Internationalization Models Study on Larger International Contractors from U.S.A. and China

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Abstract: The evolution of our living world towards a phase of globalization and growing economic and political interdependence between different countries, different societies and different companies, with consequent influence on enterprises' performance boundaries redefinition, is increasing the complexity of environment in which the latter interact. Simultaneously, the enlargement of competition among economic agents leads to an approach to internationalization thematic. Looking for new markets becomes an important subject for management and economics. International businesses consist in transactions between economic agents from more than one country. These transactions may be supported by trading products, services or financial assets. This work theme concerns studying foreign markets approach by largest international contractors from U.S.A. and China. The study of enterprises internationalization opens a rich field of research, since the variables to consider are framed in various thematic elements, meaning there are several issues that must be considered and answered when preparing and implementing an internationalization process. In this case, the main goal is trying to conclude whether the internationalization of large contractors from U.S.A. and China matches with some of the best-known models, mainly the Uppsala Model and the Networks Model. Carrying out the study and considering a working line which prevents the spread of the analysis, we formulated the following hypotheses:

Hypothesis 1: The internationalization model of U.S.A. contractors is similar to the one of Chinese contractors;

Hypothesis 2: The option for international operations, in international markets, is similar between U.S.A. contractors and Chinese contractors.

The development of our study allowed us to test the hypotheses and reach relevant conclusions opening new lines of research.

Keywords: Internationalization; Contractors; Market.

1. Introduction

Considering that we are living in a world that suffered an important evolution towards a phase of globalization and growing economic and political interdependence between different countries, different societies and different companies, with consequent influence on enterprises' performance boundaries redefinition, we know that complexity of environment in which the latter interact is increasing. Simultaneously, the enlargement of competition among economic agents leads to an approach to internationalization thematic. Interest for international markets becomes a relevant subject for management and economics. Companies must spread their activities and sales goals out from national boundaries. In order to standardize terminology we can consider that globalization will result in integration of markets, technologies and even nations. Single or collective economic agents can access more quickly, more deeply and with lower costs to all world markets, if not always in physical terms at least in

informative terms. The change on economic borders has implications on the analysis of the environment and on organizations' diagnostic construction, and also on objectives definition and strategy formulation of each economic agent, particularly those who understand the importance of foreign markets, as well as those who are forced into the latter and soon realize internationalization relevance. However, in the contemporary world, we are all influenced by the process of globalization and we should all be aware of this phenomenon. We must all act in an international perspective. The international businesses consist in transactions between economic agents in more than one country. We can speak about trading products, services or financial assets. The increased complexity of these transactions is related to the fact that economic agents may come from different cultural systems, conducting their daily lives by different laws and traditions. They have to deal with various values between them; they have different resources, different skills and use different means of payment. The theme of this work is targeted to a study on foreign markets approach by largest international contractors from U.S.A. and China. It is a challenge significantly important, especially bearing in mind that there is a high difficulty in obtaining information, above all, information well structured for analysing the evolution of international markets approach in this activity sector. We can, however, say that in this sector of activity is entirely appropriate to consider that the term Multinational Enterprise means economic entities which engage in extensive international activities. First of all it happens that their growth is not sustainable, most of time, by domestic market. Being the public works a component of building industry, which involves the implementation of on-site work, leading to the appearance of final product, with a few exceptions of components of final product that can be worked and completed in different places than their final geographic location, with subsequent transport to the latter, the analysis of the internationalization of large contractors concerns why addressing other markets than domestic one. A candidate in open competition, in a market framed by different laws, when has success, is going to work to specific clients, namely the State or a public entity.

We emphasize that the reference to the term contractor is related with the separation between management and execution of major public works. We know that it is increasingly common the referred separation.

This study engages in a reality that it is becoming more and more evident, given the diversity and frequency of economic, political, social and cultural relations, between different types of nations, countries and economic agents. Understanding the importance of dynamics and management of international business is something that has become essential in business, social environment and in all aspects of human relationships.

This broad range of relationships is the paradigm of contemporary societies, where all economic agents, regardless their size, have information about the world as a whole, and often, without even realizing the problem, are influenced for decisions and events that are geographically distant from them.

This is one more reason for studying the theme of international business. In fact, we are hardly part of an organization that is not influenced by decisions taken in different parts of the world. The intensity of this effect may vary with the characteristics of decisions and organizations, their regional location and its international importance. However, the

management of our professional life and personal goals should take this into consideration.

The choice of the public works sector makes the study inserted in an area of great economic impact, as we shall see later in this paper. Remember, for example, the competition between countries to organize sports events of great international impact. The organization of a Football World Cup or the Olympic Games is much disputed internationally. The media impact of sporting activity is very significant. The organization of a sports event of international scope, in the referred cases concerning a world scale, allows the disclosure of host countries, with consequences on touristic attraction, on social, economic and financial issues. Also, in first instance, is an opportunity to make investment on construction of infrastructures, which lasting value over time and lead to new stages of economic development.

2. Research Goals and Methodology

In this study, the relevant goal is trying to achieve conclusions, if possible, about the internationalisation process of larger construction contractors from U.S.A. and China, analysing if they are similar or if we can find different strategies and some reasons that support that difference. We will mainly approach the internationalisation models and the international operation modes, trying to find variables that can explain those options.

Analysis Limitations

The study is based on McGraw-Hill Construction data disclosure, about larger International Contractors, considering the triennium 2005/2007, according with referred criteria. We present information about the presence of companies from those two countries in nine geographic market segments considered there.

Considering the goal of our study we put two hypotheses that give guidelines to our work:

H1: The internationalization model of U.S.A. contractors is similar to the one of Chinese contractors;

H2: The option for international operations, in international markets, is similar between U.S.A. contractors and Chinese contractors.

3. Internationalisation Models

3.1. General Framing

The internationalization model option for each company must be consistent with the conditions that it has for, eventually, developing its business in foreign markets. Concerning this, the diagnosis procedure is a very important stage preparing the decision about the internationalization process. This statement aims to highlight that companies must be fully aware about their financial conditions, technical resources, human resources, technological resources, and above all, available intellectual capital, with which they will address the new markets. Actually, international context must be properly studied, analyzed and understood, given the growing complexity acting abroad comparing the performance in the domestic market.

Already Aharoni (1966), stated that a decision related to investment across borders can not be seen isolated from future decisions, meaning that, looking back to a past decision, and considering that it is not understandable for itself, placed in a sequence of options assumed by the company we understand the logic that was behind his actual choice on a past time.

In the same way Tayeb (2000), considers two major groups of internationalization models, namely:

⇒ Sequential models;
⇒ Simultaneity models.

The sequential models, as can be inferred from the name, means the internationalization by stages, being identifiable the moments when companies have developed several measures to promote their involvement in international business, since the simplest way of exporting until they reach levels of internationalization more sophisticated.

Tayeb (2000), concludes that the most important thing is to realize that the sequential models are associated with a greater degree of concern about the uncertainty of results that will be achieved with internationalization, and that companies take a responsible care, as they enter new markets involving increased risks.
The option for more defensive market commitment levels in order to acquire international experience, allowing a gradually knowledge increase about business characteristics and determinants of new market functioning, leads directly to the expansion step by step.

According to Tayeb (2000), more knowledge about the market and better perception on its idiosyncrasies, will allow progress towards a greater international involvement, possibly through strategic partnerships or other forms of collaboration with local firms, until they choose to assume foreign direct investment.

This theory was supported by Johanson and Vahlne (1990), who had studied the internationalization process, searching for:

⇒ Making a parallelism between the increase of knowledge on foreign markets and the increase of international involvement;
⇒ Studying the reduction of uncertainty, namely the risk level, through a smooth entry in foreign market, with low level of financial and facilities commitment, and later in time assume an option of higher involvement in international business.

Tayeb (2000), concludes, therefore, for stating that the process of internationalization is a sum of incremental steps, each one supported by a set of management decisions, which are always the result of balancing several experiences. The same author refers that after this study these notions have become key elements of the internationalization process, although the empirical evidence resulted of an analysis based on a very limited number of companies. This is also one of the main criticisms to the results of these studies, in spite the constraints in terms of resources and risk aversion are factors that lead to later confirmation that small and medium-sized enterprises prefer to consolidate their position before entering a new market and giving a new step in the process of internationalization.

However, according to Bridgewater et al. (2004), since the 90s that published literature pointed to a faster internationalization processes, even about companies constrained in terms of size and resources. One factor mentioned, to justify this trend, concerns the increasing number of niche markets revealing new opportunities, with reflection on internationalization. These markets allow competitive advantages based on the ability to develop and exploit innovations in products or processes as well as the flexibility of organizations adapting to change. According to Buckley (1989), small and medium companies may have not a disadvantage when compared to large multinationals if targets are specialized markets without significant economies of scale.

