

The Internationalization of Construction Industry - A Global Perspective

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Abstract: In 2015, top international contractors recorded approximately US\$500 billion of revenue outside of their domestic markets which is an increase of nearly 200% during the past decade. Despite this rapid growth, however, limited investigation has been undertaken concerning the process of internationalization of the construction industry and key trends that drive this process which has substantial impact on global construction. This study addresses this issue by completing a comprehensive literature review to: a) develop a summary of the history of the internationalization of the construction industry over the past couple of millennia, and b) perform a qualitative descriptive study of relevant reports and scholarly publications to identify the key factors that have influenced large multinational contractors to “go-global”. Economic growth, multilateral and bilateral trade agreements, innovative delivery methods such as Public-Private Partnership and modularization, foreign aid, complexity of international projects, and advancements in information technology are found to be the key factors that shape the globalization of the construction industry. Future research should focus on an in-depth analysis of these factors to both advance the understanding of opportunities and threats associated with the globalization of the construction industry, and develop strategies that could enable firms to take advantage of open global markets.

Keywords-internationalization, construction industry, key global factors, international contractors

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I. INTRODUCTION

The global construction market increased to US\$10.4 trillion in 2017 and is expected to rise by 3.7% per year and reach US\$12.4 trillion by 2022 [1]. The construction market is large and has undergone significant transformation over the course of history. The objectives of this study were to a) examine the progressive evolution of ‘global construction’, and b) identify the major factors considered to be the key drivers for the internationalization of the construction industry. The methodology utilized to achieve these objectives involved two primary strategies.

To accomplish the first objective of this study an initial literature review was conducted to permit a background (history) analysis of the evolution of the construction industry. This examination spanned from construction serving the needs of local inhabitants to a multinational industry offering a wide range of services to geographically dispersed markets. A comprehensive literature search was conducted to develop an accurate summary of this transformation

of construction industry over the past couple of millennia. Construction from the ancient Greek and Roman civilizations through the era of industrialization and the subsequent emergence of international construction firms was examined. During this literature review the volume (\$) of the international construction industry and the regional market share of the global construction industry over the past decade was identified, using the data from Engineering News Record (ENR). A summary of the findings from this initial investigative effort is presented in the following sections.



Global
Construction
2017US\$12.4

II. EARLY HISTORY AND BACKGROUND

The nature of construction is influenced by the availability of raw materials, tools, equipment, and technology utilized for construction. The ancient Greek civilization, which flourished during the Archaic and classical periods from 8th B.C. until 5th centuries B.C. used wood, mud-bricks, limestone, marble, and metals

such as bronze to create shelters, temples, and theaters. The buildings in this era were a reflection of the classic Greek culture, their values and intimate knowledge of the raw domestic materials[2].

Many civilizations and economic developments leading to the flow of knowledge and movement of the work force across domestic borders emerged because of conquest. For instance, ancient Greek culture and philosophy had a powerful influence not only on the building techniques of Romans, but also on their motives to explore the Mediterranean Basin to achieve wealth as they penetrated the Asian markets [3]. The Roman Empire's (100 BC-400 AD) expansion throughout Europe, Africa and the Middle East, facilitated advancements in production of building materials and the development of infrastructure. Roman civil engineer and architect, Marcus Vitruvius Pollo published the world's first architecture and construction publication during the 1st century BC, covering a wide range of topics from building materials to building physics [3]. Several construction and architectural innovations such as bridges, domes, high-rise buildings, and floor constructions took place in this era. The Romans not only significantly transformed the way buildings were constructed, but also played a crucial role in passing the construction knowledge, skills, and experience from one country to another by involving people from different regions of the world in Roman construction activities.

The Medieval Age, a period from 5th to 15th century AD, witnessed the construction of large-scale fortifications, castles, and expensive cathedrals such as Notre Dame in Paris. During this period, transferring knowledge from master craftsman to apprentice through training had notable impact on the rise of skilled workers in the construction industry [4].

