Bid/No-bid decisions in the international construction industry:
A comparison between theoretical and practical perspectives
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‘For God had such love for the world that he gave his only Son, so that whoever has faith in him may not come to destruction but have eternal life.’ (Holy Bible, John 3:16)

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‘I have combated the good combat, I have finished the race, I have kept the faith.’

(Holy Bible, II Timothy4:7)
Abstract

Bid/no-bid decisions in international construction markets are considered difficult, being characterized by its uncertainties and complexities, especially in today’s highly competitive market. Additionally, it is claimed by some authors that many companies still utilize tools and methods that are fragmented, incomplete and rudimentary based on “personal intuition” or “previous-experience-based” (Han and Diekmann 2001a; Han and Diekmann 2001b). On the other hand, other authors emphasize that most of the bid/no-bid models found in the literature ‘remained in academic circles and did not find their way into the practical world’ (Wanous et al, 2000, pp.457). Thus, the focus of this work is to make a contribution towards the reduction of the actual gap between theoretical and practical bidding decision models and contribute to the development of a consistent model that could satisfactorily support the bid/no-bid decision for international construction projects. This way, an investigation of the practical bid/no-bid decision models is performed combined with an evaluation of the degree of applicability of theoretical models in practice. The research is based on a multiple case study analysis. The results suggest that although bidding decisions are still based on subjective judgments, the process applied by companies is formal and highly structured. It is a defined routine with a clear sequence of steps to be followed in which relevant information is analyzed by experienced staff. Additionally, it is designed to be followed by all bids in the companies, including formal presentations for the top management of the companies, who are actively involved in the decision. However, the results also reinforce that although some features of theoretical models can be observed in practice, none of them is being fully employed. Thus, it is possible to affirm that, although the current theoretical models bring some important highlights to bidding situations, they are still not fully suitable for the international construction environment. An important contribution can be done not only to the academic field but also to managerial one if future research focuses on the improvement of the practical models.

Keywords: Bid/no-bid decision, models, theoretical, practical, international construction industry
1. Introduction

A project is defined by the Project Management Institute (PMI) as a ‘temporary endeavor undertaken to create a unique product, service or result’ (PMI, 2004). International projects have the additional characteristic of involving multiple locations, entities, organizations and business units, which implies distinct challenges compared to ordinary projects (Lientz and Rea, 2003). The international construction industry has a fundamental role in the world economic development and is characterized by large and complex projects with the interaction of many stakeholders from diverse socio-economic and cultural backgrounds such as client, contractors, subcontractors, government, financing agents and several others (Kenny 2007; Toor and Ogunlana 2008).

The decision to enter in international construction markets is not only risky but also integrated and complex. Entry decision follows three distinct phases: (1) identification of appropriate countries; (2) selection of potential projects in the countries identified and (3) decision to bid or not for selected projects (Han and Diekmann 2001b).

The last phase of the entry decision in international construction markets, the bid/no-bid decision, is difficult, being characterized by its uncertainties and complexities, especially in today’s highly competitive market. Consequently, contractors are less self-assured regarding the decision whether or not to bid for potential international project opportunities (Han and Diekmann 2001b; Han et al 2005; Wanous et al 2000). The result is that there are a relatively small number of companies in the international construction market, despite the increasing number of opportunities that the industry is facing (Han et al, 2007). In particular, small and medium size companies seldom participate in international projects (Han and Diekmann, 2001b). Additionally, although the decision for international markets is risky and complex, many companies still utilize unstructured and biased methods such as “personal intuition” or “previous-experience-based” (Han and Diekmann 2001a; Han and Diekmann 2001b). Tools and methods for evaluating international opportunities are still fragmented, incomplete and rudimentary and the existing bid/no-bid models are suitable only for domestic construction projects (Han and Diekmann, 2001a). This situation emphasizes the importance of the development of sound bid/no-bid decision-making models, which are more appropriate to deal with specific issues related to the environment of international construction projects.

On the other hand, Wanous et al claim that most of the bid/no-bid models found in the literature ‘remained in academic circles and did not find their way into the practical world’ (2000, pp.457). The authors attribute some reasons for this distance between theoretical models and their practical applicability. Firstly, the over simplicity of the models’ assumptions make them unable to represent real-life situations. Additionally, many companies are reluctant to struggle with
sophisticated mathematical models, which proved to be appropriate for academia but not for real-world conditions. Wanous highlights that few researchers approached the bid/no-bid decision in qualitative perspective, even though it is more acceptable in the construction industry (Wanous et al, 2000). According to a study conducted by Wanous, only 3% of the contractors who answered the survey use some mathematical tools to support bidding decisions. The author concluded that most contractors decide to bid or not using subjective judgments based on their past experience. This situation is emphasized by studies conducted in other countries as shown in Table 1 (Wanous et al, 2003). In addition, theoretical models usually require a large amount of data tracking that are difficult or even impossible to obtain (Lin and Chen 2004; Wanous et al 2003).

<table>
<thead>
<tr>
<th>Country</th>
<th>Contractors using mathematical bidding models (%)</th>
<th>Researcher(s)/date</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>11.1</td>
<td>Ahmad and Minkarah (1988)</td>
</tr>
<tr>
<td>UK</td>
<td>17.6</td>
<td>Shash (1993)</td>
</tr>
<tr>
<td>Australia</td>
<td>12.0</td>
<td>Ting and Mills (1996)</td>
</tr>
</tbody>
</table>

It is also claimed by some authors that traditional models overlook human behavior in the organizational environment. As bidding conditions are usually included in a complex and unpredictable competitiveness environment combined with unclear assessment criteria, the expert's judgment is of crucial importance in formulating bidding strategies. However, this role is not easy to incorporate in the bid/no-bid models (Lin and Chen 2004).

1.1. Research purpose

The present work aims at making a contribution to reduce the actual gap in the development of a consistent model that could satisfactorily support the bid/no-bid decision for international construction projects. In order to reach this objective, an investigation of the models applied by international contractors in real life situations will be performed combined with an evaluation of the degree of application of theoretical models in practice. This analysis will be developed based on a multiple-case study of two international contractors. The identification of the differences between these two categories of decision-processes may help to understand the flaws in the existent
models, opening a space for further research focused on the development of optimal models to support the bid/no-bid decision for international construction projects. This way, the research question proposed in this work is: ‘How does the bid/no-bid decision-making process function in international construction context? A comparison between theoretical and practical perspective.’ The objectives can be described as: (1) understand the functioning of the bidding process of the companies and (2) verify if theoretical models or some of their elements are being applied.

1.2. Thesis Architecture

This thesis starts with a review of the relevant literature on the proposed topic. The literature review chapter firstly presents the international construction industry as the context in which the research is included. Further, it moves to the exposition of the importance of bid/no-bid decisions in the context analyzed. The following section reviews the theoretical bidding models which are grouped into three categories according to the basis on which they are developed: multiple-attribute, historical data and portfolio analysis. Then, this work moves to the research methodology chapter, which presents the relevant methodological basis of this work including its nature, epistemology, ontology, relationship between research and theory, research strategy, design and process, data collection method and sampling. In the sampling section, the companies that are the subjects of this study are briefly described. Additionally, issues such as validity, reliability, generalizability, researcher bias and ethical considerations are also exploited in this chapter. In the following chapter the empirical data collected and a discussion of the findings is presented. Finally, the last chapter demonstrates the conclusions of this work by answering the research question. Limitations of this study, its contributions and some suggestions for further studies are also part of this final chapter.
2. Literature Review

This section has the objective of presenting the theoretical background required to answer the research question ‘How does the bid/no-bid decision-making process function in international construction context? A comparison between theoretical and practical perspective’. Firstly, an overview of the international construction industry as the context of this research is presented. The following sub-section describes the importance of the bidding phase in the project life-cycle. Finally, a discussion of the main theoretical models found in the literature to support the bid/no-bid decisions is developed.

2.1. International construction industry

According to a research from the World Bank, the construction industry is responsible for around one-third of gross capital formation. It has a crucial role in the global economic development, representing about five to seven percent of Gross Domestic Product (GDP) in most countries. The projects in the construction industry usually involve not only large, complex and non-standard activities but also complex organizational structures with many players involved such as clients, consultants, financers, insurance companies, contractors and subcontractors. Figure 1 shows an example of a simplified diagram of a Power Station construction project. The international market is dominated by few large companies, which together have annual revenues of $50 billion (Kenny, 2007).

The flourishing of the international construction industry has its roots in the reconstruction period following the Second World War. Subsequently, the access to international funding from the World Bank and the exploitation of natural resources encouraged the development of the infrastructure industry of several developing countries, which consequently influenced positively the growth of the international construction industry (Langford and Rowland, 1995). The last decades also brought significant changes that impacted directly the international construction segment. Firstly, the countries under the General Agreement on Tariffs and Trade (GATT) system are supposed to open their internal markets, which include the construction sector. In addition, the formation of Free Trade Blocks also impacted the industry, since it created a free trade region among where organizations are encouraged to work on. Moreover, the issuance of international standards such as ISO series facilitated the acceptance and approval of services and products globally. Additionally, the development of telecommunication and IT industries also contributed to the growth of international construction industry, since it provided a lower cost of communication and more reliable data exchange among multi-national companies (Han and Diekmann, 2001a).
The expansion of transportation systems was also a driver for the international construction industry’s growth, once it contributed to decrease the cost of doing business in multiple locations (Lientz and Rea, 2003). The process of globalization had also increased the opportunities for companies to extend their business outside the boundaries of their home countries, especially in the construction markets (Han, S.H. et al, 2005). Organizations began to search for expansion for their services and products worldwide not only as a way to reach global markets but also to reduce risks by diversifying services across different countries. Moreover, doing business globally means accessing global human resources’ pool, which can facilitate the accessibility to skilled and cheaper workforce (Lientz and Rea, 2003). In 2005, the global volume of the construction market was evaluated at approximately $4.1 trillion, of which $291 billion is accessible to foreign construction companies. Experts predict that the increase of the construction industry globalization process will push the rate of accessible markets to 15-20%, representing great opportunities for construction firms (Han et al, 2007).

However, decision to entry in international construction industry is difficult due to the uncertainties and complexities related to this domain (Han and Diekmann, 2001b). The multi-organizational and cross-cultural environment of international construction projects is complex regarding both
technological and organizational dimensions, and thus, carries a higher load of risks (Langford and Rowland 1995; Han et al 2005). Compared to domestic projects, international construction projects have larger contract amounts, longer return periods of investments, higher burdens of financing and complex risks associated to international transactions, which are some of the main challenges for the international projects’ success (Han and Diekmann 2001b; Han et al 2004). Additionally, the management of stakeholders in an international environment is highly demanding since it involves home, host and third parties (Chen, 2005). Furthermore, financial aspects such as currency exchange, interest and inflation rates and credits requires special attention since they can have great impact on an organization’s expected returns (Han et al, 2004). Risks related to the macro environment such as fluctuations in the macro-economy and the government policies of the specific country are also threats to overseas construction projects (Zhi, H., 1995). Consequently, international construction projects are more susceptible to failure, which is reflected on the high percentage of 15.1% of “top 225 global contractors” experiencing losses in international construction projects in the last decade (Han et al, 2007). This situation is also emphasized by Caron et al, when they state that, in recent years, the Engineering & Construction sector has experienced reduced financial results and a significant stagnation in the companies’ growth rate, which conflicts with the increasing size and complexity of projects in the current companies’ portfolios (Caron et al 2007). One breakdown structure of risks for international construction projects is exemplified in Figure 2.

The trade-off between the opportunities and risks represented by international construction projects is one of the most important issues for organizations that operate or intend to operate globally. In order to minimize the risks and maximize returns of an international construction project, a company needs reliable decision making tools in order to make consistent decisions whether or not to go for the project (Han and Diekmann, 2001b). The following sections will focus on the importance of the bid/no-bid decision process and the evaluation of some theoretical models proposed in the literature.
2.2. Importance of the bid/no-bid decision making process

Decisions regarding whether or not to bid for a project are of extreme importance, since they affect not only the daily operations but also the long-term results of the firm (Ahmad, I., 1990). Several factors have a direct influence in the bidding decision and should be considered in the decision process. While considering an opportunity, managers usually investigate the following features: alignment of the opportunity to the organization’s objectives and policies, contractor’s need for work, current workload, resources availability, market conditions, competition, capability to perform the contract, contractual and financial conditions, type and size of the project, project location, bid preparation costs and relationship with the client (Ahmad, I. 1990; Lowe and Parvar 2004).
From one side, bidding for inappropriate projects could result in financial losses, time consuming and wastage of resources which could be invested in more advantageous projects. Additionally, some authors emphasize that ‘submitting a lot of non-winning proposals in response to requests for proposals (RFP) can damage a contractor’s reputation’ (Gido J. and Clements J.P. 1999, cited in Lin and Chen, 2004). Furthermore, the growth and success of the company can be negatively impacted by projects that are not aligned with the company’s strategic goals (Lin and Chen, 2004). Additionally, since the bidding process involves the commitment of bid preparation costs, which are estimated at approximately 1% of the project contract amount for each proposal submitted, contractors need to be more selective in choosing the projects they should bid for in order to avoid dissipating energy in preparing a losing bid (Fellows, R.F. and Longford, D.A. 1980 cited in Lowe and Parvar, 2004; Lin and Chen 2004; Wanous et al 2003). However, from the other side, deciding not to bid for the right project could also represent a missed opportunity for making profit, strengthening position in the market and establishing a strategic relationship with a client (Wanous et al 2003).

