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## Article

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## Article

# Risk Management as a Success Factor in the International Activity of Spanish Engineering

Alicia Lozano-Torró \*, Tatiana García-Segura, Laura Montalbán-Domingo and Eugenio Pellicer

School of Civil Engineering, Universitat Politècnica de València, 46022 València, Spain; tagarse@upv.es (T.G.-S.); laumondo@upv.es (L.M.-D.); pellicer@upv.es (E.P.)

\* Correspondence: allotor@upv.es

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**Abstract:** During the period between 2008–2013, the internal market in Spain was characterized by economic crisis, the contraction of the demand experienced in a turbulent business environment, and strong competition among companies. This situation forced many of these companies to work abroad. One of the success factors for Spanish engineering companies abroad has been effective risk management, which avoids compromising the company's objectives, market share, or survival. This article examines the importance of risk management in the success of Spanish engineering consulting firms in the international construction market. Ten executives of Spanish engineering companies with international experience were interviewed, analyzing the importance of risk management for them in the success of internationalization compared with other success factors. The results show that the size of the companies interviewed has no influence on the importance that they gave to risk management, but international experience does relate to the assessment of risk identification and management as a success factor. In addition, companies considered risk management a key factor for optimizing their performance in foreign markets.

**Keywords:** Spanish engineering companies; international market; risk management; success factors

## 1. Introduction

### 1.1. Problem Statement

All over the world, the construction industry has increased due to economic globalization, as well as the improving economies of developing countries (Zhao et al. 2017). However, in recent years, this sector has experienced tensions with the significant reduction in prices of basic metals, which have negatively affected the mining sector, as well as political and financial upheavals that contractors have had to face. The uncertainty that was subsequently generated in the international market has been reflected in the statistics published by the Engineering News Record (ENR 2017), according to which international revenues of the 250 largest international contractors from projects abroad reached \$468.12 billion in 2016 compared to \$ 501.14 billion in 2015. Despite this uncertainty, there are different reasons why construction companies have expanded their business to international markets, such as national market saturation, the distribution of risk, or the use of opportunities abroad (Alashwal et al. 2017). However, it must be taken into account that international projects involve more risks than projects carried out in the national market because they take place in environments characterized by political, economic, social, legal, and cultural differences that will affect the performance of engineering companies (CII 2013; Han et al. 2007a; Javernick-Will and Scott 2010; Jin et al. 2013; Park et al. 2014). Therefore, in this turbulent and highly competitive business environment, it is essential to understand the nature of the performance of

companies to help them position themselves within the global market and make strategic decisions (Jin et al. 2013). A study conducted by Hwang and Lim (2012) identified 32 key success factors in the context of construction in Singapore, in order to help foreign contractors that wanted to access this country, and noted that “the success of the construction project depends on a combination of factors related to the human being, factors related to the project, factors related to the management of the project, and even factors related to the external environment”. In addition, Pal et al. (2017) analyzed the success factors in relationship management in international engineering procurement and construction (IEPC) projects carried out by Chinese companies, and Alashwal et al. (2017) identified the success factors of the internationalization of Malaysian contractors.

One of the most prominent success factors in the literature review is the identification and management of risks (Lee et al. 2015). Since contractors must take into account the different environments surrounding international projects, they must anticipate and identify political, social, and economic risks in the host country and determine how these risks influence the success of their projects (Alashwal et al. 2017). In multicultural environments, risk management in construction projects has acquired a key importance in the last two decades (Razzaq et al. 2018), being one of the factors that makes it possible to increase the value of the company (Zhao et al. 2015) and that leads to obtain potential benefits for companies (Pagach and Warr 2011). For this reason, it is important to analyze the value of the identification and previous analysis of the risks to the companies in their international activity. However, although risk management is a critical success factor for construction companies in international markets, in many cases, these companies do not have sufficient knowledge to carry out external risk management, or they tend to ignore the effects that the lack of external risk management can have on their businesses (Low et al. 2009).

### 1.2. Context of Inquiry

In recent years, the Spanish construction sector has become a world leader due to its international activity, diversification, technical development, and business concentration (Seopan 2016). In the case of Spanish engineering firms, the economic crisis that began in 2007 produced a high contraction in demand, an increase in competition, and high difficulties in accessing financing lines (Tecniberia 2011). This situation was aggravated by the high volume of business and the strong expansion of Spanish engineering companies before the crisis period, causing rigid operating structures and great difficulties in adapting to the reduced market (Tecniberia 2011). This rigidity, along with the inflexibility of labor laws in Spain, caused a lack of activity among the companies for a period of six months, resulting in losses comparable to all of the companies' resources, and with it the technical bankruptcy of these companies. Consequently, Spanish engineering companies adopted two strategies: (1) reducing their productive capacity through Employment Regulation Proceedings, which implied the elimination of the technical resources that had been training for years together with the emigration of trained technicians to other countries; and (2) searching for new business opportunities in the national and international markets. Many Spanish engineering companies chose the latter option; in 2011, over 80% of firms lacked export activity, and in 2013, the external sector accounted for more than 85% of the total turnover of companies with international presence, which constituted more than 12% of the total number of companies in the sector (Tecniberia 2013). In this process, understanding how to measure the success of international projects and conditions affecting this success is critical (Alashwal et al. 2017). In this sense, several studies have been carried out to analyze the internationalization of Spanish engineering companies: García-Canal et al. (2002) studied global alliances as a strategy to accelerate the pace of internationalization; Calderón García et al. (2007) focused on the entry mode choice as part of the internationalization strategy of Spanish companies, and Goñi (2008) identified several variables (reasons, entry modes, competitive advantages, and barriers, among others) of the internationalization of Spanish engineering companies in the period 1993–2008. However, there are no studies that analyze the importance that risk management implies for Spanish engineering companies compared to the rest of the success factors in their internationalization.

