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Schmuck, Roland

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## COMPETITIVENESS INDEX: A METHOD OF MEASURING COMPANY EXCELLENCE

Roland Schmuck

University of Pécs, Faculty of Economics

Rákóczi u. 80., H-7622 Pécs, Hungary

E-mail: sroland@sroland.com



### Abstract

*The Complex South-Transdanubian Regional Competitiveness Research was a questionnaire-based research in 2005-2007 with the main goal of measuring competitiveness. The research team developed a Competitiveness Index, which classifies the competitiveness of companies into different categories. The variables of the Competitiveness Index became the following: research and development, changing of target markets, adaptation to changes, rate of marketing budget, participation in strategic alliances, workforce fluctuation. The Index described in this paper can be used to measure regional relative company competitiveness, and with the help of it, it is possible to give practical advice to develop companies.*

**Key words:** *company, competitiveness, excellence, index*

## 1. INTRODUCTION

At the University of Pécs we conveyed a research project funded by the European Union, called Complex South-Transdanubian Regional Competitiveness Research. Through the project we were curious about those factors which make different economic organizations more competitive. We conducted a survey involving profit-orientated, non-profit and local government organizations as well. The survey was built up by thematic blocks, all of their topics could potentially affect competitiveness. We have created the Competitiveness Index, which I describe in more detail in this paper later. A course-book was written from the research, and I teach the results and conclusions in a two-semester subject in the University of Pécs, Faculty of Economics. [Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/a]

The project was fulfilled in the Hungarian Government Europe Plan co-funded by the European Union.

## 2. THE COMPETITIVENESS RESEARCH

Through the history of mankind, people were interested in how to gain more advantage or profit, and how they can be successful among their competitors. In the recent times with the intensification of competition, with the fastened business life, with the exhausting of natural resources more and more researches deal with the topic of competitiveness. Some of the aspects of these researches are common. Though, there are several methods to research different areas. These areas are the following:

- competitiveness on the level of companies or national economies
- areal competitiveness researches (global, regional and local)
- sector researches (primary, secondary, tertiary)
- scope of organization (profit orientated or non-profit)



Our research based on the upper division is an aerial and a scope research. The research took place in the South-Transdanubian Region including 199 participant organizations. In the sample we purposely over-represented the role of Baranya County, to emphasize the local nature of the research.

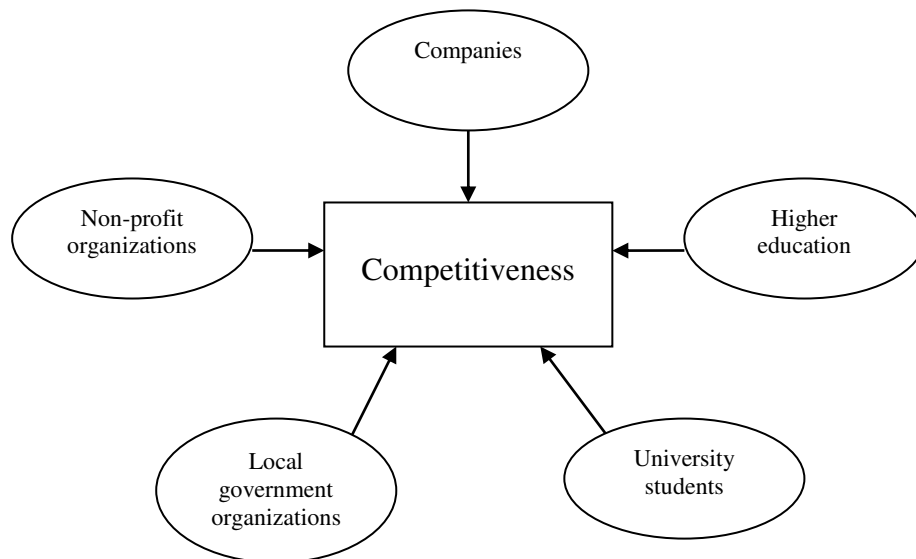


Figure 1. Target groups of the project: companies, non-profit organizations, local government organizations, higher education, university students (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

Regarding the methods of the research, we conducted a literature research first to identify those factors which the literature considers to be the most important regarding competitiveness. We created our questionnaire based on these factors, which were built up from the following modules:

- Management and strategy
- Marketing
- Finance
- Controlling
- Taxation
- Innovation
- Informatics
- Environment-consciousness
- Labour market

We created further specialized modules for the non-profit and local government organizations, since they were included in the survey as well. The table below shows the organizations included in our survey regarding scope of the organizations.