We can identify another large group of models of internationalization, the so-called simultaneity models. Tayeb (2000), states that they are based on arguments of international convergence of preferences and tastes of consumers, meaning global convergence, where the same product can be sell anywhere in the world, without any relevant changes in product mix, using the same strategy of communication and without concerns about relevant market segmentation.

Levitt (1983) is one of the authors that argued that consumers' tastes, regardless their geographic location, were becoming similar. This convergence is a result of the globalization of telecommunications, information systems, technological innovation and movement speed of information.

We would like to emphasize that the globalization of tastes can not be extended to all types of products, particularly those related to cultural profiles, region's natural conditions where one lives, such as climate, geography or orography, or with religious values, and we should always bear in mind the limitations of general applicability of this concept.

Both models are mainly based on internationalization process observation of manufacturing sector, considering Tayeb (2000) that required investment level for installation of a plant influences the choice for one of the above models.

As Hollensen (1998), a great level of financial needs, creating less flexible physical structures, associated with higher levels of production volume, as a way to get return on invested capital, imply that we should take more care deciding to expand internationally. So, it is natural that the process is made step by step, leading to a first approach to markets that are not so demanding on financial and technical involvement. The author claims that the characteristics of surrounding environment and of companies involved are the two main groups of factors to take into account building the model of internationalization.

Hollensen (1998) refers as relevant parameters for analysis, the environment characteristics, the industrial structure of host country, the degree of market internationalization, its potential, the existing level of competition and substitute products, along with geographical distances and demographic and cultural composition. Considering factors affecting the company, the author highlights the degree of internationalization already achieved, even if that involvement in international business is conducted only by exportation, referring yet, the available resources, the productive activity characteristics, the goals with business expansion to foreign markets and the relationships and networks already built in foreign markets.

3.2. The Uppsala Model

One of the most used models to study the process of companies' internationalization, particularly considering small and medium enterprises, is the Model of Uppsala, which emerges from research projects developed in the mid-60s at the University of Uppsala, by a group of researchers led by Professor Sune Carlson. According to Björkman and Forsgren (1997), the Nordic countries, compared with most regions of the world, form an area of great homogeneity. These countries have a similar geographical size, their history has common links and language proximity is significant. All of them are open economies and companies seek business opportunities abroad, because the limited size of the region where they belong to doesn't allow important growth. The importance and relevance of international trade also influenced the Nordic academics and researchers.

Björkman and Forsgren (1997) stated that initially the hypothesis in question considered that it was against human nature to develop international business, as companies were constrained by rationality and had limited access to knowledge. They intended to express that companies exporting or investing abroad had always incomplete knowledge about foreign markets and about the various alternatives to develop international business.

This perspective portrayed two fundamental perceptions. The first concerns the fact that they consider it exists a profound difference between operations in domestic market and operations in foreign markets, which must be analysed taking into account the limitations of internal company knowledge. The second key issue is that the concept of company behind the study of Scandinavian researchers is not the same as that used in the main currents of theoretical economics. As we are told by Björkman and Forsgren (1997), researchers at Uppsala University found that managers had developed their functions with less rationality and less organized form than what was normally assumed by various economic studies, and these findings were equally applicable to international business.

Kurke and Aldrich (1983) confirmed that organizational behaviour framework of managers, resulting from studies they have done subsequently, supported the belief that the theory on international companies could not be based on traditional concepts of economic theory.

Also the studies of Johanson and Wiedersheim-Paul (1975), and the studies of Johanson and Vahlne (1977), took as their starting point the model above, emphasizing that it is characterized, precisely, for considering that the process of internationalization is an incremental progression. This leads to successive stages of greater involvement in foreign markets through different operation modes with growing international level of needs in terms of resources. In addition, geographical distances between the country of origin and the company's target markets are becoming larger when international experience becomes greater.

These studies began to focus on international expansion of companies in the Nordic countries, namely Swedish ones, and later they were confirmed by studies on other industries in other countries. One of the studied cases was the Finnish, by Luostarinen

(1979), which confirmed the theory of internationalization by stages, with preference for geographical proximity in the early stages of the process.

The model of Uppsala notes that uncertainty, coupled with the physical distance between markets, will be eliminated or overcome by the knowledge acquired with practical experience in each market. However, this kind of knowledge is not transferable, or, at least, not easily transferable among markets and among businesses, being specific to each binomial company/market. The main explanation for Nordic researchers decided to persist, in their research, with the perspective of internationalization by stages, and considering that the managers are essentially adverse to risk, not risk takers, is based on influence suffered by the studies of Cyert and March (1963), which referred to the restrictions of rationality, the aversion to uncertainty, the organizational learning and conflict resolution.

Petersen and Pedersen (1997) said that Uppsala Model could be considered at two levels: the operational and theoretical. We are told by the same authors that it began to be studied in the operational plan and then was inferred the theoretical level. Petersen and Pedersen (1997) argue that it is clear that the incremental process is essentially supported by the geographic variable, considering that companies prefer to begin the internationalization process for markets that have similarities with the domestic ones. The authors speak about psychic distance.

However, Langhoff (1997), emphasizes that the concept of psychic distance has a cultural nature, and should be considered on the basis of individuals' decisions rather than as an independent variable that explains the internationalization process of companies. Indeed, the author claims that psychic distance is not an objective factor and can not be considered an independent variable that affects all enterprises in an equally way. Therefore, Langhoff (1997) questioned whether psychic distance should not be a concept which covers the cultural differences or the cultural similarities. The author clearly draws attention that the model in question assumes that all companies, in a given stage of internationalization, are encouraged to consider cultural differences, and they exert their influence in the same direction. It means it is both important to study these differences, whether they are small and medium-sized enterprises or multinationals. Moreover, the psychic distance, in the broadest sense, embracing both geographical and cultural components, should not be seen from the perspective of the unit country, but especially taking into account regions with some uniformity.

This last reference raised some criticism to the model, adding that Bridgewater et al. (2004), said that remains unclear how knowledge affects the increase of resource allocation in the process of internationalization.

Björkman and Forsgren (1997), stated that constraints of the model were not properly specified, and this one is less valid when studying large multinationals. These companies have a significant international experience, trying to use the latest generation technology; international operations are not only motivated by the quest for new markets and there is a great bet in services and industries with innovative technology.

Johanson and Vahlne (1990), however, made relevant efforts to develop the model, even accepting the critical remarks, and considering them in a positive perspective. Although the Model of Uppsala has occupied the leading position in the researchers'

concerns about the internationalization of enterprises, namely among the Nordic researchers, is well known that, from the beginning of the eighties, the development of alternative models and differential analyzing structures characterized the works on the process of internationalization.

Björkman and Forsgren (1997), said that neither the Model of Uppsala, nor the theory of networks, we address below, include the determinants economic variables when trying to explain the internationalization process of several companies. Actually, while most of research studies on international business were based on an economic perspective, the Nordic School model is based, essentially, on the behavioural theory of the firm.

The perspective of networks theory adds to the analysis assumptions hitherto considered the fact of giving relevance to the strong links formed between the various partners which are integrated in international business relations in terms of social and cognitive component. The latter perspective reveals that there are significant difficulties in the strategic planning and strategic formulation of internationalization process and to define the entry mode into foreign markets.

In the second half of the 90s, Petersen and Pedersen (1997), considered interesting to test the Uppsala model and they made so on two levels: the theoretical level and operational level. At the theoretical level they concluded that the model maintains its strength, being empirically unchanged the statements concerning the incremental internationalization. However, it becomes more difficult to justify that the accumulation of knowledge and experience in international markets are the only explanations for the option of investing by stages in foreign markets. Thus, at the operational level, the increased involvement of resources in new markets can also influence business decisions, knowing that resources are not infinite. The authors call attention to the fact that many of the studies conducted at the operational level did not sufficiently take into account the limitations of the model, so there is still a long road ahead of research studies on the process of internationalization.

3.3. Theory of Networks

Johanson and Vahlne (1990) as well as Forsgren and Johanson (1992), developed several works looking out for networks creation as a process of companies' internationalization. The networks perspective leads us to pay attention to long-term relations between companies of the same sector of activity or between companies that are economically interrelated or belong to complementary sectors. The authors state that the development of operations in international markets is influenced by the increasing existence of proximity relationships in those markets. From this perspective, the internationalization of the organization depends on a set of relationships inside the network, being the developed standards and the expressed behaviours the corollary of established relations between the various actors, introducing an international multilateral element in the process, as Johanson and Vahlne (1992). According to Madsen and Servais (1997), the internationalization process is influenced by the context in which the company operates. The authors state that the degree of internationalization of the company will depend, therefore, on networks established in the industry, and the position it occupies in this network. This position is strongly determined by the specific advantage of each company, meaning that hardly an economic unit with nothing to offer

will gain access to such type of networks or will develop its process of internationalization.