### 1.3. Goals of the Research

To cover this knowledge gap, the following research objectives have been raised. (1) Identify, through a literature review, the success factors that contribute to the increase of the international performance of construction companies, with a special emphasis on effective risk management. (2) Assess the relevance of risk management in the success factors for Spanish engineering companies, through interviews with 10 executives of engineering companies with international experience. The choice of this context is due to different reasons. (a) There have been no previous studies that analyze the importance of risk management within the success factors of Spanish engineering companies. (b) The situation of economic crisis in Spain has caused the necessary and sudden internationalization of these companies. (c) There is an opportunity to access the main data related to the international activity of several Spanish engineering consulting companies.

The results of this research will help companies in the construction industry increase their knowledge of the success factors and include risk management in the definition of strategies related to their international activity.

## 2. Research Method

The first part of the study tries to identify the success factors in the internationalization of construction companies. To do this, grounded theory (Charmaz 2006; Glaser [1978] 2002) has been used to collect and analyze data. This research is part of an exploratory study that does not attempt to develop a theory, but rather uses the model of the concept indicator (Glaser 1978) to collect, code, and categorize the variables found.

The second part of this research aims to analyze the relative importance that the engineering companies provide to risk management with respect to other success factors in a context of economic crisis, as is the case of Spain.

Based on the variables identified in the literature, and for the purpose of their validation, a semi-structured interview (Woodside 2010) was designed as a qualitative research tool and given to 10 executives of Spanish engineering consulting firms. It was chosen for its accessibility through non-probabilistic sampling of convenience and because it was suitable for carrying out exploratory studies such as the one developed in the present investigation (Carrión 2013). The interview comprised two parts: (1) a characterization of the interviewee, and (2) the questions. To determine the importance of the success factors, an 11-point Likert-type scale was used (where 0 = 'totally disagree' and 10 = 'totally agree'), which was mainly motivated by the high number of existing variables. The selection of engineering companies has tried to cover different company sizes, turnover volumes, and degrees of internationalization. Another objective has been to interview companies that offer engineering services in different areas of activity and in different countries around the world. Table 1 shows how different characteristics of the companies have been covered by the selected sample:

**Table 1.** Characteristics of the companies covered by the selected sample. SME: small and medium-sized enterprises.

Characteristic		Engineering									
		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
Size	Multinational				X				X		
	SME			X		X	X	X		X	X
	Micro	X	X								
First year of the internationalization		2012	2013	2011	1975	2007	2006	2003	2005	2011	2008
Activity areas	Civil engineering		X	X	X	X	X	X	X	X	X
	Building			X	X	X	X	X	X	X	X
	Environmental projects		X	X	X	X	X		X	X	
	Industry and energy	X		X	X				X	X	
	Technological services	X					X		X		

The influence of these characteristics on the importance given by engineering companies to risk management has been already analyzed. Several studies take into account the influence of specific characteristics of companies on their international performance. In the field of corporate finance, the size of a company is considered a fundamental characteristic that affects the results of the research (Dang et al. 2018). For example, Gabaix and Landier (2008) and Gabaix et al. (2014) observed the effect of the size of a company on the differences in salaries of managers according to their competence, concluding that larger companies tend to have more qualified managers (Himmelberg and Hubbard 2000). In the construction sector, Sung et al. (2017) considered the size of a company as one of the factors that influence the relationship between the diversification of activities and the business performance of international contractors. Finally, Panibratov (2009) observed the influence of the international experience of companies on the degree of control over the choice of entry mode into the host country.

Once the 10 interviews were carried out, they were transcribed to a spreadsheet; then, the statistical program SPSS version 24 was used to analyze the data obtained. The reliability of the measurement scale, or the degree to which the measurements are free of random error, was measured by determining its internal consistency with Cronbach's alpha and analyzed for the constructs that constitute the 11-point Likert-type questions. This index is calculated from the correlation between the items using the following formula:

$$\alpha_{\text{std}} = kp / (1 + p(k - 1)), \quad (1)$$

where  $k$  is the number of items, and  $p$  is the average of the linear correlations between each of the items. There will be  $2/(k(k - 1))$  pairs of correlations. This index presents values between zero and one, considering acceptable values higher than 0.7. Values below 0.7 mean that the instrument being evaluated presents a heterogeneous variability in its items, and therefore will lead us to wrong conclusions. Table 2 shows the result obtained for the Likert question related to success factors (0.94), which is a result that can be considered excellent.

**Table 2.** Value of Cronbach's alpha for the Likert-type question related to success factors.

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Elements	No Elements
Success factors	0.940	0.938	18

### 3. Review of Success Factors in International Construction

In the analysis of internationalization success, the theory of attribution establishes a theoretical basis in which the ability to adapt and expand from one stage to the next in the internationalization of a company is derived from the evaluation and management by the managers of the factors that led to the firm's past successes (Cort et al. 2007). This approach, which is known as critical success factors (CSFs), was first developed by Rockart (1979), who defined CSFs as "areas in which the results, if satisfactory, will guarantee [a] successful competitive performance for the organization". Saraph et al. (1989) considered them "those critical areas of management planning and action that must be practiced to achieve effectiveness". From the perspective of strategic management, traditional success factors include the creation of project teams, the optimization of the capabilities of the general project team, and the adequate management of project risks and their relevant environment, emphasizing cooperative relationships with stakeholders (Cleland and King 1998; Gareis 1991).

