Analysis of Factors Influencing the Competitiveness of Manufacturing Companies

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Abstract:

Purpose: The research provides an analysis of factors influencing the competitiveness of manufacturing companies.
Design/Methodology/Approach: A review of the scientific literature from the area covered by the study was conducted. The study was conducted on a random sample of companies operating in the Silesian Province. The analysis of the survey data was carried out in two stages. In the first stage the relations between competitiveness and potential factors influencing its level in the companies were checked using the chi- square independence test. In the second stage, the analysis of correspondence between pairs of variables for which the dependence was confirmed.
Findings: Analyzing the combined chart of points representing row and column profiles, we conclude that there are relatively more companies that are rather competitive among those that have maintained unchanged levels of relations in the last 5 years. On the other hand, there are more companies with poor competitiveness among those that have worsened their relations with suppliers in recent years.
Practical Implications: The results can be used in efforts to improve the performance of the manufacturing sector in Poland through the development of competitive strategies based on the growth of relationships with suppliers regardless of the number of people in the company.
Originality/Value: This study is an original study of manufacturing and supplier relations entrepreneurs. It serves the purpose of improving competitive activities in terms of improving business performance.

Keywords: Competitiveness, supplier, customer, dynamics, demand, profitability.
JEL codes: L23, M1, A13.
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1. Introduction

For a company to function properly, it must be profitable, even though this is to ensure that the company's workforce is available and to ensure that employees can be paid their wages. It seems natural for an enterprise to operate with a positive output balance sheet to be profitable and thus to seek to become more competitive on the market. We notice that we have suppliers and customers with whom the company cooperates. The correctness of functioning is required in order to ensure the success of the company even if it satisfies the individual needs of this organization. The number of suppliers and customers cooperating with a given company is also important (Bennett *et al.,* 2005). The dynamics of cooperation with both suppliers should be assessed, as well as the recipients in order to plan the basic process of the company's existence (stagnation) or its further development (Jeppesen, 2005; Leśniewski, 2017).

Competitiveness between companies, especially manufacturing companies, is probably connected with the demand for its goods. All activities should be aimed at increasing the demand for products (Singh *et al.,* 2010; Sieradzka *et al.,* 2015; Kucher, 2019). Competitiveness has always been an important condition for the success of companies (Barney, 1991; Yamona *et al.,* 2018).

2. Characteristics of Competitiveness

Nowadays, companies with good results face increasingly difficult and more complicated development conditions. These include increased aggressiveness and so-called corporate turbulence, dynamics of globalization, new requirements and intensity of competition and rapid technological progress. In order to succeed, every company is forced to effectively use its real capital, finances or employee potential and analyze the environment in which it operates. This makes growing companies constantly evolve, adapting the functions, goals and tasks of the organization and management methods to changing business conditions (Komarkova *et al.,* 2014).

Competitiveness has always been an important condition for the success of companies. Uncompetitive companies, unable to create value at least on a normal level, they just must fall. Therefore, the key task of managing a company is to ensure that it is competitive. The processes leading to the desired level of competitiveness must not be spontaneous and random, but must be systematically planned, implemented and controlled. Hence the growing importance of competition strategies, understood as comprehensive, long-term concepts of creating relatively permanent advantages for all participants of the competitive environment. It is important to underline that new theories and research go towards a more comprehensive view of competitiveness, going beyond the framework of competitiveness understood solely as a feature of market actors. Complexity and the dynamics of economic processes at the turn of the twentieth and twenty-first century, globalization and the development of the knowledge-based economy, imply the need for a broader perspective on competitiveness, taking into account not only the international aspect but also the

general condition of the macro and microeconomic economy. A definition of competitiveness, proposed by the OECD, could be an answer to this need.

According to it, this notion should be understood as the ability of companies, sectors, regions, countries and supranational areas to generate relatively high income from production factors and a relatively high level of employment under conditions of permanent submission to international competition. Shaping a high level of competitiveness of companies, sectors, entire economies and/or its regions is one of the most important challenges of the modern economy and economic theories describing it (Shved, 2017).

