A METHOD OF ESTIMATING THE DETERMINANT OF ENTERPRISE COMPETETIVENESS

Olaf Flak*

Abstract
The aim of the article is to propose a method for estimating the determinant of enterprise competitiveness, based on the Competitiveness Integrated Model and the Company Competitiveness Barometer. The article presents a description of The Competitiveness Integrated Model, the current status of research of the Company Competitiveness Barometer, definition and algorithms for estimating the determinant of enterprise competitiveness.
Keywords: *competitiveness, competitive potential, strategy of competition, competitive advantage, competitive positioning, determinant of enterprise competitiveness.*

1. Introduction

In the literature on the subject and in everyday business language, competitiveness is used for a lot of different phenomena present in the conduct of the company, sector or whole economy. For many years, the author of this article has been making efforts to sort out the terms associated with the wider concept of enterprise competitiveness and make use of the theoretical approaches, models and methods in a beneficial way for a business practice.

The main objective of the article is to propose a method for estimating the determinant of enterprise competitiveness, based on the Competitiveness Integrated Model (Flak and Głód, 2012, pp. 50-72) and the method of measuring the company's competitiveness which is the Company Competitiveness Barometer (Flak and Głód, 2014 in print; Flak and Głód, 2014, pp. 12-14).

The specific objectives are to present:

- the basis of the Competitiveness Integrated Model and the importance of the concepts included in that model,
- definition of the determinant of enterprise competitiveness and its elements,

* Ph.D., Assistant Professor, Department of Radio and Television, University of Silesia, ul. Bytkowska 1b, 40-955 Katowice, e-mail: ja@olafflak.com.

- the use of the Competitiveness Integrated Model until now and the current status of research under the Company Competitiveness Barometer framework,
- algorithms to create a coherent description of the company in the form of a case study, scoring its competitiveness and competitive proximity of the enterprise,
- outline of the research development based on the Company Competitiveness Barometer.

The article has a diagnostic and scheme design aspect. Therefore, the desk research method, presentation of the results of empirical research and the case study were used in the diagnostic dimension. Design issues were based on the prognostic method (Bieniok, 2001, pp. 68-75). Due to the objectives of the article, the research problem and the research hypothesis were not stated in its contents.

2. Theoretical basis

In the literature on the subject, the enterprise competitiveness is defined in many ways. A wide overview of the approaches to this issue and definitions of the terms connected with competitiveness was presented by the authors of the monograph "Competitive ones will survive" (Flak and Głód, 2012, pp. 39-49).

Theoretical basis, which was a starting point for designing the method for estimating the determinant of enterprise competitiveness, and a starting point for the consideration of company's characteristics that make the company achieve the desired results from the conducted economic activity and be able to compete in the market, is the following definition of competitiveness. "Competitiveness is a multidimensional attribute of the company, resulting from both the internal features and the ability to cope with external circumstances. Competitiveness is relative, that means, there is no absolute scale for measuring competitiveness, (...) competitiveness can be used to describe the mutual relations of enterprises in the market." (Flak and Głód, 2012, p. 44)

Since the company's competitiveness is an abstract and general concept, it has some constituent elements which are also elements of the Competitiveness Integrated Model (Flak and Głód, 2014, p. 13). The Competitiveness Integrated Model is shown in Figure 1.