Risk management is one of the success factors on which this study is focused, with the aim of determining the importance of this factor for Spanish engineering to obtain international success. In addition, the relative importance of risk management with respect to other success factors will be observed. For this purpose, an extensive literature review related to success in internationalization, and published in the period from 1976 to 2017, has been carried out. In the following sub-sections, each success factor is described and justified.

### 3.1. Identification and Prior Analysis of Risk Factors

In the first place, it is important to define the terms “risk” and “risk management”. According to [Lupton \(1999\)](#), risk in everyday language is used to refer to danger, threat, or harm. Textbooks related to finance define “risk” as a set of results that arise from a decision to which probabilities can be assigned ([Watson and Head 1998](#)). Regarding “risk management”, this concept is about making informed decisions ([Kliem and Ludin 1997](#)). The ISO Guide 73 on risk management vocabulary defines the ‘risk management process’ as the systematic application of policies, procedures, and management practices to communication activities, consultation, context establishment, and the identification, analysis, evaluation, treatment, monitoring, and review of risks ([ISO 2009](#)). The ‘establishment of context’ implies the identification of external and internal parameters that must be considered in risk management, and determination of the scope and risk criteria for the management policy of risk ([Yildiz et al. 2014](#)). The Project Risk Analysis and Management (PRAM) Guide, compiled by members of the Special Interest Group on Risk Management ([APM 2007](#)), stated that the implementation of a risk management system helps in a more realistic planning in terms of time and costs, facilitates a greater understanding of the risks, provides a view of the risks that can assist in decision making, allows a more efficient and effective management of the risks, contributes in the registry of statistical data of historical risks that will help in future actions, and facilitates greater risk taking. [Sadgrove \(1996\)](#) added that risk management helps the company avoid additional costs and interruptions in its activities, and identifies the risks that are worth pursuing and those that should be avoided. According to [Jones \(2000\)](#), risk management can be divided into four stages: (1) identification of the sources of risk, (2) quantification of risk sources, (3) development of the risk response system, and (4) estimation of the residual risk of the project.

In the business environment, the economic uncertainty and the consequences of the global financial crisis have led companies to increase their interest in the management and minimization of risks ([Manes-Rossi 2017](#)), for example, by encouraging corporate social responsibility initiatives ([Dunbar et al. 2017](#)). In particular, the international activity in the construction sector is sensitive to world events, as they involve political, financial, cultural, and legal risks ([Gunhan and Arditi 2005](#)) and cause uncertainty in the host construction markets, negatively affecting the implementation of international projects ([Deng et al. 2014](#)). As a result, many studies have examined the importance of risk management in the construction sector. [Razzaq et al. \(2018\)](#) analyzed the main external risks that affect projects carried out by construction companies in Pakistan, with the objective of managing them properly. [Hwang et al. \(2017\)](#) identified and assessed the main risks in the formation of International Construction Joint Ventures (ICJV) and the preferences in the allocation of risks. [Liu et al. \(2016\)](#) explored the risk pathways in international construction projects undertaken by Chinese contractors, and examined the effects of risks on project objectives.

Consequently, risk management has become the central element of successful project management, particularly in an environment of uncertain international construction ([Abdelgawad and Fayek 2010](#)), and a key factor in the winning strategies of any company, including international joint ventures ([Hsieh et al. 2010](#)). Therefore, effective risk assessment and management will be critical to achieving success in international projects ([Zhao et al. 2015](#); [Zhi 1995](#)), thereby constituting an indicator of project performance ([Ogunlana 2010](#)). There is a direct relationship between effective risk management and organizational success. Successful risk management not only reduces risk, it also helps to achieve or maintain a competitive advantage to improve the performance of international construction companies ([Deng et al. 2014](#)). As an example, the contractor’s ability to identify and mitigate technical and programming risks is one of the main factors that influence the technical performance of projects in developing countries ([Frimpong et al. 2003](#); [Jafari 2013](#)).

In this way, construction companies must perform a constant analysis of the risks that may arise in their international activity to avoid compromising the company’s objectives, market share, or even its long-term stability ([Ashley and Bonner 1987](#)). Specifically, the identification of political risks, their quantification, and their management are key factors for the success of internationalization



in the construction sector (Ashley and Bonner 1987; Baloi and Price 2003). One way to invest in the improvement of risk management is through companies developing a high capacity to obtain scarce and valuable resources, thereby reducing the likelihood and consequences of risks during the implementation of the project (Du et al. 2016). Another way is through the ability to learn and innovate, because they can facilitate the continuous improvement of the level of risk management through the use of advanced techniques, innovative technologies, and optimal management strategies (Du et al. 2016). Finally, partnership allows project members to share information, which will improve communication and enable external organizations to frequently provide valuable information on the operation of risk management (COSO 2004). This in turn can eliminate uncertainties and help contractors make optimal decisions that reduce missed opportunities when addressing project risks (Rahman and Kumaraswamy 2002). In this way, high organizational capacity and better risk management will lead to higher project performances (Du et al. 2016).

### 3.2. Public Support for Foreign Direct Investment

It is essential to create support programs for internationalization to increase the level of international commitment in companies that are already active outside of their borders (Martínez-Maya 2011). A specific case of support to the international activity is the one carried out by the Chinese government to local construction companies (Zhao et al. 2009).