Competitiveness is described and understood as an attribute of a company expressed in terms of effectiveness, and efficiency. Similarly, Ambastha (2004) saw competitiveness as the ability of a company to design, manufacture and sell better products and services than those offered by competitors, taking into account price and non-price quality criteria in the assessment. Lisowska (2013) describes the competitiveness of small and medium-sized enterprises as *"The competitiveness of small and medium-sized enterprises is the ability to take quick and adequate actions to manage resources efficiently"*. Other definitions of competitiveness are given in Table 1.

Table 1. *Definitions of competitiveness*

Author	Definition
Dictionary of the Polish language	Competitive - relating to competition, especially in the economic field, competing with other companies, goods, etc.; also: able to compete successfully with them because of their advantages.
M.E. Porter	M.E. Porter Competitiveness is often referred to the international market, i.e. an open economy, it is a global market where a given country, company, commodity, brand occurs. It is a view that success on the global market is determined by winning a competitive struggle on the local, regional and national market. Competition in a given sector depends on five basic forces: competition for position among current competitors, bargaining power of customers, bargaining power of suppliers, threats of new entries, threats of substitutable products and services (Porter, 2001).
M. Dzikowska M. Gorynia	Competitiveness is the ability to compete and therefore to act and survive in a competitive environment. "competitiveness' means the ability to achieve or maintain a competitive advantage, and as such may be considered synonymous with a company's competitive (Dzikowska *at al.,* 2012).
E. Cyrkon	The competitiveness of enterprises is seen as a process, in which market participants seek to pursue their interests by seeking to make better offers of price, quality or other characteristics that are more favourable than others to their trading decisions (Cykorn, 2000).
Z. Pierścionek	By competitiveness is meant an attribute of a company, expressed in terms of efficiency, effectiveness and agility (Pierścionek, 2003).

A. Ambastha, K. Momaya	Competitiveness is the ability of a company to design, manufacture and sell better products and services than those offered by its competitors considering in the assessment price and non-price quality criteria (Ambastha *et al.,* 2004).
R. Lisowska	Competitiveness of small and medium-sized enterprises is the ability to take quick and adequate actions to manage resources effectively (Lisowska, 2013).
J. Penc	Competition is a process of rivalry between various entities pursuing similar objectives and carrying out activities which make it difficult or impossible for rivals to achieve them (Penc, 2008).

Source: *Own study.*

The presented definitions of competitiveness show that the authors see competitiveness in various aspects: as a feature, a skill, a process, an ability. In the opinion of the authors, competitiveness is the ability of a company to gain a competitive advantage, and thus to achieve profits and market shares greater than the competition (Nykolyuk, 2014; Johnson *at al*., 1999; Wojtaszek., Miciuła.*,* 2019; Utami *at al.,* 2014). Competitiveness as a microeconomic, multi-faceted category is seen in the relationship the host entity and its potential, possibilities and skills and the market structure and strategic opportunities. This is reflected in the position expressed by Bowman and Faulkner (1994). They distinguish between basic and key competitiveness. The first of these includes processes and systems that give the company a leading position in the industry and are related to the ability of the company to increase the customer's perceived value (Gunasekaran *et al.,* 2011; Pearce, 1999; Zelga, 2017; Markovics, 2005; Sekerin *et al.,* 2015).

The second is associated with the skills required to gain a lasting competitive advantage in each market. In turn, in terms of other approaches to the competitiveness of enterprises, encountered in the literature on the subject, allow us to understand it as the ability of the enterprise to develop sustainably in the long term and the tendency to maintain and increase market shares, the relative ability to push its own system of objectives, targets or values, the ability of undertakings to increase the efficiency of its internal functioning by strengthening and improve its position in the market, its ability to design, manufacture and sell goods whose prices, quality and other qualities are more attractive than the relevant characteristics of the goods offered by its competitors (Yang *et al.,* 2009; Zitkus, 2011; Matysek-Jedrych, 2012).