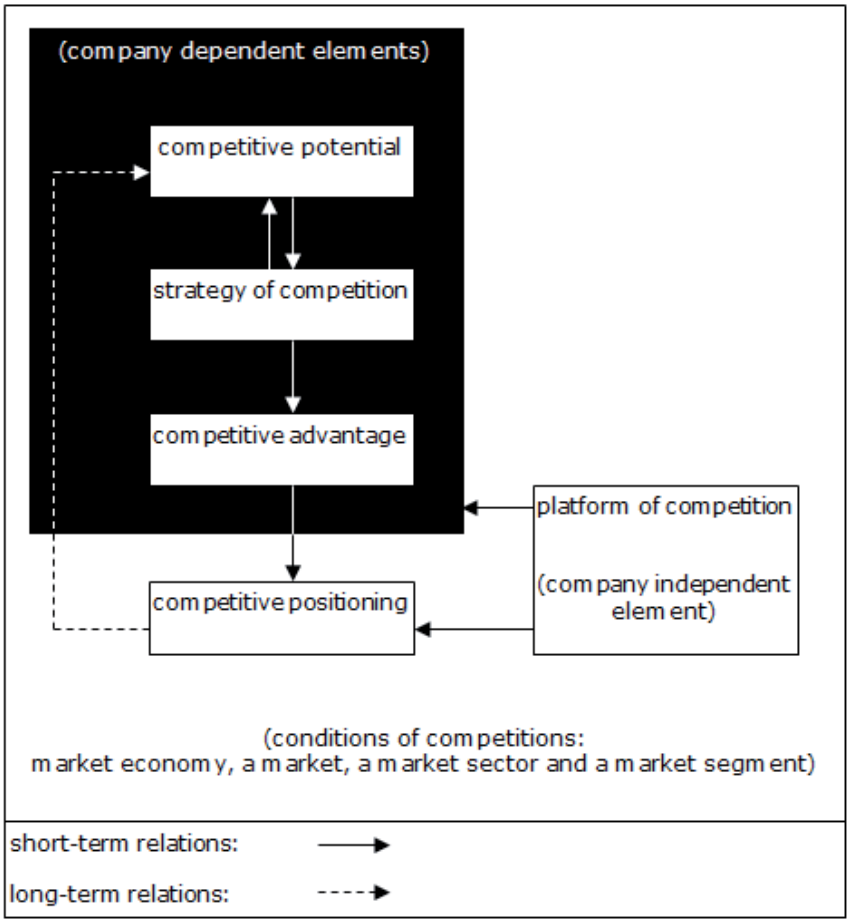

Figure 1. The competitiveness integrated model

Source: Flak and Głód (2012, p. 57).

The first element is the competitive potential, signifying the resources that enterprise has or should have to be able to use them to build, maintain and strengthen its competitiveness. These are, in a broad sense, possibilities of the company resulting from its tangible and intangible capital. Competitive potential of the company is at the same time the relative multidimensional concept.

The enterprise uses the competitive potential through its strategy of competition, which is an adopted action program aimed at achieving a competitive advantage towards the entities from the competitive environment (microenvironment), serving the basic objectives of the enterprise. The aforementioned competitive advantage is a company's ability to deliver the

tangible and intangible assets to the customer via the market. The company's competitive advantage is the relative multidimensional concept.

As a result, the company's competitive positioning is obtained, which is measured by the means of synthetic market and economic results of the enterprise, resulting from the extent of utilization of the enterprise's capacity to compete now and in the future. The competitive positioning of the company is a relative multidimensional concept.

What influences and determines the activity of the company is an environment of the company. In the Competitiveness Integrated Model, the environment is called a platform of competition and denotes a set of characteristics of macro- and microenvironment in which a company operates in a given industry sector. The features of the macro-environment are the same for every company operating in a given sector, while the characteristics of microenvironment may be different for each company in that sector.

The relationships between the model elements and their graphical representation are presented in previous publications of the author (Flak and Głód, 2012; Flak and Głód, 2014). Hypotheses concerning the relationship between the competitive potential and the strategy of competition; as well as the strategy of competition and competitive advantage, were also positively verified in previous publications of the author (Flak and Głód, 2014, pp. 15-16).

3. Antecedent use of the competitive model

The above-described Competitiveness Integrated Model was the basis for development of the concept of an annual survey of competitiveness of Polish companies, namely the Company Competitiveness Barometer (Flak and Głód, 2012, pp. 230-232).

The first edition of the Company Competitiveness Barometer was carried out in 2012 and included over 109 companies. The second edition took place in 2013, with 173 companies taking part in it. Smaller sectorial diversification of the companies and their greater number allowed for statistical verification of the hypotheses on the relationships between the competitive potential, the strategy of competition and competitive advantage – in the Barometer questionnaire only these three elements of the Competitiveness Integrated Model were used. (Flak and Głód, 2014, pp. 15-16).