### 3.3. Need to Develop an Internationalization Plan

To address successful internationalization, several authors, such as Franco Lasús (2011), defended the need to prepare an internationalization plan in advance. In the specific case of small and medium-sized enterprises (SMEs), internationalization models establish a gradual process of international activity that will favor their success, starting with entry modes such as direct exportation, and evolving into other entry modes as experience and knowledge are acquired (Martínez-Maya 2011). Experience in international project management is a factor of success in international activity (Gunhan and Arditi 2005). One of the key aspects is the planning of staff availability, because it is not easy to have the right people when they are necessary (Gunhan and Arditi 2005). Long-term financial planning is another aspect to consider (Cheng and Yu 2008; Han et al. 2007a; Korkmaz and Messner 2008), and it will be essential to have control procedures to manage deviations from the plan (Han et al. 2007b).

### 3.4. National Sensitivity

A factor that is considered essential to success in international activity is a company's ability to adapt to the requirements of the destination countries, the most important of which are the government requirements or the preferences of clients (Franco Lasús 2011). To achieve this objective, knowledge of the systems and policies of destination countries will be essential (Jin et al. 2013). Based on Ghoshal and Bartlett's (1990) model of multinational companies, organizations must be sensitive to the local environment and adapt to the diverse locations in which they operate (Javernick-Will 2013). It also will be necessary to establish close interactions with the local society through knowledge of social and cultural customs that may affect the work environment (Adnan et al. 2011). According to Barco (1994), one way to carry out a successful project is to have a manager with international experience and knowledge of the language and cultural customs of the country. From a strategic viewpoint, location is defined as the capacity of an organization to access and use processes, services, and resources in the host country (Wailerdsak and Suehiro 2002). In this way, international contractors will establish a strong link between the project (internal team and stakeholders) and the surrounding local environment through the creation of communication and networking links. Some studies consider the location in the host country as one of the main strategies of the contractor to achieve success in the global market (Jung et al. 2011; Neves and Bugalho 2008).

### 3.5. Ability to Adapt to the Demand of the Sector

The uniqueness of the services offered and the lack of adaptability to different markets is perceived by managers as an obstacle to success in the international activities of their companies (Cort et al. 2007). Therefore, it is important to develop international activity that is in line with the requirements of the sector of the destination country (Franco Lasús 2011).

### 3.6. Right Marketing Campaign

A factor related to the international success of a company is the amount of money invested in the commercialization of its products (Arditi and Gutierrez 1991), as well as the education, support, and participation of all the employees in the company's marketing plan (Versau 1986). The allocation of more resources to marketing activities, both functionally and operationally, will improve sales growth and allow the company to achieve competitive superiority. In addition, focusing on marketing activities will improve the company's reputation and expand its customer portfolio, thus leading to an increase in sales growth (Ercan and Koksall 2016).

### 3.7. High Market Knowledge

It is important to have the market information in which a company wants to work. One way to obtain it is by hiring the services of a local company that provides them or participating in trade missions organized by associations or even by the government (Gunhan and Arditi 2005). The acquisition of local knowledge is essential to internationalization (Javernick-Will 2013), because entry into the wrong market or at an inappropriate time can lead to failure in international activity (Cheng and Yu 2008; Han et al. 2007a; Korkmaz and Messner 2008). Han et al. (2007a) emphasized the importance of considering differences in the market and collected information from the host countries from the bidding stage to favor obtaining large profits in international construction projects.

### 3.8. Global Efficiency

In international development, a company must have the capacity to improve its competitive advantages, economies of scale, and forms of management, which means that it must have global efficiency (Franco Lasús 2011). In this sense, managers rely on the success of their companies if they are able to improve some competitive advantages, such as the prices of services or the use of economies of scale (Cort et al. 2007).

### 3.9. Innovation, Learning, and Transfer

This variable is related to the capacity for innovation and learning developed by a company and transferred to its subsidiaries or vice versa (Franco Lasús 2011), constituting innovation as a key resource for accessing foreign markets (Cassiman and Golovko 2011; Knight and Cavusgil 2004; Rodríguez and Rodríguez 2005).

### 3.10. Organizational Capacity

According to Madhok (1997), entry in a foreign market is more conditioned by the organizational capacities of a company than by transaction costs, which is why companies that decide to undertake internationalization must pay attention to developing these capacities. Success in a company's international activity involves impregnating, in all the human resources of the different established subsidiaries, the corporate culture or ways of doing business, fostering cohesion and unity (Franco Lasús 2011). One of the main competitive advantages of Chinese companies was to achieve a high degree of organization (Martin et al. 2017).



### 3.11. Continuous Communication with the Customer

A good relationship with customers is a success factor in relation to obtaining profitability in international projects (Han et al. 2007b). According to Raftery et al. (1998), the ability to maintain long-term relationships with political powers favors the company's success abroad. In some countries, such as those in the Middle East, it is a priority to establish good communications and gain the trust of customers to access the market (Adnan et al. 2011). Likewise, understanding the customer's requirements is a factor that will contribute to the success of an international project, increasing its quality and obtaining customer satisfaction (Ling et al. 2006, 2008).

### 3.12. High Previous Experience in the National Market

To access certain international tenders, it is a fundamental requirement to have or justify previous experience in similar works (Medall Vela 2006). The company's history will contribute to the success of its internationalization (Flanagan 1994; Ling et al. 2005; Zhao and Shen 2008).

### 3.13. High Financing Capacity

If a company has financing capacity, it is likely to increase its international activity (Arditi and Gutierrez 1991). From the viewpoint of the managers, if they perceive a shortage of financial resources, their expectations of achieving success in international activity will fall (Cort et al. 2007). A strong financial capacity of companies will be a key factor for the success of their international activity (Cheng and Yu 2008; Flanagan 1994; Gunhan and Arditi 2005; Han et al. 2007a; Korkmaz and Messner 2008; Ling et al. 2005; Raftery et al. 1998) because, among other aspects, they can withstand delays in customer payments while financing part of the costs.