The period of Renaissance in Italy from 14th to 17th century served as a bridge between the Mediaeval Ages and modern history. This period is regarded as the intellectual base for building design and construction techniques that transformed construction. This period led to the birth of modern building construction science where architects and engineers started to conduct experiments and develop theories for calculating the sizes of building members. Andrea Palladio, one of the most influential figures in the history of architecture, published his treatise, *I quattro libri dell'architettura* (The Four Books of Architecture) in 1570 addressing building materials and techniques. This publication is regarded as the foundation for professionalism and experimental science for buildings [5].

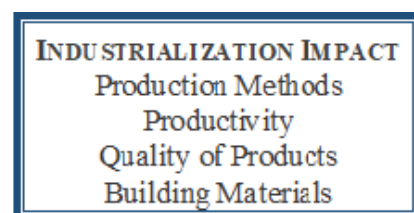
Historically, the interconnectedness of the ancient trade routes laid the foundation for the exchange of knowledge, goods and skills and thereby played an important role in development of early internationalization of the construction industry. Construction knowledge, tools, and materials developed during the Renaissance, were shared with different regions of the world and aided in the transformation of the industry from local to international.

III. INDUSTRIALIZATION OF CONSTRUCTION

The initial spark of industrialization in the 18th century in Great Britain gave birth to innovation in many industries including construction. The invention of the steam engine by James Watt in 1775 transformed the manufacturing process from human labor production to machine production, which enhanced productivity and the quality of products. The dramatic change in building materials such as the emergence of cast iron and steel increased the material options for construction. The expanding usage of steel in heavy infrastructure projects such as railways, bridges, and building frames along with the need for access to raw material, forced countries to enter the international market [2].

In the 1850s British contractors were moving heavy construction machinery (dredging machines to dig out the Suez Canal), construction materials (pre-assembled bridge sections to Africa by British bridge firms), as well as construction professionals to various countries around the globe including Canada, India, Argentina and Australia[6]. The operation of construction companies outside of their political borders fostered the spread of construction knowledge, skills and expertise among countries. It served as a base for the development of a systematic global construction market by combining the local factors of construction (labor, raw materials) with the heavy construction equipment developed in industrialized countries as well as both managerial and design skills of the advanced industrialized countries [6].

In addition, the industrial revolution had significant influence on the migration of both skilled and non-skilled workers. People suffering from poverty, unemployment, and political and religious violence moved from the 'old world' to the 'new world' to pursue economic opportunities in industrialized countries. This reinforced the movement of construction skills and knowledge between countries. For example, in the early stages of industrialization (1880s), 41% of construction workers, 57% of manufacturing workers, and 41% of railway workers in the United States were immigrants or the children of immigrants [36].



IV. THE EMERGENCE OF INTERNATIONAL CONSTRUCTION COMPANIES

From the early 1840s to the late 20th century major western European and U.S. construction companies expanded their operations into other countries. Large infrastructure projects such as railways, roads, bridges, and dams that required unique expertise, large-scale operation and capital were often delivered by firms headquartered in industrialized countries. Modern heavy construction machinery provided a competitive edge to companies based in the advanced industrial countries [2]. In the mid-nineteenth century British Railway firms, were providing the design, production and installation of railway structures as well as the workers to countries outside of their borders. Thomas Brassey (1805-1870), Samuel Morton Peto (1809-1889), and Edward Betts (1815-1872) were well-known British railway contractors who had a pivotal role in transferring railway construction techniques throughout the world. The significant shifts in the process of production in both the manufacturing and transportation sectors were a result of the Industrial Revolution. Countries on the leading edge of industrialization accumulated large capital from infrastructure construction and the installation, and the exportation of natural resources such as oil, gold, silver and coal. Weetman Pearson, a prominent British contractor, built one of the first construction firms to capitalize on the international market. Pearson’s company completed a total of 66 projects with a combined value of £42.5 million between 1884 and World War I (1914). Sixty two percent of Pearson’s contract revenue was from outside the United Kingdom. Other construction companies that established a stake in large overseas projects such as the Suez Canal [2] followed the same trends.