In a generalized attempt to indicate the essence of a company's competitiveness, it can be indicated that this concept implies the ability to efficiently pursue their objectives in the competitive marketplace. In this aspect, the competitiveness of an enterprise should be understood as a proper feature of the enterprise, playing an important role in formulating the enterprise's development strategy (Banyte *et al.,* 2008; Ungerman *et al.,* 2018). Similarly, competitiveness has been interpreted as the ability to achieve and/or maintain a competitive advantage in the aspect of the concept identical to competitive capabilities (Balkyte *et al.,* 2010).

3. Manufacturing Companies' Sample and Methodology

For the purpose of the realization of the subject of the article, the authors conducted a survey on the population of pre-school establishments registered in the Silesian Province. A sample of 247 companies was drawn for the survey. The sample was drawn using a random frame in the form of a database of companies carrying out research on behalf of the authors from the population defined above. A probabilistic method of sample selection was used - stratified random selection, which consists in dividing the surveyed population into so-called layers and making direct drawing of independent samples within each layer. The application of probabilistic sample selection will allow for general results obtained for the whole population. The application of the above described procedures ensures that the sample is experimental for the defined population of enterprises.

Initially, a pilot study was carried out to verify the measurement scales and design of such a questionnaire, which will be optimal due to the re-adjustment of the assumed work topic. The initial questionnaire was verified using the alpha Cronbach reliability factor after the pilot study. As the minimum coefficient obtained was 0,735 for all questions in the questionnaire, all questions in the questionnaire for the main survey were included in the questionnaire for the pilot study. It is assumed that for the reliability of the measurement to be considered, the minimum value of the Cronbach's alpha-value should not be less than 0,7 (Rószkiewicz, 2013).

The pilot study was carried out using two techniques which were combined and carried out on a pre-sample of 40 enterprises. The two techniques were used to exploit the advantages of both, to improve the course of the study and to increase its standardization by reducing the so-called polling effect. The aim of the procedure was additionally to minimize the number of potential errors that may result from the limited perception of respondents using one of the senses - hearing or sight. The first of the techniques was CATI (Computer Assisted Web Interviews), i.e. computer-assisted telephone interview. The second technique is CAWI (Computer Assisted Web Interviews), or online surveys.

In the next stage, a proper test was carried out with a good representative sample using an optimal questionnaire, which was checked in a pilot study.

4. Analysis of Selected Factors Influencing the Competitiveness

In order to analyze the factors influencing the competitiveness of manufacturing companies, it was considered appropriate to analyze the following elements: the size of employment in the company, the level of competitiveness of the company, the number of suppliers the company cooperates with, the number of customers the company cooperates with, assessment of the dynamics of cooperation in the last 5 years with suppliers and customers and the characteristics of demand for the company's goods.

The determination of the variables subject to analysis is presented in Table 2.

Table 2. *Determinations of variables under analysis*

Variables analyzed
X^2 - employment in the enterprise
X^3 - (subjective) assessment of the level of competitiveness of a company
X^6 - number of suppliers with which the company cooperates
X^7 - number of customers with whom the company cooperates
X^8 - evaluation of the dynamics of cooperation with suppliers in the last 5 years
X^{11} - evaluation of the dynamics of cooperation in the last 5 years with customers
X_{16} - characteristics of demand for the enterprise's goods.

Source: Own elaboration based on conducted research.

4.1 Variable Relationship Analysis

During the first stage of the study, the relationship tests between all pairs of variables included in the study were conducted. Because the sample size is n = 240 and exceeds 40, for each of the compared pairs of variables Pearson's $\chi2$ independence test or the highest reliability $\chi2$ independence test will be applied. The latter test was carried out when for any of the pairs of the analyzed variables in the multi-divisional Table there would be an expected number less than or equal to 5. The results of Pearson's $\chi2$ independence test and the highest reliability $\chi2$ independence test in the form of p - value together with the quota coefficient C showing the strength of the relation between the analyzed variables presented are presented in Table 2. For each pair of variables, the following hypothesis is verified using the above tests.