According to Nieminen and Törnross (1997), the industrial development of enterprises in new markets faces a multiplicity of factors integrated in the environment and affecting business relationships. In this sense, it is important to understand the basic construction of networks as a way to approach the market, which, still according with the same authors, has to do with understanding how to combine heterogeneous resources with different actors and various activities.

Nieminen and Törnross (1997), argue that the networks can be used as a way to look at the process of business developing in a more holistic perspective. They highlight that one can identify the existence of networks taking into account the different aspects of the business-to-business, as well the context in which it develops, whether geographic, economic, social, cultural or political one.

Cook and Emerson (1978), consider that if there is a set of organizations, even small, that are related to each other regularly, they form a network of exchanges, understanding that it may be to exchange economic, social or cultural issues, among other possible fields.

According to Johanson and Mattsson (1988), the industrial systems imply that companies are incorporated in processes of production, distribution and consumption of goods and services, describing these systems as networks of business relationships. The division of activities, actions and work among the various economic units considered show that they are mutually dependent. However, same authors emphasize that the various activities that occur between the network elements, and between them and its outer space, must be coordinated, and there isn't a central unit to manage the entire system. It is through the interaction of different firms participating in the network that it is possible to coordinate the efforts of each component. The price can be, for example, one of the variables, among many others, leading to situations of balance.

The need for adjustments between the interdependent companies, in terms of quantity and quality of various goods and services that are traded, calls for some joint planning, or that a party has ascendancy over the other, in each transaction, according with Johanson and Mattsson (1988).

Axelsson and Easton (1992), said that companies, or organizations linked to business activities, in general, operate in environments that include a set number of players. They are in constant relationship between them and this leads to the development of a stable relationship that will translate into a process of organized trade. In the long term the consolidation of mutual understanding will lead to risk reduction of within network relationship development.

Nieminen and Törnross (1997), consider that dynamics of networks can not be understood without reference to the basic concept of learning. The authors define learning as a cognitive exchange between actors and based on the ability to perceive the world in a new perspective. Learning allows to a new behaviour development for dealing with situations and problems of the contemporary world. According to Nieminen and Törnross (1997), a change in behaviour involves compromise and

adaptation. The commitment is based on trust and mutual cooperation among members of the network. The adjustment is the result of learning process and means that a company fits in production, technological and trade systems, or even in social and cultural issues, of the other partners.

Anderson and Narus (1990), argue that the success of a company depends, in part, on third ones, including one or more other companies. Based on a study of partnerships between producers and distributors contend that both are involved in fewer but ever larger networks of cooperation, in which the coordination of marketing and technological resources is increasingly challenging to achieve success near the markets.

Holm and Johanson (1997), refer that, in the Social Exchange Theory, networks are defined as combinations of two or more partners linked by relations of mutual exchange, in which the change in a dual relationship is constrained by the change, or the absence of change, on the other. In this sense, the use of the exchange networks theory in the perception of the transactions, in the business world, means that the implementation of a business is sustained by the realization of another one.

Therefore, the authors explain that, considering a relationship focused on business between a supplier and a customer, it is expected, in order for both to have access to resources controlled by others, without coincidence between these resources, that the two companies have other relationships of exchange that go beyond the named focal relationship. However, these relationships with third parties may have impacts in the latter, positive and negative, because of what Holm and Johanson (1997), called them interdependent relationships within the networking.

4. Why Public Works Sector?

Public works are activities that play a very important role in the economic and social development of any region, because the construction of infrastructures that are socially and economically efficient is a prerequisite to economic growth and to a more efficient use of resources by each country. In this sense, political, economic, governmental and non-governmental organizations agree on the importance of this sector.

Public works are mainly based on two great areas:
1. construction;
2. conservation and maintenance.

We must sign that construction, in general sense, and public works in particular, are industries based on a wide range of projects. As written by Rodrigues (2005), there is no standardization of products or processes, and each work is, usually, one particular case. However we know that construction of buildings and houses may imply that some projects allow replication of various final products. An example is the construction of blocks of flats or houses. Also according to Rodrigues (2005), this context leads to the notion of irreversibility, meaning that it is reflected in the choice of a project, for a given time horizon, the exclusion of other options in terms of new works and their nature.

We believe that the most relevant is to retain that the development of this activity

contributes to improve general well-being of people. In this sense we can speak of wealth creation, which fits into various types.

The public works enable citizens to enjoy better communication between them, by different routes of contact, since the construction of roads and highways, passing by the construction of railways and waterways, the latter through the creation of seaworthiness, and construction of ports and airports, as well as subways, bridges, tunnels, viaducts, and even mine rails, until the construction of telecommunications networks, including optics fibre, broadband or wireless technology.

Public works also contribute to the organization of daily life through the construction of public roads, public lighting systems, footpaths, cycle tracks, social facilities, sports facilities, hospitals, courts, schools, universities, among others.

Public works also contribute to environmental sustainability; through the construction of water treatment plants, garbage treatment plants, waste dumps and treatment centres, anti-noise or anti-air pollution facilities, among other possible equipment.

We can also observe a significant role of public works in the production of energy through the construction of dams, hydroelectric plants, hydropower and wind farms.

Although not running out all the fields of public works intervention, we also want to refer their contribution to the lifestyle of contemporary societies, building infrastructures that allow water, electricity and gas reaching the citizens homes, companies' facilities, public buildings and all other places where those services are required.

The public works aim to:
- arrange, improve or renew the image, the functionality or the housing of municipalities, from villages to great cities;
- contribute significantly to the economic development of a municipality, region, country or territory;
- make the persons movement fluid, as the one of goods, merchandise or services;
- increase or create conditions of security;
- work for sustainable socio-economic development.

Concerning the improvement or the renewal of image, as well the operating and living conditions of citizens, we have often seen the remodelling of older neighbourhoods with buildings and equipment more degraded, the construction of dedicated routes for pedestrians and specific transport, facilitating the movement and its fluidity, with repercussions on the security situation. We also can notice the construction of green spaces or playground equipment, dedicated, for example, to the children.

With regard to increased safety and fluidity of circulation, it is important to refer the works of construction of new railways and inland waterways; particularly those designed to decongest roads in heavy traffic and significantly congested, easing up axes close to saturation. In addition, the options for alternative routes, usually less polluting and more decongested, reduce environmental risk and accident risk.

Public works have also an important role in environmental terms, namely those with ecological relevance, with lasting effects and regarding sustainability, since it is necessary the construction of filtration plants and effluent treatment centres, as well as to develop new energy sources, building wind farms, solar power plants, geothermal power and hydropower. The construction of dams, dikes and reservoirs of rainwater are also works with environmental consequences, minimizing the effects of flooding and contributing to the storage of water.

All these works, some with an international dimension and very sophisticated technical features are support for regions economic development, regions that can have different sizes, some of which transcending states borders.

Public Works are still an important vehicle for historical knowledge. Building is probably the most visible human activity, or one of the most visible human activities, allowing future generations to know us, as today we can know the past generations. Building allows dating the experience and knowledge of people and leaves its mark on the lifestyles of communities, being a major source of history and giving us relevant information since Antiquity. It is clearly an activity of high visibility and that requires genius and ingenuity of Man.

The various stages of human thought are such marked by the evolution of science and man work that are left to the future generations. Buildings, bridges, road networks, monuments and other constructions are sources of information for historians and other academics, and allow us to understand how people lived over the centuries. The past civilizations development degree is known by different ways, but the one that analyzes the built infrastructures and the purpose for their use is of great importance.

5. Empiric Study

5.1. General Framing

According with McGraw Hill Construction reports, namely in its publication named Engineering News Record, the international market for public works was going on blooming in the years 2005 to 2007, being a strong business in developed countries and a growing business in developing countries. In these ones, inner investment, namely public investment, as well as foreign investment and international organisations support, mainly from financial sector, has been strongly led to major infrastructures construction, considered indispensable for economic development, as roads, basic sanitation structures and energy production. In 2006 public works projects, allocated to major international contractors, raised to 224.43 billion dollars, representing an increase of de 18.5% comparing 2005, when the homologous value was 189.41 billion dollars.

McGraw Hill Construction produces annually a list with the 225 major international contractors, considering the international market turnover criterion. We can have, as large international contractors, enterprises that have a lower global turnover than some other firms presenting an important set of Works in the inward market. That's why McGraw Hill Construction also organizes a list of larger global contractors considering the entire turnover, generated in international market and domestic market. We present in Table I the list based in 2007/2005 values. Most of the countries have their larger international companies also as the larger global companies, but we can find exceptions,

namely, United States of America, China and Turkey, being our study on the former two.

