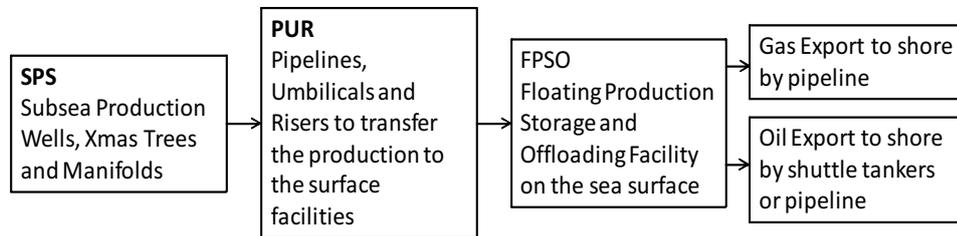
The rest of this section summarises the basic GUM FPSO project components and defines the contractual background for the transactions to be executed. In Section 9.2 the background data of the case study including causes of the specific hazards faced by the oil and gas industry in the USA and the GUM project are discussed. Justification is provided for the prior expectation of the level of risks due to these variables. Then the governance measures as predicted by the TCE model for the transactions are defined.

Section 9.3 examines the outcome of the project transactions when the *ex-ante* expectations of the level of governmental intervention and the threat to the protection of property rights arrangements are both considered to be low (i.e. issues not impacting the transactions). Section 9.4 examines the empirical findings to discuss the applicability of the TCE model to the GUM FPSO project and the validity of the research propositions concerning the selection of optimum governance arrangements. Justification is provided for transactions mechanisms found to be necessary to complete the project transactions for the GUM FPSO to achieve first oil and gas. Finally, the conclusions are drawn in Section 9.5 as to whether the evidence provided by this case study supports the research propositions presented in Chapter Four.

### **9.1.3 Summary of the Project Scope**

The GUM field is located in the Mississippi Canyon, 125 miles south-east of New Orleans. It is the largest field in the Gulf of Mexico and lies at a water depth of 1900m, i.e. very deep water compared to earlier projects. Technically, the components of the GUM project, as illustrated in Figure 9.2, are similar to the other two cases considered in this thesis. It is a major offshore deep water project to extract, process and transport oil and gas from 25 remote subsea wells by pipelines to a moored FPSO, the largest floating installation not only in the Gulf of Mexico (GUM) but in the world. The generic technical,

commercial, project execution arrangements and the uncertainties of these projects are presented in Chapter Six.



**Figure 9.2 - Components of an Offshore Oil and Gas Development in GUM**

According to interviewee 11, the GUM FPSO’s topside area is the “*size of three football fields*”. It is packed with process systems and utilities to separate the hydrocarbon into oil, water and gas and to export a quarter of a million barrels of oil per day.

The GUM FPSO is a monohull ship-like facility, anchored to the seabed by a station-keeping mooring arrangement. The FPSO hull is of standard design and construction, but enhanced with additional water ballast tanks, machinery spaces and mooring equipment to meet the requirements for the deep water (Offshore Technology, 2010). The FPSO topsides systems and module designs are highly project-specific with design variations and uncertainties depending upon the hydrocarbon processing systems required to handle the extra-large production capacity from deep water. The mooring arrangement for the station keeping of the FPSO is highly site-specific and there will be design variations and uncertainties depending on the GUM site conditions. Installation and commissioning of the FPSO in GUM deep water requires highly skilled and experienced personnel. In relation to this deep water project, the FPSO and its mooring arrangement presented the highest cost element at about \$5.4 billion out of a project total budget of \$9.2 billion. It also contains high asset specificity because the end product is not re-deployable to other locations. Therefore, the design, construction and installation of this FPSO in the

GUM presented a novel challenge to the GUM FOC and the EPCI contractor (Offshore Technology, 2010).

In addition, the issue of physical asset specificity is very high as the partner IOCGs and EPCI parties to the transaction invested in novel equipment and machinery involving specific capabilities due to product complexities. The human asset specificity was another important factor in that the EPCI contractor had to accumulate specific expertise in order to construct and install the facility.

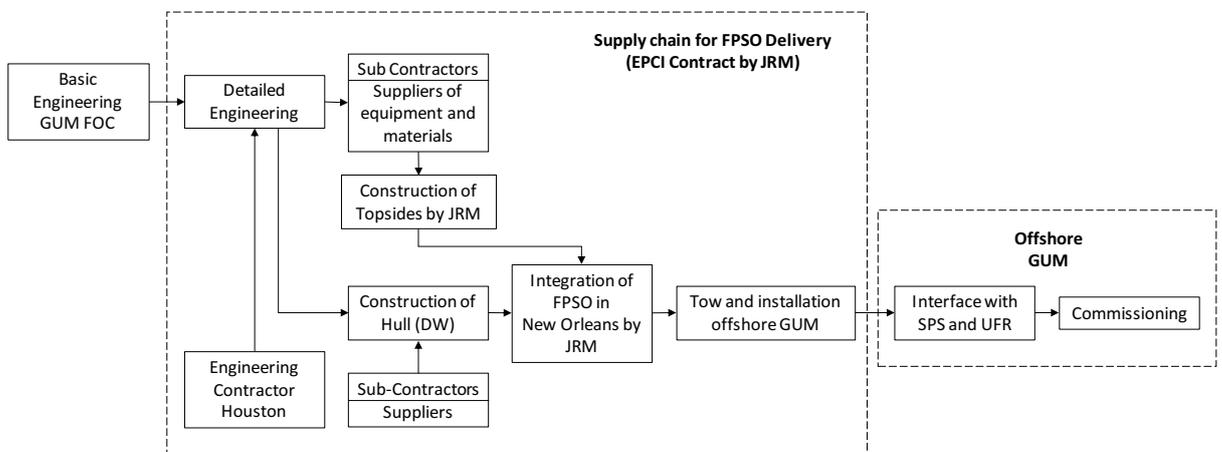
The total GUM project execution timescale was eight years. In the first three years, the GUM FOC carried out the activities for the basic engineering, preparation of tenders to obtain commercial bids, and award of EPCI contracts for the major components (OTC Paper 20400). The project transactions for the engineering, procurement, construction and offshore installation (EPCI) of the GUM FPSO form the subject of this case study. The supply chain arrangement for the GUM FPSO is presented in Figure 9.3.

#### **9.1.4 Contractual Strategy and Supply Chain**

In the first three years, the GUM FOC considered the front end phase in Houston, which included the basic engineering and award of the EPCI contracts for the FPSO, PUR and the SPS packages (Offshore Technology, 2014). The project execution phase of detailed engineering and construction, from basic design to the completed FPSO, lasted four and a half years. The final phase, towing the completed FPSO out to offshore GUM and installing it, took a further year, a reflection of the challenges presented by the site conditions in the GUM (Offshore Technology, 2013). Based on the GUM FOC's Project Management Procedure GUM FPSO transactions were divided into the following categories:

1. GUM FOC handled the overall project management of strategic activities and all transactions with the government agencies on regulatory matters.
2. The EPCI contract on a market arrangement for the complete FPSO including the hull, topside process and utilities modules and the oil export buoy awarded to JRM of the USA. The integration of the FPSO topsides with the hull and pre-commissioning were carried out in New Orleans by JRM, who was also responsible for the offshore installation activities.
3. JRM awarded the contract for the construction of the hull on a “turn-key” arrangement to DW of South Korea.

The supply chain process of a sequentially organised set of the above activities to convert the basic design to an operational GUM FPSO is shown in Figure 9.3.



**Figure 9.3 - Supply Chain for the GUM FPSO**

(Source – Offshore Technology, 2012)

The resultant outcomes of these transactions are discussed in Section 9.3.

## **9.2 Case Study Background, Issues and Expectations**

### **9.2.1 Main Specific Political and Economic Hazards**

Chapter Six presented the hazards and transactions for the main components of a FPSO EPCI contract and the foreseeable hazards associated with such transactions. This section addresses the causes and consequences of the following specific hazards faced by the GUM FPSO project. The cumulative responses to the closed interview questions E1 and E2 recorded in Appendix 2, and the input from interview participants (reference Section 9.2.2) are used for this:

- Any hazards that were caused to the FPSO transactions by political context of the USA.
- Any demand for local content propelled by political motives requiring more transactions to be done by local companies.
- Potential escalation of CAPEX and schedule of the FPSO and its mooring arrangements due to the stringent design and construction requirements for operating in a new frontier region (i.e. GUM deep water).

The impact of the above issues are examined by both primary and secondary evidence to determine the extent to which they materialised and the governance mechanisms advocated by the TCE model in order to cope with the hazards that did materialise.

### **9.2.2 Impact of Political Context on the Industry**

It is widely accepted (at least in the Western world) that the USA is one of the main leading democracies in the world. This is despite the very transparent disparities between the various layers of its population. The institutions and the legal system are strong. The

US oil and gas industry is very stable, mature and well regulated by legislation, such that there are no potential hazards due to government intervention (Wood Mackenzie, 2011; KPMG,2011). As IP10 said *“I have been an oil man all my working life and I have not experienced any problems with government meddling in our projects”*. This is supported by the input from IP9 that *“the oil lobby is very strong and the (USA) government has always supported the industry to get bigger and more powerful”*. As IP11 summarised *“Our problems were not due to political or legal issues but due to the challenges of (FPSO) operating in the GUM, a new experience for us”*. Hence, the expectation is that there will be no requirement for political governance for GUM FPSO transactions.

### **9.2.3 Regulation of the Industry in the USA**

Offshore production facilities in the United States provide a large portion of the nation’s oil and gas supply. Offshore oil and gas production in the US Gulf of Mexico has, since the late 1990s, become a major source of oil and natural gas. The western and central Gulf of Mexico, which includes offshore Texas, Louisiana, Mississippi and Alabama, produces about 25% of the nation's oil and natural gas.

Leasing and drilling on the federal offshore seabed is controlled by the US Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), previously known as the US Minerals Management Service (MMS). BOEMRE issues leases through a competitive tendering process. The oil and gas company offering the highest up-front payment to the government (called a bonus) wins the lease. The government also receives a fixed annual rental based on the area for non-producing leases, and a percentage of the market value of any oil or gas produced and sold. The leases expire after a set number of years, or continue however long the oil and gas are continually produced from the lease. As such, property rights issues between the IOCGs, the US government and EPCI

contractors are relatively very low compared to other oil and gas producing countries (KPMG, 2010; Wood Mackenzie, 2010, 2011). In addition to the established regulation of the industry, in practice there is a high level of trust between the leaders of the IOCGs and the main EPCI contractors, built up over years of working together on oil and gas projects. The foundation for this trust was explained by IP24 as *“most of the guys who run Mobile, Esso, BP (i.e. IOCGs), Halliburton, Bechtel, Worley, JRM (international EPCIs) have been buddies from the time they learnt about oil and gas at Texas A & M (University)”*.

#### **9.2.4 Impact of Uncertainties on Project Execution**

Considering the political context, the impact of the technical challenges facing the GUM FPSO has been addressed, before predicting the governance mechanisms for the GUM FPSO transactions.

Due to the ever-increasing demand for new reserves, the oil companies utilising the developments in technology have extended drilling and production farther and farther from shore, and into deeper and deeper water. Currently, 72% of oil production in the Gulf of Mexico comes from wells drilled in water depths of 1000 feet (300 m) or greater. Since the mid-1990s, sixty-five discoveries have been made in water depths greater than 5000 feet (1500m). Therefore, the development of GUM offshore deep water fields is relatively new and there are recurring technical challenges which are complex and significant enough to cause commercial hazards (Wood Mackenzie, 2009, 2010, 2011). As indicated by interview participant 5, *“We were knocking back the frontiers of technology”*. Deeper water fields (>1000 metres) also require novel technology to manage the technical uncertainties posed by hydrocarbon flow assurance issues.

These uncertainties ranged from complex reservoir patterns and flow assurance to the significantly increased large scale topsides systems for hydrocarbon processing. In the

case of GUM FPSO, these challenges are compounded by the need for stringent design, fabrication and operating requirements for station-keeping the world's largest floating production unit in deep waters. These issues are major challenges for the IOCGs and the EPCI contractors operating in the frontier region. These technological challenges have been daunting for projects carried out before the GUM FPSO project and in several cases have resulted in significant cost escalations in the CAPEX of these projects (OTC papers 20400 and 21821). According to IP12, the significant uncertainties faced by the GUM projects were the *“technical challenges to design and fabricate the components of the FPSO process systems and the station keeping (mooring) system to operate in the GUM”*. In this context, IP10 pointed out that *“We expected that extensive technological research efforts had to be undertaken to enhance the design activities and define the specifications to achieve a “suitable fit for purpose” end result for the largest FPSO in the world”*.

Installing the GUM FPSO correctly and efficiently requires highly precise and technically complex procedures involving large installation vessels. The major EPCI contractors in the USA have experience of the necessary installation procedures and have suitable installation vessels. However, installation and commissioning in a new deep water (GUM) region required the site issues to be addressed and resolved before contract award (OTC Paper 20400).

Even if the engineering and EPCI contracts are near complete, delays and escalation of the costs can occur due to uncertainties created by design failures, compounded by an increase in fabrication costs because of rework and extended offshore commissioning. Therefore, as for case studies 1 and 2, it may only be after commissioning is attempted that any defects in the design work will become apparent (OTC paper 21821). In the USA, long-term contracts are commonly used in the oil and gas industry to specify the use of the market for the engineering, procurement, fabrication and installation

transactions (OTC paper 21821). However, as explained by IP6 *“In the case of the GUM Deepwater offshore project, such contracts and relationship arrangements can turn out to be often very costly time consuming solutions since we cannot envisage every contingency for complex technological issues that cannot be specified in a contract or even known”*.