### 3.14. Carry-Over Effect by Large Companies

In the case of SMEs, their international activity can be favored by following a large client company toward the foreign markets to which it is addressed (Martínez-Maya 2011).

### 3.15. Possibility of Access through Joint Ventures

The investigation of entry strategies in the market is fundamental to the success of international contractors. Establishing alliances is one of the most effective ways to operate in international markets (Alashwal et al. 2017). The formation of joint ventures reduces the risks of international activity, and constituted an important success factor in international companies in the 1980s (Arditi and Gutierrez 1991). Similarly, participation by companies in international networks (Gunhan and Arditi 2005; Raftery et al. 1998) or the disposition of a local partner (Aznar et al. 2017) will favor their international performance.

### 3.16. Adequate Selection of Partners in Cases of Contractual Agreements

When joint investments are established, the critical factors that will condition the success of a project are reputation, trust among partners (Girmscheid and Brockmann 2009; Huemer 2004), experience, personal knowledge, commitment, the management of human resources, and shared objectives (Adnan et al. 2011). If a relationship of trust between partners is established, this can lead to closer collaboration, lower transaction costs, lower risk in the supply chain, and better project performance (Beach et al. 2005; Du et al. 2016; Manu et al. 2015).

### 3.17. International Managerial Mentality and International Profile of Human Resources

One of the components of the managerial function that is considered essential in the competitiveness of a company is the international orientation (Han et al. 2007b), because it constitutes an inexhaustible source of ideas, innovations, and adaptations (Veciana and Genescà 1994), as well as motivation for learning about other cultures (Barco 1994) or cultural intelligence (Ang et al. 2007).

The role of the management team is key in international activity (D'Angelo et al. 2013; Perlmutter 1969), and it is important to choose managers with expectations of success to assess the company's position in relation to the causal factors of internationalization success and develop strategies to improve the position of the company in the markets (Cort et al. 2007). As an example, in the internationalization of construction companies in Malaysia, a key factor was the international capacity of the entrepreneur (Spence and Crick 2006) to follow the international model of entrepreneurship (Abdul-Aziz and Wong 2010).

On the other hand, the factor related to human resources is considered as important in international activity (Cuervo and Pheng 2003; Dulaimi et al. 2004; Flanagan 1994; Gunhan and Arditi 2005; Ling et al. 2005; Zhao and Shen 2008). Within the programs of support for companies in their internationalization, aspects related to the formation of profiles with an international mentality (Abdul-Aziz et al. 2012) and the compression of cultural diversity are included (Dulaimi et al. 2004). The staff of a company is probably the most important resource in a competitive environment and the key to its success. International construction business requires additional talents in individuals, such as foreign languages, familiarity with the region, the ability to adapt to foreign cultures, and strong emotional characteristics (Gunhan and Arditi 2005).

### 3.18. Need to Have A Subsidiary in the Host Country

According to Ling et al. (2005), one of the entry modes that leads to the success of companies is establishing a subsidiary in the destination country, as well as branches and joint ventures with local companies. There are countries, such Gulf countries, in which international success is conditioned by the establishment of a local office and by maintaining contact with the locals who can act as sponsors of the company in the country (Adnan et al. 2011).

## 4. Results and Discussion

This section presents the results of the interviews and discusses them. In the first place, the characterization data of the companies interviewed are obtained in terms of size, turnover, and activity areas. Regarding the internationalization of companies, they are classified according to their internationalized activity areas, the year in which they started their international activity, and the destination countries where they have accessed. Subsequently, results of the Likert-type question are presented, relating to the importance for the companies of the different success factors and comparing the relative importance that risk management has with respect to the rest of the factors. Finally, the characteristics shared by engineering companies that attach similar importance to risk management as a factor of success in their internationalization have been observed.

### 4.1. Sample Characterization

Table 3 shows the number of employees of each company interviewed, both inside and outside of Spain.

In this research, the number of employees and the annual turnover volume have been used to rank companies by their size, according to Annex I of Regulation (EU) No. 651/2014 of the European Commission (Table 4). The number of employees and total sales are measures of company size that have been used in various studies, such as those related to corporate finance (Dang et al. 2018). Total sales measure competition in the product market, and the number of employees can be used by researchers when the main measures (total assets, total sales, and market value equity) are not available or are irrelevant. Likewise, Hart and Oulton (1996) suggested that choosing which measure to use depends on the availability of the data, as is the case of the present research.

As can be seen from the characterization data and the classification of SMEs (Table 4), two of the companies interviewed are multinationals (E4 and E8), and the rest are SMEs, two of which are microenterprises (E1 and E2). Company E3 could be considered a large company because of the current volume of employees, but it will be treated as an SME due to its turnover and the temporary situation

that has required a high hiring of personnel to deal with a job abroad. Company E7 was an SME that had to drastically reduce its number of employees due to the economic situation. Finally, company E10 entered into an insolvency procedure in 2014, with a total of 120 employees.

**Table 3.** Number of employees and turnover: in Spain and abroad.

Engineering	Number of Employees			Turnover		
	In Spain	Abroad	% Employees Abroad	National	International	% International Turnover
E1	1	0	0.0	0	0	0.0
E2	1	0	0.0	58,000	7000	10.8
E3	55	300	84.5	1,400,000	300,000	17.6
E4	1062	1419	57.2	31,000,000	188,000,000	85.8
E5	44	26	37.1	2,500,000	5,700,000	69.5
E6	84	26	23.6	3,000,000	600,000	16.7
E7	2	0	0.0	28,444	0	0.0
E8	2100	400	16.0	94,183,477	132,303,240	58.4
E9	10	0	0.0	178,175	111,967	38.6
E10	12	108	0.0	300,000	5,700,000	95.0

**Table 4.** Classification of companies (Source: Annex I of Regulation (EU) No. 651/2014 of the European Commission, 2014).