H0: the variables Xi and Xj are independent of each other against the alternative hypothesis.
H1: the variables Xi and Xj are mutually dependent.

Table 3. *Results of the χ2 - Pearson independence test and the highest reliability in the form of p - value and the value of the quota coefficient C for the tested variables*
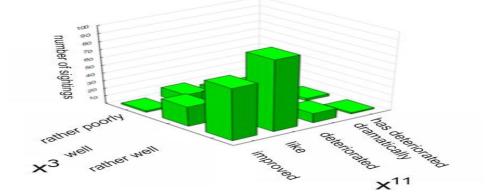
Pairs of variables	χ^2 – Pearsona	$\chi2$ – NW	C
$X_3 - X_2$	0.667	0.501	0.097
$X_3 - X_6$	0.152	0.156	0.191
$X_3 - X_7$	0.392	0.295	0.202
$X_3 - X_8$	0.716	0.48	0.122
$X_3 - X_{11}$	**0.001**[**]	**0.002**[*]	0.294
$X_{16} - X_2$	0.492	0.485	0.117
$X_{16} - X_6$	0.735	0.728	0.119
$X_{16} - X_7$	0.306	0.275	0.213
$X_{16} - X_8$	0.513	0.457	0.144
$X_{16} - X_{11}$	0.284	0.239	0.171
$X_8 - X_6$	0.418	0.244	0.189
$X_8 - X_7$	0.317	0.392	0.254
$X_8 - X_{11}$	0.053	**0.025**[*]	0.251

$X_2 - X_6$	**0.013***	**0.043***	0.243
$X_2 - X_7$	0.271	0.291	0.217
$X_2 - X_8$	0.169	0.105	0.188
$X_2 - X_{11}$	0.88	0.867	0.098
$X_{11} - X_6$	**0.049***	**0.04***	0.253
$X_{11} - X_7$	0.772	0.532	0.204
$X_{11} - X_8$	0.055	**0.025***	0.251

Note: *If p - value is set to *, it means that a given test confirmed the relation between the analyzed pair of variables at the level of materiality α = 0.05, and if ** at the result of a given test, it means that the relation between the variables is confirmed at the level of materiality α = 0.01.*
Source: *Own study.*

Since the multi-divisional tables for all the pairs of variables under consideration had expected numbers less than 5, the conclusion will be made on the basis of the results of the χ2 independence test - the most reliable. Based on the results of the above-mentioned test, there is a relationship between the following pairs of variables: X3-X11, X8-X11, X2-X6, X11-X6 and X11-X8. Figure 1-5 present histograms for multi-divisional tables between the variables for which the test has confirmed the relationship.

Figure 1. *Two-dimensional distribution of variables x3-x11*
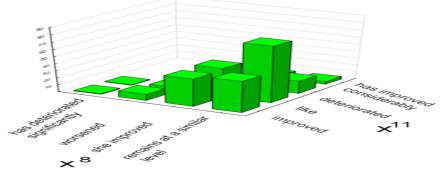

Source: *Own study.*

There is a relationship between the (subjective) assessment of a company's level of competitiveness and - an assessment of the dynamics of cooperation with customers over the last 5 years. Rather well assessed by the respondents is the level of competitiveness, where the dynamics remain at the same level and improvements are also noted (Figure 1).

There is a correlation between the assessment of the dynamics of cooperation over the last 5 years with suppliers and evaluation of the dynamics of cooperation with customers over the last 5 years. The assessment of the dynamics of cooperation with customers and suppliers over the last 5 years remains at a similar level (Figure 2).