This situation supports the proposition that the more complex the concept, the costlier it is for the principal to ensure that the agent is properly undertaking the appropriate activities. As a result, the cost of writing long-term contracts in the industry depends on the complexity of the project activities which require both client and contractor organisations to undertake a large number of investigations (OTC 21821). As discussed in Chapter Two, the difficulty for the principal is that once the contract has been signed, the agent’s action or effort cannot be observed (Anderson, 1985; Eisenhardt, 1985). Therefore, as IP5 and IP14 pointed out, *“Even though we (IOGC) have a long term strong trust with our contractors, it was not possible to use long term market arrangements in totality (i.e. in a ‘turn-key’ arrangement) for the GUM FPSO project”*.

#### **9.2.5 Prediction of the Extended TCE Model**

Due to the high technical hazards, both the basic TCE theory model and the extended TCE model would both suggest that the GUM FOC must perform the activities they do best and go to the market for transactions that others can do more cost effectively and efficiently. It means that the GUM FOC, in addition to being responsible for the project management and the transactions with government authorities, also has to provide front end engineering support and formulate the technical specifications for the complex components of the GUM FPSO to resolve the technical uncertainties due to site specific conditions. This must be done before finalising and awarding of the EPCI contract. Alternatively, provisions must be made in the contract to accommodate subsequent design

variations due to the uncertainties which can be an impossible task (OTC 21075). In this case, logic based on the extended TCE model would predict the governance mechanisms for the different GUM FPSO transactions, as follows:

- e) GUM FOC should be responsible for project governance (i.e. providing direction and control), transactions with government authorities and basic engineering.
- f) In the case of the transactions for the complex components of the FPSO subject to high technological uncertainty and asset specificity, it would be necessary for GUM FOC and EPCI companies to work in close collaboration. This is to be in the form of integrated project teams for the design and fabrication of FPSO components subject to stringent performance specifications. This GUM FOC participation in transactions can be considered to be an indirect form of vertical integration (IVI) required from a TCE perspective to ensure the hybrid governance was as robust as a pure VI arrangement.
- g) Market arrangements can be used for the rest of the transactions (such as the hull when the risks associated with the transactions are known and manageable).

In this case both the basic and extended TCE models would both predict the use of hybrid governance (with FOC participation) for the following transactions that can be subject to technical uncertainties which might cause the EPCI contractor to fail to meet the performance targets:

- Detailed engineering of the hydrocarbon processing systems;
- Detailed engineering of the GUM station-keeping (mooring) systems;
- Research and development of techniques to resolve the flow assurance and HP/HT process issues associated with the deep water fields;
- Management of the offshore commissioning of the complete GUM production complex.

This in turn would lead to market arrangements being predicted by the TCE models for the rest of the transactions including:

- Detailed engineering and fabrication of the FPSO hull (with the accommodation block and the machinery rooms) in South Korea and then towing it to the dry dock in Louisiana;
- Fabrication and offshore installation of FPSO station-keeping moorings;
- Fabrication of the process and utility modules and integration of these modules onto the hull in the dry dock in Louisiana;
- Design, fabrication and offshore installation of the oil export buoy.

Consequently, a higher level of market governance mechanisms for the GUM FPSO project transactions was possible compared to the transactions for the FPSOs in case studies 1 and 2.

### **9.3 Outcome of Project Transactions**

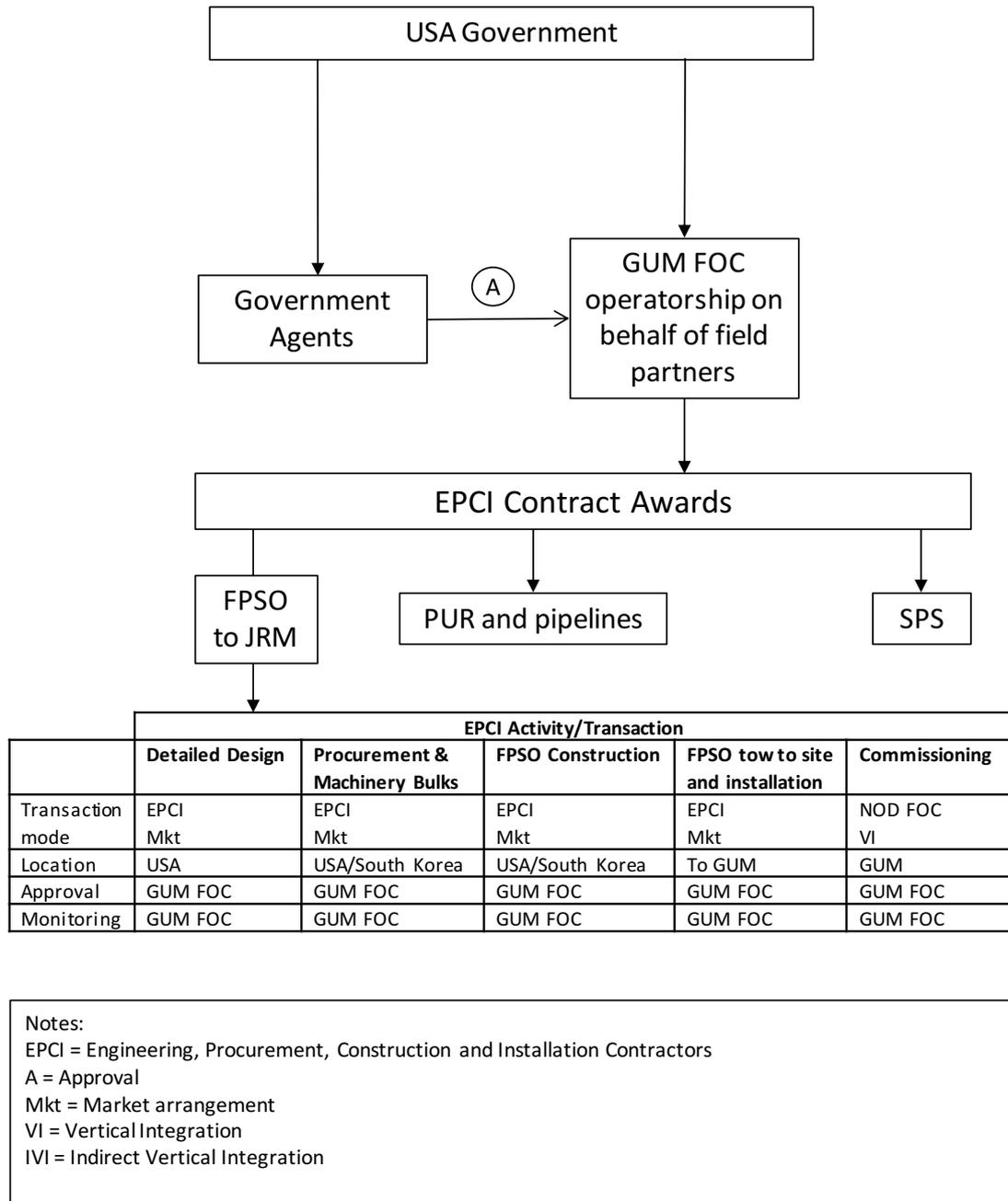
#### **9.3.1 Project Organisation and Transactional Relationships**

The previous section identified the hazards associated with the GUM FPSO transactions as mainly technological issues as political hazards were not an issue. The predictions of both the basic and extended TCE models for managing these hazards turned out to be the same. This section presents and analyses the outcome of the transactions based on the governance methods used, and the remedial arrangements used by the GUM FOC to achieve project completion. For the purpose of this analysis, as for case studies 1 and 2, the project transactions carried out for the FPSO are divided into three main categories of project management, the construction contract for the FPSO hull carried out in South Korea, and other FPSO onshore and offshore transactions in the USA. It was found that these categories can be subject to different forms of technical and behavioural

hazards. Therefore, the outcome for each was examined from the TCE point of view, taking into account the governance measures which the GUM FOC implemented, or revised measures they were compelled to implement and the reasons for these revisions.

Project management activities turned out to be more challenging for the GUM FPSO project than for previous FPSO projects carried out in the USA due to the size of the FPSO and the site conditions. These activities included developing and implementing the field development plans for the subsequent operations, liaising with the US government for approvals and sanctions. In this process approval of the deep water development plans by BOEMRE was mandatory (Woodmackenzie, 2012). However, as pointed out by IP6, *“These activities did not turn out to be difficult or time consuming as there was a significant amount of co-operation and mutual help between all the parties to resolve the technical and legislative issues”*.

The GUM FOC prepared the basic engineering and contract specifications for the tender process for awarding the FPSO EPCI contracts on a market and agency arrangement (Offshore Technology, 2012). The overall EPCI contract for the GUM was awarded to JRM after a competitive tender process. This EPCI contract was a mammoth task as this was going to be one of the biggest offshore floating production installations in the world, with highly complex hydrocarbon processing systems to produce from some of the deepest wells in the GUM. The FPSO weighed more than 50,000t and a displacement of 130,000t. The facility was designed to process 250,000 barrels of oil and 200 million cubic feet of gas per day. ME Engineering of the USA was awarded the sub-contract to provide engineering and design services for the FPSO. The contract for the 15,000 m<sup>3</sup> hull was awarded to DW, an experienced South Korean contractor (Offshore Technology, 2012). These organisational and transaction relationships are illustrated in Figure 9.4.



**Figure 9.4 - Organisational Relationships and Governance Mechanisms for GUM FPSO**

Historically, in the US oil and gas industry, there has been alignment between IOCGs and contractors with each trying to work out the best for both parties (Wood Mackenzie, 2011).

As pointed out by IP9, *“The GUM FPSO transactions were carried out in an environment where there was high mutual trust and all the companies involved are established and known to each other, having worked together on several previous*

projects”. According to IP12 *“In the case of the GUM project, it became evident that the challenge of developing the GUM deep water field was a new challenge for all of us”* and IP14 confirmed this by adding that *“A strong joint relationship with a high level of trust and open communication between the parties to the development was required to manage the challenges”*. IP9 stressed that *“A high level of front end technical loading was necessary from the GUM FOC and co-operation between all actors to resolve technical challenges”*.

As it turned out, commercial proposals were agreed between GUM FOC and JRM for using integrated joint project teams (OTC papers 20400, 21075). IP2 confirmed that *“Formation of integrated project management teams was the key to dealing with the complex and challenging technical issues to prevent CAPEX escalation and excessive delays. We (the GUM FOC) had to expand the project management teams in the USA to facilitate the IPMTs”*. In addition, IP10 explained that *“A team of specialists in deep water production and flow assurance had to be mobilised from the rest of the world”*.

### **9.3.2 Project Transactions in South Korea**

The construction of the GUM FPSO hull with the accommodation block and machinery rooms was carried out by DW in Korea who had proven capability with adequate fabrication capacity for major hulls. Hence, the EPCI contractor RJM was able to award a ‘turn-key’ (100% agency) subcontract to DW for the fabrication of the GUM hull and towing it to Louisiana. There were no unexpected significant transaction issues associated with this contract (Offshore Technology, 2012; OTC 204000).

### 9.3.3 Project Transactions in the USA

The fabrication of the topsides modules with complex process systems (21,000 tonnes) and their integration on the FPSO was carried out in Morgan City and Louisiana by RJM. It has been found that the engineering contractor (ME) for the FPSO in the USA required guidance in technical expertise to handle the complex technical requirements of the hydrocarbon processing systems and deep water mooring of the FPSO. Consequently, GUM FOC being extremely concerned about potential technical failures and delays due to inadequate expertise in the ME engineering team in deep water projects had to intervene with remedial measures (OTC paper 1821). It was also found that during the contract execution, as confirmed by IP10, *“Additional provisions had to be made both in the technical specifications and installation procedures for the FPSO mooring arrangements due to the challenges posed by the deep water”*. According to IP11, these issues meant that *“There was a requirement for increased GUM FOC participation to prevent technical failures and fabrication faults with increased front end loading, in the form of providing technical and construction expertise”*.

As pointed out by IP6, *“Our (i.e. GUM FOC) teams had to work with the JRM and ME teams to convert detailed engineering into construction methods during the fabrication period. Therefore, our (i.e. transaction) costs increased due to the need to implement these additional measures and increased management controls to ensure contractual adherence and competency”*. Furthermore, on the basis of the experience gained from other projects in the GUM, integrated project teams were used with significant access to key resources and sharing key technical and project experience. The outcome of the GUM FOC contribution in the form of front-end technical loading and facilitating integrated teams resulted in project transactions turning out to be successful (OTC paper 1821). IP10

pointed out *“We made extensive use of feedback from lessons learned by both us and JRM”*.

As such, it was ensured before and after, GUM FOC involvement throughout all project phases including building and maintaining collaborative liaison with government authorities and JRM (the EPCI contractor). IP14 pointed out that *“We set up integrated project management teams. These specific arrangements required the allocation of an adequate and skilful staff (i.e. an increase in indirect vertical integration)”*. In addition, IP9 said that *“an important lesson was the use of direct IOCG – EPCI – supplier long-term frame agreements for critical equipment”* resulted in efficient use of resources. Another lesson, according to IP16, was that *“detailed project specification requiring high GUM FOC staff involvement was essential to ensure the required product detailing, i.e. high front-end loading”*. Despite the high technical challenges, IP20 pointed out that *“There was adequate risk balance between JRM and us (the GUM FOC) and there was no inappropriate shifting of risks between us”*. As confirmed by IP21 *“In this case, difficult tasks such as flow assurance modelling, obtaining environmental permits, changes in design specifications, and basic design definition were all managed by GUM FOC”*.

