

Global Construction Competitiveness Evaluation in 2016

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Abstract: Korea's domestic construction market and overseas construction order environment are experiencing a decreasing trend, and this trend is expected to continue. Therefore, domestic construction companies are seeking to enter the global construction market. This study analyzes the global construction market and the global competitiveness for global construction companies and provides the results. To this end, this study has developed a model to evaluate the global construction competitiveness level and to evaluate global construction competitiveness in 2016. The evaluation of global construction competitiveness was analyzed based on the competitiveness of construction infrastructure by country, and the evaluation results of competitiveness of construction companies. These assessments were based on 20 detailed international statistics (ENR, Global Insight, Compass, etc.). The evaluation results are as follows. First, in regard to the comprehensive global construction competitiveness by country, America ranked first among 20 countries, followed by China. European countries like Spain, Germany and the Netherlands ranked third to fifth, respectively. Korea ranked sixth, one rank higher than that of the previous year. America and European countries remain strong. Second, in regard to the comprehensive building infrastructure competitiveness by country, America ranked first followed by Germany. Korea ranked twelfth, which is the same rank as that of the previous year. When it comes to stability in the construction market, China ranked first and Korea eighth. For construction systems, Sweden ranked first and Korea thirteenth, and for infrastructure, Japan ranked first and Korea tenth. Third, according to the construction company's capability evaluation by country, America ranked first followed by China. Korea ranked fourth, two ranks higher than that of the previous year because of its building competitiveness (fifth → fourth) and design competitiveness (eleventh → eighth) which has improved. When it comes to building competitiveness, China ranked first and Korea fourth. For design competitiveness, America ranked first and Korea eighth, and for price competitiveness, India ranked first and Korea seventh. However, Korea is still in the middle of the pack rank among the 20 countries considered when it comes to design competitiveness. It is ranked eleventh for design productivity and thirteenth for foreign sales against the total sales (internationalization). Thus, Korea needs to improve technical power and tap into new markets for improved competitiveness, including increased productivity. To do so, more R&D investment is required.

Key words: International Construction, Construction Competitiveness, Competitiveness Evaluation Model, Construction Infra Competitiveness

1. INTRODUCTION

The order amount of overseas construction of projects by Korean companies has increased steadily from \$ 39.8 billion in 2007 to \$71.6 billion in 2010 but fell to \$ 66.0 billion in 2014. This overall increase since the mid-2000s is due to the synergy effect of the proactive entry into overseas markets and government support. However, the overall upward trend has been turned into a decreasing trend since 2015, as shown in \$46.1 billion in orders in 2015 and only \$28.2 billion in 2016, due to the global economic stagnation. Despite the difficult situation, Korean construction companies have still searched for

entries into the global construction market. For Korean companies to enter the overseas construction market, it is necessary to have an evaluation model and a comprehensive evaluation system that evaluates the level of international competitiveness of Korean companies and to analyze the global construction market.

Accordingly, the present study aims to develop an evaluation model and comprehensive system to evaluate the level of global construction competitiveness, and provides policy services to government agencies and companies that demand the services. This will be accomplished by analyzing the global construction market and policies comprehensively.

In this regard, the Korea Institute of Construction Technology (KICT) developed an evaluation model of global construction competitiveness in 2011, and evaluated global construction competitiveness for the past five years (2011 to 2015). The purpose of the present study is to give the implications of the evaluation results through the evaluation on global construction competitiveness in 2016, and to analyze the reasons for the results.

2. Definition of global construction competitiveness and evaluated items

Global construction competitiveness is defined as a comprehensive capability that can provide efficient social structures, systems, and policies to make Korean construction companies compete with other foreign construction companies in the global market successfully. A nation with a high global construction competitiveness means that the nation has companies and industry assets equipped with world class competitiveness. It is highly important for a nation to have an overall investment environment in order to promote world class companies and industry. Accordingly, national competitiveness and corporate competitiveness are not separate concepts, but have complementary characteristics. Thus, global construction competitiveness should be evaluated using two criteria: one is management ability and achievements of the construction companies and the other is national, as well as international, competitiveness as management activities in construction companies become internationalized.