Considering Table I we can notice that the Republic of China presents a higher number of international contractors than global contractors, meaning a domestic market more concentrated in large companies. The relation is almost one global to two international. It seems we can find the goal of avoiding inner competition, or that domestic market is not yet dynamic enough in order to allow a great number of large contractors. Simultaneously, we find a concern with spreading economic agents, in this case large international companies, all over the world. We also can put the hypothesis that the central planning of the economy leads to more concentration of enterprises in domestic market, at least in this sector. Anyhow we know that all the companies that appear in the global ranking, with an important turnover, are also present in the international ranking. We think this confirms the interest ant the importance given to foreign markets analysis, namely in transport sector, with emphasis in railway construction, as one can conclude from Annex III.

Table I
International and Global Contractors

Countries 2005/2006	International Contractors	Global Contractors
U.S.A.	51	103
China	49	25
Turkey	22	8
Japan	15	15
Italy	11	10
South Korea	10	10
Spain	8	8
France	8	6
Germany	6	4
United Kingdom	5	5
Australia	3	2
Brazil	3	3
Canada	3	2
Belgium	2	2
Egypt	2	2
Netherlands	2	1
Ireland	2	2
Israel	2	0
Kuwait	2	1
Lebanon	2	1
Saudi Arabia	1	0
Austria	1	1
Denmark	1	1
E.A.U.	1	1
Ecuador	1	0
Finland	1	0
Greece	1	1
India	1	2
Macedonia	1	0
Norway	1	1

Pakistan	1	0
Portugal	1	1
Russia	1	2
Serbia	1	0
Sweden	1	1
Thailand	1	1
Taiwan	1	2
Iran	0	1
TOTAL	225	225

Font: McGraw-Hill Construction (author conception)

In order to give some examples we refer that the third largest company in the world, considering the situation at the end of the studied period, the China Railway Engineering Corp., is the 3rd one in global market but has only 3.1% of its turnover in international markets, being the 67th international contractor. The 6th larger contractor in the world is China Railway Construction Corporation, having only 2.4% of its turnover in international markets, and being the 83rd international contractor. Another reference goes to China State Construction Engineering Corporation, the 7th large contractor in the world. This company is the 18th in international ranking and has 18.3% of its turnover in international markets. The latter concentrates is activity on buildings construction.

On the other hand we verify that United States international contractors are about half of the number of this country large firms considered as global contractors, allowing us to suppose that we are facing a strong domestic market with a level of demand that allows the portrayed situation. Many U.S.A. companies invest and maximize their assets primarily serving the domestic market. The geographic and economic dimension of the country point to this hypothesis and facilitates to understand the binomial combination international/global. The largest U.S.A. companies have a different situation from the previous Chinese ones in terms of turnover generation. The 6th largest international company is Bechtel, with 58.12% of its total turnover generated in international markets, and it is the 9th in global ranking. In international ranking the 8th company is KBR, with 91.12% of its turnover generated in foreign markets and remaining as the 26th global contractor. Finally we can refer Fluor Corporation, the 10th international contractor, with 56.22% of its turnover coming from foreign markets, but standing as the 20th global company.

5.2. Markets of Products

According with McGraw Hill Construction criteria we can consider ten major products segments, which are described below:

1. General Building: commercial buildings, offices, stores, educational facilities, government buildings, hospitals, medical facilities, hotels, apartments, housing, etc.;
2. Manufacturing: auto assembly, electronic assembly, textile plants, etc.;
3. Power: thermal and hydroelectric power plants, waste-to-energy plants, transmission lines, substations cogeneration plants, etc.;
4. Water Supply: dams, reservoirs, transmission pipelines, distribution mains irrigation canals, desalination and drinking water treatment plants, pumping stations, etc.;
5. Sewerage/Solid Waste: sanitary and storm sewers, treatment plants, pumping plants, incinerators, industrial waste facilities, etc.;

6. Industrial Process: pulp and paper mills, steel mills, nonferrous metal refineries, pharmaceutical plants, chemical plants, food and other processing plants, etc.;
7. Petroleum: refineries, petrochemical plants, offshore facilities, pipelines, etc;
8. Transportation: airports, bridges, roads, canals, locks, dredging, marine facilities, piers, railroads, tunnels;
9. Hazardous Waste: chemical and nuclear waste treatment, asbestos and lead abatement, etc.;
10. Telecommunications: transmission lines and cabling, towers and antennae, web hotels, etc..

5.3. Geographic Markets

In terms of geographic markets we consider nine large segments, namely, North America, Latin America, Caribbean, Middle East, Asia, Oceania, Northern Africa, Sub-Saharan Africa and Europe. Each of these is divided in several sub-segments as one can see in Tables II till V. In each Table one can observe the number of U.S.A. contractors and Chinese contractors in each sub-segment, and the last column has the total of international contractors in each market.

In Table II we have the geographic segments concerning America Continent. We notice a strong presence of U.S.A. construction contractors in the largest and developed countries of the region, above all in the nearest markets, Canada and Mexico, though we have companies working in almost all the sub-segments. On the other hand we also can verify that Chinese contractors have a reasonable presence in the region, weaker than the former in terms of number of companies in the strongest markets, but showing a covering strategy of an important part of existing markets.

It is relevant to say that in Canada market U.S.A. has 30 companies in a total of 53, in Mexico has 23 in 50, in Venezuela has 7 in 21 and in Puerto Rico has 15 in 19. Concerning China contractors we highlight Guyana, with 4 companies in a total of 6 and Suriname, with 2 in 4. So, it seems that China companies rather try to occupy the less attractive markets, however with interesting geostrategic situations.

Simultaneously, the Chinese companies have a good presence in Brazil and Venezuela, two important economic and demographic markets.

Table II
Geographic Markets

		China	U.S.A.	Total
Markets		**Nº of Enterprises**		
North America	U.S.A.	3	0	45
	Canada	4	30	53
Latin America	Argentina	1	3	20
	Bolivia	1	2	11
	Brazil	5	8	35
	Chile	1	6	27
	Colombia	1	2	13
	Costa Rica	0	2	10
	Ecuador	1	3	15

	El Salvador	0	0	4
	Guatemala	0	1	8
	Guyana	4	0	6
	Honduras	0	0	4
	Mexico	1	23	50
	Nicaragua	0	4	9
	Panama	1	3	11
	Paraguay	0	0	1
	Peru	2	4	18
	Uruguay	0	0	6
	Venuzuela	4	7	23
	Suriname	2	1	4
Caribbean	Great Antilles	3	4	19
	Puerto Rico	0	15	19
	Cuba	0	2	5
	Little Antilles	2	15	28

Font: McGraw-Hill Construction (author conception)

Looking now to Table III, the East part of the world, both countries have a really important presence, and we notice that almost all segments are covered with more or less U.S.A. and China contractors. In the Middle East, U.S.A. companies are clearly choosing important oil markets, like Saudi Arabia, with 10 contractors in a total of 54, U.A.E., with 13 in 79, Qatar, with 12 in 66, Iraq, with 10 in 26, or Oman with 8 in 29. In Asia, (Far East), the American companies prefer the friendliest markets, like India, South Korea, Japan, Taiwan, Philippines, Singapore, Indonesia and nowadays even China. Together it is an option for rich raw materials markets or non-aggressive relations. It is also relevant the case of Australia, where we can notice 14 U.S.A. contractors in a total of 33.

Referring now Chinese companies options, being sure that in one or two cases, like India or Singapore in Far East, or Saudi Arabia and U.A.E. in Middle East, where we verify that China and U.S.A. have simultaneously an important presence, the options of the former is for markets where United States presence is weaker, and, normally, where China has better international relations. This is the case of Iran, Pakistan, Bangladesh, Myanmar, Vietnam and Laos.

Table III
Geographic Markets

		China	**U.S.A.**	**Total**
Markets		**Nº of Enterprises**		
Middle East	Afghanistan	5	5	19
	Iran	13	0	27
	Iraq	1	10	26
	Pakistan	14	0	25
	Bahrain	0	5	17
	Kuwait	4	5	29
	Oman	2	8	29
	Qatar	7	12	66
	Israel	3	3	14
	Jordan	4	1	15
	Lebanon	2	1	13

	Syria	2	0	11
	Saudi Arábia	10	10	54
	U.A.E.	12	13	79
	Yemen	7	2	17
Asia	Bangladesh	11	0	15
	Índia	11	11	52
	Nepal	4	1	9
	Sri Lanka	8	2	22
	South Korea	3	9	22
	Philippines	5	8	35
	Japan	5	11	21
	Taiwan	2	8	31
	China	1	14	57
	Hong-Kong	14	4	37
	Macao	11	0	16
	Mongólia	6	1	8
	Brunei	0	1	1
	Indonésia	9	8	42
	Malaysia	10	4	43
	Singapore	13	9	54
	Burma	8	1	12
	Laos	7	0	15
	Thailand	6	7	47
	Vietnam	13	4	42
	Kazakhstan	9	8	37
	Kyrgyzstan	3	1	5
	Tajikistan	3	0	6
	Turkmenistan	3	0	10
	Uzbekistan	3	3	11
Oceania	Austrália	3	14	33
	Pacífic Islands	2	5	15
	New Zealand	1	2	9
	Papua New Guinea	3	2	8

Font: McGraw-Hill Construction (author conception)

Next step are references to African markets, showed in Table IV. In this case, with exceptions like Egypt, South Africa, Guinea or Nigeria, the interest of United States contractors is weak, and there are several sub-segments without American companies.