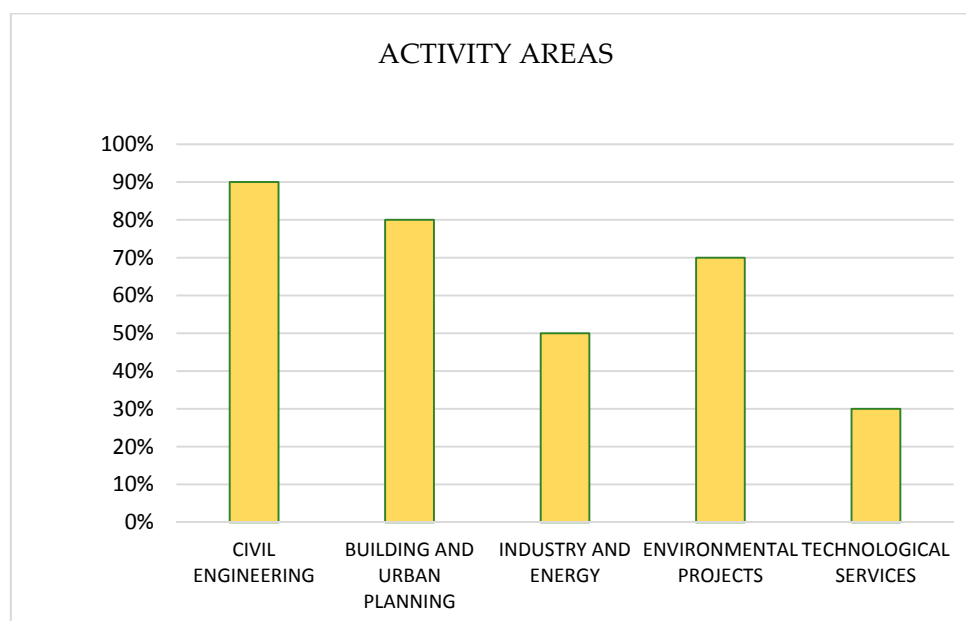
Company Category	Staff Headcount	Turnover	Balance Sheet Total
Medium-sized	<250	<= € 50 m	<= € 43 m
Small	<50	<= € 10 m	<= € 10 m
Micro	<10	<= € 2 m	<= € 2 m

In terms of turnover, there are four companies in which the volume of external turnover in a year exceed domestic sales (E4, E5, E8, and E10), with percentages ranging between 58–95% of external turnover. The rest of the companies remain within similar values of international turnover percentage at between 11–18%. Null values correspond to defaults on payments (E7) or newly created companies that do not yet have international turnover (E1).

Regarding international activity, only in two cases is the volume of personnel abroad higher than the national (E3 and E4). This is the case of company E3, which is an example of the phenomenon described in the previous paragraph. In the other companies, the main volume of human resources is maintained in the home country.

Figure 1 shows the services offered by the companies interviewed. The majority of the companies are dedicated to civil engineering (90%), followed by companies that carry out activities related to building and urban planning (80%), and companies that carry out environmental projects (70%).

Another objective of the interview has been to obtain data from companies with different degrees of internationalization. Therefore, one of the questions asked concerned the year of the beginning of their international activity. As can be seen in Table 5, the companies interviewed (E1, E2, E3, E5, and E10) started their international activity once the Spanish economic crisis began, and the rest started their international activity between the years 2003–2006. The early internationalization of the E4 company in 1975 stands out. These results suggest that most companies decided to internationalize because of the economic crisis in Spain in 2007. Some companies decided to go abroad in the previous years in view of the forecasts that announced the arrival of a crisis, while others postponed their international activity at the beginning of this crisis period.



**Figure 1.** Percentages of activity areas of the companies interviewed.

**Table 5.** Year of beginning of the international activity of the companies interviewed.

Engineering	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
Year of beginning of the internationalization	2012	2013	2011	1975	2007	2006	2003	2005	2011	2008

Table 6 shows the areas of activity in which the companies interviewed have internationalized, distinguishing between those that have led to better or worse results. Based on the results obtained, the building area is repeated as one of the worst results, because it is a highly regulated activity associated with the particularities of each country. In contrast, conventional areas of civil engineering and technology have led to better results. This is due in large part to the experience and knowledge acquired by companies in the domestic market because they are areas with a high component of specialization and innovation or, in the case of civil engineering, there is high demand in certain destination countries and low implementation costs.

**Table 6.** Internationalized activity areas and results.

Engineering	Activity Areas	
	Best Results	Worst Results
E1	Renewable energy	---
E2	Urban drainage	---
E3	Hydraulics area	Architecture
E4	Building technology and transport infrastructure	---
E5	Projects and construction supervision	Laboratory and geotechnics
E6	Roads and urbanizations in developing countries and small contracts in the technological area	Large contracts in stable countries with multilateral financing
E7	---	Building and urbanizations
E8	Industry and energy and civil and infrastructure area	Architecture
E9	---	Building
E10	Integral projects	Isolated structural calculations

Destination countries that the interviewed companies have accessed and that have provided the best and worst results, indicating the reasons, are included in Table 7. From the analysis of the table,

it can be seen that countries that have provided the worst results are those from North and Central Africa, Romania and Brazil, which was mainly due to issues related to corruption, legal uncertainty, and irregularities, as well as Ecuador for the reduction of the market. For reasons of proximity and language advantage, Latin American countries and Italy stand out, while Saudi Arabia has produced good results due to the valuation of the services received.