The metric of competitiveness in the construction industry that aims to increase global construction competitiveness can be more meaningful and acceptable if it considers factors that measure the willingness to support the industry at a national level, index systems to evaluate a level of technology, and the development of an evaluation system to measure industrial contributions to technologies into account. That is, it is necessary for the index of global construction competitiveness to focus on four areas: statistical collection capability, simplicity, representativeness, and policy applicability, thereby extracting the index of technical competitiveness in the construction industry that can be comparable between nations at the current time, and this allows verification of the competitive levels and gaps between nations by putting realistically acquirable statistical into the index.

The present study was conducted as follows: in the first stage (2011 to 2013), the evaluation model of global construction competitiveness was developed, revised, and improved for each subsequent year. During the second stage (2014 to 2015), the evaluation model of global construction competitiveness for each year was revised and improved through an expert advisory meeting. Through the above process, the competitiveness index of construction infrastructure by nation and competence evaluation index of construction companies by nation were established as the main indexes in the evaluation model of global competitiveness [1].

The evaluation on national construction infrastructure was revised and improved by three detailed indexes: stability of the construction market, construction systems, and infrastructure, and 14 sub-detailed indexes. Originally six detailed indexes were revised to three indexes as foreign exchange reserves and inflation rate were duplicated and deleted, since they were already reflected in the credit rating of the country. Furthermore, the transparency index in the public sector was moved to the construction system index since they are in close relationship. The evaluation on construction competence by nation consisted of three detailed indexes: construction competitiveness, design competitiveness, and price competitiveness, and 13 sub-detailed indexes (Table 1).

Table 1. Evaluation index of global construction competitiveness

Category	Detailed evaluation items	Sub-detailed evaluation items	Weight	
Evaluation index of national construction infrastructure competitiveness	Stability of construction market	Size of construction market	4.3%	
		Average annual growth rate of construction market	2.8%	
		Construction risk	4.1%	
		Country credit rating	2.8%	
	Construction system	Permit stage		
		Time taken in permit		2.1%
		Permit-related cost		2.2%
		Transparency index (corruption awareness) in the public sector		1.5%
		Transparency in policy decision making		2.7%
Infrastructure	Informatization advancement index		1.9%	
	Logistics performance index		1.7%	
	Overall infrastructure quality		2.3%	
	Current status of national supplier		1.9%	
	Quality of national supplier		2.2%	
Index of evaluation on national competence in construction	Construction competitiveness	Oversea turnover by nation		
		No. of companies by nation	7.2%	
		Internationalization (proportion of overseas turnover)	5.5%	
		Growth ability (compared to previous year)	3.3%	
		New order amount	7.2%	
		Construction productivity	6.2%	
	Design competitiveness	Oversea turnover by nation		8.4%
		No. of companies by nation		6.3%
		Internationalization (proportion of overseas turnover)		3.6%
Growth ability (compared to previous year)			3.6%	
Design productivity			8.1%	
Price competitiveness	Design (engineering) unit price		1.0%	
	Construction unit price (skilled worker)		0.5%	
	Construction unit price (unskilled worker)		0.5%	
	Construction unit price (equipment rental)		0.5%	
		Subtotal	100%	

3. Evaluation procedure of global construction competitiveness

For the evaluation on global construction competitiveness, data for each index was collected from Engineering News-Record (ENR) and Global-Insight etc. The evaluation methods of competitiveness proposed by the World Economic Forum (WEF) and the International Institute for Management Development (IMD) were employed to standardize the collected data. Furthermore, when the maximum and minimum values deviated by a large amount, the gap between them was alleviated via applying a square root ($\sqrt{\quad}$) to the data, by adopting a method of applying exponential or log function resolving the problem of giving an excessive advantage to specific countries. Moreover, the determination and application of weights for each evaluation index was decided through evaluation and consultation using the analytic hierarchy process (AHP) with 50 experts in related fields. Through this procedure, indexes for each evaluation index were derived, ranks of competitiveness by nation were determined, and implications of those indexes were derived (Fig. 1). The main countries to be evaluated in the global construction competitiveness were selected based on the ENR data, where nations had both construction and design performance data.