On the other hand, Chinese presence is really important, and we can highlight Ethiopia, where it has 9 companies in a total of 14, Botswana, with 8 in 11, Tanzania, with 8 in 16, or Zimbabwe, with 6 in 9.

We can infer that China is occupying geostrategic markets, with turbulence and instability, but with raw materials and looking forward for developing partners. Maybe we can also find here a way to acquire international experience and gain leadership in markets with important economic future. Ahead we will explore these comments, when we realize the hypotheses discussion.

Table IV
Geographic Markets

		China	U.S.A.	Total
Markets		**Nº of Enterprises**		
Northern Africa	Algeria	11	5	56
	Egypt	3	7	33
	Ethiopia	9	0	14
	Libya	2	1	27
	Morocco	5	2	25
	Niger	1	1	4
	Sudan	17	1	27
	Sub-Sahara	6	3	20
	Tunisia	1	1	14
Sub-Saharan Africa	Angola	11	3	30
	Congo	7	0	14
	Gabon	3	0	9
	R.D.Congo	2	1	8
	South Africa	6	5	24
	Botswana	8	1	11
	Lesotho	1	0	2
	Swaziland	0	0	3
	Cape Verde	2	0	3
	Gambia	1	0	2
	Guinea	8	6	23
	Senegal	2	0	11
	Malawi	1	0	3
	Mozambique	5	0	10
	Tanzania	8	2	16
	Zambia	5	1	9
	Burundi	1	0	1
	Rwanda	1	1	6
	Kenya	3	1	12
	Uganda	6	1	12
	Benin	1	0	3
	Cameroon	2	3	12
	Ivory Coast	3	1	8
	Ghana	7	3	21
	Nigeria	10	5	38
	Burkina Faso	0	1	4
	Liberia	2	0	4
	Sierra Leone	2	1	6
	Zimbabwe	6	0	9

Font: McGraw-Hill Construction (author conception)

Finally we can analyse the European situation, reflected in Table V. The first comment is to refer that the presence of China contractors is really weak, except in Russian market. But when we look for data about United States contractors we continue observing an important presence, as we found almost all over the world but in Africa.

Would it be possible to infer that Chinese companies are avoiding, at least in short term, the most technological and economic developed markets? If we look to the situation in

North America and Oceania, as we just have noticed about Europe, maybe the answer is yes.

Table V
Geographic Markets

		China	U.S.A.	Total
Markets		**Nº of Enterprises**		
Europe	Spain	1	8	23
	France	1	5	22
	Italy	1	5	24
	Portugal	0	5	24
	Denmark	1	3	17
	Finland	0	3	12
	Norway	0	4	17
	Sweden	1	1	19
	Belorussia	0	1	2
	Georgia	1	3	9
	Russia	7	14	60
	Ukraine	1	2	17
	Albania	1	2	9
	Bulgaria	0	2	22
	Moldova	0	0	2
	Romania	2	4	34
	Slovenia	0	0	6
	Estonia	0	1	2
	Latvia	0	1	3
	Lithuania	0	0	2
	Germany	2	7	30
	Austria	0	2	16
	Hungary	0	3	24
	Poland	2	8	37
	Belgium	1	4	28
	Netherlands	1	9	29
	Ireland	0	10	32
	United Kingdom	2	15	47
	Slovakya	0	0	18
	Czech Republic	1	4	26
	Switzerland	1	2	18
	Croatia	0	1	12
	Armenia	0	1	1
	Azerbaijan	0	4	17
	Bosnia and Herzegovina	0	0	6
	Serbia	1	0	9
	Cyprus	0	1	5
	Greece	0	3	19
	Macedonia	1	1	5
	Turkey	4	4	31

Font: McGraw-Hill Construction (author conception)

5.4. Hypotheses Discussion

H1: The internationalization model of U.S.A. contractors is similar to the one of Chinese contractors.

Considering Table II to Table V and Annex I we conclude that some companies from both countries are present in few markets. Let´s highlight some examples from both sides.

In U.S.A. companies we have Kiewit Corp., the 66th of the international ranking, only present in Canada. We find the same situation with Veco Corp., the 123rd, with The Lauren Corp., the 165th, with M.A. Mortenson Co., the 178th, with ASRC Energy Services, the 190th and with Lease Crutcher Lewis, the 224th of the international ranking.

Turner Industries Group LLC, the 170th of the ranking, is only present in Lesser Antilles, as happens with Wharton Smith Inc., the 222nd in same ranking. Torcon Inc., the 194th position, is only in Puerto Rico and Barton Malow Co., the 208th, is only in Mexico.

Still from U.S.A. we have some companies that are present only in two markets:

- PCL Construction Enterprises, the 19th of the ranking, is only in Canada and Lesser Antilles;
- Hensel Phelps Constr. Co., the 176th position, is in Lesser Antilles, and then has a presence in Europe, specifically in German;
- Flatiron Construction, the 196th position, is in Canada and Puerto Rico;
- Michels Corp., the 212th, has exactly the same attendance;
- The Beck Group, the 207th of the ranking, is only in Latin America, namely in Mexico and Brazil.

We want to make one more reference in this first group of international U.S. construction contractors, to Manhattan Construction Co., the 209th position, which is in four markets, two in Latin America, Costa Rica and Nicaragua, and two in Caribbean Islands, Puerto Rico and Lesser Antilles.

So, we conclude that 16 of the 51 U.S. companies have an internationalization option that matches with Uppsala Model, considering geographic proximity as an important variable.

We can say that most part of U.S. international contractors find other reasons for choosing target markets, but we will add some more comments ahead in this paper.

Now we look to Chinese companies. As a whole the Chinese presence is really stronger than U.S. presence in Asia region. But those contractors that are present in few markets never appear only near home. Let's pay attention to some examples:

- Harbin Power Engineering Co. Ltd., the 102nd of the ranking, is in two markets from Asia, two markets from Middle East and one market in Northern Africa;
- Shandong Electric Power Constr., the 155th position, is in one market at Latin America, one in Asia, one in Northern Africa and one in Sub-Saharan Africa;
- Zhejiang Constr. Investment Group, the 144th position, is in one market at Oceania, two markets in Asia and one market at Northern Africa;

- China Nonferrous Metal Ind. Frgn. Eng'g. & Const., the 145th of the ranking, is at two markets from Asia, one from Middle East and one from Sub-Saharan Africa;
- Nantong Construction Group Joint-Stock Co., the 171th position, is in one market from Europe and one from Sub-Saharan Africa;
- A last reference to Weihai International Eco. & Tech. Coop. Co. Ltd., the 179th of the ranking, present in one market from Oceania, one from Latin America and one from Sub-Saharan Africa.

We could go on with some more examples, but we verify that China international contractors' internationalization process doesn't really match with stage models, namely Uppsala Model, and it seems they have different strategies comparing with U.S. companies.

As we can read in Annex I, the international presence of international construction contractors from both countries is spread all over the world, but US.A. companies are stronger in developed countries than Chinese international contractors. The international experience and the military presence all over the world can allow us to support the hypothesis that U.S. contractors are more confident for working in more developed countries or faraway geostrategic localizations.

Anyhow, the geostrategic localizations seem to be also present in Chinese options considerations. Maybe we can infer that in this case we face a central planning strategy that represents a really political and economic orientation for further Chinese growth. We can't forget that China has a deficit of raw materials, and Middle East, Africa and Latin America become really important suppliers for that country development.

So, Networks Theory is more applicable to internationalization process of both countries companies than Uppsala Model, but we cannot say that Hypothesis 1 is confirmed, because reasons supporting networks are different, government paper seems to be really different between both countries and among U.S. contractors we can find cases matching Uppsala Model.

We have here an important field for further research, and we know that this paper is one step in the way for exploiting the reasons for internationalization strategies we found.

H2: The option for international operations, in international markets, is similar between U.S.A. contractors and Chinese contractors.

Concerning Chinese contractors in international markets, we have 49 companies in this ranking, and 13 of them didn't constitute any subsidiary. Consequently we have about 73.5% of international Chinese contractors operating in foreign markets through that mode.