In the first half of 2014, the third edition of the Company Competitiveness Barometer was held (www.konkurencyjniprzetrwaja.pl). All five elements of the model, which have been operationalized in the form of 45 questions within the Barometer questionnaire, were used: 12 questions about competitive potential, 10 about the strategies of competition, 8 about competitive advantage,

6 about the competitive positioning and 9 about the platform of competition. All questions in the Company Competitiveness Barometer have been closed, single-choice questions.

Due to the volume of this paper, the reader interested in the examined elements of the competitive potential, the strategy of competition and competitive advantage is referred to previous publications of the author (Flak and Głód, 2014, p. 14).Nevertheless, the names of the elements of competitive positioning and the platform of competition used in the Company Competitiveness Barometer, are presented in Table 1.

Table 1. Names of the elements of competitive positioning and the platform of competition

Competitive positioning	**The platform of competition**
ability to settle liabilities when due	risk to the company from companies in developing countries
debt level	attitude of Polish customers to the products or services offered by companies in the sector
level of the percentage market share indicator	the possibility of use of flexible forms of employment
level of the return on sales indicator	degree of technology preservation used by the company in past 5 years
sales revenue growth	the extent to which the quality of a product or service depends on the quality of supplier's raw materials (intermediates)
company's return on equity (own and foreign)	difficulty of company's withdraw from the current sector
	chance that in the next year the customer will begin own production of a product or service
	the extent to which brand awareness influences customers' purchasing decisions
	the degree of similarity of substitutes to the products or services offered by company

In previous research work with the use of the Company Competitiveness Barometer based on The Competitiveness Integrated Model, two operations on data collected from the respondents of the Barometer questionnaire have been used.

The first operation is reduced to recording unaltered responses of the respondents as new records in the database. This allows for later unlimited operations on the recorded data in order to draw up a description of the respondent's company in a form of a case study, as well as perform statistical calculations.

The second operation is used to calculate the level of competitiveness of a subject enterprise in real-time, after completing the Barometer questionnaire by the n+1 respondent, based on the data left by n respondents who answered it earlier. An assessment of a subject enterprise is made by the means of a natural number from a closed interval from 0 to 360 (as results from the number of responses – 36 – on a scale from 0 to 10 points for every answer). Since this is also a part of the method for estimating the determinant of enterprise competitiveness, a detailed description is given below.

The inference based on empirical data in the two above-described ways is sufficient for verification purposes of a part of the hypotheses in the field of enterprise competitiveness (Flak and Głód, 2014, p. 12) and to describe the characteristics of enterprises in popular science form. Therefore, these two types of inference will be used in the method of estimating the determinant of enterprise competitiveness. However, it seems that the distance that separates a given company from the characteristics of the ideal company in the sector (following there is a clarification on whether there may be an ideal company in the sector) can be deduced from the collected data. This mechanism is the third component of the method proposed in this article.

4. Nominal definition of the determinant of enterprise competitiveness

In this publication, the determinant of enterprise competitiveness is defined as a group of three competing attributes of companies in the market. This group includes:

- description of the characteristics of enterprise's competitive potential, the strategy of competition, competitive advantage, competitive positioning and the platform of competition in a form of a case study (algorithm 1),
- assessment of enterprise competitiveness in a form of a natural number from a closed interval from 0 to 360 points (algorithm 2); where 0 is the lowest value and 360 is the highest competitiveness value (the upper end of the range depends on the number of questions in a research tool, as described below),
- assessment of competitive proximity in the form of a natural number from a closed interval from 100 to 0 (algorithm 3); where 100 is the lowest value and the highest value of competitive proximity is 0.

It should be emphasized that all the above attributes, namely their determination algorithms, are based on following methodological assumptions:

- there is no theoretical model of an answer that is absolutely correct for any sector of economy (the platform of competition) valid for

a longer period of time, defining the characteristics of the most competitive enterprises (Flak and Głód, 2012, p. 44),

- comparison of enterprise competitiveness can only take place in a relative way (Olszewska and Piwoni-Krzeszowska, 2004, p. 507)
- characteristics of the most competitive companies in the sector are focused on some of the values of these features, but there is a low probability that companies with extreme traits belong to the most competitive ones in the sector (Bień and Dobiegała-Korona, 1997, pp. 143-144).