The penetration by U.S. construction firms into international markets was slower than other Western European countries (Britain, France, and Germany). This was largely because of the significant demand for domestic infrastructure and railway projects, which made overseas expansion unnecessary for U.S. contractors during the nineteenth century [6]. However, beginning in the twentieth century several large construction firms, including Warren, Bechtel, Fluor, Kellogg and others, successfully penetrated the international market by executing complex industrial and engineering projects[4]. The transition toward globalization continued to expand in the late 20th and early 21st century.

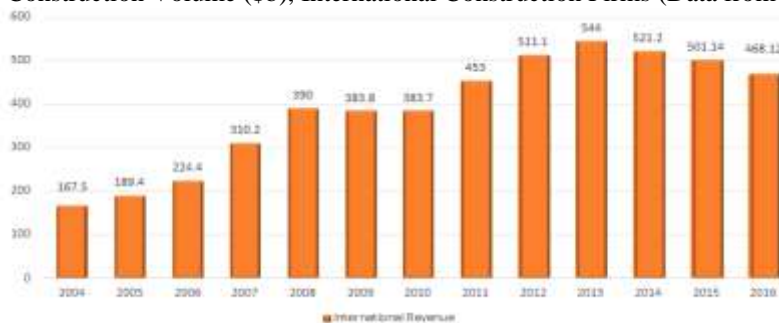


Figure (1): the “Progressive Evolution” of the construction industry

V. INTERNATIONAL CONSTRUCTION MARKET ANALYSIS

The total volume of the global construction market has grown rapidly in the past several decades thanks to globalization and growth of the world’s economy. International contractors have been taking advantage of the booming global construction industry, and the associated investment in infrastructure and industrial projects [7]. The rapid growth of global construction is supported by Engineering News Record’s (ENR) annual statistics (ENR, 2004-16). The total revenue of the Top 250/225 Global Contractors (TGC250) outside of their domestic market has increased by nearly 180% during the past decade “Table 1”. Top international construction firms have had a compound annual growth rate (CAGR) of 9.72% between 2004 and 2015.

Table 1: Global Construction Volume (\$b), International Construction Firms (Data from ENR 2004-2016)



The regional market share of the TGC250 in 2015 is illustrated in Table 2. Asia, which accounts for 24.1% of the international construction market, remains the largest global construction market for the fourth consecutive year. Europe is the second largest market with \$93 billion (or 18.6%), followed by the Middle East (\$77b), Africa (\$65b), the Caribbean and Latin America (55b), U.S. (\$53b), and Canada (\$23b). However, a large global construction market doesn't necessarily mean that all of the construction activities are performed by international contractors. Only 20% of the total volume of global construction is considered to be a potential market for international contractors [8]. The remaining 80% of global construction is done by local contractors who are using traditional materials and methods. This is also supported by contracting revenue of the Top Global Contractors.

Table 2: Regional Market Share TGC250 2015(Calculation according to the Data from ENR 2015)

Regional Market	b\$	% Top 250
Asia	121	24.1%
Europe	93	18.6%
Middle East	77	15.3%
Africa	65	12.9%
Latin America	55	10.9%
United States	53	10.7%
Canada	23	4.6%
Arctic/Antarctic	65	2.8%

In 2014, the TGC250 had total combined revenue of \$1430.8 billion and only one third was obtained from projects outside of their domestic markets [7]. Traditionally, large Engineering and Construction (E&C) projects that require more technical expertise and diverse technological and managerial competencies are often delivered by large international contractors. In terms of market segmentation as shown in Fig: 2, E&C projects constitute a large portion of the international market. The ENR statistics for the past 13 years (2004-16) indicate that Civil and Infrastructure is the largest construction segment of the TGC250 contractors. Combined with petroleum and manufacturing these market segments represent 78% of the international work of the TGCs.