On one hand, bid/no-bid analysis seems difficult to be performed provided the uncertainty level caused by the scarce information available in the earlier phases of the project combined with the limited time space (Wanous et al 2003; Zhi, H. 1995). Additionally, in the early phases of the project the risk exposure is highest and the impacts of all possible risks are difficult to measure (Caron et al 2007). Han and Diekmann claim that ‘go/no-go decision model entails a dynamic multi-stage decisions process and a highly complicated relationship among the risk variables’ (2001b, pp.768). In addition, the bidding phase is frequently mentioned as unstructured, fragmented and rudimentary, being even overlooked in many cases (Caron et al 2007; Han and Diekmann 2001b). The bidder is usually not very clear on which rational basis the decision should be made and the identification of the factors that create these basis is difficult and time-consuming (Ahmad, I., 1990). Ahmad highlights that bidding decisions are usually made in a subjective way, lacking reasonable basis, which can lead to mistakes and, consequently, result in losses to the organization and affect negatively the industry (Ahmad, I., 1990). Ahmad (1990, pp.595) also observed that, ‘the usual practice is to make bid decisions on the basis of intuition derived from a mixture of gut feelings, experience, and guesses’.

On the other hand, even experienced contractors recognize that the complexity of the problem claims for a better technique for arriving at bid decisions (Ahmad, I., 1990). Changes in the competitive environment are leading companies to modify their behavior in order to pursue a more structured method of determining the attractiveness of a specific project (Caron et al 2007). Considering the subjective nature of bid/no-bid decisions, a structured approach would help not only in combining the subjective evaluations in a meaningful way but also in reducing the chances of having overlooked factors (Ahmad, I., 1990). Additionally, as claimed by Lowe and Parvar (2004, pp. 643), ‘a suitable decision support model can be a strategic tool in determining the most appropriate projects to seek and for which to submit a bid’. 
Accordingly, it is essential for a contracting organization to develop successful strategies to deal with bidding situations. These strategies are based on the ability of filtering out inappropriate bid opportunities and focusing on opportunities that, if successful, will add value to the company (Lin and Chen, 2004). It is claimed by Han et al that the chances to decide for viable projects are increased if the company has structured tools, which serve as a guide for systematical analysis of critical factors and their impact in the project feasibility (Han et al 2004). The following section will present the main models published in the literature concerning bid/no-bid decision tools.

2.3. Theoretical models of bid/no-bid decisions

The bidding strategy problem had been focus of research since the mid-1950s. The first models found in the literature, however, reduced the problem of bidding decisions to the maximization of expected value of profit and calculation of winning probabilities. They did not consider multi-criteria outcomes such as opening future markets, firms’ need for work and development of relationship with new clients, as possible reasons for deciding to bid for a project (Han and Diekmann 2001b). Han et al emphasizes that the maximization of profit is not the main goal of organizations; instead growth combined with steady returns is a crucial decision factor in the project selection process (Han et al 2004).

The first model to enlarge the spectrum of relevant factors to be considered in bid/no-bid decisions was proposed by Ahmad in 1990 (Ahmad, I., 1990). This way, the evaluation of bid/no-bid decision models in this thesis will consider Ahmad’s model as the starting point, considering that it was the precursor of more comprehensive models of analysis. The models considered in this study can be grouped into three different categories according to the basis on which they are constructed: multiple-attributes, historical data or portfolio analysis (Caron et al 2007). These categories and the specific models included in each one are discussed in more details in the following sub-sections.

2.3.1. Multiple attributes models

The multiple attributes’ category includes the models that use the evaluation of multiple factors that affect bid/no-bid decisions as the basis to support the decision making. Into this category it is possible to include the models proposed by Ahmad, Liu et al, Wanous et al, Han and Diekmann and Lin and Chen (Ahmad I. 1990; Liu et al 1999, Wanous et al 2000; Han and Diekmann 2001b; Lin and Chen 2004).
Some authors claim that multi-attribute models do not consider the inherent uncertainty related to the assignment of numbers to one’s judgment and the influence that the subjective evaluation of decision-makers might have in the outputs. However, they also recognize that these models not only are easy to implement and understand, but also focus attention on the critical factors of bidding problems (Lin and Chen, 2004). The sub-sections below highlight the main features of each model.

2.3.1.1. Ahmad (1990)

The model proposed by Ahmad is a structured methodology that takes into consideration the bidder’s subjective evaluation and preference structure in order to build a rational basis for decision. Ahmad suggests a multiple-criteria decision-making technique in which factors such as type of job, owner, location, size of job, current work load and strength of the firm are assessed. The worth of these factors are firstly assessed as single attributes and then combined into an overall worth score of the project as a whole. Since this worth assessment is a subjective task, it implies that it reflects the bidder’s preference structure.

The first step to be performed in the model is the preparation of a list that includes the performance objectives of the highest importance to the project. This list should be exhaustive once it should include all the relevant performance objectives. The second step is to subdivide the objectives into its lower-level constitutive criteria. This subdivision results in a hierarchical structure that represents the worth structure to be analyzed by the bidder. An example of an objectives’ hierarchy is presented in Figure 3. Some quantifiable characteristic must be assigned to each lower-level criterion in order to measure its performance. This measurement is then translated into worth scores by a scoring function, which is a mathematical rule that assigns worth scores to all possible values of the performance measurements. In a following phase, a pair comparison is developed to indicate the perceived relative importance of one criterion compared to another one. In this process, temporary weights are assigned to all sub-criteria, which are then normalized so that their sum is unity. The normalized weights are added to calculate the overall project worth. The last step of the model consists in comparing the overall project worth with a threshold worth to determine the strength of the decision. The threshold worth is defined as the cut-off point between the desirable and undesirable ranges of worth. If the difference between the overall project and the total threshold worth is negative, a ‘no-bid’ decision is recommended. In contrast, a positive difference would result in a ‘bid’ recommendation. In this case, depending on the magnitude of the difference, strength of ‘bid’ decision is indicated.

Ahmad’s model is based on some assumptions such as: (1) performance objectives should be mutually exclusive; (2) performance objectives and sub-criteria should be worth-independent; (3) the bidder is certain about the important characteristics of the project; (4) the bidder has a good
understanding of the goals, objectives and strength of the firm; (5) the bidder is knowledgeable about the availability and requirements of resources and (6) the bidder can evaluate the existing market conditions.

Figure 3: Objectives' hierarchy (Ahmad, 1990)

![Objectives' hierarchy (Ahmad, 1990)]

It is important to state that no technique can guarantee a good output concerning bid/no-bid decisions. The relevance of the technique lays on the fact that it increases the bidder’s understanding about the important factors to consider in the bidding process, which, in turn, leads to a more consistent decision. The utilization of the model is a way of quantifying subjective evaluation and the bidder’s preference. Although it can be argued that this quantification is not very precise, the results are still valid once they are used in relative comparisons. In addition, considering that the attributes can be changed, included and excluded as necessary, the model is considered to be flexible. As additional advantages of the model, it is highlighted by the author that it is suitable for computerization adding speed to the process and it is possible to monitor the consistency and sensitivity of the model through computational tools.

Some researchers pointed out some limitations in Ahmad’s model. For them, some of the many inputs required by the model can be hard to be provided by bidders, especially the ones who have
a limited experience (Liu et al 1999; Wanous et al 2000). Wanous also claims that, in Ahmad’s model, there is no distinction between factors that contribute positively and the ones that contribute negatively to the total worth of the project. However, he also recognizes that Ahmad’s approach was ‘the most promising step on the road to modeling the bid/no bid decision’ (Wanous et al 2000).

2.3.1.2. Liu et al (1999)

The model presented by Liu et al can be viewed as an improvement of Ahmad’s model. As the main features of both models are extremely similar, the description of the model suggested by Liu et al is restricted to the discussion of the improvements implemented by the authors in Ahmad’s model.

On one hand, Ahmad’s approach does not consider the overall worth of the two possible options ‘bid’ and ‘no-bid’ and, thus, a comparative evaluation of them cannot be used to support the final decision. On the other hand, the approach proposed by Liu et al bridges this gap and evaluates both ‘bid’ and ‘no-bid’ options, being the final decision supported by the comparative analysis of them. In addition, as stated by Liu et al, Ahmad’s model can be difficult to apply in practice since it requires the establishment of many parameters by the bidder. This difficulty is mitigated in Liu’s model, since it reduces significantly the load of each bidder in determining parameters. Moreover, Liu’s model defines the threshold worth of individual attributes in a more reasonable and understandable way for the bidders. Furthermore, the method used by Liu et al increases the consistency, once a higher preference for a criteria or attribute is associated to a larger corresponding weight, which does not happen in Ahmad’s model. Liu’s model can be used with multiple level criteria while Ahmad’s model can handle with a bid/no-bid problem with only one level of criteria.

2.3.1.3. Wanous et al (2000)

The approach proposed by Wanous et al to support the bid/no-bid decision is based on a parametric evaluation of the relevant factors which affect the bid decision. These factors are divided into two categories: positive and negative factors. Positive factors are defined as the ones for which increasing scores strength the recommendation to bid. In contrast, for negative factors, increasing scores weaken the bid recommendation.
The first step in the model is the description of the bidding situation by the user. This description is done using a parametric scale in order to assign subjective scores between 0 (extremely low) and 6 (extremely high) to positive and negative factors. ‘Kill’ indicators are established to represent limit values for isolated factors. In the case of violation of any ‘kill’ indicator, the no-bid decision is recommended. Subsequently, a formula is proposed to calculate the ‘Bidding Index’, which reflects the degree of desirability of bidding for a project. The ‘Bidding Index’ formula takes into account not only the parameters established for the model but also the subjective scores assigned by the bidders. For projects with ‘Bidding Index’ greater than zero, the bid decision is recommended. In contrast, for projects with ‘Bidding Index’ lower than zero the no-bid decision is then recommended. The schematic diagram of the model is presented in Figure 4.

The parameters used to develop the model were collected in construction projects located in Syria. This way, some characteristics of these projects might be reflected on these parameters, which can turn into an advantage for contractors with limited experience in bid/no-bid decisions. Experienced bidders can, however, modify the parameters to reflect their own reality. In addition, the approach used to build the model can also be extended to applications in other international industries.

Some assumptions were used in order to build the model. Firstly, the model is based on subjective opinions and experience of contractors in Syria. In addition, the model assumes the classification of relevant factors into negative and positive. However, the author emphasizes that this distinction might not be always valid, considering that, in some situations, contractors might consider some negative factors as encouraging for bid decisions or vice-versa. Furthermore, in a study developed in 2003, Wanous et al pointed out the assumption of a linear influence of the decision’s criteria on the final decision as a limitation of this model (Wanous et al, 2003).

The model proposed by Wanous et al proved an 85% of accuracy in simulating actual decisions, nevertheless, the author emphasizes the importance of evaluating the real outcomes of the projects used to develop and validate the model in order to assess the reliability of the model.
2.3.1.4. Han and Diekmann (2001b)

According to Han and Diekmann, go/no-go models for international projects must integrate the following elements: country conditions, project bid conditions and strategies of risk reduction. These elements are used to develop a bidding model based on a cross-impact analysis (CIA) method, which is a technique used to foresee future events by capturing the relationship among the variables. The variables are described by initial probabilities and cross-impact relationships are used to model the interactions between them. This relationship explains how the initial probability of a conditional variable will be affected if a conditioning variable happens. The following patterns of relationship can be observed: (1) significantly in the opposite direction; (2)
moderately in the opposite direction; (3) slightly in the opposite direction; (4) significantly in the same direction; (5) moderately in the same direction and (6) slightly in the same direction. Through these patterns, the latter probability can be forecasted throughout the series of analytical processes.

The CIA method presents some advantages compared to other uncertainty reasoning techniques. Firstly, it is considered an effective tool to deal with ill-defined uncertainty. In addition, it requires relatively small amount of data to be provided by the bidder. Moreover, the CIA method can produce different scenarios that can be used to evaluate the sensitivity of the variables and generates mean values and probabilistic distribution shape. The CIA method is also claimed to be advantageous in the following situations: (1) there are complex and unclear relationships among the variables; (2) input data are scarce or unavailable and (3) there are several possible decision alternatives. Furthermore, the pattern of relationships is flexible and can be modified according to specific country and project conditions and to the bidder's knowledge about the specific context.