Due to the challenges posed by the GUM deep water field for offshore activities, it was obligatory to comply with the strategy to maximise onshore testing, pre-commissioning, and commissioning. For this, additional GUM FOC personnel had to be provided to support JRM teams (OTC papers 20400, 21075). The construction equipment and materials for the hook-up and tie-in work were loaded and sea fastened onto the FPSO before the tow from the yard to the offshore site for installation by the EPCI contractor. This was on an agency contract basis with the EPCI contractor who possessed the necessary large installation vessels. However, as pointed out by IP11 *“we (i.e. the GUM FOC) had to provide technical expertise and operational resources to JRM to manage the*

*complex tasks involved with carrying out these installation activities in the GUM offshore field with adverse site conditions*". Final commissioning of the integrated FPSO to commence oil and gas production was carried out by the GUM FOC team with the assistance of JRM.

This process was conducted on a virtually vertical integration arrangement, as the commissioning management, procedures and the logistics were all formulated, executed and controlled by the GUM FOC team. In summary, there was no requirement for specialised political governance mechanisms, but still a mixture of governance arrangements materialised for the GUM FPSO transactions and are summarised in Table 9.3.

**Table 9.3 - Governance of Transactions for GUM FPSO**

	Activity Transaction Governance					
	Front-End Design and Engineering	Detailed Design Procurement and Machinery Bulks	FPSO Hull Construction and Tow to USA	FPSO Topsides Modules and Integration with the Hull	FPSO Tow to Offshore and Installation	Commissioning
Transaction mode	GUM FOC VI	EPCI Mkt with IPMT	EPCI Mkt	EPCI Mkt With IPMT	EPCI	GUM FOC (VI)
Location	USA	USA	South Korea	Dockyard	GUM	GUM
Approval	GUM FOC	GUM FOC	GUM FOC	GUM FOC	GUM FOC	GUM FOC
Monitoring	GUM FOC	EPCI	GUM FOC	EPCI	EPCI	GUM FOC
Notes: EPCI = Engineering, Procurement, Construction and Installation Contractor Mkt = EPCI (Market) IPMT = Integrated Project Team A = Approval IVI = Indirect Vertical Integration						

IP10 stressed that the *"integrated project management and engineering teams were the key contributors to completion of the GUM FPSO project without significantly exceeding the CAPEX and schedule targets"*.

## **9.4 TCE Findings of Case Study**

### **9.4.1 Empirical Findings on the Extension of TCE**

The AOD FPSO and associated facilities were installed and successfully achieved oil and gas production. The GUM FPSO case provides evidence that international transactions can be carried out more economically when the impact of political hazards is low and the institutional arrangements to protect the property rights of investors are strong. This is due to the fact that specialised political governance mechanisms to handle adverse political intervention and concessionary contractual arrangements to protect the property rights were not required to be implemented, as was the situation for case studies 1 and 2. The empirical evidence from this case study supports the proposition that market and hybrid governance mechanisms can be implemented in an economic manner for the scenario of low level political hazards with robust property rights protection to achieve the optimum transaction costs.

As discussed in Chapter Two, uncertainty is a multidimensional concept with political, legal, technological and economic hazards posing the main threats. The evidence from the three case studies shows that these factors may have different impacts on a firm's selection between different organisational governance mechanisms. The GUM FPSO project required novel and untested technology to manage uncertainties due to operating in frontier regions, where the existing tried and tested engineering, fabrication and installation techniques were not adequate. This created technological challenges and consequent economic impact on the project activities, thus making contracts incomplete and introducing market frictions above acceptable levels. Hence, changes to the market governance were required in the form of front end loading and the use of integrated project

teams to compensate for the higher levels of technological hazards that had to be resolved to ensure project completion.

As EPCI contracts were not fully complete, in order to manage the residual risks arising out of market friction, a degree of indirect vertical integration had to be implemented in the form of joint GUM FOC and EPCI contractor integrated project management teams (IPMT). The empirical evidence discussed in earlier sections confirms that the implementation of these indirect vertical integration measures ensured that transactions did not drift out of alignment.

In summary, there was an early and deep GUM FOC involvement with the EPCI contractor throughout all project phases. These specific arrangements required an increase in the allocation of suitably qualified and experienced staff for the FPSO EPCI transactions, to provide the technical leadership and build the confidence of the EPCI contractor. According to IP10 *“These bonding arrangements for securing commitments to ensure trust prevented opportunistic behaviour by the participants and improved the project’s chances of success”*. Therefore, the successful completion of the project, meeting CAPEX, schedule and quality targets, was mainly due to the GUM FOC’s contribution to the front-end loading and the use of integrated management and engineering teams to manage the EPCI transactions.

#### **9.4.2 Measurement of Extension of the TCE Model**

The requirement for political governance was not necessary for the GUM project. There had to be increased intervention in the management of transactions by IOC to implement integrated project management teams and to provide front end loading for the engineering and construction activities. This inevitably resulted in increased transaction costs ( $\Delta$ TCE) and effort, which is measured in terms of the hours incurred to complete

these GUM FPSO transactions. In this case, the total IOC transaction costs increased from \$483 million to \$566 million, an increase of \$52 million. The estimates for the hours and costs of transactions in Europe, South Korea and Angola were verbally provided (in confidence) by IPs 6, 9, 10, 11, 12, 20, 21 and 25. The mean values of these estimates are recorded in Table 9.4. The cost figures are given in US million dollars (MD).

**Table 9.4 - Escalation of Transactions Costs (TC) for GUM FPSO**

Transaction Activity	Location	Estimated hours	Final hours	% Increase in hours	Estimated TC (MD)	Final TC (MD)	Increase in TC (MD)	% Increase in TC
Project Management and Political Governance	USA				112	131		
Project Management and Political Governance	South Korea				115	161	53	46
Project Management and Political Governance	USA and South Korea	56,000	64,200		227	238	11	48
Engineering Support and Monitoring	USA	104,000						
Engineering Support, IVI and Monitoring	South Korea	119,000						
Engineering Support, IVI and Monitoring	USA and South Korea	47,500	56,500		256	276	20	
TOTAL TRANSACTION COSTS					483	507	24	4.5

The high level of trust and co-operation between the project participants kept the increase in the transactions costs to a bare minimum.

The governance arrangements for FPSO project transactions were executed as predicted by the logic of enhanced TCE model in an acceptable economical manner. The changes implemented in the form of indirect vertical integration resulted in an incremental transactions cost of about 4.5% of the initial transactions cost as presented in Table 9.4. Very experienced IPs 10 and 11 confirmed that *“In the oil and gas industry this incremental cost (of <5%) for managing the transactions for a major offshore deep water*

oil and gas production project can be considered to be an outstanding successful outcome". The variations in the transaction costs for the GUM FPSO compared to the predictions of the basic TCE model are illustrated in Figure 9.5. The line  $H_{USA}$  represents the increased transaction costs of  $\Delta TCE_U$  for the GUM FPSO, representing a measure of the increased GUM FOC participation that was required to complete the GUM FPSO transactions.

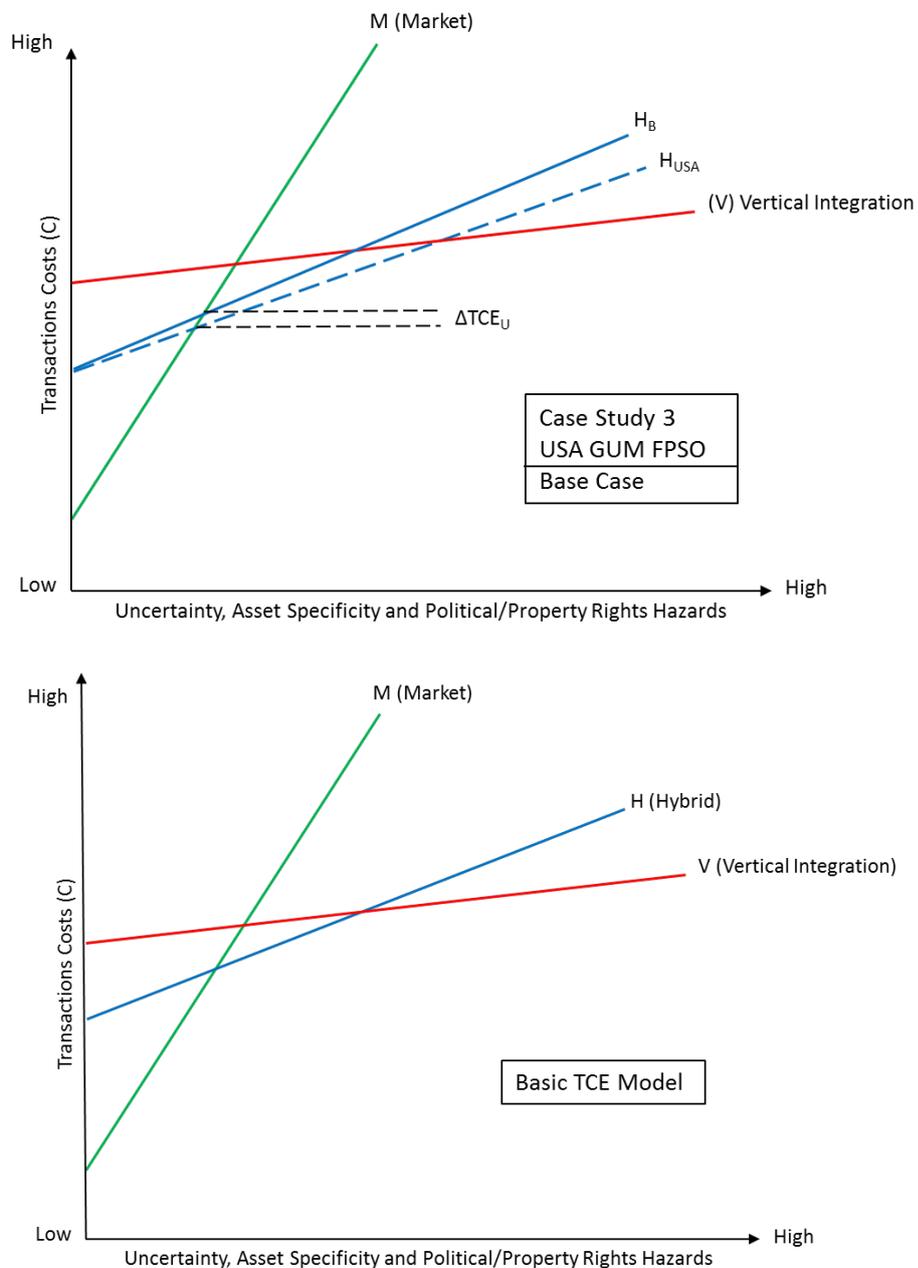


Figure 9.5 - Impact of Low Political and Property Rights Hazards on Governance Mechanisms

## 9.5 Conclusions

This case study examined whether there are any enhancements required to the basic TCE governance selection model for transactions carried out under conditions of minimum of government intervention and strong safeguards for property rights. The GUM FPSO project provides evidence that there is no requirement to go beyond the predictive capabilities of the basic TCE model for the scenario of low level intervention with robust property rights protection (modulating variables) for managing transactions economically. The outcome of the case study of the GUM FPSO project was as predicted by the basic TCE model when the impact of the institutions on project transactions was considered to be neutral.

The evidence from this case study also demonstrates that political hazards and weak property rights are not the only factors that may require firms to conduct uneconomical transactions by resorting to specialised arrangements with the EPCI contractors. In the case of the GUM FPSO hull contract, which was not subject to external challenges, the market arrangements were found to be more than adequate to ensure that the transactions were executed in an economising manner. Apart from the FPSO topsides and mooring, for the project transactions subject to high technological uncertainties that can create commercial hazards, there was a need to resort to hybrid arrangements in the form of integrated project management teams. This was because the contracts for these components were incomplete due to the technical uncertainties and commercial concessions necessary to manage the transactions to prevent delays. This supports the proposition that uncertainty is a multi-faceted concept extending beyond behavioural uncertainty considered in the basic TCE theory.

The evidence from the case study does support the discriminating alignment hypothesis of TCE for predicting the economising governance mechanisms. The

predictions based on the characteristics of the transactions sometimes favour hierarchy (vertical integration or in-house production) as an economic governance structure, and at other times favour markets or the intermediate mechanism of 'hybrid' arrangements between these two extremes if the transactions require increased flexibility. In the case of international projects, when the host country political context does not come into play, it is not necessary to go beyond the predictive capabilities of the basic TCE theory.

## **Chapter 10 FINDINGS, CONCLUSIONS AND CONTRIBUTION**

### **10.1 Introduction and Summary of the Research**

#### **10.1.1 Introduction**

The objective of this research was to develop an extension to the transaction cost economics (TCE) theory to address the theoretical issues of predicting the governance mechanisms for major international projects and to explore its applicability. This chapter concludes the research effort by initially bringing together in Section 10.1.2, the findings of the literature review to demonstrate the need for such an extension of the TCE model. This extension was found to require the incorporation of political governance mechanisms to cope with the challenges due to host country political hazards and issues connected with the protection of property rights of the investors. This conceptual model, based on TCE, thus aligns the governance mechanisms with the economic and political characteristics of the international transactions.

Section 10.2 summarises the findings of field investigation on how different levels of political hazard are handled in international oil and gas projects, and if this is consistent with the TCE reasoning or whether an extension to the basic TCE model as proposed by this research is justified. This was achieved by a comparative analysis of three case studies. Section 10.3 explains that the contribution made to knowledge by this research supports the potential of an extension to the TCE model developed and explored with qualitative case research. This demonstrated a shift parameter to the basic TCE theory, which warrants further conclusive research to confirm the capabilities of extended TCE model to predict the governance mechanisms for major international projects. The implications of the research findings for the relevant literatures and recommendations for industry practitioners for rethinking project management are discussed in Section 10.4.