The first of the aforementioned assumptions implies that there is no perfect business model which can be compared to other companies in the sector. This limitation makes it necessary to look for other ways to obtain a "pattern", and a solution is an assessment of the competitive proximity.

5. Elements of the determinant of enterprise competitiveness

The aforementioned elements of the determinant of enterprise competitiveness require their own nominal and operational definitions.

The first and methodically simplest determinant's element is the description of the company's characteristics in a form of a case study (algorithm 1). Algorithm 1, used for its presentation, is in fact (nominal definition) a verbal representation of records in the database resulting from the answers given by the respondent about a particular company. To establish it, the data collected (operational definition) have to be interpreted in the database; and their code form translated into a natural language.

The second element of the determinant of enterprise competitiveness is an assessment of the competitiveness of a company in a form of a natural number from a closed interval from 0 to 360 points (algorithm 2). Competitiveness assessment has the following nominal definition: it is a difference between the dominant values of competitiveness components and the values of these elements in the audited company without taking into account the distribution of these values in the plenitude of all surveyed enterprises.

Algorithm 2, used for its calculation and which is also its operational definition has been presented in previous publications by the author on the topic of Company Competitiveness Barometer (Flak and Głód, 2014 in print), but due to the clarity of the following argument, its brief description is presented below.

The fact that the respondents, especially those filling the questionnaire online, expect an immediate result of their actions, prompted the authors of the Barometer to develop an algorithm for calculating the results online, which on the one hand would evaluate a tested company in real time without a pre-

defined pattern of competitiveness, and on the other hand would be fair and accurate. Procedure of the algorithm 2 is illustrated in the example in Table 2

Table 2. The example of assessing the n+1 respondent's competitiveness

	Question in a questionnaire	**How is the knowledge about the enterprise collected?**				
variable	**Possible answers**	**complete paper elaborations**	**unrelated paper documents**	**complete electronic elaborations**	**unrelated electronic documents**	**in employees heads**
a	Number of each answer among the n respondents	4	6	5	13	8
b	Contractual value for the number of answers	3,076923	4,615385	3,846154	10	6,153846
c	Number of points given for the answer	0	4,62	0	0	0
x	Answer of the n+1 respondent		x			

Table 2 presents the example of a question, for which the number of answers of n respondents in given categories is indicated by variable a. Assume that n+1 respondent answered in accordance with the "x" (variable x). The maximum number of points that the respondent would receive if their answer was compatible with the most common response ("unrelated electronic documents"), would be 10 (variable b). The variable b, shows the number of points they could get for showing a different answer in proportion to the maximal number of points (10) and the response frequency (described by the variable a, in this case 13 responses). Since n+1 respondent answered "unrelated paper documents", they scored in approximation 4.62 points out of 10 possible (variable c).

Points for all questions (variable c of all questions) in a research tool can be added and their sum is in the range from 0 to 360 (resulting from the number of responses – 36 – on a scale from 0 to 10 points for each response). It should be emphasized that, in the Company Competitiveness Barometer 2014, 36 components of competitiveness (potential, strategy, advantage and competitive positioning) are assessed. 9 components belonging to the platform are not evaluated (see: Flak and Głód, 2012, pp. 230-232).

Algorithm 2, after new entry for each question in the database, updates the conventional value of points, first by searching for the response's maximum frequency and giving this answer 10 points, and then allocating to the answer of the n+1 respondent the number of points resulting from the relative frequency of the response (variable b) in the maximal response rate (the maximum

value of the variable a). In this way the IT tool "learns" how the following respondents answer and, on this basis, it sets the criteria of awarding points for the next respondent. It should be emphasized that the evaluation of enterprise's competitiveness is not based on analysis of the frequency of all responses to the question, but on a comparison of the frequency of a response chosen by the respondent (in the example, answer "unrelated paper documents") to a response with a maximal frequency (in the example, the answer "unrelated electronic documents"). Points awarded to the subject company are indicative and subject to measurement error decreasing with an increase of the number of responses recorded in the database.