Table 1. Organizations in the survey regarding scope (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

	Number	%
Profit-orientated companies	99	49.75
Non-profit organizations	48	24.12
Local government organizations	52	26.13
<b>Total</b>	<b>199</b>	<b>100</b>



It is not the topic of this paper to discuss the results of the research regarding non-profit or local government organizations. If you are interested, further results can be downloaded from the website of research. <sup>1</sup> The Competitiveness Index can be interpreted only in case of profit-orientated companies; accordingly this paper furthermore concentrates on this sector.

Table 2. Companies in the survey regarding type of company (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

	Number	%
Limited Liability Company (Kft)	59	59.6
Limited Partnership (Bt)	26	26.3
Joint-Stock Company (ZRt/NyRt)	13	13.1
General Partnership (Kkt)	1	0.1
<i>Companies in total</i>	<i>99</i>	<i>49.8</i>

Table 3. Number of employees by type of company (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

	0 - 9	10-49	50-249	250-	Total
Limited Liability Company (Kft)	33	17	4	5	<b>59</b>
Limited Partnership (Bt)	26	0	0	0	<b>26</b>
Joint-Stock Company (ZRt/NyRt)	1	2	5	5	<b>13</b>
General Partnership (Kkt)	1	0	0	0	<b>1</b>
<i>Companies in total</i>	<i>61</i>	<i>19</i>	<i>9</i>	<i>10</i>	<b>99</b>

Most of the sample consisted of small and medium-sized enterprises according to the local features, mainly Limited Liability Companies and Limited Partnerships. Though the number of Joint-Stock Companies was relatively low, examining these companies was very important, because they usually employ more people than the two other types of companies mentioned above.

The results of the survey were analysed with SPSS statistical software. The results were set forth through a series of conferences. [Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/b] Throughout the research we continually gave opportunity for the students of the University of Pécs to take part in this comprehensive project. We developed the curriculum of a two-semester subject at the University of Pécs, Faculty of Economics.

In the following pages I present the development and the calculation method of the Competitiveness Index referring to the companies.

### 3. COMPETITIVENESS INDEX

The Competitiveness Index is an index-number based on our research to measure company competitiveness. Our goal was to create an index which helps us analyse the competitiveness of companies participated in our survey. Work was done using statistic methods and the most important steps of the development of the index are introduced below.

Competitiveness can be defined in many ways, but none of these ways are absolutely accurate, all of them have their advantages, disadvantages, supporters and opposers. To estimate the competitiveness of the

<sup>1</sup> <http://www.versenykepessseg.com>



organizations in the South-Transdanubian Region we had to use fragments from several competitiveness theories. If the competitiveness is in the focus, in some way, we have to rely on the accepted point of view, but it needs to be formed in a way to be suitable of the approaching of competitiveness. We included in our model the changing of target markets and we matched self-maintenance with adaptation to changes based on the work of Adám Török [Török 1999 27p]. Referring to index-numbers of Gábor Hoványi [Hoványi 1998p] based on the Porter competitiveness model we included research and development and the rate of marketing budget in our model.

A seminar called “Competitive Regions: Finding the Proper Practices” was held between 13<sup>th</sup>–15<sup>th</sup> October 2004 in Rovaniem in three main topics, one of them was “Cooperation and Competitiveness”, which is an important base of competitive, sustainable and workplace creating European economy. [Daman 2004] It was emphasized in the sessions that micro-level alliances can largely contribute to the interregional, and as time is passing by, to the international cooperation, which is crucial to long-term competitiveness. Furthermore, in the South-Transdanubian Region cooperation is even more important because of its territorial structure: the region has a lot of small villages. After all, it seemed obvious to include the participation in strategic alliances in our model.