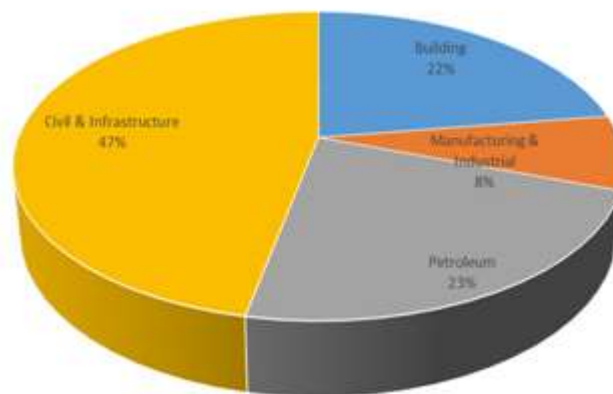


Figure (2): Top 250 Global Contractors Industry Category Market Segmentation, % Share, by Value, Average (2004-16)

Despite the decline in the last 4-5 years, the global construction industry is projected to expand. The Global Construction 2030 report, recently published by London-based researchers, predicts that the global construction market will grow faster than world GDP over the next decade. This report predicts the global construction market will grow 85% by 2030. Many of the countries across the globe will have a need for large, complex E&C projects (e.g. infrastructure & industrial plants) which will motivate global contractors to expand their 'international' operations [14].

VI. METHODOLOGY TO IDENTIFY THE KEY DRIVERS

The second focus of the literature review was centered on the identification "patterns and themes" that influenced multinational contractors to operate beyond their geographical borders. The research strategy

employed during this stage of the study could be described as a “qualitative descriptive” study. Like other qualitative research approaches, qualitative descriptive studies are characterized by simultaneous data collection and analysis [9]. It is a research methodology and is well recognized by researchers especially when it is difficult to collect “conceptual and abstract” data on a topic. The data collection for this study was limited to the examination of relevant reports, research papers, books and other published sources concerned with the international construction industry. To enhance the validity and reliability of the study the records and published reports of prominent national and international organizations such as Engineering News-Record (ENR), Global Construction Perspective (GCP) and Oxford Economics, World Economic Forum (WEF), Fails Management Institute (FMI) and American Society of Civil Engineers (ASCE) were examined. Data from these organizations was deemed rich in information for the purpose of meeting the objective of this phase of the study since they regularly collect data concerning international construction. The findings presented in this section of the paper titled ‘Factors influencing the globalization of construction’ evolved as a result of application of the “iterative categorization” technique. This included ‘transcription’ (collection of textual data from the above mentioned sources), ‘familiarization’ (read and re-read transcriptions and identifying patterns), and ‘interpretive analysis’ (relating the patterns for the internationalization of the construction industry).

VII. FACTORS INFLUENCING THE GLOBALIZATION OF CONSTRUCTION

The key factors that emerged from the investigative analysis are examined in the following sections of this report. These driving factors include economic growth, multilateral and bilateral trade agreements, innovative delivery methods such as Public-Private Partnership and modularization, foreign aid, the complexity of international projects, and advances in information technology. Each of these key factors is an important force driving the internationalization of construction.