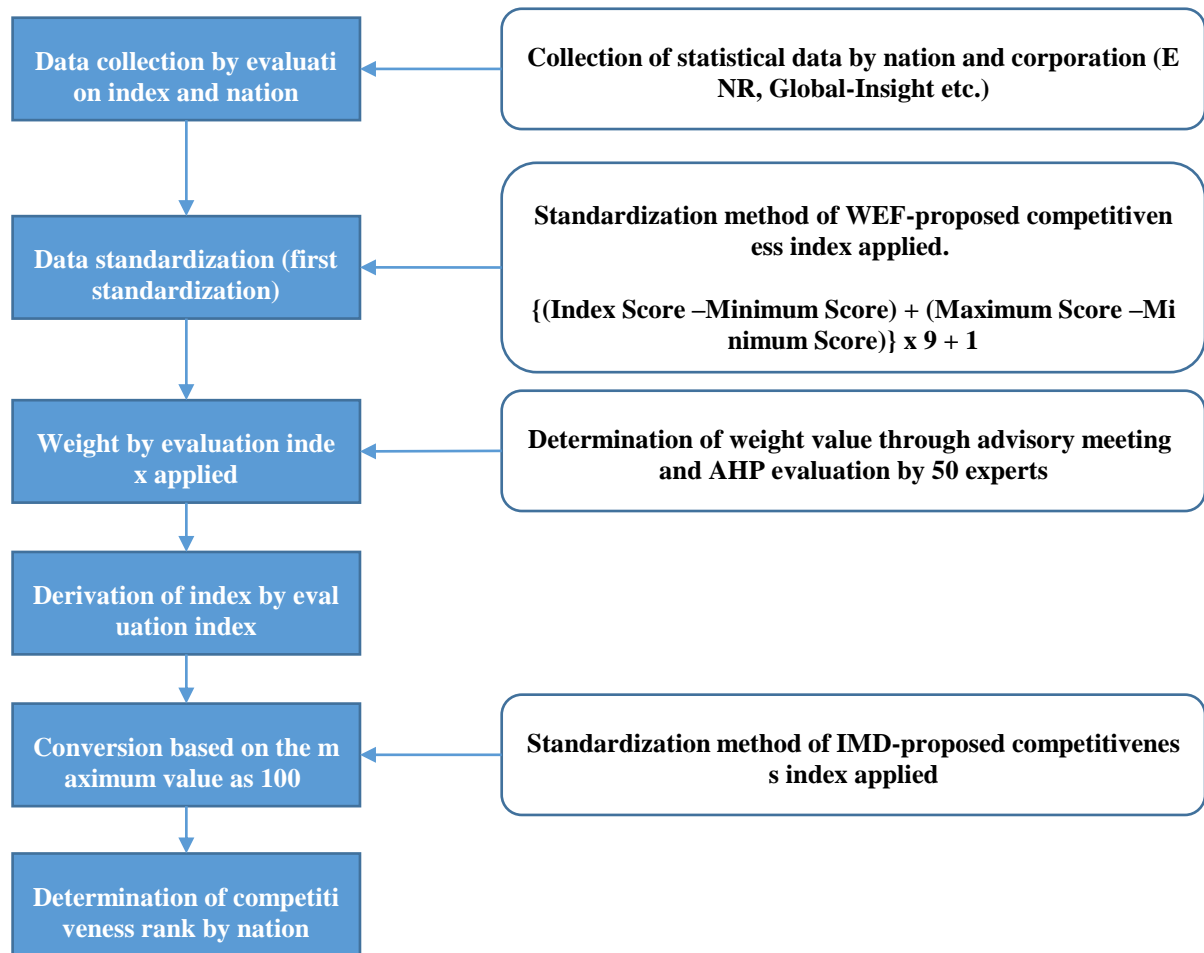


Fig. 1. Procedure and method to produce the evaluation index of global construction competitiveness

To evaluate the global construction competitiveness in 2016, 20 countries were selected for the survey. The nations whose statistical data was available through the world's 250th construction companies and the 225th design companies from the ENR published in 2016 were selected. The number of nations in 2016 (20 nations) was increased by one as compared to that in 2015, which was 19 nations [2].