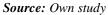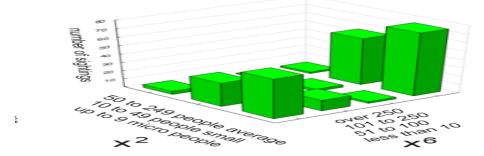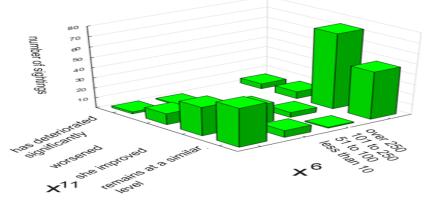**Figure 2.** *Two-dimensional distribution of variables x8-x11*

Source: Own study

Figure 3. *Two-dimensional distribution of x2-x6 variables*

Source: Own study

There is a relationship between the size of employment in the company and the number of suppliers the company works with. Suppliers usually cooperate with micro enterprises (up to 9 people) and with companies of 10 to 49 people (Figure 3).

Figure 4. Two-dimensional distribution of x11-x6 variables

Source: Own study.

There is a correlation between the assessment of the dynamics of cooperation over the last 5 years with customers to the number of suppliers with whom the company cooperates. The dynamics of cooperation with customers over the last 5 years in terms of the number of suppliers has remained at a uniform level (Figure 4).

Figure 5. *Two-dimensional distribution of x11-x8 variables*

Source: Own study.

There is a correlation between the assessment of the dynamics of cooperation over the last 5 years with customers to assess the dynamics of cooperation in the last 5 years with suppliers. The dynamics of cooperation with suppliers over the last 5 years remains at a similar (uniform) level (Figure 5).

5. Conclusion

The analysis of the correspondence carried out in the last 5 years was based on the level of competitiveness of the company and the dynamics of cooperation with the recipients. Analyzing the total graph of points representing line and column profiles, we can state that there are relatively more companies that have rather good competitiveness among companies that have maintained unchanged level of relations in the last 5 years.

On the other hand, there are more companies with poor competitiveness among those that have worsened their relations with suppliers in recent years. Thus, the largest number of enterprises that are very well competitive is among enterprises that have improved their relations with suppliers in the last 5 years.

Analyzing the chart of common points from the profiles of rows and columns, it can be seen that among enterprises that have assessed their competitiveness rather well, the most cooperate with the number of suppliers between 11 and 50. On the other hand, among enterprises that are very well competitive, enterprises that cooperate with less than 10 suppliers prevail. Enterprises that see themselves as rather poorly competitive are most often companies that cooperate with the number of suppliers from 51 to 100.

References:

Ambastha, A., Momaya, K. 2004. Competitiveness of firms: review of theory, frameworks, and models. Singapore Management Review, Vol. 26, No 1, 45-61.

Balkyte, A., Tvaronavieiene, M. 2010. Perception of competitiveness in the context of sustainable development: Facets of sustainable competitiveness. Journal of Business Economics and Management, 11(2), 341-365.

Banyte, J., Salickaite, R. 2008. Successful Diffusion and Adoption of Innovation as a Means to Increase Competitiveness of Enterprises. Inzinerine Ekonomika-Engineering Economics, 1(56), 48-56.

Barney, J.B. 1991. Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120.

Bennett, D., Vaidya, K. 2005. Meeting technology needs of enterprises for national competitiveness. International Journal of Technology Management, 32(1-2), 112-153.

Bowman, C., Faulkner, D. 1994. Measuring product advantage using competitive benchmarking and customer perceptions. Long Range Planning, 27(1), 119-132.

Zirconium, E. 2000. Compendium of economic knowledge. Scientific Publishing House PWN, Warsaw - Poznan, 35.

Dzikowska, M., Gorynia, M. 2012. Theoretical aspects of enterprise competitiveness - towards eclectic concept. National Economy (National Economy), 4 (in Polish).

Gunasekaran, A., Rai, B.K., Griffin, M. 2011. Resilience and competitiveness of small and medium size enterprises: an empirical research. International journal of production research, 49(18), 5489-5509.

Jeppesen, S. 2005. Enhancing competitiveness and securing equitable development: Can small, micro, and medium-sized enterprises (SMEs) do the trick? Development in Practice, 15(3-4), 463-474.

Johnson, J. T., Busbin, J. W., Pearce, J. W. 1999. Market tracking, research & development and international competition: An examination of linkages to profitability. Competitiveness Review: An International Business Journal.