Also based on Daman we included workforce fluctuation in our model as a factor obstructive to competitiveness, as the other important part of his report was to understand each other and work in trustfulness. This work is hardened if the employees are constantly changing. We can find the same approach on the website of the European Union: “For the national and international market competitiveness it is necessary to stabilise employers and the available workforce and minimize fluctuation. [European Union 2006] Accordingly we identified fluctuation as a factor to be included in our model.

Variables included in our model:

- Research and development (*K*),
- Changing of target markets (*C*),
- Adaptation to changes (*V*),
- Rate of marketing budget (*M*),
- Participation in strategic alliances (*S*)
- Workforce fluctuation (*F*).

Survey questions were the following, each question is marked by the Index variable described above.

- (*K*) Did the company do research and development in the past 5 years?
  - Possible answers: (1) yes, (2) no.
- (*C*) By your opinion how the target markets of you products/services are changing?
  - Possible answers: (1) expand, (2) constant, (3) sinter slowly, (4) narrow fast, (5) do not know.
- (*V*) How is your company related to changes in the environment?
  - Possible answers: (1) influenced the environment, (2) predicted and prepared in time, (3) predicted but did not find solution for it, (3) predicted but responded too late, (4) recognized too late.
- (*M*) How much is your company’s marketing budget compared to its total budget by your estimation?
  - Possible answers: 0-100%
- (*S*) Do you participate in strategic alliances, cooperation networks, if so, in what type of cooperation?
  - Possible answers: (1) yes (1/a) R&D, (1/b) marketing, (1/c) sales, (1/d) production, (1/e) supply, (1/f) other, please specify, (2) no.
- (*F*) How much was the workforce fluctuation (people left by their own mind and replaced by new workforce) regarding the whole company in the last year by your estimation?



- Possible answers: 0-100%

Between competitiveness and the variable above an additive connection has been made. Measuring the variables was in scales with the help of survey. It was practical to convert (standardize) the variable with different distributions to normal distribution with an expected value of 1 and a coefficient of variation of 0. Aggregating the six variables we created one aggregate variable. This aggregate variable may have values in the [-2.5;2.5] interval, and its frequency distribution is shown by the following figure:

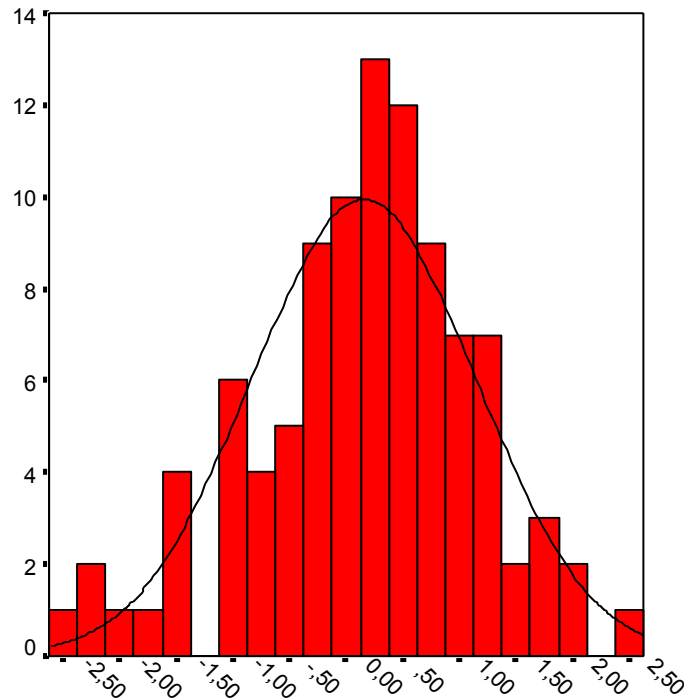


Figure 2. The frequency distribution of the aggregate variable created from the six variables (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

To identify the weight of the factors, we have to consider the aggregate Competitiveness Index as a result variable. The result of the linear regression<sup>2</sup> of the seven variables (six original explanatory variables and one result aggregate variable) gave us the weight parameters of the variables in the Competitiveness Index:



To get the upper regression model the standardized variables were multiplied by weight parameters. The Competitiveness Index calculated this way has continuous normal distribution. However, categorical variables in the survey needed competitiveness groups instead of a continuous index, so we had to break down the index values to discrete groups. The obvious multivariable statistical method, cluster analysis did not show any appropriate results. In case of normally distributed variables converting to Likert-scale is done by dividing the whole interval into same-sized smaller intervals. [Kehl-Rappai 2006] We had to make a decision at this point how many categories to use regarding to competitiveness. It was practical to use five or three categories. The original normal distribution has a lot of positive mathematical features without doubt, but being a thin edge distribution there would be less than ten elements in the two extreme

<sup>2</sup> Multivariable basic regression model:  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \epsilon$ , where  $k$  is the number of variables. [Pintér-Rappai 2007 431p]

<sup>3</sup> Variables are the following: K – research and development, V – adaptation to changes, M – rate of marketing budget, F – workforce fluctuation, S – participation in strategic alliances, C – development of markets



groups in case of using five competitiveness groups, so it is better to use three groups in this statistical case. Accordingly, we named the three groups the following: falling behind, average, leading.

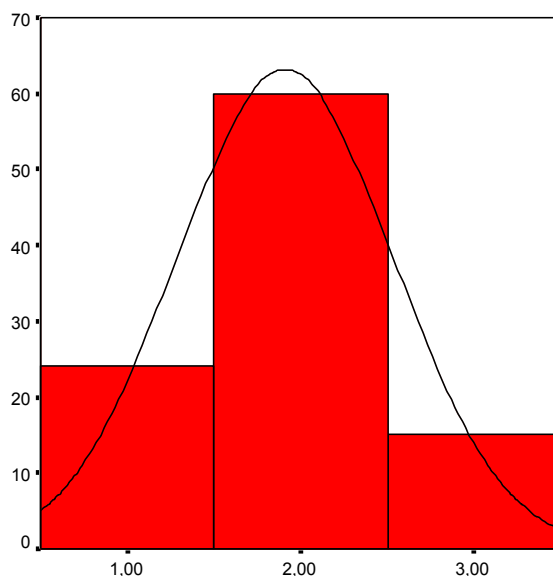


Figure 3. The categories of the discrete Competitiveness Index: falling behind (1), average (2), leading (3) (Komplex Dél-Dunántúli Regionális Versenyképességi Kutatás 2007/c)

After grouping we got the following categories:

Table 2. Competitiveness categories (Complex South-Transdanubian Regional Competitiveness Research)

Numbering of the group	Competitiveness group	Companies in the group (%)
1	Falling behind	24.2
2	Average	60.6
3	Leading	15.2

The Competitiveness Index developed this way is a method the measure the competitiveness of the companies of the South-Transdanubian Region. From the categorized index (competitiveness groups) we can assume the competitive distribution of the companies in the region. It turned out that the falling behind group is one and a half size of the leading group in the region.

The Competitiveness Index can be used to measure the competitiveness of companies, or examine the effects of other factors on competitiveness. With the use of it one can compare the economic indexes of different companies or it can be used to make time-based comparisons. With the help of it companies can recognize those factors which can make them more competitive.

#### 4. SUMMARY

Between 2005-2007 the Complex South-Transdanubian Regional Competitiveness Research examined the competitiveness of the economic organizations of the South-Transdanubian Region with the help of survey based on a comprehensive literature research. After a statistical analysis of the answers of the questionnaires we created a Competitiveness Index, which can help to measure the competitiveness of companies. The index consists of the following variables:



- Research and development
- Changing of target markets
- Adaptation to changes
- Rate of marketing budget
- Participation in strategic alliances
- Workforce fluctuation

We divided the companies of the region into three competitiveness groups (falling behind, average, leading), which made it possible to analyse the different peculiarities of companies regarding competitiveness. Furthermore, the index can be used to compare companies to each other, and to recognize those factors which affect their competitiveness in positive or negative ways.

Further information and the documents of the research can be found on the <http://www.versenykepessseg.com> website.

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