The go/no-go decision is modeled by the CIA method through a cause-effect relationship map considering five sets of variables and their cross-impact relationships: country conditions, contractor's decision strategies, intermediate (uncontrollable and controllable variables), successor and outcomes variables. The schematic diagram is presented in Figure 5.

Figure 5: Conceptual elements of go/no-go decision (Han and Diekmann, 2001b)

Source: Han and Diekmann, 2001b, pp.771

The first set of variables ‘country conditions’ are defined by the authors as ‘external variables that determine the initial circumstances of a particular project, such as political, economic or cultural
conditions’ (Han and Diekmann, 2001b). They represent the country uniqueness and are relatively fixed for a given country. The second set of variables is the ‘contractor’s decision strategies’ and it is related to contractors’ management skills, experience, resources and partnerships. The third set is the ‘intermediate variables’ which are the ones that are impacted by the first two sets of variables: country conditions and contractor’s decision strategies. The intermediate variables are divided into uncontrollable and controllable variables, being the latter the ones that are impacted by the contractor’s decision strategies. The fourth set of variables is the ‘successor variables’, which represents the variables that are specified in order to produce the final results of the project. On one hand, these variables can be related to the project such as project cost and schedule uncertainties and contractor’s capability to execute the project. On the other hand, they can be related to corporate objectives such as potential for future projects, importance of gaining market share and establishing relationship with the client. The last set of variables in the model is the outcome variables, which represent the basis for the bidding decision. The ‘outcomes variables’ are the project profitability and ‘other benefits’. Project profitability is the result of the successor variables related to the project while ‘other benefits’ is associated to the successor variables related to corporate objectives.

In practice, the model is applied by establishing the initial country conditions and contractor’s decision strategies and their cross-impact relationships for the specific model. In a further phase, the CIA methodology is applied to propagate the given conditions through the model and reach the outcomes variables. The value of the outcome variables will determine the recommendation to bid or not-to-bid for a project.

The authors describe some success factors associated to the application of the model proposed. Firstly, the model considers several variables that are crucial to the bid/no-bid decision. It also provides a rich context to model the interconnections among the decision variables. Moreover, it takes uncertainty into consideration and evaluates its effects in the project attractiveness. Through the model, it is also possible to determine multi-dimensional project outcome variables. Finally, the model can produce alternative decisions to be evaluated by the bidder. The authors also claim that the model proved to improve the quality of decisions once it increased decision correctness, confidence and consistency.

2.3.1.5. Lin and Chen (2004)

The authors propose a fuzzy logic approach in order to help companies to decide whether or not to bid for a project. They state that fuzzy theory is helpful in supporting decisions that involve imprecise and unclear factors, since it helps not only in the quantification of imprecise data in an effective and efficient way, but also in the reasoning of decisions based on incomplete
information. This approach is focused on a linguistic approximation and development of a fuzzy arithmetic to deal with bid/no-bid problems.

The first step of the technique is the selection of decision-makers to compose a committee and criteria for evaluation. The risks and costs involved in big projects justify the formation of the committee which is in charge of filtering the opportunities. Managers with different viewpoints of the company should be included in the committee and they should select the appropriate criteria to be used in each opportunity evaluation. Mainly, these criteria are related to corporate issues such as resources, reputation and mission and also to bidding problem itself such as risk and competitiveness. The second step in the model is the gathering of relevant information concerning the opportunity. This information is aimed at increasing the knowledge about the bidding situation and can be exemplified as goals, expected results and scope of the project, plans and schedules, client’s management organization, procedures of contractors’ selection, technical specifications, client’s future capital expenditure and competitors involved. The third step is concerned with the establishment of the scale system to be used. The authors suggest that the linguistic terms and correspondent membership functions can be obtained from past data or customization of basic models. The following step is the consolidation of fuzzy ratings and weights of all factors considered in the evaluation of the bid opportunity into the fuzzy attractiveness rating (FAR) through the mean operation. The FAR though reflects the overall desirability of a specific opportunity. Finally, the FAR is associated to linguistic levels, such as ‘extremely low’, ‘low’, ‘fair’, ‘high’ and ‘extremely high’, in order to translate it into the bidding decision. The schematic diagram of the model is presented in Figure 6.

**Figure 6: The Bid/no-bid decision making framework (Lin and Chen, 2004)**

The authors recognize that the model presents some limitations. Firstly, the association of the ratings and weights to linguistic terms is subject to the managers’ perspectives. In addition, the committee must be composed by decision-makers who are in the strategic level of the organization, so they would be able to analyze the relevance of all factors. Moreover, the calculation of fuzzy-weighted average is not simple and not well accepted by bidders. However, the model suggested presents several advantages. First of all, FAR is presented in a range of values, which gives an overall perspective of the bidding situation, thus, providing more reliable results. Secondly, the model speeds up the bidding decision, since it is simple and systematic. In addition, ratings and weights are directly assessed by linguistic terms. Finally, the model helps to increase the consistency in the bid/no-bid decision.

2.3.2. Historical data models

The second category of models is composed by the ones that use historical data as the means to support the decision. In this category the models proposed by Wanous et al and Lowe and Parvar are included (Wanous et al 2003; Lowe and Parvar 2004). Some authors claim that the main flaw of these models is the unrealistic assumption that the competitive environment will follow the same pattern of the past (Lin and Chen, 2004).

2.3.2.1. Wanous et al (2003)

The model presented by Wanous et al is based on a computational technique model, called artificial neural network (ANN). The authors state that ‘an artificial neural network is a computational model loosely based on the biological nervous system’ (2003, pp.739). As mentioned by the authors, ANN models receive a set of inputs which are then processed to result in a set of outputs ‘based on internal mapping relationship encoded in their structure and connection weights’ (Wasserman 1994, cited in Wanous et al 2003). It is claimed by the authors that ANN models are not only a very useful in finding solutions to highly complex problems but also a reliable tool in the modeling of the bidding process. In addition, bidding decisions are a potential application of ANN technique since it is a highly unstructured process involving many factors which contribution to the final decision is difficult to measure. Moreover, ANN models can provide meaningful answers even when input data are not complete or have some mistakes (Lippmann 1988, cited in Wanous et al 2003). Furthermore, these models are not restricted by linearity assumptions as in other models (Moshiri and Cameron 2000, cited in Wanous et al 2003). However, it is also recognized that the practical application of ANN models is reduced by the ‘black-box’ characteristic of the technique, which can make it difficult to be interpreted.
The model is developed based on the users’ personal assessment of the bidding scenario which is evaluated considering eighteen variables. The assessment scale ranges from 0 (extremely low) to 6 (extremely high). These input data after being processed by ANN technique result in a ‘Neural Bidding Index’ that ranges from 0 to 1. If the index is higher than 0.5, than the ‘bid’ decision is recommended and, in contrast, an index lower than 0.5 suggests a ‘no-bid’ decision. The schematic diagram of the model is presented in Figure 7.

This model is considered more accurate than the one presented by the same authors in 2000, since it was able to predict the real decisions in 90% of the same real life bidding situations that were used in the validation of the previous model. This result can be explained by the fact that the first model considers linear relationships between bidding variables and decisions while the actual model is able to process also non-linear relationships. The researchers emphasize the advantage of the model in helping contractors to arrive to bid/no-bid decisions without many input data and hard mathematical calculations being required. In fact, the model is able to recommend bidding decisions based only on subjective assessment of the project being considered. In addition, it can be used as a complementary tool to other procedures in order to support and validate the final decision or to what-if simulations.

**Figure 7: Structure of the model (Wanous et al, 2003)**

Source: Wanous et al, 2003, pp.742
2.3.2.2. Lowe and Parvar (2004)

The authors propose a logistic regression analysis in order to develop a model to predict the behavior of the bid/no-bid decision process. The model was also used to identify the variables that are strongly related to the final decision. The logistic regression is a conditional probability technique that aims at estimating the probability occurrence of a specific output, called dependent variable, based on the coefficients of independent variables.

For the specific purpose of developing a model to support the bid/no-bid decision, the decision itself was established as the dependent variable. The 21 factors that were previously identified in the literature as the ones that are relevant to the bid/no-bid decision were used as the independent variables. In a first phase, the authors collected bid/no-bid historical data in order to validate these factors and the methodology used. In a second phase, a regression analysis technique was applied to the factors aiming at modeling the bid/no-bid decision making process.

Even though a perfect prediction is not possible to be achieved considering the subjective nature of the bidding problem, the logistic regression model proposed seems to be a reliable model to predict bid/no-bid decisions, besides requiring a small amount of data. In addition, the model presented an overall prediction accuracy of 94.8%.

2.3.3. Portfolio analysis models

The third category is composed by the models that relate the bid/no-bid decisions to a portfolio analysis rather than to isolated projects. In this approach, the principles of portfolio management are used to support the bidding decision. The basic concept of portfolio management is to diversify in order to minimize the overall level of risks of the projects portfolio (Han et al 2004). It is claimed by Caron et al that there is a shortcoming in the traditional approaches to bid/no-bid decisions, once they consider individual projects rather than assessing the impact of new projects on the existing overall portfolio. He emphasizes the importance of a structured model capable of integrating the assessment of individual project with its impact on the current portfolio of the company (Caron et al 2007).

Most contractors focus on profit-oriented and risk evaluations at the individual project level, which does not reflect the overall value and risks at a corporate level. In addition, the total risk of the organization is not necessarily the sum of the risks of its individual projects. This assumption can lead to mistakes in the selection of the best combination of risks and return for the organization (Han et al 2004). The need to evaluate individual projects relating them to the overall portfolio of the company is reinforced by the fact that clients usually try to transfer as much risk as possible to
the contractors, which exposes the contractors’ overall portfolio to an excessive risk level (Caron et al 2007).

Some researchers proposed the usage of traditional portfolio management concept to the optimal selection of projects (Vergara and Boyer 1977; Minato 1994; Mullich 1998, cited in Han et al 2004). However, these models are based on single profit-oriented criteria instead of multi-criteria that take into account quantitative and qualitative perspectives (Han et al 2004). Due to this shortcoming, this study will focus on the multi-criteria portfolio-based approaches proposed in the models presented by Han et al and Caron et al (Han et al 2004; Caron et al 2007).

2.3.3.1. Han et al (2004)

The authors suggest a multi-criteria portfolio approach which evaluates new projects at a corporate level through Net Present Value (NPV) analysis.

Firstly, input data of each project is required in order to perform individual evaluations. These data can be based either in historical data or experts’ judgment. In the next stage, risks and returns of individual projects are assessed, being the ones that have extremely high level of risks or low level of return eliminated. After this cut-off phase, simulations of new sets of portfolios are performed and each set is evaluated based on a NPV analysis, which consider risks, returns and efficiency criteria. The combined scores of these criteria are used as a basis for the selection of the best set of projects. The optimal portfolio must then be selected and the bid decision is recommended for the projects that are included in this alternative. If, there are no clearly optimal alternative, the firm should develop a strategy in order to improve the potential portfolios’ attractiveness. Finally, the last phase is the development of the feedback cycle, which aims at monitoring periodically any changes in the environment that could lead to a relevant modification in the total risk exposure of the company. The schematic diagram of the model is presented in Figure 8.

The authors recognize that the applicability of the model is focused on the selection of new sets of international projects by large multinational contractors, which limits its utilization by smaller contractors searching for opportunities abroad. However, the model proposed also brings important insights to the bid/no-bid problem. Firstly, as the selection of potential candidate projects is based on their contribution to the existent project portfolio, it allows the company to make more inclusive decisions. In addition, the model proposed selects candidate projects by maximizing the firm’s overall value through a well-balanced multi-criteria assessment.
2.3.3.2. Caron et al (2007)

The model is based on the quantitative evaluation of the expected return and risk exposure for the overall portfolio aimed at building a portfolio which is aligned with the company’s strategy and resources constraints. The model proposed is built based on the analysis of both the intrinsic risks of a specific project and the risks represented by this project in the overall portfolio of the organization.

The first step of the model consists in the development of a financial model to evaluate the impact of risks on the cash flow using a Monte Carlo simulation. This model is generated by the description of the changes in inflows and outflows when a specific risk event occurs. Then, variations of the value and time-horizon of each inflow and outflow are considered using Monte Carlo simulation. The result is probabilities distributions and risks measurements for variables that
reflect project performance such as Net Present Value. In addition, through the simulation it is also possible to assess the financial risk of individual projects. The second step of the model consists in comparing all potential projects in the company’s portfolio taking into consideration factors such as their impact on the overall risk exposure of the company, resources availability and alignment with the company’s strategy. The projects can then be plotted in a matrix which relates the level of risks and expected returns in order to facilitate the decision on which projects the company should bid for. An example of this matrix is presented in Figure 9. The same model can also be applied to support the decision of adding a project to the current portfolio. In this case, the level of risks and the expected returns of the current projects have to be adjusted to reflect the work already done.