**Table 7.** Destination countries and results.

Engineering	Destination Countries	
	Best Results (Reasons)	Worst Results (Reasons)
E1	Italy (proximity and better knowledge)	Brazil (legal irregularities)
E2	Colombia (activity area of interest)	
E3	Latin America (language advantage, need for qualified technicians, and public works)	Central Africa (high corruption and legal insecurity)
E4	Saudi Arabia (good valuation of services)	Libya, Algeria, Kenya (high risks) and Romania (corruption and legal insecurity)
E5	Colombia, Mexico, and Romania	China (insufficient knowledge of the country and lack of experience), Morocco (defaults), and Ecuador (stoppage of contracts)
E6	Colombia, Mexico, Peru, and Algeria	Uzbekistan, Ecuador, and Nicaragua
E7	-----	Algeria
E8	Mexico, Saudi Arabia, and South America	North Africa (political instability and cultural difference)
E9	-----	Romania (high corruption), Panama (impossibility to sign, work is purchased, not engineering, low fees), and Angola (legal and citizen insecurity)
E10	Georgia, Slovenia, Panama, and Colombia	Saudi Arabia (late payments)

#### 4.2. Importance of Risk Management

Finally, to analyze the degree of agreement of the companies with the success factors in their internationalization, they were asked an 11-point Likert-type question, where 0 = ‘totally disagree’ and 10 = ‘totally agree’. Table 8 shows the responses of each company with respect to each success factors. It shows that companies E4 and E7 have given greater importance to management and the identification of risks. Companies E5, E9, and E10 have valued it with eight points.

The profile of the companies that give the best score to the identification and prior analysis of the risks is shown in Table 9, while Table 10 shows the characteristics of the two companies that have scored the lowest risk management. Considering the classification of companies according to the European Commission (Table 4), the companies that have the highest score to risk management are SMEs (E5, E7, E9, and E10) and the multinational E4, while the companies that have the least valued risk management are considered as an SME (E3) and a microenterprise (E2). Considering that the other microenterprise (E1) has awarded seven points to risk management and the other multinational (E8) has valued it with six points, it can be concluded that company size does not seem to influence the valuation of risk management, always taking into account the limitation that the size of the sample obtained implies.



**Table 8.** Degree of agreement/disagreement of the companies interviewed regarding the success factors.

Success Factor	Engineering									
	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
Identification and prior analysis of risk factors	7	0	5	10	8	6	10	6	8	8
Public support for foreign direct investment	0	0	1	2	4	4	10	2	0	9
Need to develop an internationalization plan	6	0	1	8	8	10	5	6	4	9
National sensitivity	7	0	7	10	8	8	10	8	4	10
Ability to adapt to the demand of the sector	7	0	6	10	8	6	10	8	2	10
Right marketing campaign	0	0	2	0	10	4	0	2	1	7
High market knowledge	5	0	2	5	8	6	10	7	7	8
Global efficiency	7	0	3	5	7	7	7	4	2	7
Innovation, learning, and transfer	9	0	3	5	8	6	5	7	7	8
Organizational capacity	8	0	6	10	8	8	5	8	2	9
Continuous communication with the customer	9	0	8	10	9	9	10	9	5	9
High previous experience in the national market	10	0	7	5	9	9	10	7	2	6
High financing capacity	9	0	2	5	7	9	8	7	10	9
Carry-over effect by large companies	8	0	1	2	4	9	5	8	8	3
Possibility of access through joint ventures	0	0	0	6	4	7	10	4	5	8
Adequate selection of partners in case of contractual agreements	0	8	6	7	8	9	10	7	7	10
International managerial mentality and international profile of human resources	8	10	5	10	9	8	8	8	8	10
Need to have a subsidiary in the host country	4	0	7	8	9	6	8	4	8	7

If the data of the year of initiation of internationalization are observed, then the companies that best score risk management began their internationalization between 2003–2011, apart from company E4, which started an early internationalization in 1975. Among them, those that started their internationalization later (E9 in 2011 and E10 in 2008) have abandoned international activity (E9) or have completely finished their activity as an engineering company (E10). On the other hand, companies that do not consider risk management as important as the previous ones started their internationalization later: in 2011 for company E3, and in 2013 for company E2. In risk management, companies that access the international market must overcome several barriers (Du et al. 2016), including: a lack of incentives for better risk management, lack of a formal risk management system, ineffective implementation of risk control strategies, lack of historical data for the analysis of risk trends, and insufficient information of the project for decision making. Based on the results obtained, companies that have internationalized later and do not give importance to risk management may be due to the lack of formal risk management systems in their projects, while companies that value risk management, but experience internationalization late, can be attributed to insufficient knowledge of the international activity to carry out an effective risk management that leads to the success of its internationalization. In addition, it should be considered that this late internationalization has occurred after the beginning of the Spanish crisis in 2007, when companies experienced a significant reduction in their human and financial resources. According to Zhao et al. (2015), this reduction is the main obstacle for implementing a risk management system in companies.

Considering the external turnover data, the companies that least valued risk management had an external turnover of 10.8% for company E2 and 17.6% for company E3 compared with the total annual turnover, while companies that awarded the highest score to risk management have percentages between 38.6–95% of international turnover. A particular case is company E7, which, despite having internationalized before the economic crisis began, did not obtain good results in its international activity, and has not yet achieved external turnover. Due to this, and taking into account again the limitation of the sample size, it seems that the companies that started their internationalization before and have a higher percentage of foreign turnover give more importance to risk management to achieve success in their international activity; therefore, the degree of internationalization of the companies would directly relate to a greater assessment of risk management as a success factor.

