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EVIDENCE THAT THE GLOBAL CONSTRUCTION INDUSTRY MAY HAVE ENTERED THE POST-DOMESTIC ERA

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Abstract: International construction projects account for a significant portion of revenue for contractors from the U.S. and many other countries. Although domestic, international and global revenues are published and available for the largest global construction corporations; we lack a comprehensive study of construction historical market share trends. The goal of this study was to conduct an in-depth study of global and domestic trends over the most recent 15 year period. To examine this, we created a database containing financial figures of the top 225 global contractors from 1994 to 2011, as published in Engineering News Record. Trends in global growth were compared against trends of global market share for the 7 countries with the largest shares. Additionally, the total domestic and total international revenue trends were compared to illustrate the globalization of the construction industry. The results reveal that the global market is growing; however, domestic construction companies' hold on domestic markets may be weakening. Furthermore, the analysis suggests that the global construction industry has entered into a new era in which globalization is the dominant means of expansion.

1. Introduction

The global economy influences the global construction industry. Although most companies are aware of economic impacts on the industry, forecasts on how the global construction industry will change are not always available or accessible. In 2011 alone, the 225 largest construction companies, based in 33 different countries, generated over \$1.2 trillion in revenue. These global contractors completed work domestically as well as internationally, and in multiple market sectors. On a general-level, information regarding the growth of the industry and who the current world leaders are can be readily obtained. On a specific-level, however, there is too much global information to be operationalized and utilized by most contractors. This paper presents market analyses that can be used by construction leaders of both large and small construction companies to impact their strategic decision making.

2. Literature Review

The benefits and challenges of global construction work are well understood. For instance, a recent study concluded that success in global markets can be achieved, but an open, and versatile approach is required (Cheah et al. 2004). From this study, we can see that there is no universal formula for success, but rather, a dynamic strategy must be utilized for a company to be successful due to the ever changing nature of the industry. The idea that companies need a versatile approach is supported by a recently published global analysis of construction development (Crosthwaite 2010), which indicates that construction work comprised a significantly higher portion of the GDP in less developed countries than for

developed countries. The evolution of GDP is critical to understanding the global market because it indicates that the volume of domestic work declines as a country develops. International contractors can increase their revenue by pursuing the work available in these less developed countries as work in their home country declines. The inherent risk of international projects may be evaluated in a profitability prediction model that can help determine feasibility of a venture (Han et al. 2007) and ease the concerns that decision makers may have about globalization.

Research regarding global market transition and expansion indicates that companies seeking to globalize need to understand the current market and how their company functions within that market. A Construction Industry Institute (CII) study published in 1995 recommended that contractors perform a comprehensive self-analysis to understand how they can improve their global functionality (Badger and Mulligan 1995). A subsequent CII study created a global performance index and self-assessment tool to aid firms in their self-analysis (Comu et al. 2012). Another study concluded that transitioning from domestic to global work is difficult due to the differing economic and political conditions. Assessing feasibility and planning for the work are critical for expansion (Ramcharran 1998). These two studies highlight the complexity of the construction industry and recommend comprehensive planning to overcome the challenges.

Another challenge that industry professionals seeking to globalize face is assessing how to enter into profitable markets. Jung and colleagues (2012) performed research regarding a highly profitable portfolio and they demonstrated that the contents of a successful portfolio are dependent on market factors. Furthermore, Jung et al.'s research culminated in the creation of a model that global contractors can utilize to determine their ideal portfolio, given the market conditions. Portfolio planning and reaching into new markets is a critical component of successful strategic planning and development. Another study, which featured case studies of Turkish contractors, led to the development of a Case-Based Reasoning model to assist contractors in strategic market planning (Ozorhon et al. 2006). A supplementary study that supports international construction states that companies must cautiously design their strategies to enter a market (Chen and Messner 2005). In other words, pursuing work in the rapidly changing global construction arena requires an equally dynamic plan to secure new contracts. Chen and Messner's study concluded that an analysis which identifies market factors would be required in order to effectively develop entry strategies. These three studies can be utilized by contractors seeking to plan their expansion; however, they also highlight the need for a current market analysis.