Figure 9: Expected returns (E[NPV]) x Level of risks (NpV@R) (Caron et al, 2007)

Source: Caron et al, 2007, pp.574

The authors recognize that the quantitative estimate of the parameters is a limitation to the application of the model. However, the model is helpful in identifying not only opportunities that have a high risk level compared to the existing portfolio but also the ones that could balance the overall risk exposure of the organization.

Table 2 presents a comparison among the three different categories of bid/no-bid decision models regarding their rationales. Tables 3, 4 and 5 summarize the models presented including their main rationales and key features:
Table 2: Comparison of different categories of bid/no-bid decision models

<table>
<thead>
<tr>
<th>Model category</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple attribute</td>
<td>Evaluation of multiple factors that affect bid/no-bid decisions as the basis to support the decision making</td>
</tr>
<tr>
<td>Historical Data</td>
<td>Use historical data as the means to support the decision</td>
</tr>
<tr>
<td>Portfolio Analysis</td>
<td>Relate the bid/no-bid decisions to a portfolio analysis rather than to isolated projects</td>
</tr>
</tbody>
</table>

Table 3: Summary of Multiple Attributes Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Key feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad, I, 1990</td>
<td>Utilization of weighting criteria to calculate the bid worth</td>
</tr>
<tr>
<td>Liu et al, 1999</td>
<td></td>
</tr>
<tr>
<td>Wanous et al, 2000</td>
<td>Distinction between positive and negative factors</td>
</tr>
<tr>
<td>Han and Diekmann, 2001b</td>
<td>Specific model for international projects</td>
</tr>
<tr>
<td>Lin and Chen, 2004</td>
<td></td>
</tr>
<tr>
<td>Wanous et al, 2000</td>
<td>Calculation of a Bid Index</td>
</tr>
</tbody>
</table>

Table 4: Summary of Historical Data Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Key feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowe and Parvar, 2004</td>
<td>Historical data used to develop mathematical model</td>
</tr>
<tr>
<td>Wanous et al, 2003</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Summary of Portfolio Analysis Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Key feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Han et al, 2004</td>
<td>Utilization of financial indicators (NPV analysis)</td>
</tr>
<tr>
<td>Han et al, 2004</td>
<td>Relationship with current project portfolio</td>
</tr>
<tr>
<td>Caron et al, 2007</td>
<td></td>
</tr>
</tbody>
</table>
3. Research Methodology

The next sections present some fundamentals of the research methodology such as its nature, epistemology, ontology, the relationship between research and theory, research strategy, design and process, data collection method and sampling. In the sampling section, the companies that are the subjects of this study are briefly described. Additionally, issues such as validity, reliability, generalizability, researcher bias and ethical considerations are also exploited in this chapter. This discussion aims at defining the boundaries in which this Master Thesis is included and the reasoning behind the methodology chosen.

3.1. Research nature

In recent years, the relevance of applied research has been emphasized by several authors as a way to reduce the gap between management research and management practice (Gibbons et al 1994 cited in Saunders et al 2003; Starkey and Madam 2001; Saunders et al 2003). Gibbons et al introduce the Mode 1 [M1K] and mode 2 [M2K] categories of knowledge (Gibbons et al 1994 cited in Saunders et al 2003). These categories can be associated to basic and applied research respectively. On one hand, basic research is mainly focused on solving questions of academic interest independently if the research will be applied or not by practitioners. On the other hand, applied research is governed by the world of practice, emphasizing the collaboration with and between practitioners and the practical applicability of the research (Saunders et al, 2003). It is focused on addressing business issues and practical managerial problems and on pursuing practical implications of the researcher’s findings. Some authors emphasized the importance of the interface between business and academia in management research ([Starkey and Madam, 2001], [Tranfield and Starkey, 1998]). According to Tranfield and Starkey, a key goal of management research is to improve the relationship between theory and practice (Tranfield and Starkey, 1998). Table 6 highlights the main differences between basic and applied research.

Additionally, business research can be divided into two categories, although the status of this distinction is not a consensus among researchers. On one hand, quantitative research emphasizes quantification in the collection and analysis of data and, on the other hand, qualitative research emphasizes words rather than quantification (Bryman and Bell, 2003). In addition to the distinctive feature concerning data collection and analysis, there are epistemological and ontological issues that also contribute to the distinction between quantitative and qualitative business research. These issues are presented in subsections 3.2 and 3.3.
Considering that this Master Thesis is focused on bridging the gap between theoretical models of decision-making support and the processes performed in practice by managers in international construction projects, this study is considered as an applied-research. Moreover, the data collection and analysis do not involve quantification, since the objective is to understand deeply the processes involved in the bid/no-bid decisions. This way, it is assumed that this study is included in the qualitative context. This assumption will be further reinforced by the discussion of epistemological and ontological implications in the following subsections.

### Table 6: Differences between basic and applied research

<table>
<thead>
<tr>
<th>Basic research</th>
<th>Applied research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>- Expand knowledge of process of business and management</td>
<td>- Improve understanding of particular or management problem</td>
</tr>
<tr>
<td>- Results in universal principles relating to the process and its relationship to outcomes</td>
<td>- Results in solution to problem</td>
</tr>
<tr>
<td>- Findings of significance and value to society in general</td>
<td>- New knowledge limited to problem</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td><strong>Context</strong></td>
</tr>
<tr>
<td>- Undertaken by people based in universities</td>
<td>- Undertaken by people based in a variety of settings, including organisations and universities</td>
</tr>
<tr>
<td>- Choice of topic and objectives determined by the researcher</td>
<td>- Objectives negotiated with originator</td>
</tr>
<tr>
<td>- Flexible timescales</td>
<td>- Tight timescales</td>
</tr>
</tbody>
</table>

*Source: Adapted from Saunders et al, pp.5*

### 3.2. Research epistemology

In the literature, there are three predominant views concerning epistemological issues. On one side, there is the doctrine of positivism; on the other side, there is the epistemology of interpretivism and in the middle of both is the realism (Saunders et al, 2003). According to Bryman and Bell (2003, p.14), positivism can be defined as ‘an epistemological position that advocates the application of the methods of the natural sciences to the study of the social reality and beyond’. In positivist research, the emphasis is not only on a highly structured methodology, which allows the replication of experiments, but also on quantifiable observations, which can be
evaluated by statistical analysis. The end product of a positivist research is ‘law-like’ generalizations and the research should be performed by an objective analyst researcher, who should be independent and not have any influence on the research (Saunders et al, 2003).

On the other hand, some researchers argue that reducing the complex social world of business and management to ‘law-like’ generalizations could lead to a loss of rich insights (Saunders et al, 2003). In addition, they also highlight that the differences between the object of the social research (people and organizations) and the one of the natural sciences imply that the application of the scientific model for the social research is not appropriate (Bryman and Bell, 2003). The interpretivist research is not concerned with generalizations since business situations are function of the context where they are inserted in. Furthermore, in the interpretivism, the researchers are not neutral, since they are directly involved in trying to understand the subjective reality of those they study (Saunders et al, 2003).

In between of these two opposing views on the research process, lays the realism. Saunders et al (2003, p.84) claim that realism is based on the idea that ‘a reality exists that is independent of human thoughts and beliefs’. For realists, a shared interpretation may result from commonly experienced stimuli, which in turn will influence the construction of the world (Saunders et al, 2003).

The objective of this Master Thesis is to understand how the bid/no-bid decision-making process for international projects is being performed in organizations against theoretical models presented in the literature. There is no ambition to use highly structured methodologies which allow the replication of experiments and lead to ‘law-like’ generalizations concerning supportive models to be used in the international construction industry. In addition, in this study, the professional experience that the researcher has in the field of construction projects may exert an influence on the interpretation and analysis of data. This influence is in opposition to the basis of positivism, which claims that the researcher should be neutral to the data evaluation. In conclusion, the framework of this research can be described as an interpretivist epistemology.

3.3. Research ontology

Research can also be influenced by the nature of social entities. On one hand, social entities can be considered as objectives entities with a reality external to social actors. On the other hand, they can be viewed as social constructions build up from these social actors (Bryman and Bell, 2003). These two different perspectives regarding social entities are associated to objectivism and constructionism ontology respectively. Objectivism is defined by Bryman and Bell as the ‘ontological position that asserts that social phenomena and their meanings have an existence
that is independent of social actors’ (2003, p.19). According to this position, organization and culture function as external constraining forces that impact social actors, who follow organizations’ rules and procedures and internalize the culture beliefs and values in which they are inserted (Bryman and Bell, 2003). In the opposite direction is the constructionism position, which claims that ‘social phenomena and their meanings are continually being accomplished by social actors’ (Bryman and Bell, 2003, p.20). In this case, culture and organizations are seen as an emergent reality in a continuous state of construction and reconstruction in which individuals play an active role.

From the literature review previously presented, it is possible to notice that bid/no-bid decision models are constantly being improved by managers in organizations and also by academicians. In this context, people are active actors who contribute with their experience and expertise to the construction of the best models to support decisions. This way, the framework of this thesis can be described as a constructionist ontology.

3.4. Research and theory

Theory and research can be linked through different approaches: deductive and inductive. On one hand, theory can drive and influence the gathering and analysis of data, being the aim of the research to solve issues raised by theoretical considerations. The researcher, based on the knowledge associated to a specific domain, deduces some hypotheses and designs a strategy in order to test these hypotheses using high structured methodology [(Bryman and Bell, 2003), (Saunders et al, 2003)]. This approach is known as deductive theory and is the dominant research approach in the natural sciences.

On the other hand, the emergence of the social sciences in the 20th century led to critics of the deductive approach, since it tries to explain casual relationships between variables without understanding deeply the social context involved. In addition, the rigid methodology involved in the deduction process does not give space to alternative explanations of the situations. In an attempt to bridge this gap, the inductive approach emerged (Saunders et al, 2003). The process of induction involves building generalizations from observations. In this case, theory is the outcome of data analysis (Bryman and Bell, 2003). As the inductive approach is more concerned in analyzing the contexts in which objects are, a small sample is usually more appropriate, in opposition to the deductive approach. In addition, researchers usually utilize qualitative data collected by different methods in order to build different perspectives of the phenomena (Saunders et al, 2003). The schematic diagram of both inductive and deductive approaches is presented in figure 10.
There is a relationship between research philosophies and research theory. The deductive approach is more related to positivism, while the inductive one is more related to interpretivism. However, it is important to emphasize that this relationship might not be rigid and can sometimes be misleading (Saunders et al., 2003).

The induction process seems more suitable for this study, since the main objective is to better understand the context of bid/no-bid decision-making process of international projects and the gap between what is being done by organizations and what is suggested in the literature. In addition, as suggested by Figure 10, any hypothesis or theory creation resulting from this study is mainly driven by the observations, rather than the deductive opposite direction, which reinforces the appropriateness of the inductive approach for the development of this thesis.

3.5. Research strategy

A case study is defined by Robson as a ‘strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence’ (Robson, C., 2002, pp.178). Case study was, in a recent past, considered as an exploratory precursor or a complement to other more ‘hard’ strategies such as experiment or survey but, as defended by Robson, ‘case study is not a flawed experimental design; it is a fundamentally different research strategy with its own design’ (Robson, C., 2002, pp.180).
According to Bryman and Bell, case study terminology is usually associated with a location such as a workplace or an organization. The intensive examination of the setting and the elucidation of the unique features of the case are the main focus of the research (Bryman and Bell, 2003). Moreover, Saunders et al highlights that a case study strategy is considerable helpful to generate answers to questions such as ‘why?’, ‘what?’ and ‘how?’ (Saunders et al, 2003) and are usually more appropriate strategies in situations when the researcher has little control over events (Yin, R.K., 1989). Additionally, Bryman and Bell states that ‘when the predominant research strategy is qualitative, a case study tends to take an inductive approach to the relationship between theory and research’ (Bryman and Bell 2003, p.55). This statement reinforces the coherence regarding the selection of the inductive approach and case study strategy for the development of this Master thesis as presented in Sections I.4 and I.5.

