Assessment of Opportunities for Construction Enterprises in European Union Member States Using the MULTIMOORA Method

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Abstract

A large part of the construction sector consists of small and medium enterprises (SMEs), which play a key role in the dynamics of the European economics. Thus, to help them achieve their growth potential, the European Union (the EU) has been channeling all possible efforts towards promotion of entrepreneurship and development of more advantageous business conditions for small enterprises. The article addresses the relationship between the significance of construction sector actors for economic development on the national scale and business development potential in the European states. The business development potential of the EU member states is suggested to be assessed with the help of the decision-making tool MULTIMOORA. To assess and rank the countries, eight integrated criteria have been selected for this particular purpose. MULTIMOORA is a quantitative method, which compares multiple and optimum objectives, expressed in different units, on as non-subjective basis as possible. MULTIMOORA is composed of three parts: the Ratio System, the Reference Point and the full Multiplicative Form, all of which are of the same importance and each in control of two others. With the help of results and the theory of dominance, countries were ranked according to suitability of their environment for business.

Keywords: European Union, SMEs, construction, MULTIMOORA, Dominance theory

1. Introduction

Subsequent to three of the most difficult economic years in history, the construction industry is still in the process of adjusting and setting foundations for improved performance in the future. In the global construction industry, the reason for hope and positive sentiment depends in part on location and sector, as wider economic prospects determine the pace and volume of workload [1]. The European construction sector is composed of approximately 97% of Small and Medium Enterprises (SMEs); consequently, their performance is essential as it drives the economic activity in all other sectors [2]. A positive impact of construction sector SMEs on the national economic growth is suggested in various sources of literature [3-10]. This impact can be substantiated by investments directed at renovation or construction of infrastructure during the economic downturn, which have been given an important role in economic promotion and recovery plans of EU member states due to their ability to boost the overall demand as well as assurance of long-term return on investments [11]. In large measure, the development of small and medium enterprises determines the competitiveness and growth of the EU market as well as contributes to resolution of employment-related issues. To help member states achieve their growth potential, the EU has been channelling all possible efforts towards promotion of entrepreneurship and development of more advantageous business environment. The European Strategy for the Sustainable Competitiveness of the Construction Sector is intended to

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complement the strategies developed by the enterprises of the construction sector themselves to improve their competitiveness and to respond to business-related challenges [12]. The Strategy focuses on five key objectives: a) stimulating favorable investment conditions; b) improving the human-capital basis of the construction sector; c) improving resource efficiency, environmental performance and business opportunities; d) strengthening the Internal Market for construction; e) fostering the global competitive position of EU construction enterprises [12]. On the one hand, the strategy suggests recommendations that could address the short to medium-term economic and employment challenges faced by the construction sector. On the other hand, it presents a number of recommendations with a long-term perspective to ensure durable effects on the competitiveness of the sector in the quest to develop favorable conditions for business development.

The market of the European Union construction sector and the sector itself are highly fragmented, with many small enterprises and large differences in the performance of the sector between member states. This statement has been substantiated by Professor Mario Monti [13] in his report to the President of the European Commission José Manuel Barroso regarding the Strategy for the Single Market of Europe. The diversity of the activities within each branch of the construction sector results in contrasting realities in terms of socio-economic, organizational, cultural and technological issues and adaptation to new regulations and market opportunities [12]. As European market is multifaceted, each member state has its own legislative and legal frameworks, differently functioning internal markets and a number of other differences. Many construction sector aspects (e.g. products, works, professional qualifications, occupational health and safety, environmental impact) are highly regulated and many of them are member states’ competencies. Favorable business environment is an essential factor ensuring competitiveness of a country. The overall competitiveness of a country is often perceived as attractiveness for investments. In order to ensure a better functioning of the Internal Market for construction products and services, it is important that the legal framework is as clear and predictable as possible and that administrative costs are proportionate to the objectives pursued.

The article aims to reveal the business development potential as well as the current condition in countries after the three-year economic crisis. The selected statistical data reflects individuality of each member state and in this case, a comparative research was undertaken. To assess the business environment, the integrated criteria of 2013 were used as produced by the World Bank, which cover both qualitative and quantitative aspects.

2. Scope and methodology

This paper describes a study on the situation of SMEs operating in the EU member states. The study was delivered based on the national macroeconomic factors, quality of the legislation, regulations and institutional arrangements that shape daily economic life. The focus is on the advanced phases of business development in these countries. The Doing Business data are based on domestic laws and regulations as well as administrative requirements. For each economy, the ranking is calculated as the simple average of the percentile rankings on each topic accommodated in the index of Doing Business [14].