Many researchers have sought to create market analyses and fill the gap highlighted by previous research, but none have addressed the recent shifts in the industry. Han and colleagues focused on how to sustain growth in the current market by proposing that a large portion of international work could help a company avoid downsizing during cyclical domestic downturns (Han et al. 2010). The data that supported this research was derived by analyzing both the ENR Top Global Contractor lists as well as market data from Global Insight; however this data is no longer current and is no longer accurate in light of the rise of China as a global construction leader. A similar study focused on trends observed in financial data from 61 global engineering and construction firms (Yee and Cheah 2006). This study analyzed financial data from ENR and various other sources to compare how a firm's size affects its international profitability; however, it did not create forecasted market trends. Also, Jung et al. (2010) identified strategies for the globalization of small and medium construction companies. With global strategies identified, another researcher sought to apply this general knowledge to a more specific context. In 2009, Gunham analyzed the features of regional construction (2009). The goal of the regional analysis was to highlight areas of the world that will soon have large volumes of construction work available for bid, but this study did not address what countries were capable of pursuing the work. The Gunham study attempted to

create a predictive global analysis; however, it did not capture the current state of the construction market.

In summary, this paper will provide essential market trends upon which the aforementioned papers seek to build. Previous studies reveal that global market pursuit, as opposed to primarily domestic market pursuit, is beneficial. It is also apparent that a profitable sector portfolio, a plan to enter the chosen markets, and a strategy to sustain performance in those markets can be generated if a current market analysis is available. This paper will provide the required current and forecasted market trend analysis to address this gap. At the same time, this study will provide the underpinning analyses that construction firms need and will highlight the current and forecasted market trends of the global industry.

3. Data and Methods

With the goal of providing a market trend analysis and forecast in mind, we selected an empirical quantitative approach. The benefit of this method is that it allows for mathematical modeling based on historical data that is available in the form of the ENR Top 225 Global Contractors lists. This type of descriptive investigation adds value to the available information in that it provides the summary of market data from which the inferential research can be applied. To understand the investigation, it is important to make the distinction between domestic, international, and global revenue. Domestic revenue is income acquired in a company's home country. Similarly, international revenue is income acquired outside of a company's home country. Global revenue is the total revenue acquired by a company regardless of location.

Our initial step in creating this database was collecting and consolidating the data from various sources. We compiled ENR's Top 225 Global Contractor lists beginning with fiscal year 1994 and continued annually through the currently issued figures for fiscal year 2011. The data fields provided in the lists included: fiscal year, rank, previous rank, firm name, home country, total revenue, international revenue, and percentages of total work that were performed in each market sector. The data did not include information on where a contractor obtained revenues, thus the study is limited to only show the volume of revenue for a country, and not where work is being performed.

The second step was converting all of the data into usable financial information. We derived the revenues gained both domestically and internationally using the figures given by ENR. We then sorted this information by country and derived yearly summaries of all work performed in each country using a pivot table in Excel. Yearly summaries of revenues for each company in the most recent "Top 225" were generated using the same pivot table. We further itemized our information by creating summaries for global, international, and domestic revenues.

We conducted an analysis of the historical construction revenues over the indicated period, which created a historical perspective on the global construction industry. The goal of the analysis, however, was to create a market-sector forecast that could be utilized by contractors. For the analysis, we selected the 7 countries with the highest construction revenues. The countries that we chose to analyze currently represent over 80% of the global market, while the remaining 26 countries represented less than 20% of the market and thus were not modeled.

The first portion of our forecast was conducted at a country level. We modeled the historical domestic and international revenue trends for each country and generated an equation that accurately described that trend to project financial figures for the next 2 years. The global revenue projections were derived by

summing the domestic and international figures for each country in the analysis. The ENR data used for the model did not distinguish between domestic and international revenues for each industry sector; therefore, we then needed to perform separate international and sector analyses. This study is limited in that it only compares the international and domestic data, not the sector specific information.

The second portion of the forecast was on a global scale. We modeled the international total of all countries in the analysis to create the forecast of total international work in the coming 2 years. By modeling the total, rather than summing the 7 selected countries' totals, we were able to incorporate the international work that will be performed by the countries that weren't independently modeled, thus adding accuracy to our forecast. A similar model for the domestic trend was also generated. Our selection of a 2 year forecast period was made because the validity and accuracy of a mathematical model are greater when extrapolated for shorter periods of time.