The possible limitations of the research, proposals for further research, reflections and some concluding remarks on the research are then presented in Section 10.5.

### **10.1.2 Summary of the Development of an Extended TCE Model**

In addition to technical and operational complexities, the causes for failures of major projects were summarised as incomplete information on the future state of affairs causing non-quantifiable uncertainties, bounded rationality of the decision-makers and opportunistic behaviour of participants in transactions. In the case of international projects, additional challenges can be posed by the political context and the role of the judiciary of the host country. These identified causes of failures support the proposition for rethinking management of international projects to mitigate turbulence that emerges over the life of the project and to steer and harmonise the behaviour of the participants. TCE was found to address all the above causes of failures of transactions, more than other theories of the firm. Thus, the research focused on TCE to formulate a conceptual model for the prediction of the most appropriate governance mechanisms to align with the economic and political characteristics of the international transactions. In this formulation, it was demonstrated that a coalition of governance mechanisms of market, vertical integration and a hybrid of the two were required for the successive phases of a major project depending on the characteristics of the particular project transaction.

However, in addition to the micro-economic critiques of TCE, the main criticism of TCE is that it is based on the concept of self-enforcement and by sin of omission does not cover exogenous uncertainties due to political, economic or social developments in the host country that can impact transactions. A further criticism made of TCE is that its lack of consideration of the allocation and enforcement of property rights. This can become a major concern, particularly if the role of the state in the transactions is not neutral.

The dimensions of the political hazards are defined in Table 3.1 as the nature of the host country regime, processes by which regulatory changes are introduced and how demand for local content requirements can increase due to political pressure. Protection of property rights is dimensionalised as the role of the state in initial allocation and independence and strength of the judiciary in enforcing measures for the protection of property rights. The dimensions of these hazards that directly impact the project transactions were scaled as low, medium and high. The proposition was developed that major projects carried out in countries with authoritarian democratic or authoritarian political systems can be subject to significantly higher hazards than those carried out in liberal democratic countries. These are due to opportunist intervention of the host government and inadequate protection of property rights due to a weak judicial system. Political governance mechanisms were identified to mitigate the consequences of these challenges. These mechanisms were construed to provide the required theoretical basis for extending the predictive capabilities of the basic TCE model to mitigate the consequences of these challenges. This coalition of TCE and political governance is based on the basic TCE proposition that the client firm must perform the activities they can do best and go to the market for transactions that can be done more cost effectively and efficiently by the market.

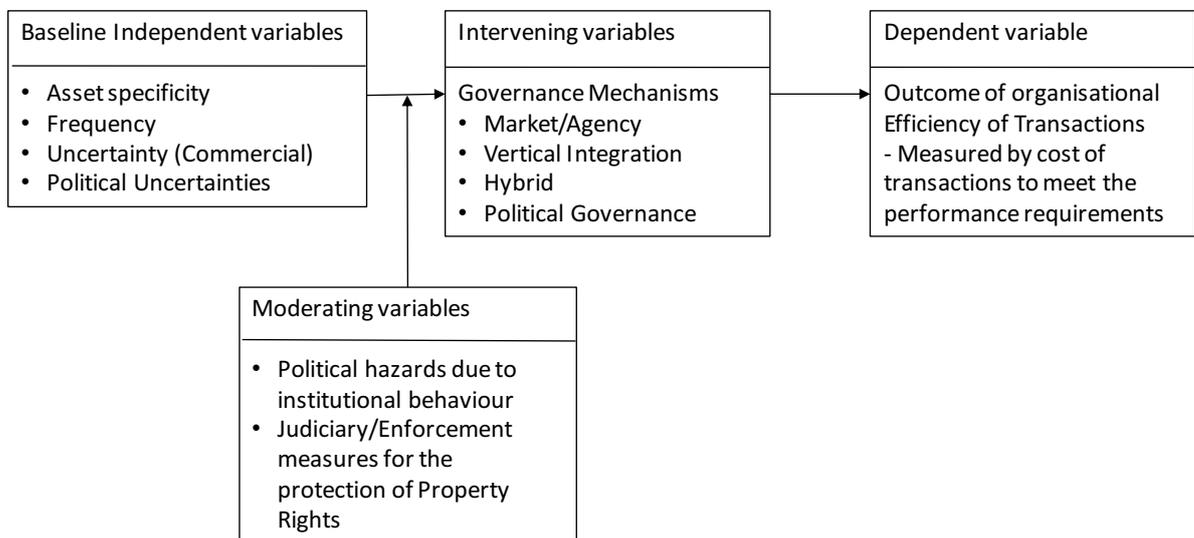
The propositions (Ps) to explore the potential of the extended TCE model to manage the impacts of political hazards and property rights issues on major international transactions were defined as follows:

P1 – The relative hazards created by behaviour of the host country government and weak institutional regimes will affect governance of project transactions in a non-economising manner. Such non-self-assuring exchanges cause the firm either to incur higher transaction costs due to the need to implement political governance

mechanisms for a given level of asset specificity, or to select higher vertical integration arrangements at lower levels of asset specificity.

P2 – Any adverse state intervention in transactions including increased demand for local content will affect the protection of property rights of the firm. This will require the firm to select governance mechanisms in a non-transaction cost economising way, particularly if there are compelling political requirements to form joint ventures with local firms.

In the basic TCE model, impact of inherent political context and institutional behaviour of the host country on transactions is considered to be neutral. The introduction of the variables of political hazards, enforcement of protection of property rights and political governance represent the extended TCE model for prediction of governance mechanisms as illustrated in Figure 4.5 and repeated below in Figure 10.1.



**Figure 10.1 - Variables of an Extended TCE Model**

## **10.2 Summary of Findings of Field Investigations**

### **10.2.1 Comparative Analysis of Case Studies**

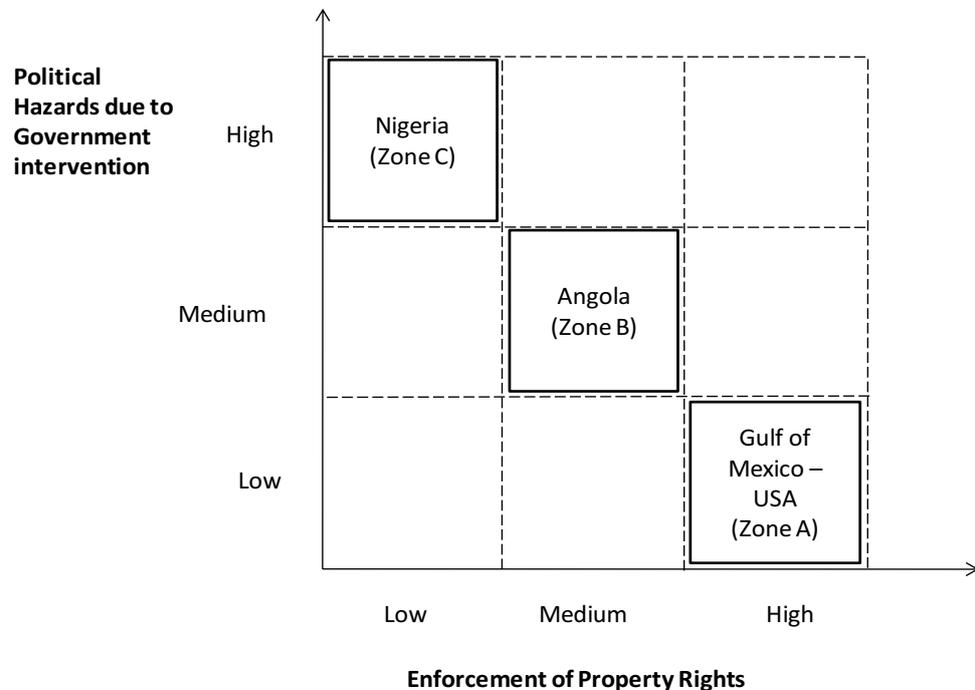
This section summarises the findings of field investigation to explore the applicability of the extended TCE model to predict the governance mechanisms for major international projects.

The investigation is on how different levels of political hazard are handled in international oil and gas production projects, and if the approach used is consistent with reasoning of the basic TCE model or whether an extension as proposed by this research is justified. For this exploration, three case studies were selected to represent the Zones A, B and C of political hazards and protection of property rights spectrum as illustrated in Figure 4.1. The scaling of these parameters as low, medium and high for the case studies is the same as those presented in Figure 4.1. These are major oil and gas projects carried out in Nigeria, Angola and United States of America (USA) and are presented in Chapters Seven, Eight and Nine respectively. The scaling of political hazards and strength of the enforcement of property rights for the case studies selected are as shown in the matrix in Figure 4.6 and repeated below in Figure 10.2. As a result, the Gulf of Mexico USA was considered as the bench mark case study for the comparative analysis to examine the applicability of the extended TCE model. The findings of these case studies are based on project documentation, industry data and input from interview participants selected for their knowledge and extensive participation in oil and gas projects (see Chapter Five).

The approach used for this analysis was consideration of:

- The nature of the political regime and institutional behaviour of the host country.
- Ex-ante project management arrangements based on the IOC expectations.

- What materialised during the transactions.
- The changes the IOC had to make to the governance arrangements.
- Conclusions of the case study findings.



**Figure 10.2 - Ex-Ante Dimensioning of Case Studies**

### 10.2.2 General Findings of Case Studies

Responses from the interview participants to closed and open questions in the Questionnaire (Appendix A1) presented in Appendix 2 are used to draw general conclusions on the impact of contextual variables and are summarised in this section. The responses from the interview participants were also used as primary evidence in Chapters Six, Seven, Eight and Nine.

A general consensus amongst interview respondents was that political context of the host country has an overriding impact on project transactions. This can be a contributing factor in the failure of transactions to meet costs, schedules and quality objectives. There was also overwhelming agreement (score of 80%) on the theoretical

prediction that impact of host country opportunistic behaviour, weak protection of property rights and increasing demands for local content are the most significant hazards concerning the execution of project transactions across national borders. These responses also supported the view that it is impossible to draw up EPCI contracts to cope with government intervention in project transactions. This is due to the fact that data concerning potential hazards that can be caused by the host country regime is very limited before EPCI contractual arrangements are settled. In this situation, the use of subjective probabilities based on expert judgement was found to be useful in anticipating and managing political hazards to project transactions.

The outcome of the case studies and interview responses supported the proposition that governance mechanisms must be selected to align with the characteristics of the transactions to be managed, as proposed in Chapter Two (see Figure 2.4).

It was found from the interviews and case studies that project processes focused mainly on commercial and technical risks in defining the project specifications and contracts. This meant that data on unpredictable institutional hazards could not be transferred from project to project. Experienced interviewees believed that governance mechanisms based on the TCE model are required to be extended by political measures (i.e. governance) to manage impacts of the host country political hazards. In this context, interview participants considered the political uncertainties caused by unilateral opportunistic behaviour of the Nigerian government were high (score of 80%) compared to Angola and the USA. In addition, the calculated opportunistic behaviour of the state bureaucracy in Nigeria created significant time consuming challenges to obtain project sanctions and approvals.

### **10.2.3 Comparative Analysis of Case Study Findings**

#### ***Case study 1***

Case study 1 examined the potential of the extended TCE governance for transactions carried out for the Nigeria FPSO. The expectations of the client firm NOD FOC was that it would be required to cope with a high level of political hazards caused by government intervention and by weak safeguards for property rights due to a legal system which was not neutral. NOD FOC depended on their traditional project management arrangements to obtain project sanctions, the FPSO engineering, the construction in South Korea and transactions in Nigeria. As case study evidence presented in Section 7.2 shows, the NOD FOC ex-ante expectations did not include the need for political governance mechanisms to complement project governance in order to counter the ever increasing political hazards and institutional opportunism faced by projects in Nigeria.

Both primary evidence (responses of IPs) and secondary evidence (from project documentation and industry publications) provided in Sections 7.2 and 7.3 confirm that high levels of political hazards materialised due to adverse government intervention in the execution of the NOD FPSO project. The consequences of these hazards manifested in the form of excessive demands of the regulatory authorities (on behalf of the ruling elite) for financial ‘rewards’ in return for smoothing the path for the execution of the project activities. These were beyond the reasonable expectations of the NOD FOC. Thus, as predicted by the extended TCE model, NOD FOC was forced to implement an early and deep liaison with government authorities throughout all project phases to complete the FPSO. The NOD FOC had to implement measures to influence political authorities, directly by lobbying and relationship building, and by indirect means which included financial concessions (and contributions) to political institutions. The formal and informal

political governance mechanisms used by the NOD FOC in dealing with the institutions in Nigeria were in the form of ‘hierarchical organisation’ in TCE terms.

In the case of all the NOD FPSO transactions subject to high commercial uncertainty and asset specificity, the NOD FOC and EPCI companies had to use hybrid arrangements. These were in the form of high NOD FOC involvement in the design and fabrication of FPSO components subject to stringent performance specifications. These hybrid forms of governance dominated by the NOD FOC in transactions can be considered to constitute an indirect form of vertical integration (IVI), as NOD FOC provided the direction and control of the joint venture activities. This situation required the project’s economic governance to be complemented by political governance mechanism as a means of mitigating the increased hazards caused by the behaviour of the host government and weak institutions. In this case, logic of the situation required an even more pressing need for NOD FOC to resort to hybrid governance with an indirect form of vertical integration (IVI) for main transactions of the FPSO project.

In conclusion, case study 1 provides strong evidence to support the proposition that in the case of international projects, the extension of the basic TCE model with political governance is inevitable to address the impacts of high political opportunistic intervention and weak protection of property rights protection. This extension of the basic TCE theory took the form of political governance mechanisms, which included provision of economic concessions, lobbying, and relationship building with national political actors and local companies. In the case of the extended TCE model, the impact of the modulating variables of political and property rights hazards faced by the NOD FPSO project led to an increase in the transaction costs (dependent variable) due to the need to execute the governance arrangements (intervening variable) in a non-economising manner.