Economic Activities

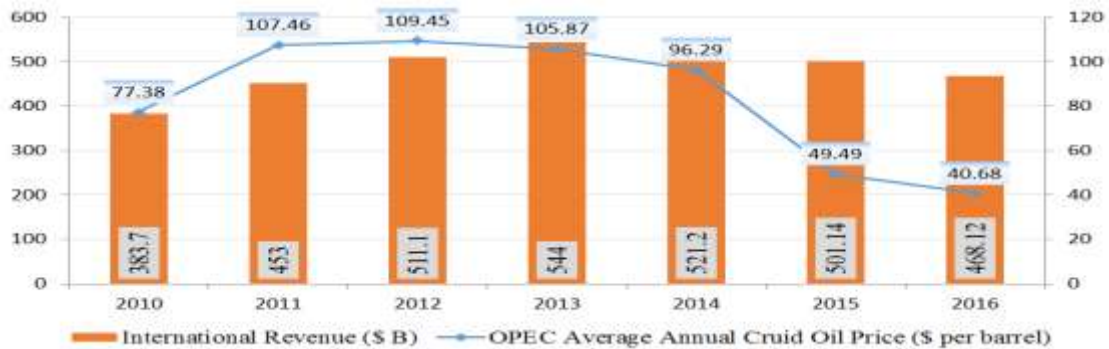
The industrialization and mechanization of the production processes have created tremendous global economic growth [10]. The rapid growth in the global economy and the urgent demand for large and complex E&C projects including infrastructure and industrial plants have forced the construction industry to “go-global”. Multinational contractors expand their operations and services to other countries to take advantage of the opportunities offered by the rapid growth in the global economy. Other reasons to expand contractor reach include stagnant domestic markets, a desire to spread risk through diversification into new markets, aspiration of higher profit margins, and competitive utilization of their resources [11][12][13].

The extraction of energy from natural resources, especially oil and gas, serves as a primary driver for the economic growth of the oil rich countries in the Middle East, South Africa, and North America. This creates substantial demand for large, multinational construction firms in these countries. FMI’s 2015 report predicts that by 2035 investment in the oil and gas industry of the U.S. alone will be more than \$5.1 trillion in cumulative capital expenditures [27]. This volume of new work will encourage foreign firms to expand their presence in the United States.

The recent upswing of global economy could bring new opportunities for global contractors in the long-term. The findings of prominent organizations including the Oxford Economics and World Economic Forum (WEF) predict the continuation of increased demand for global construction over the next 2-3 decades. Economic growth, rising populations, urbanization and the shift toward industrialized economies in emerging markets are expected to further influence this growth [14]. This will bring new opportunities to construction firms who are seeking to increase their revenue from the projects located beyond their domestic borders.

On the other hand, the uncertainties in global economic activities such as downward trend in commodity and oil prices can have severe negative impact on the revenue of international contracting firms and this as a result may force them to reevaluate their presence in other countries. As an example, due to the cut in the oil prices the demand for the specialty construction services of a French company (VINCI Construction) in Africa has been significantly reduced [32]. Furthermore, the interrelationship between low oil prices and the drop in the total revenue of TGC250 especially in the last couple of years (Table 3) indicates the impact of cyclic commodity prices on the international construction market. This drop in the international revenue is mainly due to the reduction in the petroleum projects throughout much of the world’s oil reach countries [32].

Table 3: The Correlation between Oil Prices and International Construction Revenue (Calculation according to Data from ENR 2010-2016 and OpEC)



In addition, it's important to note that the demand for global construction is not only determined by the ups and downs of global economic activities, but also by the stage of economic development of a country [2]. Countries have been classified per their income: Advanced Industrialized Countries (AIC), Newly Industrialized Countries (NIC), and Least Developed Countries (LDC)[15]. The statistical analysis of Bon (1992)[33] and Crosthwaite (2000)[34] suggest that the share of the construction industry in economic growth (measured as GNP), grows in the LDC status, increases in NIC status, and declines in AIC status. Many of the large and complex E&C projects in NIC and LDC countries require international contractor expertise and capacity.

Public Private Partnership (PPP)

Joint ventures, alliances, and project partnerships have been commonly utilized both by private and government entities to mitigate the risks associated with international construction[16]. The participation of the private sector in building infrastructure projects is one of the most important trends in the construction industry in many countries [17]. The growth in Public-Private-Partnerships (PPPs) has fueled the internationalization of construction, especially in the last decade. According to the United Nations, private sector participation in infrastructure projects in developing countries alone amounted to about \$164 billion in 2014, which was almost equivalent to overseas development assistance. Limited domestic budgets and resources, increasing national debt, and the lack of the advanced technical and managerial skill necessary for highly complex infrastructure projects, are the primary drivers that have increased the participation of the private sector in public infrastructure projects [17].