The selection of the research strategy for this study was based not only on its appropriateness to answer the research question proposed but also on the analysis of the existent constraints. In order to perform the investigation of how the decision process to bid or not to bid for international construction projects function in practice, a case study strategy seemed suitable since the detailed and intensive analysis of a case could bring rich insights concerning differences, similarities and possible gaps among practical and theoretical models being applied in the international construction industry. In order to improve the generalizability of the findings, a multiple-case study was developed. Bryman and Bell suggest that a multiple-case study can also improve theory building. According to them, the comparison of different cases not only helps the researcher to set up the conditions of the theory but also suggests concepts that are relevant to an emerging theory (Bryman and Bell, 2003). In addition, Robson claims that the first case is used to collect evidences to support a theoretical position. This position and its evidences will further be used to guide the selection of the next case. The findings and pattern of data from the case studies are the basis for the analytical rather than statistical generalization (Robson, C., 2002). Robson mentions Sim’s work to explain the basis of analytical generalization: ‘data gained from a particular study provide theoretical insights which possess a sufficient degree of generalization or universality to allow their projection to other contexts or situations’ (Sim 1998, cited in Robson, C., 2002 pp.177).

Thus, this Master Thesis is based on multiple-case studies of companies O&G and C&P, which are included in the context of the international construction industry. The data collected in the companies were used to investigate the practical perspective of bid/no-bid decision-making models in international construction projects. In order to give a better overview of the context of this research, the profiles of O&G and C&P are presented in section 3.8. Further studies on other companies in different countries are suggested in order to better understand the difficulties in applying theoretical models to the complex real life situations of international construction projects.
3.6. Research design & process

3.6.1. Research design

In conclusion, this Master thesis is an applied-research, since it aims at investigating a problem faced by managers in international competition environment. Furthermore, it is considered a qualitative research since the main objective is not the quantification of data; instead is the understanding of the decision-making process, which is achieved by collecting ‘words-format’ data. In addition, it is an interpretivist study, since it aims at investigating deeply a process rather than generating ‘law-like’ generalizations. Moreover, since it is considered that the process being investigated is directly affected and constructed by people, this thesis adopted a constructionist ontological position. Additionally, as there are no pre-conceived hypotheses to be tested; instead, the conclusions are a product of the data collected, this work has an inductive approach to the relationship between research and theory. Finally, considering that a deep investigation of the bid/no-bid process in international construction environment is pursued and that there is a time limit for this research, a case study strategy was chosen to develop this thesis.

Figure 11 presents the location of this Master Thesis in terms of theory-research relationship, epistemological and ontological approaches.

**Figure 11: Theory-research, epistemology and ontology**

![Diagram showing differences between quantitative and qualitative research strategies.](image)

Source: Adapted from Bryman and Bell, 2007, pp.22
3.6.2. Research process

The research process for the development of this thesis started with the definition of the research topic. This definition was based on the author's previous professional experience of eight years working as a planning & control engineer in a Brazilian infrastructure company. During her professional life, the author faced the several difficulties that are associated to complex construction projects, but one of the main challenges emerged when the company decided to internationalize its business. The additional uncertainties and risks involved in an international project combined with the difficulties that the company was facing in order to expand its business abroad suggest that 'international projects' seem a good topic to focus on. At this moment, in order to narrow down the research field, the author intended to choose the planning phase of international projects as a research topic. After a meeting with the supervisor, the author was oriented to start reading the literature on the topic in order to identify a gap to be worked on. After reading some articles related to international projects, the researcher identified that the actual processes to support decisions to bid or not to bid for a project were not sufficient in the case of international construction projects, suggesting the need for a customized model to support top management's decision. This way, the author decided to investigate the models suggested by the literature. The process of reviewing the literature combined with the author's professional background suggested that some of the models seemed too complex to be put in practice and others seemed too theoretical to fit in real life situations. The acknowledgement of this disruption between literature and practice finally suggested the final research question of the Master thesis: ‘How does the bid/no-bid decision-making process function in international construction context? A comparison between theoretical and practical perspective.’

The literature review was developed based on searches in on-line databases related to business studies such as 'Business Source Premier (EBSCO)', 'Emerald Fulltext', 'Helecon (SCIMA)' and 'LIBRIS webbsök'. Expressions such as ‘international projects’, ‘overseas projects’, ‘construction projects’, ‘international construction projects’, ‘bid/no-bid’, ‘go/no-go’ and ‘decision-making’ were used in the search for articles in the mentioned databases. In addition, the author also searched for specific books on international projects management, but could find only on-line versions. The selection process of companies to be the object of the multiple-case studies is described in Section 3.8.

3.7. Data collection method

The selected method to collect data for this thesis was the semi-structured interview. According to Robson, the semi-structured interview ‘has predetermined questions, but the order can be modified based upon the interviewer's perception of what seems most appropriate’ (2002, pp.178). Since the structure is not rigid, questions can be added if the interviewer needs them to
further develop the research question and objectives. In the same way, inappropriate questions may be omitted, question wording can be changed or even explanations can be given (Bryman and Bell 2003; Robson, C. 2002; Saunders et al 2003).

Saunders emphasizes that semi-structured interviews aim not only at revealing and understanding the ‘what’ and ‘how’, but also exploring the ‘why’, since this method gives the opportunity to let the interviewees explain or build on their answers (Saunders et al, 2003). Semi-structure interviews are appointed as the most appropriate method to collect data when several questions need to be answered, the questions are complex or open-ended and when the order and logic of questions may vary (Saunders et al, 2003). In addition, semi-structured interviews are also suitable when there is no time available to collect data through questionnaires.

One of the most known advantages of semi-structure interviews is the flexibility. According to Robson, semi-structured interview is a ‘flexible and adaptable way of finding things out’ (2002, pp.272). In addition, it can provide rich and highly illuminating material, allowing to go into more depth and to clarify any misunderstandings. (Robson, C. 2002). However, there are also disadvantages such as the careful preparation that is required, the possibility of loss of control by the interviewer and the difficulties in the data analysis.

The semi-structured interview seemed the most appropriate data collection method for the development of this thesis, since the complexity involved in bid/no-bid decisions for international projects could not be captured by other methods. In order to understand deeply how the decision process functions as well as the variables and analysis involved, listening to people who are involved in the process turned to be the best way. In addition, in order to identify possible disruptions from the theoretical models, several questions need to be asked, which reinforces the appropriateness of the semi-structure interview.

An interviewer-guide for the semi-structured interview was prepared. The first set of questions was focused on investigating how the bid/no-bid decision process of O&G and C&P functions. In a second set of questions, an evaluation of the gap between practical and theoretical models was carried out. For this evaluation, questions related to the main feature of each theoretical model were developed. The interviewer-guide prepared is presented in Appendix II.

In total, the author performed two interviews, one with each company. The selection of interviewees was done based on their knowledge and involvement in the bid/no-bid decisions of the company. The interviews were conducted through Skype. The interview with O&G was fully recorded and transcribed. Due to technical problems, the interview with C&P was not recorded, which was only noticed by the author at the end of the interview. In order to reduce the loss of data, the author immediately summarized the topics discussed after the interview. The summaries of both interviews were sent to the interviewees to get their approval to the publication of the data
and to guarantee the correct understanding of what was discussed. The interviews lasted on average 40 minutes.

3.8. Sampling

The sampling of the company for this study was driven by its appropriateness to answer the research question. Since the research question was focused on bid/no-bid process for international construction projects, the sample should be based on the following criteria: (1) a company which is involved in construction projects and (2) which is involved in international projects. For the matter of this study, the author defined as international projects, projects developed in countries outside the company’s headquarter. In addition, considering that the research strategy selected was a multiple-case study, the sample size was made up of two companies.

The author begun by contacting a Swedish construction company called Skanska, which the author, from her professional experience, already knew that was a company with projects in many countries rather than Sweden. After some correspondences with a manager in Skanska, the author found out that Skanska would not fit into this study, since for projects outside Sweden, Skanska develops the projects through their local branches, applying in this case the ‘national projects’ model for bid/no-bid decisions, which would take out the ‘international factor’ of this study.

In a following step, the author used a list of the Swedish construction companies found in an appendix of a last year Master thesis in order to identify the Swedish companies which have relevant revenues coming from abroad. In parallel, the author also searched in the internet the biggest construction companies in Scandinavia. The author contacted all the companies identified previously by e-mail or by contact forms in the companies’ websites presenting her topic and asking for permission to collect data. As the author did not receive positive answers, she decided to search for companies outside Scandinavia, and so, contacted previous professors in Politecnico di Milano who had good contacts with construction companies asking for their help in finding a company to work with for the data collection. The director of MSPME at MIP, Professor Antonio Calabrese, introduced the author to some of his contacts in O&G and C&P. These people were contacted by the author and further they indicated the responsible for the bidding process in their respective companies. This way, the General Manager in O&G and the Vice President – Commercial in C&P were contacted and kindly agreed to participate in an interview. For confidentiality reasons the names of the companies are not disclosed in this study and fake names are used instead.
3.8.1. O&G

O&G is an international major contractor with relevant experience in the design and implementation of industrial facilities. The company operates in the oil & gas upstream, oil refining, gas treatment, petrochemicals and fertilizers, infrastructures and transport. The portfolio of services provided by O&G includes from feasibility studies to the implementation of complete plants. The interviewed company is a local branch of the Group. Its relevant portfolio of projects is composed by approximately 500 major projects in 60 countries. In 2005, its turnover was 634 million of Euros, of which 82% came from projects abroad. From these projects, 75% were mainly turn-key lump sum type contracts. The Group’s revenues in 2007 reached 7.9 billion of Euros. As the main sector of the company is the oil & gas (O&G) the company is mentioned in this study as O&G.

3.8.2. C&P

C&P is an international engineering and construction group with provides a full range of services in chemicals & petrochemicals, oil & gas, power, civil engineering and infrastructure sectors. The portfolio of C&P includes services for the implementation of complex projects such as feasibility studies, design and engineering, material and equipment procurement, works execution, start-up and technical assistance to operations and maintenance. C&P manages EPC (Engineering, Procurement and Construction) projects on a turnkey basis in different geographical locations, being present in 24 different countries. The interviewed company is the headquarters of the Group. The revenues of the group in 2007 reached approximately 2 billion of Euros. As the main sector of the company is the chemicals & petrochemicals (C&P) the company is mentioned in this study as C&P.

3.9. Validity, reliability, generalizability and researcher bias considerations

During the development of a research, issues related to validity, reliability and generalizability should be considered. According to Ticehurst and Veal, validity is defined as ‘the extent to which the data collected truly reflect the phenomenon being studied’ (1999, pp.23). In the same way, reliability is ‘the extent to which research findings would be the same if the research were to be repeated at a later date, or with a different sample of subjects’ (1999, pp.24). Finally, generalizability refers to ‘the probability that the results of the research findings apply to other subjects, other groups, and other conditions’ (1999, pp.24).
There had been some discussion among researchers concerning the relevance of validity, reliability and generalizability for qualitative research (Bryman and Bell, 2003). As emphasized by Wills, these concepts are based on the assumption that the researcher is pursuing universals so that the research should be generalizable and replicable. However, these features are not the main goal of the interpretivist research, since interpretivists view the reality as socially constructed rather than as general laws. Wills also argues that validity is not a core issue in interpretative research, since interpretivists emphasize that there are multiple perspectives on reality and so there is no point in trying to eliminate all but one true reality (Wills, J.W. 2007).

On one hand, as this work is based on multiple-case-studies, generalizability could be a great concern. ‘How can a single case possibly be representative so that it might yield findings that can be applied more generally to other cases?’ (Bryman and Bell 2003, pp.55). On the other hand, statistical generalization of the findings is not the purpose of this research; instead, the crucial point is ‘how well the researcher generates theory out of the findings’ (Bryman and Bell 2003, pp.56). In addition, as mentioned in Section 3.5, the utilization of multiple-case studies is more related to analytical generalization than to statistical generalization (Robson, C., 2002).

Even if the concepts of validity and reliability in qualitative research cannot be applied in the same way of quantitative research, there are some actions that could improve the reliability of the data collected, especially considering interview situations. According to Silverman, the utilization of tapes and transcripts can reduce many of the shortcomings concerning reliability. Special attention should be given to three aspects in the attempt to increase reliability: right selection of what is recorded, technical quality of recordings and the adequacy of the transcripts (Silverman, D., 1997). Finally, according to Wills, ‘a well done study using one method, such as interviewing, may be far more convincing to readers than a poorly done study using three data collection methods (2007, pp.220).