## *Case study 2*

Case study 2 of the FPSO project for offshore Angola (AOD FPSO) examined the scenario where the host country political regime could be classified as an authoritarian democracy. For the FPSO transactions carried out in Angola before the AOD FPSO project, known government opportunistic intervention was minimal and there were no major concerns regarding the protection of property rights. Thus, political intervention and protection of property rights were considered as 'medium level' hazards. Thus, both the basic TCE model and the extended TCE model predicted greater use of the market than in case study 1. The expectations were that the complete technical and commercial specifications would enable the EPCI contract to be executed efficiently. However, the extended TCE model predicted the use of vertical integration for the project's front-end activities. This included political governance for liaising with the Angolan authorities to obtain the necessary project sanctions, which turned out to be more difficult and time consuming than anticipated.

During the transactions, the ex-ante expectations of the levels of political hazards and the existing arrangements for the safeguarding of the property rights became ineffective. This was due to the changed behaviour of the Angolan government resorting to exploiting the revenues from oil and gas production in order to overcome the economic and political problems in Angola. Such practice of self-interest with guile by the government could not be anticipated ex-ante due to the bounded rationality of the participants. Hence, the appropriate mitigation measures required did not become evident until the circumstances materialised. The Angolan government overruled the EPCI contractor selected by AOD FOC for selfish economic reasons and imposed a contractor of their choice on AOD FOC, whose technical capabilities did not match the task. This adverse selection of the FPSO EPCI contractor created issues of inadequate competency, a

lack of trust and the potential for delays. As such, indirect vertical integration was required in the form of greater participation by the IOC in the transactions. This resulted in transactions being carried out uneconomically as the market arrangements perceived before the event had to be augmented by remedial measures. The case study therefore provides empirical evidence of the relationship between the governance mechanisms (intervening variable) and the impact of political hazards (modulating variable) of the extended TCE model.

As is evident from both primary evidence (responses of IPs) and secondary evidence (from industry publications) provided in Sections 8.2 and 8.3, it was not possible to rely on extensive market arrangements as in previous Angolan projects. This is a situation when, contrary to ex-ante expectations, it was necessary to introduce increased political governance mechanisms to complement project governance in order to counter the unexpected increased political hazards and institutional opportunism. The findings (as with case study 1) supports the argument made in Chapter Four, that property rights allocation is determined and implemented by those participating in the transactions and reflects the conflicting economic motives and the relative bargaining strengths of those participants. As the Angolan government's political opportunism increased, so too did the potential threat to FOC AOD's right to execute transactions in an optimal manner.

In this case study of AOD FPSO, the property rights were determined and enforced solely by the Angolan government who displayed pre-meditated, selfish, opportunistic behaviour to exploit the benefits from the oil and gas projects. Therefore, this case study demonstrates that the potential effects of political opportunistic behaviour, which were not evident before the event, can negate the corporate selection of governance arrangements.

### *Case study 3*

Case study 3, the FPSO project in the Gulf of Mexico (GUM), examined governance arrangements that would be predicted by the TCE model for managing transactions economically for the scenario of ‘low level’ political intervention with robust property rights protection. The conclusion was drawn that there was no requirement for specialised political governance mechanisms, but hybrid mechanisms were still required for governance of the transactions. This was because of high technical challenges for the design, construction, and operations of the FPSO presented by the offshore deep-water field. The eventual outcome of the post-contract EPCI transactions was that ex-ante governance mechanisms planned had to be complemented by hybrid governance in the form of integrated project management teams (IPMT) to ensure successful completion of project transactions. This supports the proposition that uncertainty is a multi-faceted concept extending beyond behavioural uncertainty considered in the basic TCE theory. The GUM FPSO project provides evidence that there is no requirement to go beyond the predictive capabilities of the basic TCE model to manage transactions economically for the scenario of low level of political hazards with robust property rights protection (i.e. modulating variables in the extended TCE model).

#### **10.2.4 Comparison of the Extension of TCE Model**

It was proposed in Chapter Seven that the escalation in transaction costs and increase in the effort required (measured in terms of hours expended to complete transactions), can be credible measures of the extension of the TCE model required to manage the FPSO transactions. The results of these measurements can be used for comparative purposes to answer the question as to what extent the strategy of political governance plus indirect vertical integration had to be used to mitigate the ex-post regret in

each case study. The measure of extensions of the TCE model for the three case studies in terms of increase in transaction costs can be summarised as below:

**Table 10.1 - Comparison of Increase in Transaction Costs**

Case Study	Political Hazards	Protection of Property Rights	% Increase in Transaction Costs
1 – Nigeria FPSO	High	Low	30
2 – Angola FPSO	Medium	Medium	17
3 – GUM FPSO	Low	High	4.5

The comparative extensions of the TCE model represented by the shift in the curves of the transaction costs are illustrated in Figure 10.3 below. In the figures, the lines M, H and V represent the market, hybrid and vertical integration for transaction cost curves as per the basic TCE model. For case study 3 (GUM FPSO base case), the line  $H_{USA}$  represents increased transaction costs ( $\Delta TCE_U$ ) to implement integrated project management teams as a hybrid governance mechanism. For case study 2 (Angola FPSO), the line  $H_{ANG}$  represents increased transaction costs ( $\Delta TCE_A$ ) for implementing political governance for transactions with the Angolan government and IVI for the hybrid mechanisms for the EPCI transactions. This was to cope with the property rights issues due to the consequences of the adverse selection of the EPCI contractor, enforced by the Angolan government. For case study 1 (Nigeria FPSO), the line  $H_{NIG}$  represents increased transaction costs ( $\Delta TCE_N$ ) to implement political governance mechanisms due to high adverse government intervention. The use of IVI in EPCI transactions was also required to overcome problems caused by political motives, including the need to operate joint ventures to comply with the demand for high local content.

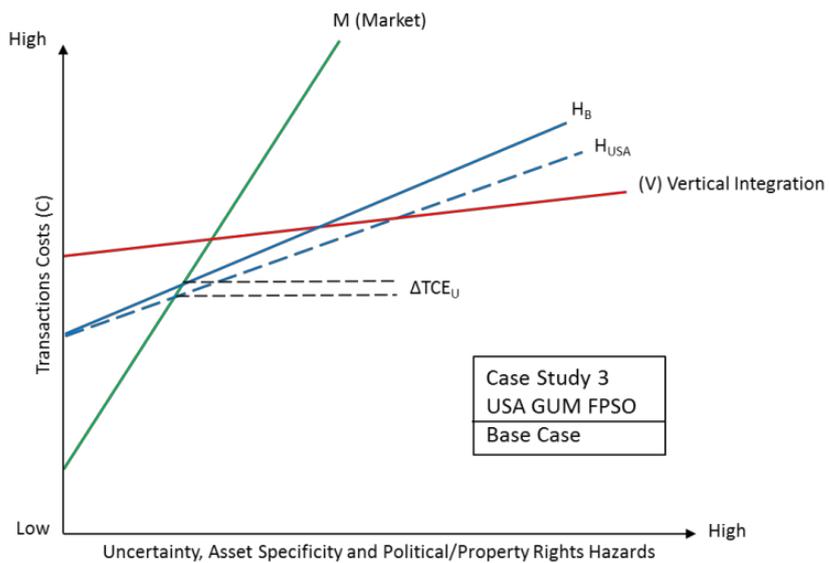
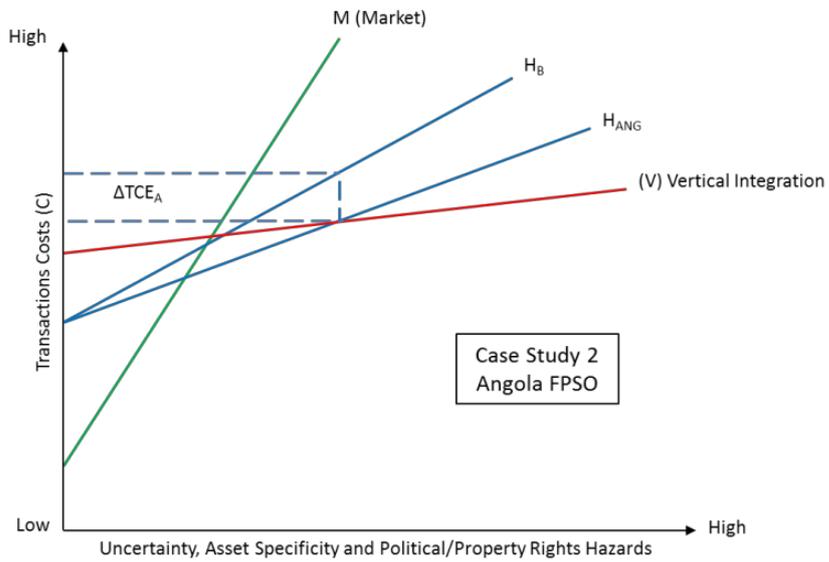
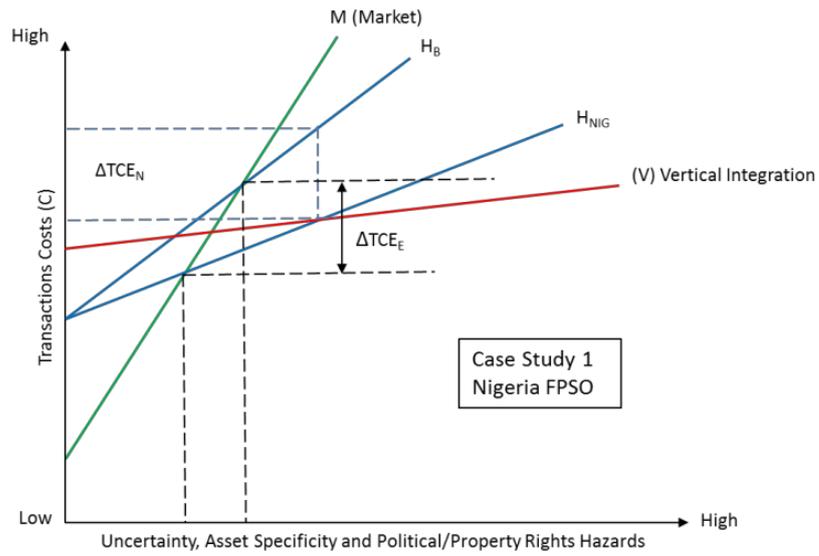


Figure 10.3 - Comparison of the Extension of TCE Model in the Case Studies

## **10.3 Conclusions and Contributions of the Research**

### **10.3.1 General Conclusions**

The research objective was to extend the predictive capabilities of the transaction cost economics (TCE) theory to predict the governing mechanisms for high value, complex, industrial projects executed across international borders. This research was of an exploratory nature and does not claim to have provided conclusive answers to the required extensions to the basic TCE model. However, support for the extension to the TCE model formulated has been demonstrated by this exploratory research using empirical evidence generated by findings of the field investigation. This was achieved by a comparative analysis of three industry case studies, which were subject to varying levels of political hazards, and executed in environments that had different levels of institutional controls and safeguards. The findings have provided evidence to support the research propositions for the basis of the extended TCE model to address the impacts of political hazards and property rights issues.

The findings of case studies 1 (Nigeria) and 2 (Angola) demonstrated that the relative hazards created by behaviour of the host country government and weak institutional regimes did affect the governance of project transactions in a non-economising manner. In this case, higher transaction costs were incurred due to the need to implement political governance and hybrid governance (with indirect vertical integration arrangements) at lower levels of asset specificity. In both these case studies there was opportunistic adverse state intervention in transactions and compelling political requirements to form joint ventures with local firms. This required the firm to select governance mechanisms in a non-transaction cost economising way to protect the property rights of the firm.

The findings of case study 3 (USA) provides evidence for the proposition in Chapter Four, that when the impact of political context and institutional behaviour of the host country on transactions is neutral, the basic TCE is applicable in totality to predict the governance mechanisms for the transactions.

The implications of the research findings for the main propositions used to develop an extended TCE model (i.e.the causes of the failures of major international projects to achieve their targets), need for rethinking of project management, impact of the state on property rights and justification for political governance are discussed in Section 10.4.

### **10.3.2 Contribution to Knowledge**

As discussed in earlier chapters, the basic propositions of TCE originate from the discriminating alignment hypothesis according to which transactions that differ in their attributes of asset specificity, frequency and uncertainty need to be aligned with governance mechanisms which differ in their costs and competencies, in a discriminating (mainly transaction cost economising) way (Williamson, 1981,1991). The literature reviewed supports the argument that this can be considered as a micro-analytical proposition, even though TCE is considered an empirical success. More than 900 contributions have been generated which support the central propositions of TCE.

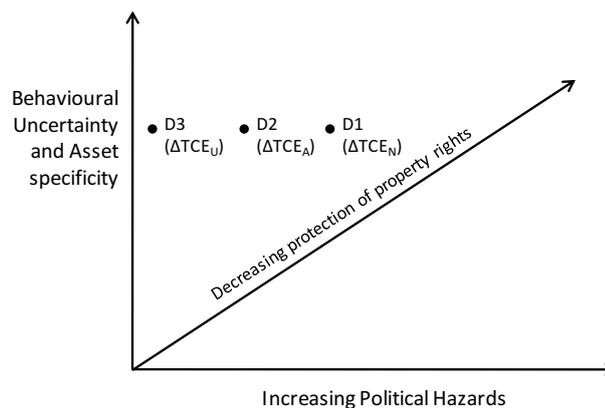
In the context of research, the main criticism of the TCE proposition is that it is a static micro-analytical self-enforcing proposition, committing a sin of omission in taking the impacts of political environment and institutional arrangements as neutral. The focus of the basic TCE is on asset specificity and behavioural uncertainty with inadequate attention to the uncertainties that can be caused by the political environment and institutions of the host country.