A strategic analysis was formed by comparing the different models. First, the total international revenue growth was put into perspective by comparing it with the total global revenue growth. Second, the relative growth of total international revenue was compared with total domestic revenue. These two comparisons highlighted the market potential that global contractors could successfully expand internationally. Finally, the international revenues of the 7 selected companies were compared to assess how globalization was occurring around the world. An industry snapshot was created when each country's international revenues were graphed relative to one another, at which point, the vicissitude of a possible Asian-dominated market and its magnitude became apparent.

4. Results

The analysis indicated that the global construction industry is projected to grow 7% in 2012, followed by 11% growth in 2013. Similarly, international revenue totals are forecasted to grow 15% in 2012, and slow to 12% growth in 2013. Associated with the increased international revenues is the ratio of international to global revenue. In 2012, the ratio will increase from 34% to 37%, and in 2013 the ratio is expected to remain at 37%.

5. Discussion

6.1 Global and International Forecast

The global construction industry has seen continued and consistent growth throughout the last 8 years, and we predict that this trend will continue through 2013 as shown in Figure 1 below. The top 225 global contractors, in total, have increased revenues by nearly \$110 billion on average annually from 2003 through 2011. This global increase in revenue indicates a period of global growth that contrasts distinctly from the previous decade in which there was little or no growth from year to year. Paralleling this global growth is the increase in international revenue; the total international revenue earned by all global contractors is currently in excess of \$400 billion and expected to grow by nearly \$80 billion each year for the next two years. These two trends seem to be divergent in that global revenues are increasing far faster than international revenues, indicating that domestic work is increasing at a faster rate than international work.

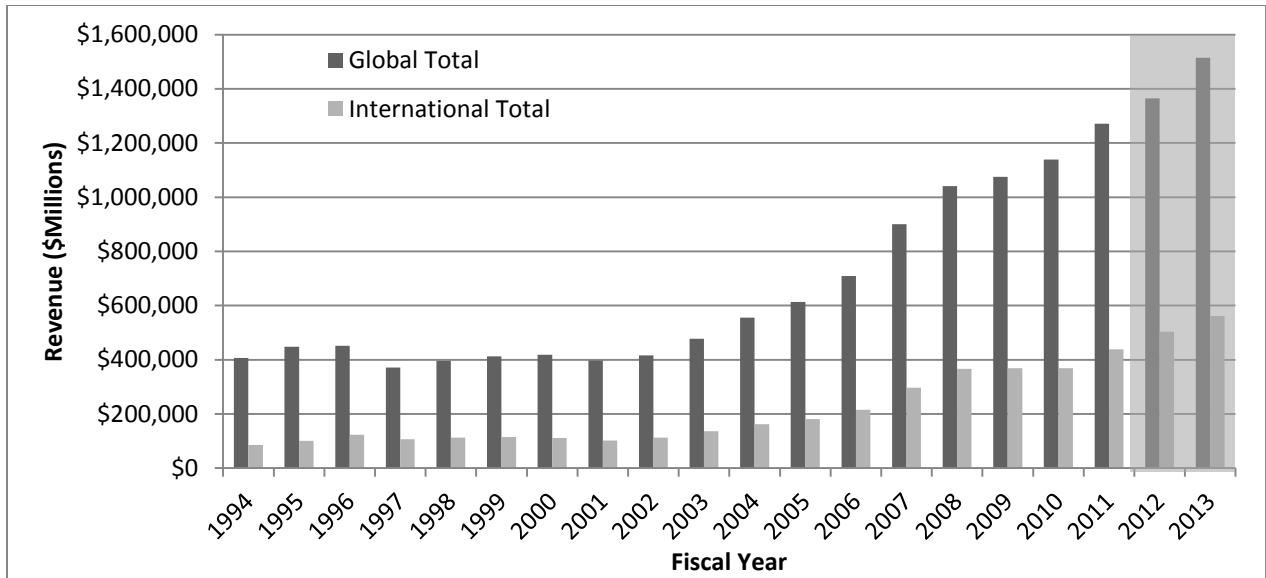


Figure 1: Global and International Revenue Market Trends (1994-2011) and Forecast (2012-2013)

6.2 Modified International Forecast

The recent increased rate of domestic revenue growth can be largely attributed to China and its growing volume of domestic projects. Over 85% of China's nearly \$600 billion of work is domestic revenue. This volume of work, nearly one-third of total global revenue, is bid by state-run firms, and thus is largely not available to other global firms. Due to this fact, including Chinese domestic work in an international analysis is not representative of actual market conditions. If Chinese revenues are excluded from the analysis, the picture of global international revenues changes dramatically; international revenues now nearly equal domestic revenues as shown below in Figure 2. Although many countries have state-run companies, China is the only country with state-run companies that is modeled in this study, thus additional countries could fall into this exclusion however they have not been accounted for. The altered international trend in Figure 2 shows growth independent of the domestic trend. International revenue growth is forecasted to exceed domestic revenues by 2013 as contractors continue to globalize and pursue more international work.