We still add that the option for using subsidiaries is not dependent of the position in the ranking, because it is not always the larger companies to have more subsidiaries. We can refer some examples.

China Communications Construction Group, 14th of international ranking, constituted, till 2006, 42 subsidiaries, and China Metallurgical Group Corp., 95th of same ranking,

constituted 37 subsidiaries. China State Construction Eng'g. Corp., the 18th position, has only 5 subsidiaries, but Beijing Uni-Construction Group Co., 185th position in ranking, has 12 subsidiaries.

The number of subsidiaries is also not connected with the importance of foreigner markets in global turnover. For example, China Henan Int'l Coperation Grp. Co., the 155th in ranking, has total turnover in foreign markets and has any subsidiary and China Nat'l Complete Plant Imp. & Exp. Corp., the 197th position, and also with its entire turnover generated in foreign markets, has 5 subsidiaries.

Looking now towards U.S. contractors, we have 12 companies, in a total of 51, that didn't constitute any subsidiary, meaning there are 76.5% of international contractors making the option of using subsidiaries in international public works markets.

Once more the position in ranking and the number of subsidiaries are not linked. We just highlight Bechtel, the 6th position, with 6 subsidiaries, against Weston Solutions Inc., 191th in ranking and having 20 subsidiaries.

In this perspective we can say both countries companies have similar options, and so, we can say that this hypothesis is verified.

Conclusions

In order to finish our paper with a set of conclusions, considering Table I to V and Annexes I to III, we highlight:

- U.S. contractors seem to have more international experience and to point to more developed markets than Chinese contractors;
- Chinese companies internationalization process seem to be planned with government international economic and political interests;
- We can find some U.S. companies with an internationalization profile matching with Uppsala Model, but it seems that in China case Networks relations are almost always more important;
- In both countries the international operation mode is often the use of subsidiaries;
- Only two U.S. international contractors have more than 90% of their turnover generated in international markets, 3.9% of total U.S. companies here considered;
- The same situation is verified in 12 Chinese companies, 24.5% of total international contractors from China;
- The most important markets of products for Chinese contractors are Industrial Process/Petroleum, General Building, Power and Transportation;
- In U.S.A. case we have General Building, Industrial Process/Petroleum, as the most important markets, and we can still refer Power Market.

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Annex I

Countries/Companies Ranking Position	Europe	North America	Oceania	Latin America	Caribbean	Asia	Middle East	Northern Africa	Sub-Saharan Africa	Total
China										
China Communications Construction Group 14	13	2	2	5	0	17	9	5	7	60
China State Construction Eng'g. Corp. 18	1	1	0	0	0	7	2	2	2	15
Sinohydro Corp. 51	0	0	0	0	0	6	7	3	4	20
China National Machinery Indus. Corp. 55	5	0	0	3	2	15	5	2	9	41
China Railway Engineering Corp. 67	1	0	0	1	0	10	3	1	7	23
China Petroleum Eng'g. & Constr. (Group) Corp. 70	0	0	0	1	0	2	2	2	0	7
Shanghai Constr. (Group) General Co. 73	0	0	2	0	1	4	0	0	2	9
China Civil Engineering Constr. Corp. 82	4	0	0	2	1	5	3	2	5	22
China Railway Construction Corp. 83	0	0	0	0	0	3	3	1	2	9
China National Chemical Eng'g. Group 88	2	0	0	0	0	6	2	0	1	11
Zhongyuan Petroleum Explor. Bureau 90	0	0	0	1	0	2	3	2	1	9
China Metallurgical Group Corp. 95	1	1	0	2	0	9	3	0	3	19
China Int'l Water & Electric Corp. (CWE) 97	0	2	0	1	0	5	1	4	2	15
CITIC Construction 98	1	0	0	2	0	4	1	1	2	11
Harbin Power Engineering Co. Ltd. 102	0	0	0	0	0	2	2	1	0	5
Shandong Electric Power Constr. 115	0	0	0	1	0	1	0	1	1	4
China Overseas Engineering Group Co. Ltd. 122	0	0	1	0	0	3	0	3	4	11
Qingdao Construction Group Corp. 126	0	0	1	0	0	2	3	2	6	14
CGC Overseas Construction Co. Ltd. 137	0	0	0	0	0	1	1	3	2	7
Dongfang Electric Corp. 138	0	0	0	0	0	2	1	0	0	3
China Jiangsu Int'l Econ-Tech. Coop. 140	0	0	1	0	0	1	2	3	7	14
China Wanbao Engineering Corp. 143	0	0	0	0	0	4	2	3	0	9
Zhejiang Constr. Investment Group 144	0	0	1	0	0	2	0	1	0	4
China Nonferrous Metal Ind. Frgn. Eng'g. & Const. 145	0	0	0	0	0	2	1	0	1	4
China Nat'l Machinery Import and Export Corp. 147	0	0	0	1	0	1	0	0	0	2
Shanghai Electric Group Co. Ltd. 148	0	0	0	0	0	2	0	0	0	2
China Gezhouba Group Corp. 150	0	0	0	0	0	2	2	1	0	5
China Dalian Int'l Coop'n (Group) Holdings 154	1	0	0	1	0	2	1	0	2	7
China Henan Int'l Coperation Grp. Co. 155	0	0	0	0	0	1	0	0	5	6
China Zhongyuan Engineering Corp. 158	0	0	0	0	0	1	1	1	0	3
China Petroleum Pipeline Bureau 159	0	0	0	0	0	3	0	2	0	5
SEPCOIII Electric Power Construction 161	0	0	0	0	0	2	0	0	1	3
China Shanghai SFECO 163	0	1	0	0	0	1	2	0	0	4
Beijing Construction Eng'g. Group Co. 168	0	0	0	0	0	4	2	0	4	10
Nantong Construction Group Joint-Stock Co. 171	1	0	0	0	0	0	0	0	1	2
China Jiangsu Construction Corp. 177	0	0	0	0	0	2	5	0	0	7
Weihai International Eco. & Tech. Coop. Co. Ltd. 179	0	0	1	1	0	0	0	0	1	3
Beijing Uni-Construction Group Co. 185	0	0	0	0	0	0	2	0	1	3
China Wu Yi Corp. Ltd. 187	0	0	0	0	0	1	0	0	2	3
Jiangsu Nantong No. 3 Construction Grp. 188	1	0	0	0	0	4	4	1	4	14
China Petroleum Pipeline Eng'g. Corp. 189	0	0	0	0	0	1	1	1	1	4
China Huanqiu Contracting & Eng'g. Corp.192	0	0	0	0	0	4	0	1	0	5
China Jiangxi Corp. for Int'l Eco. & Tech. Coop'n 193	0	0	0	0	0	0	0	1	5	6
China Nat'l Complete Plant Imp. & Exp. Corp. 197	0	0	0	0	1	2	1	2	2	8
China Chongking Int'l Construction Corp. 201	0	0	0	0	0	0	1	1	2	4

Shandong Hong Chang Road & Bridge Eng'g. Co. 206	0	0	0	0	0	0	0	1	0	1
Shanghai Tunnel Engineering Co. Ltd. 211	0	0	0	0	0	2	0	0	0	2
China Liaoning Int'l. Eco. & Tech. Coop. Group 216	0	0	0	1	0	1	1	0	3	6
Guangdong Xinguang Int'l. Group 219	0	0	0	1	0	4	1	0	0	6