The third element of the determinant of enterprise competitiveness is an assessment of competitive proximity in a form of a natural number from closed interval from 100 to 0 (algorithm 3). The competitive proximity is nominally defined here as a difference between the dominant values of the components of competitiveness in the overall plenitude of subject enterprises and values of these elements in the analyzed company, taking into account the distribution of these values in the plenitude of surveyed enterprises. The difference in the definition of competitive proximity (algorithm 3) and the above definition of the evaluation of competitiveness (algorithm 2) is worth noting. This difference, in the case of competitive proximity consists in the reference of a distribution of values in the overall plenitude of surveyed enterprises, whereas the assessment of competitiveness does not apply to this distribution.

It should be emphasized that the concept of competitive proximity is based on considerations made in the works of W. Czakon (2010), who wrote that "the category of proximity has a direct or indirect use in explaining the key problems in science of managing. In particular, it contributes to a better understanding of sources of the competitive advantage that are beyond the boundaries of enterprise" (Czakon, 2010, p. 16; Boschma, 2005, p. 61). A similar approach to this category is presented by P. Klimas (2012) in his works. The competitive proximity, however, is a reverse of organizational proximity, which is reflected in an operational definition of the term.

Algorithm 3, used for its calculation and the operational definition, is shown in Table 3 together with an example of a designation of the competitive proximity, for reasons of clarity, for its only one element.

Table 3. The example of assessing the n+1 respondent's competitive proximity

	Question in a questionnaire	**How is the knowledge about the enterprise collected?**				
variable	**Possible answers**	**complete paper elaborations**	**unrelated paper documents**	**complete electronic elaborations**	**unrelated electronic documents**	**in employees heads**
a	Number of each answer among the n respondents	4	6	5	13	8
b	Contractual value for the number of answers	11,11	16,67	13,88	36,11	22,22
c	Number of points given for the answer	0	16,67	0	0	0
x	Answer of the n+1 respondent		x			
y	Competitive proximity for this question		19,44			

Table 3 presents the same question as Table 2. As before, the number of responses of n respondents in each category is indicated by the variable a; n+1 respondent answered in accordance with the sign "x". The maximum number of points that this respondent could receive if his answer was compatible with the most common response ("unrelated electronic documents"), would be 36.11 (variable b). The variable b indicates how many points they could get for a different answer, proportionally to the maximal number of points (36.11) and frequency of a response (variable a). Since n+1 respondent answered "unrelated paper documents", they scored approximately 16.67 points. It shall be noted that the sum of all values of the variable b equals 100. In other words, they are the percentages of share of each of them in total response. In this way, the competitive proximity takes into account a distribution of these values in the entire plenitude of the subject companies.

Algorithm 3, after new entry for each question in the database, updates the conventional value of points, first by searching for the maximal frequency of a response, and then allocating the response of n+1 respondent a number of points, resulting from the percentage frequency of a response (variable x) in a maximum frequency of a response. Similarly, as in the case of algorithm 2, the IT tool "learns" how following respondents answer and, on this basis, it sets criteria to award points for the next respondent.

Then, the competitive proximity is calculated as the sum of the variable y (for each question) and compared to the sum of the maximal values of the variable b for all the questions of a research tool. The variable y is the difference between the maximum point value for the number of responses (variable b, in the example 36.11) and the number of points scored for the answer to the

question (variable c, in the example 16.67). In the above example, the variable y for the sample question is 19.44.

After dividing a sum of variable y for all the questions by a sum of the maximum value of the variable b for all the questions, and multiplying a resulting fraction by 100; a measure for the competitive proximity is obtained, which is a natural number from a closed interval from 100 to 0. Standardization procedure, characterized by the fact that a sum of variable y is referred to a sum of the maximal values of the variable b, aims at unifying the range of accepted values for the same numerical interval, regardless of the distribution of responses in the sector. Otherwise, the left side of the interval for two different sectors (greater number - left end of the interval) would vary and depend on the distribution of company's characteristics in the sector. At that time, there would be no possibility of comparing the competitive proximity for companies belonging to different sectors.