The study focuses on eight integrated criteria that describe the national business landscape (Table 1). 26 EU member states were ranked on the basis of these indicators as Malta failed supplying sufficient data.

### Table 1. Criteria used to assess the national business landscape for SMEs [14]

| Objectives            | Clarification                                                                                                                                 |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Starting business     | Doing Business records all procedures officially required, or commonly done in practice, for an entrepreneur to start up and formally operate an industrial or commercial business, as well as the time and cost to complete them and the paid-in minimum capital requirement. |
| Dealing with construction permits | Doing Business records all procedures required for a business in the construction industry to build a warehouse. These procedures include submitting all relevant project-specific documents (for example, building plans and site maps) to the authorities; obtaining all necessary clearances, licenses, permits and certificates; completing all required notifications; and receiving all necessary inspections. |
| Registering property | Doing Business records the full sequence of procedures necessary for a business (buyer) to purchase a property from another business (seller) and to transfer the property title to the buyer’s name so that the buyer can use the property for expanding its business, use the property as collateral in taking new loans or, if necessary, sell the property to another business. |
| Getting credit        | Doing Business measures the legal rights of borrowers and lenders with respect to secured transactions through one set of indicators and the sharing of credit information through another. The first set of indicators measures whether certain features that facilitate lending exist within the applicable collateral and bankruptcy laws. The second set measures the coverage, scope and accessibility of credit information available through public credit registries and private credit bureau. |
| Protecting investors  | Doing Business measures the strength of minority shareholder protections against directors’ misuse of corporate assets for personal gain. The indicators distinguish 3 dimensions of investor protections: transparency of related-party transactions (extent of disclosure index), liability for self-dealing (extent of director liability index) and shareholders’ ability to sue officers and directors for misconduct (ease of shareholder suits index). |
Objectives Clarification

Trading across borders Doing Business measures the time and cost (excluding tariffs) associated with exporting and importing a standardized cargo of goods by sea transport. The time and cost necessary to complete every official procedure for exporting and importing the goods are recorded.

Easy to doing business The ease of doing business index ranks economies from 1 to 185. For each economy the ranking is calculated as the simple average of the percentile rankings included in the index in Doing Business 2013.

Paying taxes Doing Business records the taxes and mandatory contributions that a medium-size company must pay in a given year as well as measures of the administrative burden of paying taxes and contributions.

This study aims demonstrating the ability of EU member states to create an environment that would be beneficial for development of SMEs under changing macroeconomic conditions. The initial decision matrix is supplied in Table 2. The decision matrix provides criteria that are expressed in dimensionless values. In case of each alternative, the criterion demonstrates the rating of a member state in the context of 185 countries of the world. To compare business environments in different EU member states, the MULTIMOORA method was used on the matrix (Table 2).

Table 2. Objectives characterizing the positions of the EU member states [14]