4. Evaluation results of global construction competitiveness

The overall evaluation results on global competitiveness in the construction industry by nation showed that the USA was ranked first followed by China which ranked second, and Spain, Germany, and the Netherlands in Europe ranked third to fifth respectively. South Korea was ranked sixth, which was up one step up from the previous year. Overall, the USA and European nations were ranked high (Table 2).

The overall result on the competitive index of national construction infrastructure showed that the USA (first rank) and Germany (second rank) in 2016 ranked the highest. South Korea was ranked 12th, which was one step down from the previous year (Table 3). More specifically, South Korea increased their rank in the stability in the construction market (11th to eighth) compared to the previous year, but the construction system (12th to 13th) and infrastructure (10th the same) decreased or maintained in rank. Of particular note, the construction risk index in the stability of construction market decreased by two spots as compared to the previous year (10th to 12th), which indicated difficulties in the construction market in recent years.

The evaluation result on the competence of construction companies by nation showed that the USA was ranked first, while South Korea was ranked fourth in the overall evaluation since it improved construction competitiveness (fifth to fourth) and design competitiveness (11th to eighth) (Table 3). In particular, the construction competitiveness of South Korea showed that a growth rate of overseas turnover was turned from a negative to a positive rate, the design competitiveness showed that overseas turnover increased and the internationalization rate (proportion of overseas turnover) was improved. The

overall evaluation showed that South Korea was ranked sixth, which was one step up from the previous year. The reason for this increase was due to an increase in competence result of the construction industry by nation (sixth to fourth) despite of a decrease in evaluation results on national infrastructure competitiveness by nation (11th to 12th). Specifically, this was because construction competitiveness (fifth to fourth) and design competitiveness (11th to eighth) were improved particularly in the increase in overseas turnover followed by an improvement concerning growth rate.

In the evaluation on national infrastructure competitiveness by nation, South Korea finished ranked 12th, which was down by one from the previous year, as construction system rose by one (12th to 13th) and infrastructure maintained the 10th rank. Particularly, transparency in policy decision making (18th), corruption awareness index (14th), and logistics performance indexes (14th) were still evaluated poorly, which shows a need for improvement. The design competitiveness of South Korea still remained as the eighth best out of 20 nations, and design productivity (11th rank) and overseas turnover proportion (internationalization) compared to overall turnover (13th rank) were still in the lower half, which indicated that South Korea needs to increase technical skills and market exploitation followed by expanding government support and investment on research and development to improve design productivity and competitiveness.

Table 2. Evaluation results on global construction competitiveness (2014 to 2016)

Rank	2016	2015	2014
1	U.S.A.	U.S.A.	U.S.A.
2	China	China	Germany
3	Spain	Spain	China
4	Germany	Germany	Spain
5	Netherlands	France	France
6	S. Korea	U.K.	Netherlands
7	U.K.	S. Korea	U.K.
8	Japan	Japan	S. Korea
9	France	Netherlands	Japan
10	Canada	Turkey	Sweden
11	Austria	U.A.E.	Ireland
12	Australia	Sweden	Turkey
13	Sweden	Canada	Italy
14	Italy	Italy	U.A.E.
15	Denmark	Denmark	Canada
16	Turkey	Portugal	Denmark
17	Portugal	Greece	Portugal
18	India	Egypt	Greece
19	Greece	India	India
20	Egypt		Egypt

Table 3. Evaluation on competitiveness of global construction infrastructure and competence of construction companies