Countries/Companies Ranking Position	Europe	North America	Oceania	Latin America	Caribbean	Asia	Middle East	Northern Africa	Sub-Saharan Africa	Total
U.S.A.										
Bechtel 6	11	1	2	3	1	9	6	3	1	37
KBR 8	15	1	2	4	2	7	7	5	5	48
Fluor Corp. 10	16	1	1	6	3	10	7	2	6	52
PCL Construction Enterprises 19	0	1	0	0	1	0	0	0	0	2
Foster Wheeler Ltd. 27	15	1	1	4	1	9	5	1	2	39
Jacobs 28	14	1	2	1	1	6	7	1	0	33
CB&I 34	6	1	2	8	1	7	6	1	4	36
Mcdermott International 36	3	1	1	1	1	8	3	1	0	19
Washington Group International 65	11	1	1	4	2	4	4	1	1	29
Kiewit Corp. 66	0	1	0	0	0	0	0	0	0	1
Black & Veatch 86	3	0	1	2	1	7	3	0	0	17
Parsons 87	3	1	0	0	3	4	6	1	0	18
CH2M Hill Cos. 105	4	1	3	2	1	7	5	1	0	24
Earth Tech Inc. 107	7	1	1	3	0	4	0	0	0	16
ABB Lummus Global 108	4	0	0	0	1	7	2	0	0	14
Caddell Construction Co. Inc. 118	1	0	0	2	0	2	0	1	3	9
Veco Corp. 123	0	1	0	0	0	0	0	0	0	1
TIC Holdings Inc. 125	0	1	0	2	0	0	0	0	1	4
Alberici Corp. 127	0	1	0	2	1	0	0	0	0	4
B.L. Harbert International 129	0	0	0	0	2	2	0	1	5	10
The Shaw Group Inc. 132	10	1	1	5	1	7	4	0	0	29
Perini Corp. 135	1	0	0	0	0	0	2	0	0	3
Insituform Technologies Inc. 149	7	1	0	2	0	0	0	0	1	11
Layne Christensen Co. 152	0	1	1	1	0	0	0	1	7	11
Zachry Construction Corp. 156	0	0	0	2	0	1	0	0	0	3
The Lauren Corp. 165	0	1	0	0	0	0	0	0	0	1
Turner Industries Group LLC 170	0	0	0	0	1	0	0	0	0	1
Great Lakes Dredge & Dock Corp. LLC 172	0	0	0	0	0	0	2	0	0	2
BE&K Inc. 173	4	0	0	0	0	1	1	0	0	6
Primoris Corp. 174	0	1	0	3	0	0	0	0	0	4
Structure Tone 175	3	0	0	1	0	7	0	0	0	11
Hensel Phelps Constr. Co. 176	1	0	0	0	1	0	0	0	0	2
M.A. Mortenson Co. 178	0	1	0	0	0	0	0	0	0	1
Tutor-Saliba Corp. 180	0	0	1	0	0	1	0	0	0	2
Dick Construction Co. 181	0	0	1	0	2	0	0	0	0	3
Stellar 182	0	0	0	1	1	0	2	1	0	5
ASRC Energy Services 190	0	1	0	0	0	0	0	0	0	1
Weston Solutions Inc. 191	1	1	0	1	0	3	2	0	0	8
Torcon Inc. 194	0	0	0	0	1	0	0	0	0	1
Flatiron Construction 196	0	1	0	0	1	0	0	0	0	2
CCC Group Inc. 199	0	1	1	3	1	0	0	0	0	6
Walbridge Aldinger 204	1	1	0	1	0	0	1	0	0	4
The Beck Group 207	0	0	0	2	0	0	0	0	0	2
Barton Malow Co. 208	0	0	0	1	0	0	0	0	0	1

Manhattan Construction Co. 209	0	0	0	2	2	0	0	0	0	4
Michels Corp. 212	0	1	0	0	1	0	0	0	0	2
The Facility Group 213	3	0	1	0	0	0	0	0	0	4
The Yates Cos. Inc. 217	0	0	0	0	1	1	0	0	0	2
Wharton-Smith Inc. 222	0	0	0	0	1	0	0	0	0	1
Day & Zimmermann Group 223	1	1	0	0	0	1	0	0	0	3
Lease Crutcher Lewis 224	0	1	0	0	0	0	0	0	0	1

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Annex II

Countries/Companies Ranking Position	% Int. Turn./Total Turn.	Geographic Markets Presence	Nº of Subsidiaries
China			
China Communications Construction Group 14	22,9%	8	42
China State Construction Eng'g. Corp. 18	18,3%	6	5
Sinohydro Corp. 51	19,2%	4	5
China National Machinery Indus. Corp. 55	66,4%	7	8
China Railway Engineering Corp. 67	3,1%	6	6
China Petroleum Eng'g. & Constr. (Group) Corp. 70	100,0%	4	n/a
Shanghai Constr. (Group) General Co. 73	9,2%	4	n/a
China Civil Engineering Constr. Corp. 82	81,0%	7	6
China Railway Construction Corp. 83	2,4%	4	5
China National Chemical Eng'g. Group 88	17,5%	4	9
Zhongyuan Petroleum Explor. Bureau 90	24,5%	5	n/a
China Metallurgical Group Corp. 95	2,6%	6	37
China Int'l Water & Electric Corp. (CWE) 97	73,6%	6	5
CITIC Construction 98	76,4%	6	2
Harbin Power Engineering Co. Ltd. 102	96,0%	3	n/a
Shandong Electric Power Constr. 115	15,3%	4	8
China Overseas Engineering Group Co. Ltd. 122	88,6%	4	4
Qingdao Construction Group Corp. 126	16,1%	5	5
CGC Overseas Construction Co. Ltd. 137	98,5%	4	7
Dongfang Electric Corp. 138	5,5%	2	5
China Jiangsu Int'l Econ-Tech. Coop. 140	59,5%	5	5
China Wanbao Engineering Corp. 143	100,0%	3	n/a
Zhejiang Constr. Investment Group 144	5,2%	3	5
China Nonferrous Metal Ind. Frgn. Eng'g. & Const. 145	100,0%	3	n/a
China Nat'l Machinery Import and Export Corp. 147	100,0%	2	n/a
Shanghai Electric Group Co. Ltd. 148	40,0%	1	1
China Gezhouba Group Corp. 150	10,7%	3	6
China Dalian Int'l Coop'n (Group) Holdings 154	45,3%	5	n/a
China Henan Int'l Coperation Grp. Co. 155	100,0%	2	n/a
China Zhongyuan Engineering Corp. 158	100,0%	3	n/a
China Petroleum Pipeline Bureau 159	10,8%	2	11
SEPCOIII Electric Power Construction 161	31,5%	2	n/a
China Shanghai SFECO 163	90,3%	3	7
Beijing Construction Eng'g. Group Co. 168	3,4%	3	7
Nantong Construction Group Joint-Stock Co. 171	15,1%	2	7

China Jiangsu Construction Corp. 177	29,2%	2	n/a
Weihai International Eco. & Tech. Coop. Co. Ltd. 179	100,0%	3	n/a
Beijing Uni-Construction Group Co. 185	5,7%	2	12
China Wu Yi Corp. Ltd. 187	25,1%	2	3
Jiangsu Nantong No. 3 Construction Grp. 188	7,4%	5	8
China Petroleum Pipeline Eng'g. Corp. 189	76,9%	4	3
China Huanqiu Contracting & Eng'g. Corp.192	29,8%	2	4
China Jiangxi Corp. for Int'l Eco. & Tech. Coop'n 193	92,0%	2	10
China Nat'l Complete Plant Imp. & Exp. Corp. 197	100,0%	5	4
China Chongking Int'l Construction Corp. 201	44,6%	3	10
Shandong Hong Chang Road & Bridge Eng'g. Co. 206	37,4%	1	3
Shanghai Tunnel Engineering Co. Ltd. 211	7,2%	1	4
China Liaoning Int'l. Eco. & Tech. Coop. Group 216	70,7%	4	3
Guangdong Xinguang Int'l. Group 219	7,4%	3	2

Countries/Companies Ranking Position	**% Int. Turn./Total Turn.**	**Geographic Markets Presence**	**Nº of Subsidiaries**
U.S.A.			
Bechtel 6	58,1%	9	6
KBR 8	91,1%	9	6
Fluor Corp. 10	56,2%	9	6
PCL Construction Enterprises 19	61,5%	2	16
Foster Wheeler Ltd. 27	95,0%	9	20
Jacobs 28	47,3%	8	n/a
CB&I 34	53,7%	9	12
Mcdermott International 36	52,0%	8	3
Washington Group International 65	22,9%	9	5
Kiewit Corp. 66	15,1%	1	19
Black & Veatch 86	32,2%	6	n/a
Parsons 87	29,3%	6	5
CH2M Hill Cos. 105	20,2%	8	8
Earth Tech Inc. 107	53,9%	5	n/a
ABB Lummus Global 108	88,1%	4	7
Caddell Construction Co. Inc. 118	54,4%	5	n/a
Veco Corp. 123	75,8%	1	8
TIC Holdings Inc. 125	10,4%	3	9
Alberici Corp. 127	19,9%	3	6
B.L. Harbert International 129	38,4%	4	n/a
The Shaw Group Inc. 132	4,7%	7	14
Perini Corp. 135	5,1%	2	5
Insituform Technologies Inc. 149	23,1%	4	n/a
Layne Christensen Co. 152	18,0%	5	6
Zachry Construction Corp. 156	6,7%	2	n/a
The Lauren Corp. 165	47,8%	1	2
Turner Industries Group LLC 170	5,8%	1	3
Great Lakes Dredge & Dock Corp. LLC 172	22,8%	1	1
BE&K Inc. 173	7,3%	3	1
Primoris Corp. 174	17,0%	2	5
Structure Tone 175	2,9%	3	4
Hensel Phelps Constr. Co. 176	3,9%	2	n/a