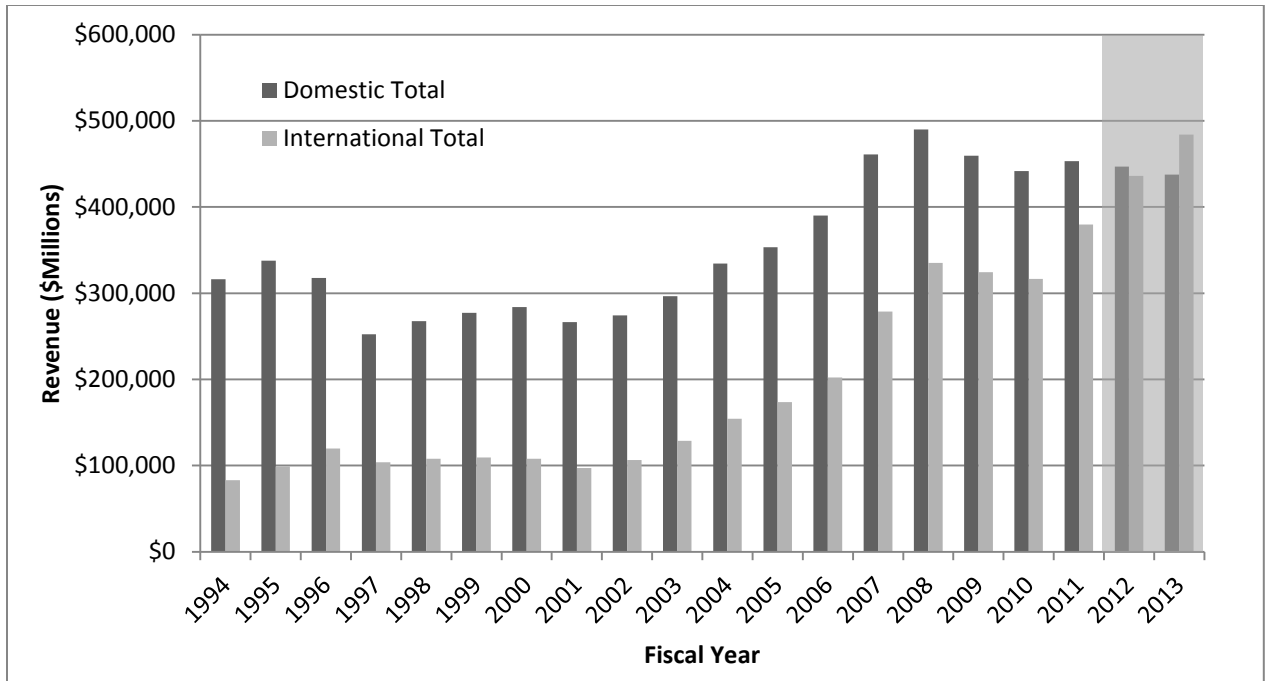


Figure 2: Global and International Revenue Market Trends (1994-2011) and Forecast (2012-2013) Excluding China

6.3 International Revenues by Country

Although work in China is almost exclusively domestically bid, Chinese contractors have embraced globalization and grown their international revenue by \$50 billion in the last 6 years. Similarly, Spain and South Korea have seen tremendous growth in their international work. The revenues of the United States and Japan, both previous leaders in international market share, have decreased significantly relative to previous periods of growth. These international revenue trends are shown below in Figure 3.

The US recession beginning in 2008 and the European sovereign-debt crisis both created an upset in international revenue leaders. France, Germany, USA, and Japan were all significantly affected and show decreased revenues. Amid this market downturn for the previous leaders, Spain was able to acquire much of the available international work and displayed their strongest period of growth. Going forward into 2012, Spain and China are forecasted to continue growing and maintain their 1st and 2nd place positions, respectively. The other notable trend is that South Korea continues to accelerate its growth in the international marketplace, and has remained resilient to US and European crises.