**Table 9.** Characteristics of the companies that give the highest score to risk management.

Engineering	Classification of Companies	External Turnover (%)	Year of Beginning of the Internationalization	Internationalized Areas with the Best Results	Destination Countries with Best Results
E4	Multinational	85.8%	1975	Building technology and transport infrastructure	Saudi Arabia
E5	SME	69.5%	2007	Projects and supervision of works	Colombia, Mexico, and Romania
E7	SME	0%	2003		-----
E9	SME	38.6%	2011		-----
E10	SME	95%	2008	Integral projects	Georgia, Slovenia, Panama, and Colombia

Regarding the best and worst internationalized areas, there are only common characteristics in the two companies that minimize the importance of risk management (E2 and E3) that have obtained better results in hydraulic activities developed in Latin America.

Finally, the other aim of the research is to compare the importance of risk management for the companies interviewed against other success factors. For this, the following descriptive statistics were obtained: mean, median, and standard deviation from the answers to the Likert question related to the success factors (Table 8). Table 11 shows the results obtained, in which it is observed that the five success factors best valued by companies are: (a) training and the international profile of human resources, (b) continuous communication with the client, (c) national sensitivity or ability to adapt to the country of destination, (d) appropriate selection of partners, and (e) identification and previous analysis of risk factors. From a total of 18 success factors in international activity, Spanish engineering companies place risk management in fifth place. Some of the success factors best valued by companies are related to the availability of human resources and trained partners, whose limitation, according to Zhao et al. (2015), implies the difficulty of implementing a risk management system in companies. It is worth mentioning that except for the E2 company, which only considers these two factors important in the achievement of success, companies that have valued the availability of human resources and qualified partners more highly have rated these factors with a maximum of three points more than risk management (E6 company). The rest of the companies have valued them at one or two points more than risk management (E3, E5, E8, and E10 companies). The other two factors that are better valued than risk management are related to the destination country: national sensitivity and communication with the client. However, in a total of 11 points, the E3, E6, E8, and E10 companies have rated the national sensitivity at only two points more than the risk management, and E3, E6, and E8 companies have valued communication with the customer at three more points, which does not mean a high differentiation with respect to the assessment of risk management.

**Table 10.** Characteristics of the companies that give the lowest score to risk management.

Engineering	Classification of Companies	External Turnover (%)	Year of Beginning of the Internationalization	Internationalized Areas with the Best Results	Destination Countries with Best Results
E2	Microenterprise	10.8%	2013	Urban drainage	Colombia
E3	SME	17.6%	2011	Hydraulics area	Latin America

**Table 11.** Descriptive statistics of the answers about the success factors.

Descriptive Statistics Success Factor	Mean	Median	Standard Deviation
Identification and prior analysis of risk factors	6.80	7.50	2.898
Public support for foreign direct investment	3.20	2.00	3.645
Need to develop an internationalization plan	5.70	6.00	3.302
National sensitivity	7.20	8.00	3.120
Ability to adapt to the demand of the sector	6.70	7.50	3.401
Right marketing campaign	2.60	1.50	3.438
High market knowledge	5.80	6.50	2.974
Global efficiency	4.90	6.00	2.558
Innovation, learning, and transfer	5.80	6.50	2.700
Organizational capacity	6.40	8.00	3.204
Continuous communication with the customer	7.80	9.00	3.084
High previous experience in the national market	6.50	7.00	3.375
High financing capacity	6.60	7.50	3.307
Carry-over effect by large companies	4.80	4.50	3.293
Possibility of access through joint ventures	4.40	4.50	3.534
Adequate selection of partners in case of contractual agreements	7.20	7.50	2.860
International managerial mentality and international profile of human resources	8.40	8.00	1.506
Need to have a subsidiary in the host country	6.10	7.00	2.726

## 5. Conclusions

To face the risks and minimize the uncertainty generated by international activity, engineering companies in the construction industry must acquire knowledge of the success factors that have the greatest influence on international activity. Through a review of the literature, 18 success factors have been identified, including the identification and prior analysis of risk factors. Subsequently, with the aim of determining the importance that companies with international activity give to risk management with respect to other success factors, this study particularizes the analysis in Spanish engineering companies with international activity. The situation of economic crisis experienced in Spain since 2007 has caused engineering consulting companies to begin to access the foreign market to ensure their survival. Subsequently, interviews have been conducted with 10 managers of Spanish engineering companies with international activity, in which they have been asked about the importance of the identified success factors for them, and especially the effective risk management. Taking into account the valuation of this factor, it is observed that although the size of the company has not been a determining factor in the valuation, there is a correlation between the international experience of the company interviewed and a better assessment of risk management. Likewise, and in comparison with other factors of success, risk management is the fifth most valued factor, behind the international managerial mentality and international profile of human resources, continuous communication with the client, national sensitivity or ability to adapt to the destination country, and the appropriate selection of partners in the case of contractual agreements.

This research provides a list of 18 internationalization success factors that may be used by companies in their international construction activity. In addition, this research broadens the existing knowledge on the internationalization of Spanish engineering companies by identifying the importance of risk management for the selected sample with respect to the rest of the success factors. Considering the limitation of the size of the selected sample, these results will be especially useful for engineering companies that intend to start in the international market or have little international experience, regarding the implementation of their strategies to obtain international success. Another limitation of the study is the Spanish context, so future research should take into account the particularities of the context that they intend to analyze; although, in similar contexts of economic crisis, the results obtained can be more easily extrapolated. Based on this study, future research could be carried out to further knowledge in risk management systems developed by companies in their international construction activity, and analyze how these systems influence the success of their businesses.

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