A value of 100 indicates the smallest proximity, that is the biggest difference between the characteristics of competitiveness components of the subject n+1 enterprise and all the dominant (most common) features of the n subject enterprises in the sector. A value of 0 means the greatest proximity, i.e. the smallest difference between the characteristics of the competitiveness components of the subject n+1 enterprise and all the dominant (most common) features of the n subject enterprises in the sector. In the latter case, the subject enterprise would have all the characteristics such as the dominant characteristics of enterprises in the sector. However, it is a theoretical value, comparable to the concept of infinity in number theory. If so, the enterprise would have "picked up" the dominant features of all enterprises in the sector. This would be an ideal company in terms of business competitiveness (!). The most competitive company would have all the most common characteristics of other companies, but not of one of the existing companies, but the entire plenitude of these companies.

Later in this article, examples of the company's competitive profile designation, based on empirical data collected in the framework of the Company Competitiveness Barometer 2013, are presented. It should be noted that the method of estimating the determinant of enterprise competitiveness, in particular algorithms 2 and 3 described above, is based on the assumption that 36 components of competitiveness (36 evaluated questions about the platform, strategy, competitive advantage and positioning) are assessed. Such action has been implemented only in the framework of the Company Competitiveness Barometer 2014. In 2013 the Barometer contained 30 questions instead of 45, and therefore, in the examples below the limit values of points for the elements of the competitive profile are, as follows:

- assessment of enterprise competitiveness: <0; 300>,

- assessment of competitive proximity: <100; 0> (due to the measurement standardization this interval does not change depending on the number of questions in the research tool).

More information on the results of the Company Competitiveness Barometer 2013 can be found in previous publications of the author (Flak and Głód, 2014, pp. 15-17).

6. Examples of the competitive profiles of chosen companies

Table 4 presents the competitive profile of the most competitive Polish company that took part in the Company Competitiveness Barometer 2013. Company belonged to the service sector.

Table 4. Competitive profile of the most competitive Polish company of 2013

Elements of competitive profile		**Assessment content and value**
Case study	Competitive potential	The person representing the company declared that the creditworthiness of the company is high and the level of held share cash in relation to the nature of their business is moderate. Our research shows that in 2013 the most competitive company reached the profit on their core business. Knowledge of business activity is accumulated in complete electronic elaborations. Similarly to the least competitive company, a single employee can introduce small improvements in their work to a limited degree. In addition, constructive conclusions are often drawn within teams or departments from projects or activities that have been successful. Creativity of employees who perform the most critical activities of the company is (only) moderate (!). At the same time, the company documents of realized projects initiatives and production processes (only) in a moderate degree (!). Professional experience of employees, who perform the most critical activities in the company, was high. The extent to which the employee is free to choose how to perform tasks depends on the type of task. In the studied company employees can get to know the company's strategy during meetings with supervisors. The attentive reader will notice that these three characteristics of the competitive potential are identical to the features shown by the least competitive company. Declared deterioration or obsolescence (economical) of existing fixed assets is moderate.
	Strategy of competition	The respondent representing the company declared that in the field of the strategy of competition the subject company has a very dynamic development of marketing skills and shows the care of maintaining the high reputation. Efforts are also made in the field of public relations. However, there is no tendency to employ methods aimed at "slimming" the organization, including lean management. According to the company representative numerous actions to maintain a strong position of the company's brand, such as preparing a trade offer for each of the clients individually and at the same time trying to create own market niches, are taken. The audited company uses modern methods of marketing research in order to reach the right customer target group. Activities that increase the company's competitiveness may include the fact that the test company is looking for more competitive co-operators functioning thanks to the use of outsourcing. At the same time it uses the economy of scale and experience, as well as benchmarking target the search for sources of lowering the costs of production or services.
	Competitive advantage	The main objective of currently used pricing strategy for all products or services altogether is to maximize the total share in the sector or market segment. At the same time the customer can often negotiate the price of these products. The distribution system ensures timely delivery of products of a fairly high level. Sometimes a customer can test the products before buying. All products are warranted (e.g. a free after-purchase service, repair or replacement) and meet, in a fairly high degree, generally accepted criterion of being environmentally-friendly. The company often plans their obsolescence before introducing the product to the market; from 51 to 75 percent of customers are covered by the loyalty program.
Assessment of competitiveness <0; 300>	274 points (very high competitiveness)	