To counter these criticisms, Oliver Williamson introduced the ‘shift parameter framework’ in 1991, proposing the need for extensions of the TCE model to predict the optimal choice of governance arrangements in response to dynamics in the institutional environment (Williamson, 1991; Henisz and Williamson, 1999). In addition, other academics proposed that complementary theories with an interdisciplinary approach are required to extend the universal application of TCE theory. In this situation, investigation is required to reveal how the impact of institutional arrangements, the multi-dimensional nature of uncertainty and property rights issues may lead to the need to formulate specialised governance mechanisms for international transactions. A requirement is to split external uncertainty into its components, to investigate which dimensions of uncertainty are relevant to the respective transaction (Milgrom and Roberts, 1992; Acemoglu, 2003; Dixit, 2007; Ruester, 2010; Foss and Klein, 2010; Caniels *et al.*, 2012).

Based on the theoretical arguments formulated, this research has developed a conceptual model to address the requirement for a shift parameter of TCE by incorporation of political governance for the international project transactions. This extension of TCE provides an integrated approach to governance of international transactions without compartmentalising economic and political transactions as separate entities. Thus, this shift parameter framework extends the basic TCE model from the micro-analytical to the macro-analytical arena to predict optimal choice of governance mechanisms for major international transactions.

The empirical data generated provide evidence that political hazards of the host country institutions and property rights issues caused by conflicts between actors in the transactions were found to be the main causes of disturbances in the environment. The changes in response to dynamics of institutional environment shifted the costs of the governance mechanisms and therefore did have an impact on the optimal alignment of

transactions to institutional arrangements. The extended TCE model could be used as an option for the client organisations to optimise in both economic and political transaction costs, which is an important source of strategic advantage (Williamson, 1995, 2005). While the sort of discriminating alignment that mitigates contractual hazards is relatively well established, this research provides some insights into an analogous relationship for political transactions. Arguments are developed for the need to align the relationship between a firm's ability to produce goods and services and to optimise on political and economic governance. For this, the research demonstrates that extensions to the basic TCE can be carried out with incorporation of political governance mechanisms such as lobbying, commercial concessions and negotiations to manage the impact of opportunistic political behaviour, which in turn can affect the property rights of the investors. The research findings propose that the extended TCE model for international transactions needs to have three interactive dimensions: behavioural uncertainty and asset specificity characteristics of the basic TCE model, the impact of increasing political hazards and the strength of protection of property rights. The interaction of these dimensions is illustrated in Figure 10.4 below, using the findings from the three case studies.



**Figure 10.4 - Dimensions of the Extended TCE Governance Model**

D1 represents the NOD FPSO project where  $\Delta TCE_N$  represents an increase in transaction costs due to the high level of political governance and indirect vertical integration in EPCI transactions. This was required to manage the high level of political hazards and increased demand for local content.

D2 represents the AOD project where  $\Delta TCE_A$  represents transaction costs due to political opportunism with guile causing adverse selection of the EPCI contractor, requiring political governance and increased vertical integration in EPCI transactions.

D3 was the case of the GUM FPSO project in the USA where political governance was not required but integrated project teams (with indirect vertical integration) were required to manage the uncertainties due to technical issues.

The relative increases in the transaction costs were:

$$\Delta TCE_N = 30\% \text{ for Nigeria FPSO project}$$

$$\Delta TCE_A = 17\% \text{ for Angola FPSO project}$$

$$\Delta TCE_U = 4.5\% \text{ for USA GUM FPSO project}$$

Thus, we find that:  $\Delta TCE_N > \Delta TCE_A > \Delta TCE_U$  thereby supporting the proposition that transaction costs will increase with increasing political hazards and property rights issues. In every case, a degree of indirect vertical integration in a hybrid form of governance was found to be required. This level of indirect vertical integration was found to increase as political hazards increased and/or protection of property rights became weaker.

In conclusion, this research explored the potential to develop an extension to the TCE model and found that there was support for it. This warrants further conclusive research to extend the capabilities of TCE for the prediction of governance mechanisms for international projects, taking into consideration the impact of political and legal institutions.

## **10.4 Implications of the Research to Literature and Industry Practice**

### **10.4.1 Implications to Relevant Literatures**

This section examines the impact of the research findings on the arguments based on the relevant literatures used for the development of the extended TCE model for predicting the governance mechanisms for major international projects. The following arguments are supported by the empirical evidence generated by the research:

1. The causes of failures of major projects identified support the proposition for rethinking management of international projects. The focus need to be on appropriate governance mechanisms, to provide necessary dimensions of authority and encourage an alignment of behaviours and objectives. In order to achieve this, a theoretical framework based on TCE is required for the prediction and application of the most appropriate governance mechanisms aligned with the characteristics of the transactions, taking into account host country institutional arrangements (Williamson, 1996; Flyvbjerg, 2003; Miller and Lessard, 2000; Atkinson *et al.*, 2006; Sanderson, 2012).
2. In the case of international transactions, political and legal institutions generate rules and constraints that can shape the relative challenges to the economic performance of transactions in different countries (Acemoglu, 2003; Dixit, 2007).Uncertainties can be caused, in particular to international transactions, by the political and legal environments of the host country (Dixit and Pindyck, 1994; Chapman and Ward, 2003; Acemoglu, 2003).
3. The role of opportunism in the context of TCE is that some participants to transactions might try to further their gains by their opportunistic behaviour, either with guile or with stealth, or more aggressively in a blatant manner. In this case,

these participants are not transparent with their intentions and tend to take advantage of unexpected developments to the detriment of other participants to the transactions in order to enhance their own benefits (Winch, 2002, 2008; Dixit, 2007). The problem is that such opportunistic behaviour cannot be anticipated before contracts are agreed because it is not easy to determine who among the transaction participants are opportunists (Williamson, 1981, 1995; Hart and Moore, 1999).

4. The decline in the overall uncertainty and asset specificity over the project life cycle makes the case for a coalition of governance mechanisms for the transactions of a major project. Recent research into the use of a coalition of alternative governance mechanisms in complex projects, such as an oil and gas field development in Norway, supports this argument (Caniels *et al.*, 2012).
5. As major projects become increasingly international, it is inevitable that the effectiveness of existing management arrangements can weaken based on the level of political and legal hazards (Miller and Lessard, 2000). Political theory literature proposes that some political systems are more challenging to the firm than others. The proposition was that major projects carried out in countries with authoritarian democratic or authoritarian political systems can be subject to significantly higher hazards than those carried out in liberal democratic countries. These are due to opportunist intervention of the host country government and inadequate protection of property rights due to a weak judicial system (Dixit and Pindyck, 1994; Olson, 2005; Dixit, 2007; Kamrava, 2008; Scott *et al.*, 2012).
6. The interactions between the partners in a major project can be considered as a dynamic social network with differences in motivation and preferences among the participants causing increased issues regarding property rights. Evidence from the

case studies supports the proposition that property rights are determined through political processes and that political behaviour has an overriding influence on the governance arrangements required to deliver project success. This is in contradiction to the classic TCE theory of frictionless market where the host country government or the regulatory bodies are considered as neutral or even redundant to the execution of the transactions. The conclusion is drawn from case studies 1 and 2 that an extension of TCE by political governance may be required, even for situations where the political and property rights hazards faced by international transactions are considered to be manageable (Milgrom and Roberts, 1992; Libecap, 1986,1998; Olsen *et al.*, 2005; Merrow, 2012).

7. The findings of case studies 1 and 2 demonstrated that, in the face of political hazards and weak institutional regimes, there are significant limitations on using basic TCE governance arrangements for major project transactions carried out across national borders.
8. The empirical evidence provided by the case studies and interviews supports the argument that a coalition of TCE and political governance mechanisms is required to cope with politically motivated hazards and the commercial and technical challenges of the projects. It was found that in such cases, an inherent feature of such coalition of governance mechanisms is the need for an indirect form of vertical integration by the client organisation in addition to application of the political governance mechanisms. The evidence generated by case studies supports the proposition that it is necessary to implement political governance mechanisms in the form of lobbying, relationship building and economic concessions to address institutional-specific political hazards (Henisz and Williamson, 1999; Olson, 2000; Dixit, 2007; Kamrava, 2008).

9. The extension of the basic TCE model by political governance mechanisms will naturally result in incremental transaction costs ( $\Delta TCE$ ). However, the incremental transaction costs due to the introduction of indirect vertical integration and political governance need to be balanced against the organisation transaction benefits of completing the project activities without excessive costs (CAPEX) escalation and undue delays to meet the required performance standards. This proposition of mixing governance arrangements is supported by research carried out by Caniels *et al.* (2012), who based their research on a single case study in the oil and gas industry in Norway, where behaviour of political and property rights institutions is consistent and predictable. The present research goes further by evaluating three case studies representing varying levels of political hazards and protection of property rights. Hence, it can be claimed that this research provides more credible evidence to support the argument that a coalition of alternative governance mechanisms need to be used when there are several inter-firm relationships in international transactions subject to political hazards (Dixit, 2007; Kamrava, 2008).

The case study evidence highlighted that the following issues, not adequately addressed by the basic TCE, need to be examined in future research efforts:

1. All case studies demonstrate the need for relational governance aspects to be developed to ensure trust between partner firms and reduce opportunism. As can be expected, developing these relational aspects in non-democratic countries can be painfully slow and requires additional expertise in activities causing increased transactions costs.
2. Another finding from the case studies is that the basic TCE model, which is focused on outcomes of economic processes, must be extended to take into account

the co-ordination of the production processes and the complexity of the product. Williamson's (1991,1996) focus is on the end product of the transactions, while taking for granted the production processes and resources required to produce the output. This has hitherto made it difficult to visualise how product complexity and production uncertainties, caused by the use of inefficient suppliers have to be managed.

#### **10.4.2 Implications for Industry Management**

Before presenting the contribution made by this research to industry practice, some relevant observations from the performance of major international projects in the oil and gas industry are summarised. This is to provide an appreciation of the magnitude of the problem addressed by this research. Although there is much anecdotal evidence, published data is rare of projects that did not achieve their objectives of technical performance targets and economic parameters (Merrow, 2012). This research found that international projects face significant political and institutional hazards and, as such, an explicit understanding of what is involved is essential for their competent management. The reliance on EPCI contracts as simplistic approaches to complex issues can only lead to inevitable failure (Scott *et al.*, 2012). It has been argued in this research that the underlying reason for failure of many projects to achieve their targets is the multifaceted nature of the political, technological and commercial hazards, which can result in over-estimating returns, or under-estimating the difficulties in executing project transactions. Therefore, the key to improving project execution efficiency is to consider not only the current 'statutes-of-nature' but also the predictions of potential future events that can affect implementation of projects as planned (McKenna *et al.*, 2005).

Most of the participants in the oil and gas industry know of significant escalations of the CAPEX and excessive delays in meeting completion targets. A fact that is not considered as significant is that the failure to meet project targets is invariably publicised towards the middle or end phase of the construction activities. This is well beyond the end of the front-end phase of the project when the PEST hazards associated with project execution activities should have been identified and necessary measures to mitigate their impact built into the project execution plan and contracts for major project components (McKenna *et al.*, 2005).

In this situation, IOCGs seem to underestimate the impact of project uncertainties and hence the problem appears to be that they do not seem to have a comprehensive understanding of governance mechanisms required to manage them (KPMG, 2014). In this case, strong evidence of underperformance by the industry is provided by an investigation carried out by Merrow (2012) who reviewed over a thousand international exploration and production projects whose CAPEX ranged from \$1 billion to \$4 billion. The author revealed that many oil and gas projects failed to deliver the performance targets and that one in eight projects were disasters, where disaster is defined as the project failing on two out of the following three metrics:

- >40% escalation of CAPEX beyond the estimated value.
- >40% increase in the project execution duration to achieve production.
- >15% loss of production of first year operability (i.e. quality and reliability of performance).

The finding was that over half of the biggest projects (CAPEX >\$1 billion) were deemed disasters according to the above criteria. In this scenario, the industry evidence from the interview responses and case studies (see Chapters Seven, Eight and Nine) demonstrates that the project management teams have for a considerable time resorted to

the practice of including contingencies in the contracts. These are in the form of deterministic values to cover the escalation in costs and potential increase in the length of time for completion so that the risks identified can be addressed. This approach results in an inadequate systematic evaluation of the host country political hazards, risks and uncertainties at the front-end of the project. This in turn leads to unjustified optimistic estimates being included in the contracts for major project components. Thus, the contracts are drafted with exclusions and qualifications, as the project teams focus on the project risk analysis (see Chapter Six), possibly based on some unproven suppositions but not on host country political and institutional hazards. Even very senior project managers such as interviewees 1, 2, 3, 7 and 8 who were responsible for presenting the project economics and the project plans to the Board of Directors of IOGCs admitted that this practice was forced upon them due to the pressure from corporate management of partner IOGCs to deliver the projects.

The failure to recognise the host country political and institutional challenges results in the Board of Directors of IOGCs not being presented with the complete data on the scope and consequence of the project hazards and risks, especially the host country's political hazards, the impact of which can be devastating. Clearly, conventional project management techniques and EPCI contracts are no longer sufficient for today's portfolio of major international oil and gas projects. In this case, the traditional approach of using EPCI contracts is no longer adequate for managing project risks and uncertainties by allowing contingencies. This research supports the propositions that a radical change is required in the project governance process for identifying and then addressing political and institutional hazards in the execution of major international capital projects.