The implementation of the PPP procurement method has opened numerous growth opportunities for large construction companies in foreign markets. For example, Skanska, headquartered in Sweden, is one of the world's largest infrastructure development and construction groups with PPP projects from Europe to North America. The Royal London Hospitals, La Guardia Airport in New York, and Elizabeth River Tunnel in Virginia are some of the largest PPP projects completed by Skanska. Financial strength, superior technical and managerial skills, positive track record, technological advantages, and a strong international network are considered to be some of the important attributes that give multinational companies a competitive advantage to deliver large PPP projects in today's global market[13].

PPP projects can be attractive for large international contractors with the right due diligence, business modeling and an informed awareness of the domestic market. The financial and technological superiority, as well as the ability to form long-term relationships with domestic political leaders [13] have enabled international construction firms to participate in financing infrastructure projects in foreign countries.

The expansion of large Public-Private Partnerships can be a "game-changing" procurement mechanism for public agencies to tackle infrastructure needs [18]. The Royal Institution of Chartered Surveyors (RICS) has been providing educational and professional services to construction firms worldwide for the last 140 years. A review of their recently published report: "The Future of Private Finance Initiative and Public Private Partnership" projects the rise of PPPs as governments continue to explore alternative solutions to address infrastructure investment gaps created by public budgetary constraints. According to the report, over the next twenty years the global demand for both new and upgraded infrastructure for electricity transmission and distribution, transportation, telecommunication and water supply is likely to average 3.5% of the world GDP, approximately \$50 trillion per annum until 2030. The United States alone will need to invest \$3.6 trillion to repair and upgrade its decaying infrastructure by 2020, according to the report published by the American Society of Engineers in 2013 [19]. The increased demand for infrastructure both in developed and developing countries will attract large international construction companies and investors seeking to expand their global footprint.

Bilateral and Multilateral Trade Agreements

The trend toward the internationalization of construction industry has been further reinforced with establishment of global organizations such as the World Trade Organization (WTO) [2] and the International Monetary Fund (IMF). These organizations were formed primarily to aid countries in the liberalization of trade and commerce by facilitating trade negotiations [20]. International trade policies, such as protocols of the WTO, have become the driving force behind globalization of trade and have increased business opportunities across the globe. The move toward free trade agreements has facilitated the exchange of construction resources including labor, materials, technology, management expertise and capital flow among participant countries [21].

Bilateral and Multilateral Trade Agreements have had significant impact on the globalization of the construction industry in terms of size, structure and expansion. For example, the North American Free Trade Agreement (NAFTA) is a trilateral trade agreement between the U.S., Canada, and Mexico that was executed in 1994 for the purpose of removing trade barriers for the exchange of goods and services among these countries. This agreement has had significant impact on the construction industries of the participating countries both in terms of size and production [22].

In recent years, there has been a shift toward mega-regional agreements but the current political climate has created some resistance toward this movement. Trans-Pacific Partnership (TPP) agreements among Australia, Canada, Japan, Mexico and the United States (the U.S. recently withdrew from negotiation); and the Regional Comprehensive Economic Partnership (RCEP) negotiation pursued by China are the most recent examples that have raised questions for both conventional multilateral trade agreements and the World Trade Organization (WTO) [23].

In summary, recent trends and future consequences of free trade agreements will pose both opportunities and challenges for local, regional and international construction companies. Nevertheless, bilateral, multilateral, and mega-regional trade agreements will continue to influence the internationalization of the construction industry and encourage international contractors to build strong alliances and develop robust networks with local contractors either through joint venturing or establishing new offices in foreign countries.