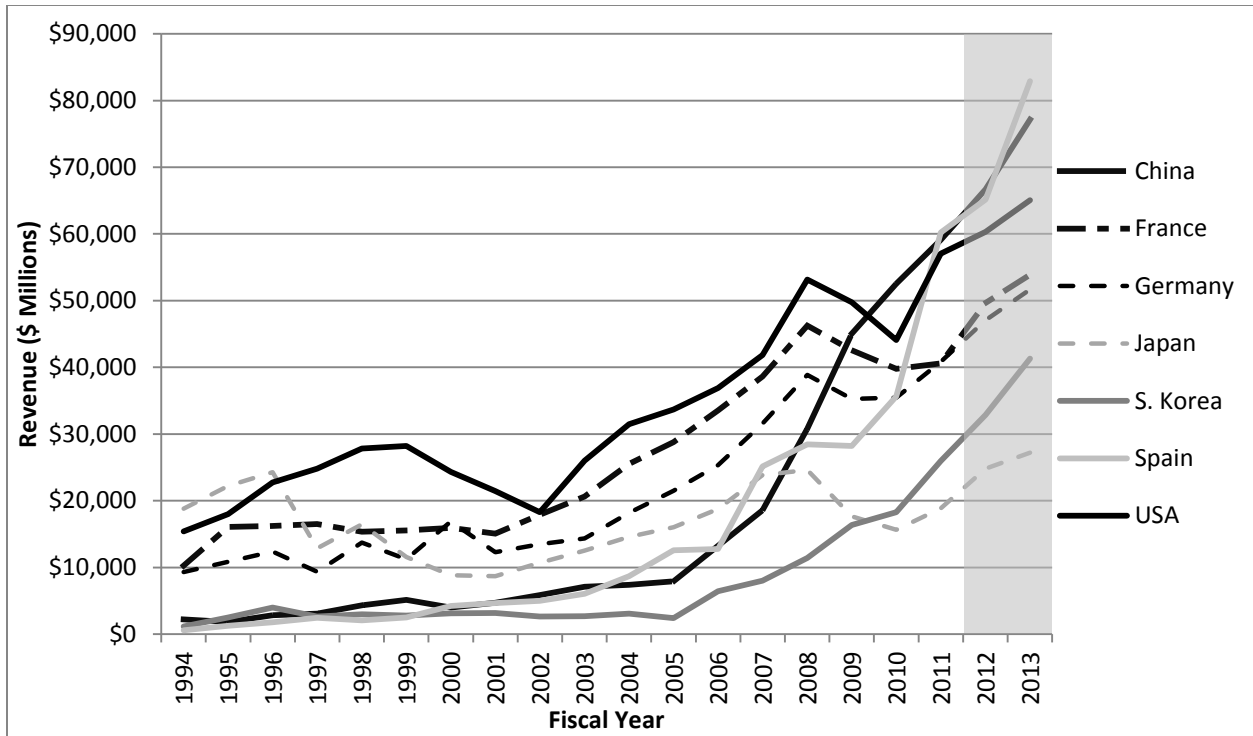


Figure 3: International Revenue Market Trends (1994-2011) and Forecast (2012-2013)

7 Conclusions

This paper builds upon previous research which indicates that globalization is beneficial for contractors (Badger and Mulligan 1995, Comu et al. 2012, Cheah et al. 2004, Ramcharran 1998), while also reinforcing the research relating GDP growth to globalization in the construction industry (Crosthwaithe 2010). Furthermore, this paper fulfills the need for a market analysis which was highlighted by the strategic planning studies (Chen and Messner 2005, Jung et al. 2012, Ozorhon et al. 2006). Finally, this paper extends previous market analyses (Gunham 2009, Han et al. 2010, Jung et al. 2010, Yee and Cheah 2006) by addressing the recent shifts of dominance in the construction industry. The market analyses that this paper contributes are designed to be used by decision-makers, companies, and policy-makers involved in the construction industry. The analyses impact both large and small construction companies by predicting the future condition of the international market. Also, this study revealed that further investigation of the individual market sector trends needs to be performed in order for a more complete market snapshot to be formed.

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