Elements of competitive profile	Assessment content and value
Assessment of competitive proximity <100; 0>	4,54 points (very high competitive proximity, company has many dominant features in other companies of the sector)

Table 5 presents the competitive profile of the least competitive Polish company which took part in the Company Competitiveness Barometer 2013. Company belonged to the science and higher education sector.

Table 5. Competitive profile of the least competitive Polish company of 2013

Elements of competitive profile		Assessment content and value
Case study	Competitive potential	The level of held share cash in relation to the nature of their business is low, creditworthiness is equally low. The respondent representing the company declared that it did not generate profit from core business. Knowledge of business is accumulated in unrelated paper documents. To some limited extent, a single employee may make minor improvements in the their work; in addition extremely rarely the constructive conclusions are drawn in teams or divisions after completing projects or activities that have been successful. Respondent rated the creativity of the most critical company's employees as low. In contrast, the company documents the projects, initiatives and production processes to a high extent. Professional experience of the most critical company's employees was very high, and the degree to which the employee is free to choose how to perform tasks depends on the type of task. In the subject company employees can get to know the company's strategy during the meetings with their supervisors. Person participating in the study estimated that deterioration and obsolescence (economical) of existing fixed assets is high.
	Strategy of competition	In terms of the strategy of competition, the subject company has a very dynamic development of marketing skills and shows the care of high reputation. Efforts are also made in the field of public relations. In addition, multiply measures are made to maintain a strong position of the company's commercial brand. However, there is no tendency to employ methods aimed at "sliming" the organization, including lean management. According to a company representative, trade offer is not prepared for the needs of each client individually and at the same time the company is not trying to create own market niches. Subject company does not apply modern methods of marketing research in order to reach the right target group. Activities that increase the company's competitiveness may include the fact that the subject company is looking for more competitive cooperators functioning thanks to the use of outsourcing. At the same time it makes use of economy of scale and experience, but it does not apply benchmarking targeted to search for sources of lowering costs of production or services offered.
	Competitive advantage	The main objective of the current pricing strategy for all products and services altogether, is the survival the difficult times in the market. At the same time, however, the buyer of the company's products may not negotiate the price. The distribution system ensures timely delivery of products or services to a fairly high extent. However, the client does not have the possibility of testing the product or service before purchasing. The company never plans the product life cycle before launching the product. None of its customers is covered with a loyalty program. None of the products are covered by the warranty (e.g. a free after-purchase service, repair or replacement). The company's products meet generally accepted criteria of being environmentally-friendly at a fairly low level. The company never plans the product or service's obsolescence before they are introduced to the market, and none of the customers are covered by the loyalty program.

Elements of competitive profile	Assessment content and value
Assessment of competitiveness <0; 300>	140 points (very low comptetitiveness)
Assessment of competitive proximity <100; 0>	31,43 points (low competitive proximity, company has few dominant features in other companies of the sector)

7. Conclusion

The aforementioned method for estimating the determinant of enterprise competitiveness is a part of a larger scientific intention which is a research project aimed at the diagnosis of enterprise competitiveness in the European Union. In 2014, a pilot study includes countries, such as Poland, Czech Republic, Slovakia, Spain, Finland and Germany. For this purpose, the research tool Barometer24.org has been prepared, which is a development of the presented in the article concept of enterprise competitiveness research. The specific objectives, scope and schedule of this project can be found in other publications by the author (Flak and Głód, 2014, Bratislava, pp. 86-92).

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