Increased uncertainty and increased complexity of the international project execution activities, combined with a lack of experience at many levels within the IOGC

organisations can lead to a ‘Black Swan’ event – an apparently unexpected or unpredicted event that leads to adverse events on a much larger scale. The ‘elephant in the room’ metaphor can be used to explain the corporate management neglect or disregard of the warning signals of the host country political and institutional issues. The elephant in the room, if ignored for too long, may trigger a Black Swan event (Taleb *et al.*, 2009).

The increasing hazards to be addressed in project transactions must also include increasing levels of terrorism, labour disputes, data security and tax arrangements of the host countries. Indeed, the strategic planning must account for a minimum life cycle of seven to ten years for the field development to be completed before first oil and gas. As offshore oil and gas projects become larger, more complex, and more internationalised, greater involvement by IOGC Boards becomes essential in the governance of these projects. Here the body of knowledge is quite limited and new ideas are needed for governance of these projects, as confirmed by the interview responses. In this case, the lesson for the oil and gas industry is that host country political aspects and behaviour of institutions must be considered proactively by having a holistic approach to the application of political governance mechanisms, which can not only prevent losses, but can also bring unexpected benefits.

In conclusion, the industry management need to accept that it is not always possible to formulate perfect project planning or draw up complete EPCI contracts for major international transactions. This is due to the fact that data concerning potential hazards that can be caused by the host country regime and institutions is very limited, before EPCI contractual arrangements are settled. In this situation, the use of subjective probabilities based on expert judgement was found to be useful in anticipating and managing political hazards to project transactions.

## **10.5 Limitations, Further Research and Concluding Remarks**

### **10.5.1 Limitations of the Research**

Research findings from the case studies and interviews provide evidence to the proposition presented in Chapter Two that relational governance with mutual trust is not a substitute to the TCE model but is a significant complementary measure. The findings from the case studies supports the argument that mutual trust between participants of the transaction can help to reduce the level of indirect vertical integration required for major transactions. This is an area for further research.

The field investigation of this research to derive empirical evidence concentrated on managing transactions only in the oil and gas production industry. This can result in the criticism that the extended TCE model developed by this research is limited in its application for the prediction of governance mechanisms for international transactions for major projects in other industries and can lead to biased conclusions. However, the objective of the research is to explore theoretical propositions developed and the potential of an extended TCE governance model for international transactions. The case studies were deliberately selected to represent projects of similar technical specifications and scope. This allowed for a comparative analysis of the impact of various levels of political and institutional hazards on the transactions of these projects. Thus, the findings of this exploratory research are sufficiently robust to contribute to knowledge and be of value as a foundation for further conclusive research. In addition, the extended TCE model formulated can be complemented by industry specific requirements to predict governance mechanisms to manage transactions in other industries. This is particularly for those transactions with high technical complexity and subject to hazards on an international scale.

Another difficulty experienced by the researcher was the constraint in providing greater transparency of the data on costs and schedule of the case studies, due to the confidentiality issues. However, there was no attempt to compromise on the ethical issues, and as such the anonymity of sources of the confidential data that had been used was maintained.

### **10.5.2 Subjects for Further Research**

All case studies demonstrate the need for relational aspects to be developed to ensure trust between partner firms to transactions in order to reduce opportunism. The impact of relational aspects on TCE for the prediction of governance mechanisms for major international projects is a topic which needs to be researched.

Sociological and cultural factors can affect the selection of governance mechanisms for international transactions. In this research, sociological issues were considered briefly in the discussion of findings of the case studies and application of the project risk management process. The selection of governance mechanisms to mitigate the consequences of cultural and sociological factors on the execution of major international projects is a subject that would benefit from further research.

### **10.5.3 End of the Research Comments**

The research journey achieved its objective of developing a conceptual model to meet an academic challenge of formulating an extension to the predictive capabilities of transaction cost economics (TCE) theory. This extension addressed theoretical issues of governing high value, complex industrial projects executed across international borders. The extension of TCE was facilitated by the introduction of political governance and indirect vertical integration to complement market mechanisms for international transactions.

The propositions developed to formulate the extended TCE model and its potential were explored by field investigation using three case studies complemented by responses of interviews of experienced industry professionals.

The comparative institutional analysis of three case studies was carried out by comparing the outcome of the transactions, which were subject to varying levels of political hazards and institutional controls. This analysis demonstrated that relative hazards created by behaviour of the host country government and weak institutional regimes will have an overriding impact on transactions for major projects carried out across national boundaries. It was also found that a firm may have to select governance mechanisms in a non-transaction cost economising way, if there are compelling political requirements to form joint ventures with local firms.

The use of political governance mechanisms to extend the TCE model was overwhelmingly supported by experienced industry managers and professionals interviewed. The expectation is that the extended TCE model developed would greatly facilitate ex-ante selection of optimal governance mechanisms for international transactions by examining impacts of potential behaviour of the host country government and the institutions.

This research journey was expected to be academically challenging. The completion of this journey was facilitated by the clear signposts provided along the route by research supervisors. The interviews with the industry professionals to explain the purpose of the research and to obtain their valuable contributions turned out to be a very motivating experience.

This research effort, while being intellectually demanding, was an experience to cherish.

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## **Offshore Technology Conference Papers**

### **2009**

OTC Paper 16680, Commercial/Contracting Strategies for offshore Projects, C.T. Harris, J. Formigli, B. Crager, S. Eggen, J. Reed and S. Khurana

OTC Paper 20287, Agbami Nigerian Content Execution – Successes, Challenges and Lessons Learned Henry Ehondor, Chevron Nigeria/Mid-Africa Strategic Business Unit

OTC 20021 Gimboa, Angol Block 4? First Deep Water Challenge for SonangolPandP. *H. Wime, Y. Nogueira, L.K. Fernandes, G. Eriksen, J.O. Bondevik*

OTC 20201 Structuring Projects to Benefit Multiple Stakeholders – How IOC, NOCs and Service Companies can Collaborate to Create Stakeholder Value and Promote Local Development *Christopher E.H. Ross*

OTC 20249 Agbami Project: People and Partnerships Delivering a World Scale Field Development *Craig D. Bloomer*

### **2010**

OTC 20996: AKPO: Early Completion of a Giant Nigerian Deep Offshore Development *F. Rafin, A. Laine*

OTC 21075: Risk Mitigation in International Oil and Gas Developments *Seven P. Otilar, Sandeep Khurana*

OTC 20249 Agbami Project: People and Partnerships Delivering a World Scale Field Development *Craig D. Bloomer*

OTC 29287 Agbami Nigerian Content Execution – Successes, Challenges and Lessons *Henry Ehondor*

### **2011**

OTC 20400: SS: Thunder Horse and Atlantis Deepwater Frontier Developments in the Gulf of Mexico: Advanced *Frank Ragan, Alan Ford, Ross Huebel, Kerry Moore-Cernoch, Jim Ross*

OTC 20996: AKPO: Early Completion of a Giant Nigerian Deep Offshore Development *F. Rafin, A. Laine*

OTC 21075: Risk Mitigation in International Oil and Gas Developments *Seven P. Otilar, Sandeep Khurana*

### **2012**

OTC 21336 An Evaluation of Critical Success Factors in Deepwater Oil and Gas Project Portfolios in Nigeria *EngrDamiebiDenni-Fiberesima, NazatulShima Abdul Rani*

OTC 21821 Versatility in Answering the Challenge of Deepwater Field Developments *Jackson, Bullock II, Eduard M. Geertse, Marcel M. Landwehr*

OTC 21858 Oil Industry Megaprojects: Our Recent Track Record *Edward W. Merrow*

OTC 21878 The Economics, Execution and Management of Complex Offshore Projects  
*Patricia M. Doherty*

**2013**

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OTC 21858 Oil Industry Megaprojects: Our Recent Track Record Edward W. Merrow

OTC 21878 The Economics, Execution and Management of Complex Offshore Projects  
Patricia M. Doherty

Conference Presentation

Local Content Management on the USAN Deepwater Development in Nigeria.

MCE Deepwater Development – 28th March 2012 – Paris.

## Appendix 1 - Questionnaire for Semi-Structured Interviews

### (A) Declaration of Confidentiality

**The information provided by the Respondents shall be used only for Research purposes. The names of respondents and the data provided will not be disclosed to other parties without the permission of the respondent. All responses will be treated as strictly confidential.**

This document is in two parts to meet two objectives. The first part comprises closed questions to record your response in an ordinal scale in order to estimate correlations between variables considered in the research programme. The second part contains open questions on specific scenarios and your responses will be used as input to the evaluation of the three Case Studies which form the basis for the research design.

### (B) Personal Data of Respondent

Name: \_\_\_\_\_

Position: \_\_\_\_\_

Organisation: \_\_\_\_\_

Experience: The number of years' experience in the Oil and Gas Industry

B1  0-10 years

B2  10-20 years

B3  20-30 years

B4  >30 years

In how many international projects have you participated in the past 10 years?

Five

Four

Three

Two

(C) Oil and Gas Industry Uncertainties and Risks

The following five factors have been identified by surveys as the top uncertainties and risks which impact the execution of offshore oil and gas Projects. Please rank them in order of their impact on the Project execution.

	Uncertainty Factor	Rank 1 = Lowest 5 = Highest
C1	Political uncertainties including opportunistic behaviour of the host country government.	
C2	Host Country demand for local content causing increases in engineering, fabrication, construction and installation costs and schedule delays.	
C3	Shortage of engineering, fabrication and installation capacities in the host country causing escalation of CAPEX and schedule	
C4	Failure of novel technology (required for frontier deep water regions).	
C5	Shortage of technical expertise and skilled project management.	

(D) Impact of Uncertainties on Project Execution

How do you rate the impact of the following factors on the execution of Projects for the oil and gas field development?

(D1) Impact of political uncertainties in the host country

- D1.1 Political stability of host country.  High  Medium  Low
- D1.2 Opportunistic behaviour of the Government.  High  Medium  Low
- D1.3 Changes in the Taxation regime.  High  Medium  Low
- D1.4 Strength of the Legislation structure to impose contractual terms.  High  Medium  Low
- D1.5 Pressure for Increased local content.  High  Medium  Low

(D2) Impact of market economic uncertainties on the costs and schedule of Project Components

- |      |  |                               |                                 |                              |
|------|--|-------------------------------|---------------------------------|------------------------------|
| D2.1 | Subsea Systems and Wellheads.                                | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D2.2 | Pipelines and Risers.  | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D2.3 | Offshore Production Processing Facility (Fixed or Floating). | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(D3) Impact of Technological Uncertainties on Project Execution

- |      |   |                               |                                 |                              |
|------|---|-------------------------------|---------------------------------|------------------------------|
| D3.1 | Novel technology required. e.g. Deep Water                    | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D3.2 | Shortage of required technical and management expertise.      | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D3.3 | Inadequate construction and fabrication capacity.             | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D3.4 | Availability of skilled labour.                               | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| D3.5 | Availability of Installation and commissioning of facilities. | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(E) Potential Impact of Host Country Political Context

(E1) How do you rate the impact of political uncertainties including behaviour of the host government in the following countries on Project transactions?

- |      |         |                               |                                 |                              |
|------|---------|-------------------------------|---------------------------------|------------------------------|
| E1.1 | Nigeria | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| E1.2 | Angola  | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| E1.3 | USA     | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(E2) How do you rate the demand for local content in the following countries impact the Engineering, fabrication, construction and installation activities for the Project Components?

- |      |         |                               |                                 |                              |
|------|---------|-------------------------------|---------------------------------|------------------------------|
| E2.1 | Nigeria | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| E2.2 | Angola  | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| E2.3 | USA     | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(F1) Impact of Asset Specificity on the Project Execution

Asset specificity is defined as the site specific functional requirements (i.e. specific design) of the Project components. Asset specificity of a Project component is high if the Project component is highly site specific and the potential for re-use in other locations is low or negligible.

How do you rate the asset specificity of the following components of an offshore deep water Oil and Gas Project?

- |      |                                   |                               |                                 |                              |
|------|-----------------------------------|-------------------------------|---------------------------------|------------------------------|
| F1.1 | Subsea Systems and Wellheads.     | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F1.2 | Pipelines, Umbilicals and Risers. | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F1.3 | Floating Offshore Production      | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(F2) Contracts for project components with high uncertainty

In the case of a Project component (e.g. Floating Production Facility (FPSO) with high uncertainties, which type of Project execution arrangement would you choose?

- |      |   |                               |                                 |                              |
|------|---|-------------------------------|---------------------------------|------------------------------|
| F2.1 | Turn-Key Contract with technical and legal specifications (Client – Agent). | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F2.2 | High level of Client management of transactions (Vertical Integration).     | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F2.3 | Hybrid/Joint Venture with Contractors.                                      | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(F3) In the case of a Project Component with high asset specificity (e.g. pipelines, umbilicals and risers), which type of Project execution arrangement would you choose?

- |      |  |                               |                                 |                              |
|------|--|-------------------------------|---------------------------------|------------------------------|
| F3.1 | Turn-Key Contract with technical and legal specifications (Client – Agent) | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F3.2 | High level of Client Management of transactions (Vertical Integration).    | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F3.3 | Hybrid/Joint Venture with Contractors                                      | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

(F4) In the case of a Project Component with high level of local content, which type of Project execution arrangement would you choose?

- |      |   |                               |                                 |                              |
|------|---|-------------------------------|---------------------------------|------------------------------|
| F4.1 | Turn-Key Contract with technical and legal specification (Client – Agent) | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F4.2 | High level of Client management of transactions (Vertical Integration).   | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |
| F4.3 | Hybrid/Joint Venture  | <input type="checkbox"/> High | <input type="checkbox"/> Medium | <input type="checkbox"/> Low |

**(G) Open Questions for Discussion**

(G1) – How did the relative political uncertainty created by the behavior of the host country institutional regime and weak contract enforcement to safeguard property rights affect the Project transactions?