Some actions were taken by the researcher in order to reduce the risks related to validity, reliability and generalizability in this qualitative work. In order to improve the validity and reliability of the data, the author decided to record and transcribe the whole interviews. This way, during the transcription and analysis of the data, the interview of O&G was listened carefully more than once and the summary of the interview with C&P was also reviewed, which could increase the chances of having valid and reliable data. Additionally, the researcher sent a summary of the interview for the interviewees, asking for their approval. This way, any misunderstood point could be clarified. Regarding generalizability issues, the author is aware that the findings concerning the way how the bid/no-bid decision-making process is performed in O&G and C&P and their disruption from theoretical models cannot be extended indiscriminately to other situations. However, these findings can suggest that theoretical models are not being applied in practice in organizations and can give some insights about the reasons.
Additionally, Max Weber’s work cited by Silverman highlighted the issue of the researcher bias. He states that all studies are, to some extent, affected by the values of the researcher (Weber, M. 1946 cited in Silverman, D., 2001). He adds that these values influence not only in the identification of the topic but also in the way that it is studied. Moreover, he states that even the conclusions and implications of the research are based on the researcher’s moral and political beliefs. Accordingly, as mentioned in the ‘Research Process’ section, the professional experience of the researcher had influenced in the choice of the research topic. In addition, this professional background also contributed to the researcher’s understanding of the context in which the companies studied are included. It also helped in the comprehension of the answers given by the interviewees. Finally, once in qualitative research the researcher is accepted as being part of the study, the author’s knowledge and experience regarding the topic might be considered as a positive influence to the results and conclusions of this thesis.

3.10. Ethical considerations

Ethics have an important role in the planning, design and development of the research. Besides the universal principles of honesty and respect for the rights of the subject, two principles are often mentioned in codes of research ethics: (1) No harm should affect the research subjects; (2) subjects should voluntarily take part in the research and provide an informed consent (Ticehurst, G.W. and Veal, A.J., 1999). Informed consent can be obtained by giving to the subject relevant information about the research and ensuring that the information was correctly understood. Additionally, the researcher should get a further consent as to how the data might be used (Silverman, D., 2001). Furthermore, some other rules are also mentioned as important in a qualitative research. Firstly, the researcher must safeguard the rights, interests and sensitivities of informants. In addition, not only the objectives of the research must be communicated but also the reports should be available to the informants. Moreover, the privacy of the informants should be protected and they should not be exploited (Spradley, J.P., 1979).

In this work, the researcher had carefully followed the applicable principles of research ethics. Firstly, after getting the contact details of the person in the companies to talk about the research topic, the researcher sent an e-mail asking for the interview. In this message, the topic and main objectives of the research were presented and a file with the research proposal was attached to the e-mail (see the research proposal in Appendix I). Before starting the interview, the researcher asked for the interviewee’s consent for recording the interview. Additionally, after the interview, the researcher asked for the right approach to take concerning the names of the interviewee and of the company. Considering the strategic nature of the topic, both informants asked not to publish their names and nor the companies’ ones. This request was fully attended by the
researcher by renaming the companies as O&G and C&P and not mentioning the interviewees’ names in this work. Moreover, the researcher prepared a summary of the interview and sent to the informants asking their approval to the publication of the data. Subsequently, the researcher also sent to the interviewees the description of the company that is part of the ‘Sampling’ section asking for their approval to the publication of it.
4. Empirical data

This chapter initially presents the results from the interviews with O&G and C&P. The data from each company is presented individually starting with the description of the bidding process and then investigating the degree of applicability of theoretical models. Subsequently, a combined analysis of both companies regarding their bid/no-bid process and applicability of theoretical models is developed, preparing the basis for the conclusion chapter.

The empirical data for this study were collected through semi-structured interviews in Companies O&G and C&P. The first set of questions was focused on investigating how the process of bid/no-bid decision functions in each one of the companies. In the second set of questions, the objective was to verify if the decision-making process of the companies follows any one of the theoretical models reviewed previously in the Literature Review chapter or at least presents any of their key features. The next sub-sections will present the findings of these interviews.

4.1. O&G

4.1.1. Bidding process

The bidding process of company O&G usually starts with a pre-qualification stage. In this pre-qualification stage, the client provides information about a future investment that is under evaluation and asks for the contractor’s interest in participating in a bid for this project. The contractor needs to reply the client and in the case that there is an interest in bidding for the project, the contractor is asked to send some preliminary documents. Depending on the client, this pre-qualification process can be simple or complex. Major clients tend to have complex processes while medium clients, who do not have a structured system to measure the contractors, have a more simple pre-qualification process. If the contractor gets a ‘green-light’ from the client in the pre-qualification stage, then an ‘Instructions to bid’ (ITB) is received from the client. In the ITB, the client provides information concerning the scope of work, commercial, technical and contractual frames, schedule and other requirements of the project. After receiving the ITB, the go/no-go decision in O&G starts.

The bid is then evaluated by two different perspectives: commercial frame and operational frame. The commercial frame is related to a kind of ‘flavor’ that the company has since the beginning of the process that recommends informally if the company should bid or not. This commercial frame
is basically dependent on market conditions. For example, according to O&G manager, before the current crisis, contractors could select works that were more risk-free or the ones that the contractors were more comfortable with. However, since the beginning of the financial crisis of the last months, owners are delaying or even cancelling investments. In this new context, contractors need to be more pro-active, ‘aggressive’ in their bids, accepting more risks and being opened to relax some minimum requirements of satisfaction. In addition, O&G emphasized that, in a contractor’s market, the most important objective is not the search for more profitable jobs; instead the company needs to be more selective and attentive to the jobs they bid for in order to pick the right jobs. This way, this subjective analysis of the external environment, called by the interviewee ‘commercial frame’ is performed in O&G in order to support the bidding decision.

In addition to the ‘commercial frame’, O&G has also some internal procedures that the bidding process should follow. Firstly, if the value of the bid is below a certain threshold, the decision process can be done at the local branch level. In contrast, if the bid value is above this threshold or, if it involves multi-operating-centers in the group, then, the decision process includes the management level in the headquarters. The procedures are structured into several gateways. In this framework, some events need to be worked-out for the bid to move to the next stage and the bid should meet certain minimum requirements set at the group level. The interviewee added that nowadays, there is a derisk policy from both sides: client and contractors. From the contractor’s side, the policy is to avoid, explicitly during the bidding process, any unfair and harsh contractual requirements from the client. This way, these processes, rules of conduct and gateways performed by O&G have the objective of monitoring the bid using peer reviews or management reviews at all levels in order to guarantee that all risks are sufficiently managed.

There is a formal event which takes place based on some inputs which are normally provided by the commercial professional in charge of the specific area of the specific bid. A bidding case is presented to the company’s management and, at this point, the go/no-go decision is made. The most relevant aspects evaluated in the bidding case are client, country, type of contract, kind of job (Greenfield, Brownfield or revamping), potential structure of the contractual entity, the existence or not of a joint-venture partner, value of the contract, the group’s portion of the contract, bid costs, technical details (stage of the work, local content, etc.), commercial issues such as bid bond, performance bond and down payment, risks (planning, cost, technology, financial, political), analysis of workload combined with the company’s strategy (local branch and headquarters), technical schedule of the ITB and competition. A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis is performed in order to evaluate these factors. If the bid is ‘on’, then a budget for the bid is created and a proposal manager is assigned. Before the bid is submitted, there is another gateway when a review of the bid occurs. The objective of the review is to check if the bid is aligned with the business strategy of the group and the expectation of the client. After the submission, O&G is often called to re-propose the bid, especially for large jobs. At
this point, there is another gateway, since the initial conditions may have changed and some assumptions may not be valid anymore.

For international projects there are two possible situations: (1) project is outside the country of origin of the local branch managed by the local branch; (2) project is outside the country of origin of the local branch but managed together with other companies in O&G’s group. In the first situation, the bid/no bid decision process follows the same process. The risks and competition under consideration are different, but the process follows the same framework. If the bid value exceeds the threshold, then an approval from the headquarters is needed. In contrast, in the second situation, when there is a joint-venture (JV) between different operating-centers within O&G’s group, the process is managed by a multi-management entity, which goes beyond the local branch management. In this case, a leader of the JV is assigned who manages the entire operation and is the responsible of presenting the bidding case and getting the approval from all the partners. The leader gathers information and consults the other parts, but it is the main responsible for all the initiatives.

4.1.2. Usage of theoretical models

O&G was asked about the utilization of weighting criteria assigned to relevant factors to measure the worth of the project. The answer given by O&G was that the weighting criteria used in the bid decision process mostly follows the same weighting structure that the client used to judge the bids. According to the interviewee, the weights used by the clients in the judgment of bids are known by contractors and O&G uses the same weights assigned to the same factors in order to evaluate internally the bid. This evaluation is performed in a qualitative way by a SWOT analysis. In the case of very complex, critical and structured projects, O&G can use, in addition to a SWOT analysis, a full risk evaluation in which all the relevant parameters behind the bidding decision are considered. This evaluation is done in a qualitative way since, according to O&G, the bidding phase is usually very strict in schedule.

When asked about the utilization of quantitative tools to decide whether or not to bid, O&G answered that quantitative tools for risk assessment are usually used in the management of projects not for bids’ evaluation. The interviewee said that, in the case of complex bids with long duration (6 to 8 months), some quantitative tools might be used. However, he complemented that, nowadays, bids are usually very quick, which means that in a short-period the company needs to read a lot of documentation and evaluate the relevant parameters. The interviewee stated that the competence of the company allows the decision to be taken based on judgment from qualitative reviews.
Concerning the question about the way that O&G utilizes past projects data in the bidding decision, the interviewee answered that, in the case of clients, countries or sites in which the company (local branch or headquarters) had a previous experience with, the company already knows the appropriate behavior to take. In addition, in the case of clients that are long-term partners, the decision is restricted to the maintenance of a partnership. In contrast, in the case of clients that are not partners, the decision is more opportunistic. The interviewee added that the kind of experience with the client also influences the decision. In the case of a bad experience with a specific client and with a specific contractual framework, unless the conditions change, the company will not bid again.

A further question concerning the utilization of financial indicators to evaluate the bid was asked. The interviewee answered that in order to decide to bid for a project, the bid should satisfy the minimum financial requirements set for the group. Several financial factors are assessed such as client's financial solidity, risks of not being financially compensated, currency, currency exposure, credit and financial request from the client. The project is also evaluated in order to check if it is financed in a realistic and proper way. However, no indicator such as Net Present Value (NPV) or IRR is used.

A question focused on investigating how O&G relates the future project with the current portfolio was then asked. O&G answered that the relationship of the bid with the current portfolio is based on a workload evaluation. One of the parameters evaluated when the company analyses whether or not to bid for a new project is if the project fits into the current workload or, if it is so strategic, that the company will have to find a way to make it fit in the current workload. The interviewee added that other reasons may influence the company decision to bid even if the short-term workload (approximately 1 year) is full such as: (1) the client is strategic; (2) client is providing an experience with new technology that the company is interested in or (3) client is signalizing with future expansion in another jobs.
4.2. C&P

4.2.1. Bidding process

Bid/no-bid decisions in C&P are basically evaluated based on strategic perspective, workload and environmental issues. The analysis of strategic perspectives includes factors such as price of the bid, the development of new markets and the acquisition of new clients. In addition, to evaluate the competitiveness of a bid, the company has to assess the competitors’ behavior. According to the interviewee, in the Engineering & Construction market, the players are more or less known, so it is possible to evaluate in which market and in which country a competitor is stronger. Regarding the workload perspective, the appraisal is basically focused on resource availability. The company verifies if there are enough people to prepare the bid. This verification is not restricted to commercial staff but includes also engineering and procurement staffs, who are directly involved in the bid preparation. The engineering team is responsible for preparing the technical specifications of materials and equipment needed to implement the project. Subsequently, these specifications are sent to the procurement staff who asks for quotations for these equipment and materials in the market in order to calculate the cost of the project. Furthermore, environmental issues are also analyzed regarding specific laws and regulations that need to be followed in the place where the project is going to be implemented.

The process is structured following some steps. Firstly, a form is prepared including the main information of the project such as an estimate price of the project, type of project (EPC, etc), location, major risks and client. This form is then presented to a committee that will evaluate and decide whether or not to bid. The process is led by the commercial department, but it is a decision that involves all the main departments that will be affected by the project. The committee is formed by Vice-Presidents (VPs) of different departments of the company.

The bidding evaluation process for international projects follows the same steps. The main difference when evaluating a project outside the headquarters’ country is in the factors that are taken into account. For example, the company needs to investigate the cost of labor, the environmental regulations and other country-specific issues. For projects within the country, the company has a better knowledge concerning these data, but in the case of international projects, C&P usually contacts a local contractor that knows the local market and its regulations and can help in the bid appraisal.
4.2.2. Usage of theoretical models

The same question about the utilization of weighting criteria assigned to relevant factors to measure the worth of the project was also asked to C&P. The interviewee answered that the company does not use weighting measures to bid decisions and he complemented that this kind of tool is used in a further phase of the project in the risk management process.

Further, a question concerning the usage of some kind of ‘Bid Index’ was asked to C&P. The answer was that indexes are sometimes used to help in the estimates of new projects, but not to evaluate the bid. Indexes such as US$/MW and cost of labor/man-hour can come from past projects, personal experience, literature and from market information and are helpful in the initial estimates. Data from previous projects are stored in databases and can also help to give a first idea of the price of the new project. This database can be an official one or even the memory of the people. There is no ‘Bid Index’ used to evaluate the worth of the bid.