Foreign Aid

In many developing countries major capital-intensive infrastructure projects such as telecommunication, power, water, energy, and transport, are mostly financed by foreign aid [24]. The International Bank of Reconstruction and Development (IBRD) was created in 1944 to help rebuild Europe. Since 1946, IBRD has provided \$500 billion in loans mostly to third world countries to rebuild infrastructure, strengthen economies, and alleviate poverty. The bulk of these loans financed the construction of dams, power stations, highways, and ports of third world countries that have been built primarily by international construction firms. For example, Morrison-Knudsen and Raymond built 2000 miles of highway in Colombia that was financed by the World Bank [6]. Other U.S. Government agencies such as The U.S. International Cooperation Administration (ICA) and the United States Agency for International Development (USAID) have financed major infrastructure projects in developing countries that were often awarded to large contractors with an international footprint. The participation of U.S. based construction firms in building dams, canals and roads in Afghanistan during the height of the cold war is one of the examples of foreign assistance that has contributed to the internationalization of construction. Foreign aid and international economic assistance remains a major financing source for many of the developing and post conflict countries. For example, Afghanistan alone received total foreign aid of \$7.3 billion in 2014 with \$ 1.3 billion contributed by USAID. Out of this \$289 million was spent on infrastructure development projects [25]. Similarly, in recent years Chinese Governments' overseas infrastructure development policies such as "Belt and Road" initiative, an ambitious effort toward "global dominance" and regional connectivity has encouraged Chinese construction and engineering firms to expand their operation to countries along the "Belt and Road" route that are the recipients of Chinese investment and/or loans [37]. Ministry of Commerce of China announced that in 2016 the total value of internationally contracted projects was roughly \$ 244 billion.

International development aid, which has flourished since World War II with the implementation of the Marshall Plan, has served as one of the most important driving forces behind the penetration of international construction firms into the markets of aid-recipient countries.

Complexity of International Projects

International projects are generally very complex and sophisticated in terms of both management and construction. Furthermore, unlike domestic projects, international projects present unique challenges because of numerous variables including multiple ownership, differing financial provisions, diverse political ideologies, and the high level of risk associated with working in a foreign country. Therefore, large international firms with special technological and management expertise are often needed to deliver these projects successfully.

This finding has been supported by the research of Strassmann and Wells (1988) [38]. Their conclusion was that American and European companies have a competitive advantage in the international construction

market because they incorporate well-known building methods and have expertise in advanced technologies. Large American and European contractors have efficient organizational and management skills to deliver large, complex international E&C projects. Construction firms located in developed countries with expertise in complex infrastructure projects such as highways, dams, urban infrastructure, power, industrial, and petroleum are often able to win large contracts overseas [13].

Modularization

The “site-based” nature of construction activities makes every construction project unique and subject to numerous variables including different environmental and local climates, a unique workforce, and distinctive site conditions[26]. Over the past decade, there has been a global trend to “industrialize” construction through pre-fabrication, modularization, and standardization of production techniques [26]. A survey of 170 firms conducted by Fails Management Institute (FMI) revealed that the driving forces behind the recent growth of prefabrication/modularization included price and productivity pressure, lack of skilled construction labor, and advancing technology that fosters design and construction coordination [27]. The growing interest in lean construction, the rise of BIM technologies, and the increasing demand for green construction have also influenced practitioners in the construction industry to consider prefabrication/modularization for production[35]. As an example, Fluor Corporation has five major “self-perform fabrication yards” around the world to support their engineering and construction solutions from North America to Africa, and from Asia to Europe [28]. This growing trend to produce construction components in a controlled production (Pre-fab) environment has had a significant impact on the globalization of the construction industry. Large international contractors outsource (or produce) large portions of construction projects to controlled production sites where it’s efficient, affordable and greener to produce.

Information Technology

It has been widely acknowledged that the use of information technology and digitalization of construction processes enhances productivity, reduces project delays, and improves the quality and safety of construction projects [29][30]. The developments in information technology (IT) and ease of global communication has remarkably enhanced the internationalization of the construction industry by the transformation of construction technology from one country to another. Technology can be a “most powerful strategic weapon” that enables both small and large construction companies to carve out a niche for themselves in global markets[13].