Komarkova, L., Pirozek, P., Pudil, P. 2014. The factors and other characteristics influencing competitiveness of enterprises in countries in the post-transition phase of the economy. Engineering Economics, 25(5), 513-521.

Kucher, A. 2019. Assessment of the impact of land quality on competitiveness of enterprises. Agricultural and Resource Economics. International Scientific E-Journal, 5(2), 99-120.

Leśniewski, M.A. 2017. Behavioural-humanistic model of soft competitiveness of enterprises. Jagiellonian Journal of Management, 3(2), 77-91.

Lisowska, R. 2013. Competitive advantages of small and medium-sized enterprises located in developed and marginalised areas - comparative analysis. Family companies - global and local challenges, (2), 158 (in Polish).

Markovics, K. 2005. Competitiveness of domestic small and medium enterprises in the European Union. European Integration Studies, 4(1), 13-24.

Matysek-Jedrych, A. 2012. Competitiveness and crisis – the case of the Baltic States economies. Poznan University of Economics Review, 12(2), 49-73.

Nykolyuk, O. 2014, Conceptual principles of competitiveness of enterprises. Management Theory and Studies for Rural Business and Infrastructure Development. Scientific Journal, 36(3), 608-615.

Penc, J. 2008. Management Encyclopedia: basic categories and terms. University
        of International Studies, 11-19 (in Polish).

Pierścionek, Z. 2003. Competition and company development strategies. Scientific Publisher
        PWN, Warsaw, 165-166 (in Polish).

Porter, M.E. 2001. Porter about the competition. Polish Economic Publishing House,
        248 (in Polish).

Rószkiewicz, M. 2013. Socio-economic research design. Recommendations and research
        practice. PWN. Warsaw (in Polish).

Sekerin, V.D., Burlakov, V.V., Dzyurdzya, O.A., Gorohova, A.E. 2015. Peculiarities
        of forecasting competitiveness of innovations for industrial enterprises. International
        Journal of Economics and Financial Issues, 5(3S), 54-60.

Shved, T.V., Bila, I.S. 2017. Evaluation of competitiveness of enterprises. Economies and
        Societies 8, 405-410.

Sieradzka, K., Luft, R. 2015. Theoretical aspects of enterprise competitiveness. Central
        European Review of Economics & Finance, 10(4), 133-141.

Singh, R.K., Suresh, K.G., Deshmukh, S.G. 2010. The competitiveness of SMEs
        in a globalized economy. Management research review, 33(1), 54.

Ungerman, O., Dedkova, J., Gurinova, K. 2018. The impact of marketing innovation
        on the competitiveness of enterprises in the context of industry 4.0. Journal
        of Competitiveness, 10(2), 132.

Utami, R.M., Lantu, D.C. 2014. Development competitiveness model for small-medium
        enterprises among the creative industry in Bandung. Procedia-Social and Behavioral
        Sciences, 115(21), 305-323.

Wojtaszek, H., Miciuła, I. 2019. Analysis of Factors Giving the Opportunity for
        Implementation of Innovations on the Example of Manufacturing Enterprises in the
        Silesian Province. Sustainability, 11(20), 5850.

Yamova, O.V., Maramygin, M.S., Sharova, I.V., Nesterenko, J.N., Sobina, N.V. 2018.
        Integral Valuation of an Enterprise's Competitiveness in the Industrial Economy.
        European Research Studies Journal, 21(S2), 777-787.

Yang, Ch.L., Pinglin, S., Chan, Y., Sheu, Ch. 2010. Mediated effect of environmental
        management on manufacturing competitiveness: an empirical study. International
        Journal of Production Economics, 123(1), 210-220.

Zelga, K. 2017. The importance of competition and enterprise competitiveness.
        World Scientific News, 72, 301-306.

Zitkus, L. 2011. Competitive ability as an instrument for ex-ante evaluation of enterprise's
        competitiveness. Engineering Economics, 4(22), 423-433.