The interviewee was then asked about the utilization of quantitative tools. The answer was that, in C&P, no quantitative tools are used to support the bidding decision. The methods are usually based on the company’s experience.

In sequence, a question was formulated to verify the usage of financial indicators. C&P answered that financial indicators such as NPV or IRR (investment rate of return) are usually used by clients to evaluate the viability of the project. The interviewee added that these indicators are used by contractors only in the case that the client requires the financing of the project by the contractor.

When asked how C&P relates the candidate project to the current portfolio, the interviewee answered that the candidate project is related to the current portfolio in such a way that the portfolio should be balanced. He added that the company cannot only have one kind of project, since some kind of projects have big revenues but not big margins. This way, the company cannot just have this kind of projects in its portfolio.
5. Discussion

This chapter analyses and discusses the results from the empirical data aiming at answering the research question: ‘How does the bid/no-bid decision-making process function in international construction context? A comparison between theoretical and practical perspective.’ In the sequence, the conclusions reached by this study are finally presented.

The first part of the research question is focused on the bidding process in the international construction industry. In order to understand the dynamics of this decision-making process, the bidding process of two international contractors was investigated. In the ‘Empirical data’ Chapter, an individual description of each company’s process and its relationship with theoretical models was presented. In contrast, in this Chapter, a combined analysis of the processes of both companies and their relationship with theoretical models is developed. Table 7 shows the difference in the approach followed in the ‘Empirical data’ Chapter and in this one.

Table 7: Approaches to empirical data analysis

<table>
<thead>
<tr>
<th>Bidding process</th>
<th>Comparison with theoretical models</th>
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<tr>
<td>O&amp;G</td>
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<td>C&amp;P</td>
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While evaluating a bid/no-bid decision model, it is important to verify not only if it is a formal and structured process within the company but also if it correctly addresses the main factors in a bidding situation. In Chapter 2, the review of the literature showed that researchers such as Ahmad, Lowe and Parvar consider as the most relevant in the bidding decision the following factors: alignment of the opportunity to the company’s strategy, contractor’s need for work, current workload and resources availability, market conditions and competition, capability to perform the contract, contractual and financial conditions, project characteristics (type, size, location and risks), bid preparation costs and client (Ahmad, I. 1990; Lowe and Parvar 2004). The structure of the bidding processes of O&G and C&P and their ability to address these critical factors are the focus of the appraisal developed in this section. Additionally, the way how companies deal with bidding problems of international projects is also discussed in this section.
5.1. Bidding process

The description of the bid/no-bid decision process of companies O&G and C&P in sections 4.1.1 and 4.2.1 respectively reveal that both companies have a formal and structured process to evaluate the bids. In both cases, a careful investigation of the most relevant factors concerning the candidate project by the top management of the company is performed. In the case of O&G, the formal process of decision is framed into gateways through which the bid moves if it fulfills some requirements. A bidding case with the most relevant factors of the project supported by a SWOT analysis is presented to a higher level committee, who is in charge of the decision. In the case of C&P, the most important issues considered by the company such as the alignment with the company’s strategy, workload and environmental issues are the drivers of the bid evaluation. Following the same pattern of O&G, a form with the most influential factors of the bid is presented to a committee who is also in charge of deciding whether or not to bid for the specific project.

The strategic alignment of the candidate project with the company’s objectives and goals is a crucial point of the bidding process for both companies. In O&G, this alignment is guaranteed through the involvement of the top management of the company in the decision. For example, for bid values over a specific threshold even the headquarters of the company is involved in the decision committee. In addition, before the submission of every bid, a review is done to make sure that the final bid is in line with the strategy of the company and the Group. In the case of C&P, strategic alignment is one of the three perspectives through which a bid is primarily evaluated. The strategic alignment analysis includes factors such as bid price, development of new markets, acquisition of new clients and competitiveness. Additionally, C&P assures the strategic alignment of the potential project with the company’s major strategies by including in the decision committee the VPs of all departments affected by the project.

In addition, a factor that might be part of the bidding process of the companies is the contractor’s need for work. For example, O&G mentioned that the financial crisis in today’s market pushed owners to delay or even cancel investments, which, in turn, lead the contractor’s need for work to increase. Accordingly, contractors need to be more pro-active, accept more risk and relax some requirements of satisfaction. This situation might create a need for contractors to search for opportunities to bid for rather than waiting for receiving client’s invitation to bid. In this case, a ‘pre-bid/no-bid decision phase’ is included in the bidding process. However, the evaluation of the contractor’s need for work is not always part of the bidding process of international contractors, since it was not observed in the process of C&P.

On the other hand, analysis of current workload and resources availability can be considered as part of the bidding process in the international construction industry, since it is considered by both companies. In the case of O&G, for strategic clients or projects, even if the workload is full, the
company will ‘make the new project fit into the current workload’, which means that the company will search for alternatives such as outsourcing or staff relocation in order to develop the project. This way, depending on the strategic level of the bid, the workload is not considered a constraint.

Additionally, the analysis of market conditions and competitiveness is also part of the bidding process of international contractors. O&G investigates market conditions under the commercial frame during which the external environment is subjectively assessed in order to give the ‘flavor’ whether or not to bid. In addition, the assessment of the competition is formally done in the bidding case presentation. C&P performs the appraisal of the competitiveness under the strategic perspective analysis, which most probably also includes the evaluation of market conditions.

On the other hand, it is not possible to consider the analysis of the technical capability to perform the project explicitly as part of the bidding process in the international construction industry, since it was not mentioned by the companies studied. However, O&G stated that in a contractor’s market, the most important objective is to ‘pick the right jobs’. The ‘right job’ can be interpreted as the one that fits in the company’s capability. In addition, both companies mentioned the importance of their experience and competence in the bidding process evaluation, which reflects that the companies view themselves as capable enough to perform the contracts they bid for. Furthermore, in the case of O&G, for complex contracts over a specific threshold, a joint-venture between different operating-centers within the Group can be formed in order to increase the company’s capability to perform the contract.

In addition, the assessment of contractual and financial conditions of the bid is also considered as part of the bidding process of international contractors. O&G takes these conditions into consideration in the bidding case, while C&P includes them into the form to be presented to the committee. The costs to be incurred in the preparation of the bid might also be part of the analysis. In the case of O&G, these costs are included in the bidding case presentation. However, C&P did not mention this factor as being part of the bid form. In addition to the evaluation of these commercial conditions, both companies include in their bid analysis some technical characteristics of the project such as type, size, location and risks. Following the same procedures of the commercial analysis, this technical information is assessed through the bidding case and the bid form of O&G and C&P respectively.

Moreover, considered one of the most important factors in the bidding process of the companies is the client evaluation. Both companies review previous experiences with the same client, client’s capability to finance the project, client ownership (private or government-owned), client’s strategic importance and other issues associated to the client. O&G even emphasize that their relationship with clients is frequently in the form of a long-term partnerships.
Finally, the bidding process for international projects cannot be considered different from the one for local projects. Although some authors emphasize that international projects should follow a specific bidding model due to their intrinsic risks and complexities, both companies use the same process to assess international projects bidding situations (Han and Diekmann 2001a; Han and Diekmann 2001b). However, both companies emphasize that, although the process is the same, the relevant factors under consideration vary for international projects. Some country-specific issues are taken into account in this situation. O&G highlighted that in international projects the risks and competition being evaluated are different. C&P also includes in its analysis some specific issues related to the country such as cost of labor and the environmental regulations. In addition, C&P usually contacts a local contractor to help in the appraisal of the local market and regulations. The exception is the case of an international project in O&G which involves joint-ventures between companies of the Group. In this case, the bidding process varies from the usual one. The process is handled by a multi-management entity which has an assigned leader who is the ultimate responsible for presenting the bidding case. The other companies of the Group involved in the project give the necessary support. A summary of the combined analysis of the bidding process of O&G and C&P is presented in Table 8.

Table 8: Summary of the combined analysis of O&G and C&P

<table>
<thead>
<tr>
<th></th>
<th>O&amp;G</th>
<th>C&amp;P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is it a formal and structured process?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Relevant factors are considered?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Alignment with the company’s strategy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Contractor’s need for work</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Current workload and resources availability</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Market conditions / competition</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Capability to perform the contract</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Contractual and financial conditions</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Project characteristics (type, size, location and risks)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bid preparation costs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Client</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>International projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the bid/no-bid decision process the same as the one for local projects?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Are country-specific issues considered in the process?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1 Market conditions not explicitly mentioned in the case of C&P
2 Not explicitly mentioned; ‘Pick up the right jobs’ can be interpreted as the ones that the company is capable to perform
3 In the case of Joint-Ventures between companies in the Group, the process is different

The results discussed showed that both companies have a thorough, formal and structured process to evaluate and decide whether or not to bid for a project, which predominantly takes into account the most relevant factors suggested by researchers as being the critical ones in a bidding decision problem. On one hand, C&P does not consider all the factors suggested and its process
seems less structured than the one of O&G. On the other hand, O&G’s considers almost all the factors and have a highly structured bidding process. This distinction might be attributed to the difference in the size of the companies. O&G is a Group with revenues around 8 billion of Euros (data from 2007) while C&P is Group with revenues of 2 billion of Euros (data from 2007). The difference in the Groups’ revenues might imply that projects of O&G are bigger and more complex than the ones of C&P, though requiring a more detailed evaluating process. Additionally, the bigger size of company O&G might suggest a more complex organizational structure, which might lead to more stages in the approval process of a bid.

5.2. Comparison with theoretical models

It is claimed by some authors that most of the theoretical bid/no-bid models are not used in real-life situations (Wanous et al 2000; Wanous et al 2003). It indicates that there is a gap between the processes implemented by companies in bidding decisions and the models suggested by researchers. The focus of the combined analysis developed in this section is to discuss the degree of application of theoretical models in the companies studied. This discussion will then give the basis for the comparison between the theoretical and practical perspectives, which is the answer to the second part of the research question.

In the models proposed by Ahmad and Liu, weighting criteria are used to calculate respectively the overall project worth and the overall worth of the two possible options ‘bid’ and ‘no-bid’ (Ahmad, I. 1990; Liu et al 1999). In real life situations, it was verified that these models are not fully followed. While C&P does not use any weighting criteria to evaluate the bids, O&G uses them but in a subjective judgment rather than in calculations. The company uses the same weighting criteria that the client uses to judge the bid as guidelines to help to focus attention on the factors considered more relevant by the client. On one hand, the utilization of weighting criteria as proposed by the authors might help not only to quantify subjective evaluations but also to increase the consistency of the decision. On the other hand, companies find it hard to implement these calculations considered the strict schedule to answer bid requests. In addition, quantitative models are also pointed as costly to implement.

The same considerations can also explain why the model proposed by Wanous is only partially performed by companies (Wanous et al, 2000). In his model, Wanous proposes a distinction between positive and negative factors in order to calculate a Bid Index, which is used to translate into numbers the recommendation to bid or not to bid for a project. For instance, O&G uses the distinction between positive and negative factors but in the form of a SWOT analysis, which basically analyses strengths and opportunities (positive factors) and weaknesses and threats (negative factors) separately. However, the analysis is subjective and no bid index is calculated.
This contractors’ propensity to use subjective evaluations lead Lin and Chen to develop a more qualitative model to calculate a fuzzy attractiveness rating of the bid based on linguistic evaluations (Lin and Chen, 2004). Although it is argued that the model is simple and systematic, provides reliable results and increases the consistency of the decision, companies do not use indexes to translate the bid/no-bid decision into numbers. C&P uses bid indexes such as US$/MW and cost of labor/man-hour, which are mainly focused on the estimate of the initial bid price and not on the support of bid/no-bid decisions.

The usage of historical data of past projects to develop models to support bid decisions is suggested by Wanous, Lowe and Parvar (Wanous et al 2003; Lowe and Parvar 2004). In fact, the importance of historical data in bidding decisions was reinforced by the companies studied. For instance, O&G’s previous experiences with a client, country or site might influence in the approach to be taken by the company in the bid/no-bid decision. In the case of C&P, data from previous projects which are stored in databases are used to estimate the initial price of the candidate project. However, none of the companies uses historical data as inputs for mathematical models, although the authors claim that the models proposed do not require many input data or hard calculations, are reliable and accurate (Wanous et al 2003; Lowe and Parvar 2004).

Additionally, the relationship between the candidate project under evaluation and the companies’ current portfolio was also investigated in O&G and C&P. Han suggests a model that evaluates the new set of projects using the NPV as an indicator (Han et al, 2004). Even though the authors emphasize that the model can maximize the firm’s overall value through a well-balanced multi-criteria assessment, companies do not use NPV analysis in their bidding process (Han et al, 2004). For instance, O&G only considers financial factors such as client’s financial solidity, risks of not being financially compensated, currency, currency exposure, credit, financial request from the client and financing structure.