Category	Index of national construction infrastructure competitiveness				Index of evaluation on national competence in construction companies			
	2016		2015		2016		2015	
	Nation	Score	Nation	Score	Nation	Score	Nation	Score
Rank								
1	U.S.A.	100.00	U.S.A.	100	U.S.A.	100.0	U.S.A.	100
2	Germany	97.02	Germany	98.4	China	86.2	China	81.7
3	Japan	96.40	Japan	97.9	Spain	82.7	Spain	78.6
4	U.K.	95.97	U.K.	96.8	S. Korea	74.6	Turkey	71.5
5	The Netherlands	93.77	The Netherlands	92.9	Italy	71.3	France	68.9
6	Sweden	92.92	U.A.E.	92.3	The Netherlands	67.9	S. Korea	67.6
7	Denmark	91.04	Denmark	92.0	Germany	67.3	Italy	65.4
8	Austria	87.99	Sweden	91.7	Canada	66.1	Germany	61.6
9	France	85.14	Canada	85.2	France	65.4	U.K.	59.0
10	Australia	84.42	France	84.6	Australia	63.4	The Netherlands	57.1

Category	Index of national construction infrastructure competitiveness				Index of evaluation on national competence in construction companies			
	2016		2015		2016		2015	
	11	Canada	83.69	S. Korea	82.2	Greece	62.0	Japan
12	S. Korea	82.11	China	78.0	U.K.	62.0	Canada	52.8
13	China	78.03	Spain	77.7	Austria	60.9	U.A.E.	52.6
14	Spain	77.29	Portugal	73.2	Japan	59.1	Greece	52.3
15	Portugal	68.05	Turkey	67.9	India	57.2	Egypt	51.7
16	Turkey	64.23	Italy	64.6	Sweden	55.7	Sweden	50.6
17	Italy	63.58	India	52.2	Turkey	55.1	Portugal	47.1
18	India	59.62	Greece	47.9	Egypt	52.5	Denmark	40.8
19	Greece	47.50	Egypt	38.8	Portugal	52.0	India	38.7
20	Egypt	39.91			Denmark	48.4		

5. CONCLUSION

The present study aimed to provide a forecast of the global construction market and an entry into the market by analyzing the global construction market and developing an evaluation model and comprehensive evaluation system that can evaluate the level of international competitiveness of Korean companies. The present study conducted an evaluation on global construction competitiveness by combining national construction infrastructure competitiveness and evaluation results on the competitiveness of construction companies by nation based on the evaluation model of global construction competitiveness. The analysis results showed that the USA maintained the top rank continuously (2011 to 2015) while South Korea improved its rank by one from seventh in 2015 to sixth in 2016. This result was obtained because construction and design competitiveness were improved from the previous year, and South Korea has maintained a top 10 ranks since 2011.

Main detail evaluation result is as follows. First, according to the comprehensive building infrastructure competitiveness by country, America ranked first followed by Germany. Korea ranked twelfth, which is the same as that of the previous year. Second, according to the construction company's capability evaluation by country, America ranked first followed by China. Korea ranked fourth, two ranks higher than that of the previous year because its building competitiveness (fifth → fourth) and design competitiveness (eleventh → eighth) improved.

However, Korea is still in the middle rank among 20 countries when it comes to design competitiveness. It is ranked eleventh for design productivity and thirteenth for foreign sales against the total sales (internationalization). Thus, it needs to improve technical power and tap into new markets for improved competitiveness, including increased productivity. To do so, more R&D investment is required.

For the future study, constant improvements on the evaluation index of global construction competitiveness as well as field survey on Chinese construction companies that maintained a high rank constantly in the evaluation on competence of construction companies will be conducted to derive implications, and in cooperation with McGraw-Hill in the USA, will be pursued to strengthen overseas public relations with regard to the evaluation results on global construction competitiveness. Furthermore, big issues in overseas construction will be derived through big data analysis in order to analyze the evaluation results on global construction competitiveness and the reasons for the implications.

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