In order to deliver large complex projects efficiently and timely there is a need for the application of specialized technologies. The need to access the latest technology in less developed countries is often fulfilled by companies from developed countries where there’s a focus on research and development (R&D) and use of new technologies. Japanese and U.S. construction firms’ competitive edge in the global construction market is mainly due to their technological expertise[2].

*BIM, VR and AI technologies
could determine the next
frontiers of global
construction industry.*

The emergence of new technologies such as Building Information Modeling (BIM), Virtual Reality (VR) and Artificial Intelligence (AI) and their application in the construction industry is accelerating. Similarly, the positive impact of technology on design and construction processes has drawn the attention of both practitioners in industry and researchers in academia. For instance, VR, which provides a computer generated, immersive, and multi-sensory simulation of the three-dimensional environment in real time could have important implications for design and construction of large industrial projects. [31]. Similarly, it can also be used to facilitate safety trainings in a

virtual reality construction site.

The enormous potential of new emerging technologies may transform the global construction industry to a level where design professionals and contractors from different countries will have the ability to collaborate and work as a cohesive team in a single virtual environment. Given the complex, interrelated and collaborated nature of large international projects, it is vital for global contractors to build strategic alliances with reliable partners that are team players, open minded and innovative [21]. This could eventually spur long-term profitability and growth for multinational firms beyond their borders.

VIII. SUMMARY

In today’s ever-changing globalized and interconnected economic system, no business is isolated from the influence of international markets. The construction industry has evolved and continues its evolution rapidly over the time. Globalization and developments in science and technology coupled with the significant demand for complex industrial and engineering projects encourages the construction industry to operate beyond their local, regional and national boundaries. This study reviewed this transformation by looking into the past, current and future of the global construction industry. The study also explored the “patterns and themes” that have influenced large, multinational contractors to “go-global”.

Historically, the industrial revolution in the 18th century sparked the initial organized effort toward globalization of the construction industry. Innovations in building materials, the involvement of immigrants in construction activities, the advancement in manufacturing processes, and the invention of heavy construction machines were the major driving forces that enabled large contractors to penetrate the markets of other countries around the world [2].

In the modern era of human kind, the globalization and liberalization of the world's economy and the establishment of global trade organizations such as the WTO and the IMF have brought tremendous momentum into the international construction market. ENR's annual statistics for the last 13 years (2004-2016) indicate a 180% increase in the total international revenue of the Top 250 Global Contractors (TGC250). Traditionally, large E&C projects that require more technical expertise and diverse technological and managerial capabilities are often delivered by large international contractors [13]. According to ENR (2004-16), Civil and Infrastructure are the largest construction segments of the TGC250.

Despite relatively slow growth over the past 4-5 years, global contracting is expected to grow rapidly, especially in emerging countries. According to the Global Construction 2030 report, the global construction market will grow faster than the world GDP over the next decade as the U.S. economy recovers from financial crises and Asian countries move toward industrialized economies. This means that opportunities in the international markets will materialize. However, the globalization of the construction industry also presents unique challenges including changing rules and regulations, multiple ownership, differing financial provisions, and diverse political ideologies [13].

Therefore, it's imperative for international construction firms to enhance their understanding of the key trends shaping the internationalization of construction industry. Understanding trends and how they interplay to shape the global construction market could help companies develop strategies that would enable them to strategically position themselves in today's globalized economy. Economic growth, multilateral and bilateral trade agreements, innovative delivery methods such as Public-Private Partnership, modularization, foreign aid, complexity of international projects, and advancements in information technology are found to be the major factors that drive the globalization of the construction industry. Understanding these trends, and how they interplay to shape the global construction market, will help position companies to take advantage of global markets and capture new opportunities outside of their domestic market.

Future research should focus on in-depth statistical analysis of these factors to further the understanding of the opportunities and challenges associated with internationalization of the construction industry and help to identify strategies that could enable contractors to benefit from this industry trend

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