M.A. Mortenson Co. 178	5,7%	1	n/a
Tutor-Saliba Corp. 180	10,6%	2	1
Dick Construction Co. 181	12,7%	2	5
Stellar 182	13,9%	4	n/a
ASRC Energy Services 190	10,7%	1	8
Weston Solutions Inc. 191	26,5%	5	20
Torcon Inc. 194	12,9%	1	5
Flatiron Construction 196	8,5%	2	4
CCC Group Inc. 199	15,2%	4	n/a
Walbridge Aldinger 204	5,0%	4	5
The Beck Group 207	5,6%	1	2
Barton Malow Co. 208	3,0%	1	1
Manhattan Construction Co. 209	4,0%	2	3
Michels Corp. 212	6,5%	2	2
The Facility Group 213	10,5%	2	3
The Yates Cos. Inc. 217	1,5%	2	9
Wharton-Smith Inc. 222	11,7%	1	1
Day & Zimmermann Group 223	2,9%	3	7
Lease Crutcher Lewis 224	7,9%	1	n/a

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Annex III

Product Markets									
Countries/Companies Ranking Position	**General Building**	**Manufacturing**	**Power**	**Water Supply**	**Sewerage /Solid Waste**	**Industrial Process/ Petroleum**	**Transporta-tion**	**Hazardous Waste**	**Telecommu-nications**
China									
14	6%	0%	0%	0%	1%	0%	88%	0%	0%
18	91%	0%	0%	0%	0%	1%	8%	0%	0%
51	21%	2%	38%	16%	1%	0%	21%	0%	0%
55	11%	5%	37%	5%	0%	9%	12%	0%	5%
67	13%	0%	0%	0%	0%	2%	75%	0%	0%
70	0%	0%	0%	0%	0%	100%	0%	0%	0%
73	96%	0%	0%	0%	0%	0%	4%	0%	0%
82	61%	2%	0%	8%	0%	0%	27%	0%	2%
83	7%	0%	0%	0%	0%	0%	90%	0%	3%
88	0%	0%	35%	0%	0%	18%	0%	0%	0%
90	0%	0%	0%	0%	0%	100%	0%	0%	0%
95	5%	0%	1%	9%	0%	64%	1%	1%	0%
97	2%	0%	35%	49%	5%	0%	9%	0%	0%
98	0%	6%	6%	1%	0%	13%	72%	0%	0%
102	0%	0%	0%	0%	0%	100%	0%	0%	0%
115	0%	0%	100%	0%	0%	0%	0%	0%	0%
122	48%	0%	0%	0%	20%	9%	19%	0%	0%
126	91%	0%	0%	5%	0%	1%	3%	0%	0%
137	5%	0%	0%	28%	0%	0%	67%	0%	0%
138	0%	0%	67%	0%	0%	0%	0%	33%	0%
140	79%	0%	0%	0%	10%	8%	3%	0%	0%
143	0%	0%	13%	0%	0%	0%	56%	0%	0%

144	70%	0%	0%	3%	0%	22%	5%	0%	0%
145	0%	0%	0%	0%	0%	100%	0%	0%	0%
147	0%	61%	39%	0%	0%	0%	0%	0%	0%
148	0%	0%	100%	0%	0%	0%	0%	0%	0%
150	0%	0%	58%	35%	0%	0%	7%	0%	0%
154	59%	0%	0%	0%	0%	0%	29%	0%	0%
155	0%	0%	1%	11%	0%	0%	80%	0%	0%
158	11%	0%	87%	0%	0%	1%	1%	0%	0%
159	0%	0%	0%	0%	0%	100%	0%	0%	0%
161	0%	0%	100%	0%	0%	0%	0%	0%	0%
163	6%	1%	67%	0%	0%	2%	24%	0%	0%
168	88%	2%	0%	0%	0%	0%	6%	0%	0%
171	28%	5%	9%	0%	0%	58%	0%	0%	0%
177	100%	0%	0%	0%	0%	0%	0%	0%	0%
179	90%	0%	0%	9%	0%	0%	1%	0%	0%
185	99%	0%	0%	1%	0%	0%	0%	0%	0%
187	59%	0%	0%	11%	0%	0%	30%	0%	0%
188	100%	0%	0%	0%	0%	0%	0%	0%	0%
189	0%	0%	0%	0%	0%	0%	0%	0%	100%
192	1%	0%	0%	0%	0%	99%	0%	0%	0%
193	18%	0%	1%	80%	0%	0%	0%	0%	0%
197	70%	0%	17%	1%	0%	12%	0%	0%	0%
201	0%	0%	0%	0%	0%	0%	100%	0%	0%
206	0%	0%	0%	0%	0%	0%	100%	0%	0%
211	0%	0%	0%	0%	0%	0%	100%	0%	0%
216	3%	0%	52%	0%	0%	0%	0%	0%	0%
219	85%	0%	0%	15%	0%	0%	0%	0%	0%

Product Markets									
Countries/Companies Ranking Position	**General Building**	**Manufacturing**	**Power**	**Water Supply**	**Sewerage /Solid Waste**	**Industrial Process/ Petroleum**	**Transporta-tion**	**Hazardous Waste**	**Telecommu-nications**
U.S.A.									
6	0%	0%	3%	0%	0%	60%	35%	0%	0%
8	5%	0%	0%	0%	0%	12%	10%	0%	0%
10	11%	1%	1%	0%	0%	81%	0%	0%	4%
19	64%	0%	1%	2%	0%	18%	15%	0%	0%
27	0%	0%	28%	0%	0%	69%	0%	1%	0%
28	0%	5%	3%	0%	0%	74%	15%	2%	0%
34	0%	0%	1%	0%	0%	99%	0%	0%	0%
36	0%	0%	19%	0%	0%	81%	0%	0%	0%
65	14%	1%	27%	7%	0%	28%	1%	21%	0%
66	1%	0%	18%	6%	0%	37%	28%	0%	0%
86	0%	0%	20%	27%	22%	31%	0%	0%	0%
87	38%	0%	0%	19%	1%	0%	6%	36%	0%
105	47%	25%	0%	7%	0%	5%	0%	5%	11%
107	1%	0%	0%	28%	63%	0%	0%	8%	0%
108	0%	0%	3%	0%	0%	97%	0%	0%	0%
118	100%	0%	0%	0%	0%	0%	0%	0%	0%
123	0%	0%	0%	0%	0%	100%	0%	0%	0%
125	0%	0%	25%	0%	0%	75%	0%	0%	0%

127	0%	90%	1%	0%	3%	6%	0%	0%	0%
129	100%	0%	0%	0%	0%	0%	0%	0%	0%
132	4%	0%	21%	0%	1%	61%	3%	8%	0%
135	87%	0%	13%	0%	0%	0%	0%	0%	0%
149	0%	0%	0%	0%	74%	26%	0%	0%	0%
152	0%	0%	0%	0%	0%	7%	0%	0%	0%
156	100%	0%	0%	0%	0%	0%	0%	0%	0%
165	0%	0%	4%	1%	0%	95%	0%	0%	0%
170	0%	0%	0%	0%	0%	100%	0%	0%	0%
172	0%	0%	0%	0%	0%	0%	100%	0%	0%
173	4%	0%	0%	0%	0%	96%	0%	0%	0%
174	0%	0%	24%	0%	0%	76%	0%	0%	0%
175	100%	0%	0%	0%	0%	0%	0%	0%	0%
176	100%	0%	0%	0%	0%	0%	0%	0%	0%
178	0%	0%	100%	0%	0%	0%	0%	0%	0%
180	53%	0%	0%	0%	0%	0%	47%	0%	0%
181	86%	0%	1%	0%	13%	0%	0%	0%	0%
182	0%	0%	80%	0%	0%	20%	0%	0%	0%
190	0%	0%	0%	0%	0%	100%	0%	0%	0%
191	99%	0%	0%	0%	0%	0%	0%	1%	0%
194	0%	0%	0%	0%	0%	100%	0%	0%	0%
196	0%	0%	0%	0%	0%	0%	100%	0%	0%
199	0%	0%	0%	0%	0%	68%	0%	0%	0%
204	22%	67%	0%	0%	0%	0%	11%	0%	0%
207	100%	0%	0%	0%	0%	0%	0%	0%	0%
208	0%	100%	0%	0%	0%	0%	0%	0%	0%
209	100%	0%	0%	0%	0%	0%	0%	0%	0%
212	0%	0%	0%	0%	11%	0%	0%	0%	0%
213	100%	0%	0%	0%	0%	0%	0%	0%	0%
217	33%	0%	0%	0%	0%	67%	0%	0%	0%
222	0%	0%	0%	30%	70%	0%	0%	0%	0%
223	0%	0%	100%	0%	0%	0%	0%	0%	0%
224	100%	0%	0%	0%	0%	0%	0%	0%	0%

Font: McGraw-Hill Construction (author conception)