| Alternatives | Starting business (rank) | Dealing with construction permits (rank) | Registering property (rank) | Getting credit (rank) | Protecting investors (rank) | Trading across borders (rank) | Easy to doing business (rank)* | Paying taxes (rank) |
|-------------|--------------------------|------------------------------------------|-----------------------------|-----------------------|-----------------------------|-------------------------------|-----------------------------|-------------------|
| Optima      | min                      | min                                      | min                         | min                   | min                         | max                           | min                         | min               |
| Austria     | 2                        | 11                                       | 37                          | 4                     | 70                          | 44                            | 175                         | 48                |
| Belgium     | 44                       | 57                                       | 176                         | 70                    | 19                          | 29                            | 152                         | 75                |
| Bulgaria    | 57                       | 123                                      | 68                          | 40                    | 49                          | 93                            | 119                         | 91                |
| Cyprus      | 37                       | 80                                       | 99                          | 53                    | 32                          | 18                            | 149                         | 31                |
| Czech Rep.  | 140                      | 74                                       | 27                          | 53                    | 100                         | 68                            | 120                         | 120               |
| Denmark     | 33                       | 8                                        | 6                           | 23                    | 32                          | 4                             | 180                         | 13                |
| Estonia     | 47                       | 35                                       | 14                          | 52                    | 70                          | 7                             | 164                         | 50                |
| Finland     | 49                       | 34                                       | 24                          | 40                    | 70                          | 6                             | 174                         | 23                |
| France      | 27                       | 52                                       | 146                         | 53                    | 82                          | 27                            | 151                         | 53                |
| Germany     | 106                      | 14                                       | 81                          | 23                    | 100                         | 13                            | 165                         | 72                |
| Greece      | 146                      | 31                                       | 150                         | 83                    | 117                         | 62                            | 107                         | 56                |
| Hungary     | 52                       | 55                                       | 43                          | 53                    | 128                         | 73                            | 131                         | 118               |
| Ireland     | 10                       | 106                                      | 53                          | 12                    | 6                           | 28                            | 170                         | 6                 |
| Italy       | 84                       | 103                                      | 39                          | 104                   | 49                          | 55                            | 112                         | 131               |
| Latvia      | 59                       | 113                                      | 31                          | 4                     | 70                          | 16                            | 160                         | 52                |
| Lithuania   | 107                      | 48                                       | 5                           | 53                    | 70                          | 24                            | 158                         | 60                |
| Luxembourg  | 93                       | 33                                       | 134                         | 159                   | 128                         | 32                            | 129                         | 14                |
| Netherlands | 67                       | 89                                       | 49                          | 53                    | 117                         | 12                            | 154                         | 29                |
| Poland      | 124                      | 161                                      | 62                          | 4                     | 49                          | 50                            | 130                         | 114               |
| Portugal    | 31                       | 78                                       | 30                          | 104                   | 49                          | 17                            | 155                         | 77                |
| Romania     | 68                       | 129                                      | 72                          | 12                    | 49                          | 72                            | 113                         | 136               |
| Slovakia    | 83                       | 46                                       | 8                           | 23                    | 117                         | 98                            | 139                         | 100               |
| Slovenia    | 30                       | 61                                       | 83                          | 104                   | 17                          | 57                            | 150                         | 63                |
| Spain       | 136                      | 38                                       | 57                          | 53                    | 100                         | 39                            | 141                         | 34                |
| Sweden      | 54                       | 25                                       | 35                          | 40                    | 32                          | 8                             | 172                         | 38                |
| UK          | 19                       | 20                                       | 73                          | 1                     | 10                          | 14                            | 178                         | 16                |

*Ranks of easy to doing business were turned because MULTIMOORA method requires maximized at least one criterion
The multi-objective analysis is a popular tool used to solve many economic, managerial and construction-related problems [15]. The MULTIMOORA method was chosen because it is not only relatively efficient and easily understood but also based on logic in selection of the most appropriate alternative or ranking from available alternatives [16, 17]. For decision making in manufacturing, Chakraborty [18] compared MOORA to TOPSIS and VIKOR in terms of: computational time, simplicity, mathematical calculations and stability. With regard to all these characteristics, MOORA was superior to TOPSIS and VIKOR.

3. MULTIMOORA and the theory of dominance

In his book issued in 2004, Brauers [19] described the three parts of MULTIMOORA: (1) the Ratio System Approach (RS), producing dimensionless ratios, (2) the Reference Point Approach (RP), but still based on scores, and (3) the Full Multiplicative Form (MF). Later, Brauers [20, 21] switched to the Reference Point Approach, which uses ratios found in the ratio system instead of scores. This way, dimensionless measures were obtained again. The synthesis of the two approaches was later called MOORA [22]. In 2010, the third approach was added to create MULTIMOORA [23]. Consequently, MULTIMOORA is composed of MOORA and of the Full Multiplicative Form of Multiple Objectives. So MULTIMOORA is the most robust system for optimization of multiple objectives.

The recent use of MULTIMOORA method in shortly listed in Table 3.

| Reference | Considered problem |
|-----------|--------------------|
| Baležentis, Zeng [24] | Group multi-criteria decision making based on interval valued fuzzy numbers |
| Kalibatas et al. [25] | A method of multi-attribute assessment using ideal alternative: choosing an apartment with optimal indoor environment |
| Baležentiene et al. [26] | Fuzzy decision support methodology for selection of sustainable energy crops |
| Brauers, Zavadskas [27] | Robustness of MULTIMOORA: A Method for Multi-Objective Optimization |
| Brauers et al. [28] | Lithuanian case study of masonry buildings from the Soviet period |
| Brauers et al. [29] | European Union member states preparing for Europe 2020 |
| Baležentis, Baležentis [30] | An innovative multi-criteria supplier selection based on two-tuple MULTIMOORA and hybrid data |
| Baležentis et al. [31] | Personnel selection based on computing with words and fuzzy MULTIMOORA |
| Baležentis et al. [32] | A Multi-Objective Decision Making Method for Linguistic Reasoning with an Application to Personnel Selection |
| Baležentis et al. [33] | Multi-Objective Optimization of wellbeing in the European Union member states |
| Brauers, Zavadskas [17] | MULTIMOORA optimization used to decide on a bank loan to buy property |