(G2) –Did the state intervention IOGC’s selection of Project execution arrangements mechanisms (due to increased demand for local content), require the IOC to select these arrangements in a non-economising way, leading the IOC to incur additional transaction costs, due to the requirements to form Joint Ventures with local partners?

(G3) – In your opinion, does the location or the host country in which the project operates appear to most affect project execution costs and duration?

(G4) – When the project execution process is subject to high host country political hazards what contingencies were used to mitigate the impact of these hazards on the transactions?

(G5) – In your experience, to what extent were the uncertainties that pertain to political instability and bureaucratic obstacles were concerns for the successful completion of the Project execution?

(G6) – What are the main issues involved in executing Project activities with Joint Ventures with host countries companies and with EPCI Contractors?

## **Appendix 2- Analysis of Responses from Structured Interviews**

The interview responses of the participants listed in Table 5.4 are reported as follows: -

1. Responses to close questions by all participants were used to calculate the average score using the technique given below in A 2.1. The results are given in section A 2.2.
2. Responses to the open discussion were grouped according to the host country of the case study and used as primary evidence for the evaluation of the case studies.

### **A 2.1 Basis of the Analysis of the Interview Closed Questions**

The interview responses recorded in the Questionnaire and the questions (A) to (H) were entered into an Excel spreadsheet with the necessary formulae built in to convert the responses into average score of all the respondents for the questions.

For questions (C)

$$\text{Average Score} = \frac{\text{Total Score} \times 100 \%}{\text{Maximum Score}}$$

$$\text{Maximum Score} (= 30 \times 5 = 150)$$

For questions (D), (E) and (F),

$$\text{Average Score} = \frac{\text{Total Score} \times 100 \%}{\text{Maximum Score}}$$

$$\text{Maximum Score} (= 30 \times 3 = 90)$$

Several individuals who are involved in projects bring together a larger fund of experience, knowledge and creative insights. The synergy of individuals may make the overall quality of the input to the group decision greater than the sum of the parts. The creation of juries, panels and cabinets as ways of reaching decisions can be seen to be based on this premise (Ferrel, 1985). A number of experts may combine in order to deliver an assessment superior to that which might be attained by merely accepting an individual recommendation. A review of these techniques indicates that mathematical aggregation is the most suitable for combining individual judgements to complement quantitative methods (Ferrel, 1985; Goodwin, P. & Wright, G, 1998).

## 2.2 Results

### Oil and Gas Industry Uncertainties and Risks

The following five factors have been identified by surveys as the top uncertainties and risks which impact the execution of offshore oil and gas Projects. Please rank them in order of their impact on the Project execution.

	<b>Uncertainty Factor</b>	<b>Average Score %</b>
C1	Political Uncertainties including opportunistic behaviour of the host country government.	81
C2	Host Country demand for local content causing increases in Engineering, Fabrication, Construction and installation costs and schedule delays.	80
C3	Shortage of Engineering, Fabrication and Installation Capacities in the host country causing escalation of CAPEX and schedule	55
C4	Failure of Technology including requirements for novel technology (for frontier deep water regions).	42
C5	Shortage of Technical Expertise and Skilled Project Management.	37

### **Impact of Uncertainties on Project Execution**

How do you rate the impact of the following factors on the execution of Projects for the oil and gas field development?

	<b>Factor</b>	<b>Average Score %</b>
D1.1	Political stability of host country.	60
D1.2	Opportunistic behaviour of the Government.	86
D1.3	The Taxation regime.	60
D1.4	Strength of the Legislation structure to impose contractual terms.	65
D1.5	Pressure for Increased local content.	80

### **(D2) Impact of market economic uncertainties on the costs and schedule of Project Components**

	<b>Factor</b>	<b>Average Score %</b>
D2.1	Subsea Systems and Wellheads.	42
D2.2	Pipelines and Risers.	72
D2.3	Floating Offshore Production Processing Facility	75

**(D3) Impact of Technological Uncertainties on Project Execution**

	<b>Factor</b>	<b>Average Score %</b>
D3.1	Novel Technology required. e.g. Deep Water	75
D3.2	Shortage of required Technical and Management expertise.	82
D3.3	Inadequate Construction and Fabrication Capacity.	70
D3.4	Availability of Labour.	60
D3.5	Availability of Installation and Commissioning of Facilities.	70

**(E) Potential Impact of Host Country Political Context**

	<b>Factor</b>	<b>Average Score %</b>
E1.1	Nigeria	80
E1.2	Angola	72
E1.5	USA	40

**E2)** How do you rate the demand for local content in the following countries impact the Engineering, fabrication, construction and installation activities for the Project Components?

	<b>Factor</b>	<b>Average Score%</b>
E2.1	Nigeria	85
E2.2	Angola	76
E2.5	USA	20

### **Impact of Asset Specificity on the Project Execution**

Asset specificity is defined as the site specific functional requirements (i.e. specific design) of the Project components. Asset specificity of a Project component is high if the Project component is highly site specific and the potential for re-use in other locations is low or negligible. How do you rate the Asset specificity of the following components of an offshore deep water Oil and Gas Project?

	<b>Factor</b>	<b>Average Score</b> %
F1.1	Subsea Systems and Wellheads.	30
F1.2	Pipelines, Umbilicals and Risers.	78
F1.3	Floating Offshore Production Processing Facility.	75

### **Contracts for Project Components with high uncertainty**

In the case of Construction of a Project component (e.g. Floating Production Facility (FPSO) with high execution uncertainties, which type of contract arrangement would you choose?

	<b>Factor</b>	<b>Average Score</b> %
F2.1	Turn-Key Contract with technical and legal specifications (Client – Agent).	40
F2.2	High level of Client management of transactions. (Vertical Integration).	65
F2.3	Hybrid/Joint Venture with Contractor.	75

For the construction of a Project Component with high asset specificity (e.g. pipelines, umbilicals and risers), which type of contract would you choose?

	<b>Factor</b>	<b>Average Score</b> %
F3.1	Turn-Key Contract with technical and legal specifications. (Client – Agent)	40
F3.2	High level of Client Management of transactions. (Vertical Integration).	65
F3.3	Hybrid/Joint Venture with Contractor.	75

**(F4)** In the case of a Project Component with high level of local content, which type of contract would you choose?

	<b>Factor</b>	<b>Average Score</b> %
F4.1	Turn-Key Contract with technical and legal specification. (Client – Agent)	35
F4.2	High level of Client management of transactions. (Vertical Integration).	80

### Appendix 3- Analysis of Responses of Semi-Structured Interviews/Questionnaire

MPTS= Maximum Possible Total Score																																MPTS	% Value		
Ref No.	Question/Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			Total	
<b>C Oil and Gas Industry Uncertainties and Risks</b>																																			
C1	Political Uncertainties including opportunistic behaviour of the host	5	4	5	4	4	4	5	5	4	4	5	4	4	5	4	4	3	4	4	4	3	3	2	3	3	5	5	4	3	4	120	150	80.0%	
C2	Host Country demand for local content causing increases in Engineering, Fabrication, Construction and installation costs and schedule delays.	4	5	4	5	5	5	4	4	3	3	4	3	5	4	1	3	4	5	3	5	4	5	5	2	2	4	3	5	4	5	118	150	78.7%	
C3	Shortage of Engineering, Fabrication and Installation Capacities in the host country causing escalation of CAPEX and schedule.	3	3	1	2	3	2	3	3	5	2		5	1	2	3	5	5	2	5	2	5	3	3	2		3	2	2	2	3	82	150	54.7%	
C4	Failure of Technology including requirements for novel technology (for frontier deep water regions).	1	2	3	3	1	1	2	3	2	1		2	3	1	4	2	2	1	2	1	1	1	1	4	5	3	2	1	3	5	1	63	150	42.0%
C5	Shortage of Technical Expertise and Skilled Project Management.	2	1	2	1	2	3	1	2	1	5		1	2	3	2	1	1	3	1	3	2	4	1	1	4	1	2	1	1	2	56	150	37.3%	
<b>D Impact of Uncertainties on Project</b>																																			
D1.1	Political stability of host country.	2	1	1	2	3	2	2	1	3	1	2	2	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	55	90	61.1%
D1.2	Opportunistic behaviour of the	3	3	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3	2	2	2	2	2	2	2	3	2	2	2	2	3	77	90	85.6%	
D1.3	Changes in the Taxation regime.	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	2	2	2	54	90	60.0%	
D1.4	Strength of the Legislation structure to impose contractual terms.	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	2	2	2	54	90	60.0%	
D1.5	Pressure for increased local content.	3	3	2	3	3	3	3	3	2	2	2	2	3	3	2	3	3	2	2	2	2	3	2	2	2	2	2	2	2	2	72	90	80.0%	
D2.1	Subsea Systems and Wellheads.	1	1	2	2	1	2	1	2	1	1	1	1	2	1	2	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	38	90	42.2%	
D2.2	Pipelines and Risers.	3	2	3	3	2	3	2	3	2	1	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	65	90	72.2%
D2.3	Offshore Production Processing Facility (Fixed or Floating).	3	2	3	3	3	3	3	3	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	68	90	75.6%
D3.1	Novel Technology requirements	3	2	3	3	2	3	2	3	3	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	68	90	75.6%
D3.2	Shortage of required technical and management expertise.	3	3	2	3	3	3	3	3	2	2	2	2	3	3	2	3	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	72	90	80.0%
D3.3	Inadequate construction and fabrication capacity.	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	63	90	70.0%
D3.5	Availability of installation and commissioning resources.	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	63	90	70.0%
<b>E Potential Impact of Host Country Political Context</b>																																			
<b>E1 How do you rate the impact of political uncertainties including behaviour of the host government in the following countries on Project transactions?</b>																																			
E1.1	Nigeria	3	3	3	3	3	2	3	2	2	3	2	2	3	2	3	3	2	3	2	3	2	3	2	3	2	2	2	2	2	2	72	90	80.0%	
E1.2	Angola	2	2	2	2	2	2	2	2	2	2	2	3	2	2	3	2	3	2	2	2	3	2	2	3	2	2	2	2	2	2	63	90	70.0%	
E1.3	USA	1	1	1	1	2	1	1	2	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	36	90	40.0%
<b>E2 How do you rate the demand for local content in the following countries impact the Engineering, fabrication, construction and installation activities for the Project</b>																																			
E2.1	Nigeria	3	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3	3	2	3	2	3	2	3	2	2	2	2	2	2	2	76	90	84.4%	
E2.2	Angola	3	2	3	3	2	3	2	3	2	2	2	2	2	3	3	3	2	2	3	3	3	3	2	2	2	2	2	2	2	2	1	68	90	75.6%
E2.3	USA					1			1				1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	90	20.0%	

F1 Asset Specificity of the components of an offshore deep water Oil and Gas Project?																																	
F1.1	Subsea Systems and Wellheads.	3	3	3	3	3	3	3	2	3	2	3	2	2	3	3	2	2	3	2	2	2	2	2	2	2	2	2	1	68	90	75.6%	
F1.2	Pipelines, Umbilicals and Risers.	3	2	3	3	2	3	2	3	2	2	2	2	2	3	3	3	2	2	3	3	3	3	2	2	3	2	2	2	1	70	90	77.8%
F1.3	Floating Offshore Production Processing Facility.	2	2	2	3	2	3	2	3	2	2	2	2	2	3	3	3	2	2	3	3	3	3	2	2	2	2	2	1	67	90	74.4%	
<b>F2 Contracts for Project Components with high uncertainty</b>																																	
<b>F2 Contracts for Project Components with high uncertainty</b>																																	
<b>In the case of Construction of a Project Component e.g. Floating Production Facility (FPSO) with high execution uncertainties, which type of contract arrangement would</b>																																	
F2.1	Turn-Key Contract with technical and legal specifications. (Client - Agent).	1	1	1	1	2	1	1	2	1	1	1	1	2	1	2	1	1	1	1	1	2	1	1	1	1	1	1	2	36	90	40.0%	
F2.2	High level of Client management of transactions. (Vertical Integration).	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1	2	2	59	90	65.6%
F2.3	Hybrid/Joint Venture with Contractor.	3	3	3	3	3	3	3	2	3	2	3	2	2	3	3	2	2	3	2	2	2	2	2	2	2	2	2	1	68	90	75.6%	
<b>F3 For the construction of a Project Component with high asset specificity (e.g. Pipelines, umbilicals and risers), which type of contract would you choose?</b>																																	
F3.1	Turn-Key Contract with technical and legal specifications. (Client - Agent).	1	1	1	2	1	1	2	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	36	90	40.0%	
F3.2	High level of Client management of transactions. (Vertical Integration).	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1	2	2	59	90	65.6%
F3.3	Hybrid/Joint Venture with Contractor.	3	3	3	3	3	3	3	2	3	2	3	2	2	3	3	2	2	3	2	2	2	2	2	2	2	2	2	1	68	90	75.6%	
<b>F4 In the case of a Project Component with high level of local content, which type of contract would you choose?</b>																																	
F4.1	Turn-Key Contract with technical and legal specification. (Client - Agent).	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	31	90	34.4%	
F4.2	High level of Client management of transactions. (Vertical Integration).	3	3	3	3	3	2	3	3	3	2	3	2	3	3	3	2	3	3	2	3	2	1	2	3	2	2	2	2	72	90	80.0%	
F4.3	Hybrid/Joint Venture.	3	3	3	3	3	2	3	3	3	2	3	2	3	3	3	2	3	3	2	3	2	1	2	3	2	2	2	2	72	90	80.0%	