Caron also proposes a bid/no-bid decision model which relates the bid under evaluation to the current portfolio. His model uses a quantitative evaluation of the expected return and risk exposure for the overall portfolio (Caron et al, 2007). The model is claimed to help in the identification of opportunities that could balance the overall risk exposure of the organization, nevertheless, companies are not applying it as proposed by the authors. For instance, the evaluation in C&P is focused on the correct balance of the project portfolio, but this balance is verified only in qualitative terms. In the case of O&G, the relationship of the bid to the current portfolio is basically concerned with the evaluation of workload level.

In the case of international projects, Han and Diekmann suggest a specific bid/no-bid model that is able to address the particularities of this kind of projects such as political, economic or cultural
conditions (Han and Diekmann, 2001b). Authors argue that the model improves the quality of decisions since it increases decision correctness, confidence and consistency. However, none of the companies are implementing this model. In fact, both O&G and C&P apply the same process for international projects and for local ones.

A summary of the results of the combined analysis of the degree of application of theoretical models by O&G and C&P is presented in Tables 9 and 10.

Table 9: Presence of key features of theoretical models

<table>
<thead>
<tr>
<th></th>
<th>O&amp;G</th>
<th>C&amp;P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are weighting criteria used?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Is a distinction between positive and negative factors used?</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>Is a Bid Index used?</td>
<td>NA</td>
<td>Yes</td>
</tr>
<tr>
<td>Are historical data used?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Is NPV analysis used?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Does the current project portfolio influence the decision?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Do international projects follow different bidding process?</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

NA = Not applicable (no question was asked)

1 In a qualitative evaluation
2 In a SWOT analysis
3 To estimate initial price for the bid
4 To determine the approach in the bid decision
5 To estimate initial price for the bid
6 Only in terms of workload
7 Only in the case of JV between companies in the Group

Table 10: Degree of application of theoretical models

<table>
<thead>
<tr>
<th>Models</th>
<th>Key feature of the model</th>
<th>Does the company follow the model?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad, I, 1990</td>
<td>Utilization of weighting criteria to calculate the bid worth</td>
<td>Partially</td>
</tr>
<tr>
<td>Liu et al, 1999</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Wancous et al, 2000</td>
<td>Distinction between positive and negative factors</td>
<td>Partially</td>
</tr>
<tr>
<td>Lin and Chen, 2004</td>
<td>Calculation of a Bid Index</td>
<td>No</td>
</tr>
<tr>
<td>Wancous et al, 2009</td>
<td></td>
<td>Partially</td>
</tr>
<tr>
<td>Lowe and Parvar, 2004</td>
<td>Historical data used to develop mathematical model</td>
<td>No</td>
</tr>
<tr>
<td>Wancous et al, 2003</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Han et al, 2004</td>
<td>Utilization of financial indicators (NPV analysis)</td>
<td>No</td>
</tr>
<tr>
<td>Han et al, 2004</td>
<td>Relationship with current project portfolio</td>
<td>No</td>
</tr>
<tr>
<td>Caron et al, 2007</td>
<td></td>
<td>Partially</td>
</tr>
<tr>
<td>Han and Diekmann, 2001b</td>
<td>Specific model for international projects</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>
On one hand, the results discussed in the previous section do not support researcher’s statements concerning the unstructured and fragmented nature of bid/no-bid process. In contrast, it is possible to state that, although bidding decisions are frequently based on subjective judgments, the process is formal and highly structured. Firstly, it is a formal process in the sense that it is a defined routine designed to be followed by all bids in the companies, including formal presentations for the top management of the companies, who are actively involved in the final decision. Secondly, it is a structured process, with a clear sequence of steps to be followed in which relevant information is analyzed by experienced staff. In both cases, it was verified that both companies scrutinize the most important factors of a bidding problem including the review of the alignment of the candidate project with the companies’ strategy. Thus, it is possible to affirm that, although the processes might leave space to some improvements, they seem to be effective in supporting companies in bidding decisions.

On the other hand, results reinforce that theoretical models are not being applied by companies. Some features of the models can be observed in the application of practical models but none of the theoretical ones is being fully employed in practice. For example, O&G uses weighting criteria, distinction between positive and negative factors while C&P uses databases of past projects and an evaluation of current portfolio to arrive at a balanced portfolio. However, these features are used in a different way than the one suggested by the authors. The dynamic and time-constrained environment of the international construction industry is claimed by the companies as not appropriate for rigid and complex models. Additionally, companies argue that their experience and competence in the industry justify the non-implementation of more complex and quantitative-based models. Thus, it is possible to affirm that, although the current theoretical models bring some important highlights to bidding situations, they are still not fully suitable for the international construction environment.
6. Conclusion

This study was focused on the investigation of how bid/no-bid decision models are implemented in practice by organizations and the existent gaps between practical and theoretical frameworks of bidding decision models. The context of the study was the international construction industry.

The first step towards this investigation was the evaluation of the models proposed in the literature by researchers and the identification of the key features of each model in order to verify the application of these features in real life situations. Subsequently, this work moved to field investigations of practical models. Two international contractors were studied in a multiple case study with the objective of examining how companies in the international construction industry arrive at their bid/no-bid decisions. The bidding processes of the companies were then evaluated according to their structure and ability to address the critical factors in a bidding situation. Afterwards, the degree of application of theoretical models or some of their key features were explored.

Many researchers state that bid/no-bid models employed by companies are unstructured, fragmented and rudimentary (Caron et al 2007; Han and Diekmann 2001b). They also argue that bidders are not clear on the rationale behind the bidding situation, and that usually the decision lacks reasonable basis and is highly subjective (Ahmad, I., 1990). Researchers even claim that ‘the usual practice is to make bid decisions on the basis of intuition derived from a mixture of gut feelings, experience, and guesses’ (Ahmad 1990, pp.595). Accordingly, in an attempt to contribute to minimize this problem, they propose some theoretical models to support the bid/no-bid decision.

However, there are other researchers that observe the problem from a different perspective. They point out that theoretical models ‘remained in academic circles and did not find their way into the practical world’ (Wanous et al 2000, pp.457). They emphasize that the simplicity of the model’s assumptions do not represent real life situations, besides the difficulties created by the large amount of data required in the application of these models. Additionally, they highlight that the companies’ unfavorable behavior towards the usage of mathematical models also contribute to the non application of the models. Moreover, the development of these theoretical models not only disregard qualitative approaches, which are more accepted by the industry, but also reduce the importance of the experts’ experience and competence in the judgment of a bid problem (Lin and Chen 2004).

The research question proposed in this study aims at contrasting these two different viewpoints. The first part of the research question ‘How does the bid/no-bid decision-making process function in international construction context ?’, is focused on confirming if practical models used by
companies in international construction context are unstructured and fragmented as claimed. In addition, the case studies also attempt to verify if bidders are taking their decisions soundly based on the most critical factors of the bidding problem. Furthermore, the second part of the research question ‘A comparison between theoretical and practical perspective’ aims at investigating the opposing viewpoint, which argues that theoretical models are not being fully implemented by companies.

From the results discussed, it is possible to answer the research question proposed: ‘How does the bid/no-bid decision-making process function in international construction context? A comparison between theoretical and practical perspective’. In the international construction industry, bid/no-bid decision-making process function as a formal and structured method following some steps towards a comprehensive analysis of the most critical factors involved in a specific bidding situation. Factors such as the alignment of the opportunity to the company’s strategy, contractor’s need for work, current workload and resources availability, market conditions and competition, capability to perform the contract, contractual and financial conditions, project characteristics (type, size, location and risks), bid preparation costs and client are usually evaluated for each candidate project. This analysis is usually performed using a qualitative approach with the support of people’s experience and competence. Then, the final decision is taken by the top management of the company. In this process, theoretical models are not fully applied considering their complexity, large amount of data required, time constraints and dynamism of the sector.
7. Final considerations

This last chapter highlights the main limitations and contributions of this study and also presents some suggestions for further studies in the topic.

7.1. Limitations of the study

The answer of the research question presented in the section above, demonstrate that the aim of this research was achieved. Nevertheless, it is important to recognize that the work also present some limitations. Firstly, as the topic is related to the strategies of the companies, the researcher was asked by the interviewees not to disclose the name of the companies or any information that could be directly related to them. This way, some ‘alternative’ names were used instead. A full description of the companies including their names and countries might have enriched this research. Moreover, the sample size of two, especially considering that both are regarded as big companies, does not allow the findings to be extended to other companies such as small and medium. However, these shortcomings do not reduce the importance of the study, which still contributes with rich insights about the bidding process in the international construction industry.

7.2. Contributions and suggestions for future research

This study contributed to the knowledge concerning one of the most important phases in the project life-cycle, the bidding phase. This work provides rich insights regarding the international construction industry and the main challenges faced by the sector. Furthermore, this work demonstrates how the bid/no-bid decision process functions in this context, its structure, phases and decisive factors considered in the analysis. Additionally, from this study it is possible to verify that practical bidding models are far from the ones suggested by researchers. This gap can represent a potential area for future research. Some studies can be further developed in the development of bid/no-bid decision models that are more appropriate to be used in practice. This development might take a different approach from what has been done so far. Instead of creating new bidding models, researches can focus on improving the practical models that are being applied in real life situations, which will be an important contribution not only to the academic field but also to managerial one.
8. References


APPENDIX I: Research Proposal

I) Research Objectives

The uncertainties and complexities related to international construction projects, makes the bid/no-bid decision-making process even harder, being the contractors less self-assured regarding the decision whether or not to bid for potential project opportunities (Han et al, 2005). Additionally, many companies utilize unstructured and biased methods such as “personal intuition” or “previous-experience” based methods in order to decide for international markets (Han and Diekmann, 2001a). Furthermore, tools and methods for evaluating international opportunities are still fragmented, incomplete and rudimentary and the existing bid/no-bid models are suitable only for domestic construction projects (Han and Diekmann, 2001a).

According to Wanous et al, ‘despite the crucial importance of the ‘bid/no bid’ decision in the construction industry, it has been given little attention by researchers’ (Wanous et al, 2003). This situation emphasizes the importance of the development of sound bid/no-bid decision-making models, which are more appropriate to deal with specific issues related to the environment of international construction projects. On one hand, this analysis seems difficult to be performed provided the uncertainty level caused by the scarce information available in the earlier phases of the project (Zhi, H., 1995). On the other hand, changes in the competitive environment are leading companies to change their behavior in order to pursue a more structured method of determining the attractiveness of a specific project (Caron, Franco, 2007).

The present work aims at minimizing the actual gap in the development of a consistent model that could satisfactorily support the bid/no-bid decision for international construction projects. In order to reach this objective, an evaluation will be performed focusing on the differences between the theoretical models and the practices carried out by international contractors regarding their decision process to bid for an international construction project. The identification of these differences may help to understand the flaws in the existent models, opening a space for further research focused on the development of optimal models to support the bid/no-bid decision for international construction projects.

II) Research Question

The research question proposed is: ‘How does bid/no-bid decision-making process of international construction projects function? – A comparison between theoretical and practical perspective.’

III) Methodology

The methodology proposed to support this research is semi-structured interviews conducted with decision-maker representatives in Swedish construction companies.
APPENDIX II: Interviewer-guide

Set 1: ‘How does the bid/no-bid decision-making process function in Company X?’

1) After receiving a client’s RFP (Request for Proposal), what are the steps taken?

2) How do you describe the formal process for a bid/no-bid decision?

3) How do you describe the formal process for a bid/no-bid decision of international projects? What are the main differences in the process, if any?

Set 2: Analyzing the gap between practical and theoretical models

4) How the specific context of the international project is evaluated? e.g.: country-related issues such as currency, inflation, interest rates and so on. Han and Diekmann (2001b)

5) What are the key variables evaluated in the bid/no-bid process? (Han and Diekmann, 2001b)

6) In the case of international projects, what are the main differences concerning the key variables being evaluated? (Han and Diekmann, 2001b)

7) How the duality ‘opportunities (positive factors) x threats (negative factors)’ is assessed? (Wanous et al, 2000)

8) Is there any bid-index used to quantify these factors? e.g.: is there a number above which the result is ‘to go’ and below which the result is ‘not-to-go’ (Wanous et al, 2000; Lin and Chen, 2004)

9) Are historical data from previous projects used to support decision to bid or not to bid? (Lowe and Parvar, 2004)

10) Are financial indicators such as NPV (net present value), ROI (return on investment) and VaR (Value at risk) used to evaluate the bids? (Han et al, 2004)

11) How is the relationship between the potential project being assessed and the actual portfolio of projects? (Han et al, 2004; Caron et al, 2007)