To achieve synthesis between the results of the three approaches – the Ratio System, the Reference Point Method, which uses the ratios obtained in the ratio system as coordinates, and the Full Multiplicative Form – Brauers and Zavadskas developed the theory of dominance [17]. Absolute dominance means that an alternative, a solution or a project dominates in ranking among all other alternatives, solutions or projects. This absolute dominance manifests as rankings for MULTIMOORA: (1-1-1).

For instance, general dominance in two of the three methods with a P b P c P d (P preferred to) can have the following form:

(d-a-a) is generally dominating (c-b-b).
(a-d-a) is generally dominating (b-c-b).
(a-a-d) is generally dominating (b-b-c)
and further fully plays on transitiveness.

Transitiveness
If a dominates b and b dominates c than a will also dominate c.
The overall dominance of one alternative over the other.

For instance, (a-a-a) is overall dominating (b-b-b), which is overly dominated by (a-a-a).

Equability
Absolute equability has the following form: for instance, (e-e-e) for 2 alternatives.
Partial equability of 2 on 3 exists e. g. (5-e-7) and (6-e-3).

Circular reasoning
Despite all distinctions in classification, some contradictions remain possible in somewhat circular reasoning. For example:

the Object A (11-20-14) generally dominates the Object B (14-16-15).
Object B (14-16-15) generally dominates the Object C (15-19-12)
but the Object C (15-19-12) generally dominates the Object A (11-20-14).

In this case, the same ranking is given to all three objects. The same rules apply to all three methods of MULTIMOORA with no significance coefficients proposed as the three methods are considered to have the same importance.

Below, Table 4 presents the final classification of MULTIMOORA and ranking based on dominance.

Table 4. Ranking by dominance depending on the Doing Business situation by MULTIMOORA

| Countries   | RS  | RP  | MF  | Ranking based on dominance |
|-------------|-----|-----|-----|----------------------------|
| Austria     | 3   | 5   | 3   | 3                          |
| Belgium     | 17  | 25  | 16  | 18                         |
| Bulgaria    | 20  | 21  | 23  | 22                         |
| Cyprus      | 9   | 7   | 11  | 9                          |
| Czech Rep.  | 24  | 19  | 24  | 24                         |
| Denmark     | 1   | 1   | 1   | 1                          |
| Estonia     | 7   | 4   | 7   | 7                          |
| Finland     | 6   | 4   | 5   | 6                          |
| France      | 14  | 22  | 17  | 15                         |
| Germany     | 11  | 9   | 10  | 11                         |
| Greece      | 25  | 20  | 26  | 25                         |
| Hungary     | 19  | 13  | 22  | 19                         |
| Ireland     | 4   | 8   | 4   | 4                          |
| Italy       | 23  | 16  | 25  | 23                         |
| Latvia      | 8   | 11  | 8   | 8                          |
| Lithuania   | 10  | 10  | 9   | 10                         |
| Luxembourg  | 26  | 26  | 20  | 26                         |
| Netherlands | 13  | 12  | 13  | 13                         |
| Poland      | 21  | 24  | 18  | 21                         |
| Portugal    | 12  | 15  | 12  | 12                         |
| Romania     | 22  | 18  | 21  | 20                         |
| Slovakia    | 18  | 23  | 14  | 17                         |
| Slovenia    | 15  | 15  | 15  | 14                         |
| Spain       | 16  | 17  | 19  | 16                         |
| Sweden      | 5   | 2   | 6   | 5                          |
| United Kingdom | 2 | 6  | 2  | 2                          |

Stakeholders or their representatives may grant a different importance to objectives in a multi-objective problem; however, this is not the case with three methods of MULTIMOORA. These three methods represent all possible methods with dimensionless measures in multi-objective optimization and it cannot be argued that one method is better or more important than the others. Consequently, no significance coefficients are needed [27].

4. Comments on the ranking of the business environment in European countries

The study aimed to reveal the business environment in EU member states and rank them according to conditions for business development. Country-specific business conditions are a sort of potential. If improved, it can lead to a better
competitiveness and greater investments. On the basis of the multi-criteria analysis, EU member states can be divided into three groups:

The first group accommodates states that have the best conditions for business: Denmark, United Kingdom, Austria, Ireland, Sweden, Finland, Estonia, Latvia and Cyprus. This demonstrates that the listed countries give extensive attention to microeconomic (i.e. enterprise-level) factors that indicate effective management.

The second group includes states with gaps in their business environments and less favorable conditions for SMEs: Lithuania, Germany, Portugal, Netherlands, Slovenia, France, Spain, Slovakia and Belgium.

The third group includes states with least favorable conditions for business: Hungary, Romania, Poland, Bulgaria, Italy, Czech Republic, Greece and Luxembourg.

Assessment of member states according to business conditions showed that old EU member states – Denmark, Great Britain and Finland – are in the lead. The Baltic States rank in-between the average and the top countries, lagging not too far behind the leaders. Developmental trends of SMEs, aspirations of other EU member states, and assistance provided by the state as well as Structural Funds allows for a positive assessment of small and medium business prospects.

Some examples of the ways member states facilitated business conditions are provided below:

- Cyprus made property transfers faster by computerizing its land registry.
- The Czech Republic made registering property easier by allowing the cadastral office online access to the commercial registry’s database and thus eliminating the need to obtain a paper certificate from the registry before applying for registration at the cadaster.
- Greece reduced the time required to obtain a construction permit by introducing strict time limits for processing permit applications at the municipality.
- Italy made transferring property easier by digitizing cadastral maps of properties and making the maps available to notaries online.
- Lithuania made starting a business easier by introducing online registration for limited liability companies and eliminating the notarization requirement for incorporation documents.
- The Netherlands made dealing with construction permits simpler by merging several approvals and implementing an online application system.
- Poland made property registration faster by introducing a new caseload management system for the land and mortgage registries and by continuing to digitize the records of the registries. Poland made paying taxes easier for companies by promoting the use of electronic filing and payment systems though it also increased social security contributions.
- In Sweden property transfers became more time consuming during implementation of a new information technology system at the land registry [14].

Reacting to economic downturn, most countries channeled investments towards recovery measures that include advance investments in infrastructure projects, reduced value added tax (VAT) rates on new construction and/or renovation of buildings, and preferential interest rates on mortgages, etc. However, with regard to competitiveness, only those measures can be effective in the long run, which are aimed at advancement of skills and qualifications, implementation of innovations and development of environmentally-friendly economics. Without a doubt, the aforementioned measures used by EU member States to promote business will improve their business environments.

The article reviewed structural reforms that heavily contributed to improvement of business environment in various EU member states. The development of SMEs is one of the priorities of the EU economic policy. This segment of enterprises is a constant source of employment, which gives stimulus to economic growth. The construction sector has a great input into the gross domestic product (GDP) and the level of employment of the European Union; besides, the sector plays an important role in achieving objectives of the sustainable growth strategy Europe 2020. The competitiveness in the construction sector may greatly impact on the overall development of economics. Thus, competitiveness of construction enterprises is not only important in terms of economic growth and employment in general, but also for sustainability of the sector.

5. Conclusions

Using the multi-criteria decision making method MULTIMOORA, the applied research aimed to rank the EU member states according to their current business conditions and measure their potential for development of the construction sector SMEs. For this purpose, a study on the World Bank statistics for 2012 was conducted to select criteria for assessment of the business environment in the EU. The MULTIMOORA method, which considers all attributes together with their relative importance, can provide a more accurate evaluation of alternatives. Finally, the theory of dominance was used to evaluate and rank the situation of the business environment in 26 EU member states. Analysis of EU Member States by current business conditions resulted in describing three groups of states:
• best conditions for business: Denmark, United Kingdom, Austria, Ireland, Sweden, Finland, Estonia, Latvia and Cyprus;
• states with gaps in their business environments and less favorable conditions for SMEs: Lithuania, Germany, Portugal, Netherlands, Slovenia, France, Spain, Slovakia and Belgium;
• states with least favorable conditions for business: Hungary, Romania, Poland, Bulgaria, Italy, Czech Republic, Greece and Luxembourg.

This ranking of EU member states can be used as a certain indication of the current situation as well as progress achieved in promotion of business development.

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