

IDENTIFICATION OF THE MAIN COMPONENTS OF THE COMPETITIVE POTENTIAL OF ENTERPRISES OPERATING IN CRISIS CONDITIONS

Anna WOLAK-TUZIMEK

Kazimierz Pulaski University of Technology and Humanities, Faculty of Economic and Finance, Radom;
awt@uthrad.pl, ORCID: 0000-0002-2998-909X

Purpose: The paper aims to identify major components of the competitive potential of enterprises operating at the initial stage of the economic crisis caused by the COVID-19 pandemic. The research hypothesis **H1** is advanced: the scope of business objects affects the selection of enterprise competitive potential components. The concept and nature of competitiveness are discussed and the subject matter of enterprise competitive potential is detailed.

Design/methodology/approach: The theoretical section follows a thorough review of leading specialist literature. The empirical part, on the other hand, uses the exploratory factor analysis, which detects an optimum group of main factors and explains correlations among observable variables, serves to verify the hypothesis. The number of factors is determined by means of the Cattell scree and Kaiser criteria.

Findings: The paper contains the results of research into 253 large enterprises in the Polish economy. Exploratory factor analysis is employed to define the statistically significant components of competitive potential of enterprises active in the initial phase of the economic crisis and the effect of business objectives is explored on the selection of the components of enterprise competitive potential. It is shown that, regardless of business objects, three factors, namely, innovative machinery and equipment, the financial condition of an enterprise, and human capital, are the key components of enterprise competitive potential.

Practical implications: The results can be utilised by entrepreneurs as a guide to the selection of the components of enterprise competitive potential at the times of crises.

Originality/value: The paper presents the results of original research into a representative group of large enterprises which can be generalised to the entire population assuming a confidence level of $\alpha = 95\%$ and maximum error of $\beta = 6\%$

Keywords: Competitiveness, enterprise, competitive potential.

Category of the paper: research paper.

1. Introduction

Competitiveness is an inevitable characteristic of the market economy. It sets directions for all business entities and forces enterprises to take a rational advantage of the resources in place

The resource-based trend defines resources as all assets, abilities, skills, information, knowledge or organisation processes an enterprise has control over that enable it to create and implement a strategy leading to a greater effectiveness and efficiency of an organisation (Daft, 2006, p. 73)

The competitive potential is of particular interest to the resource-based school, therefore, the definitions of this concept commonly refer to such elements as resources, competences, abilities, skills or knowledge. N.G. Boyd, S.C. Hanlon and A.A. Lado (1997, p. 113) believe resources and the skills of their distribution and application generate profits to an organisation and allow for a long-term competitive advantage

Since resources are a major factor of enterprise competitiveness, the literature offers a number of divisions based on different criteria of resource classification. The varied nature and characteristics of the particular resources prevent a division that would unambiguously classify and define all the attributes of resources

The contemporary specialist literature defines a resource as anything that can be thought in terms of an enterprise's strengths and weaknesses (Sopińska, 2006, p. 112). The most common classification divides resources into four categories: financial capital, physical capital, human capital, and organisational capital (Barney, 1997, p. 143), which can be subdivided into more components

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The competitive potential of an enterprise should address both the internal elements of an entity and its business environment. It is most often directly identified with its resources, competences and specific skills available to a given firm, which implies the business objects may affect the choice of competitive potential elements. Therefore, the research hypothesis **H1** is posited: the scope of business objects affects the selection of enterprise competitive potential components

In order to verify the hypothesis, the results are used of research into 253 Polish enterprises and exploratory factor analysis is applied. Statistica 1 software serves as a tool of data analysis

2. The competitive potential of an enterprise - literature review

In the market economy, competition is a fundamental requirement of business activity and allocation mechanism of economic resources in place. Competitiveness consists in an effective operation of businesses in a turbulent competitive environment (Wolak-Tuzimek et al., 2021, p. 284)

Competitiveness has a range of aspects (Łukiewska, Juchniewicz, 2021) rooted in economics, management, history, politics, and culture and is a complex, multidimensional and relative notion whose meaning changes over time and depends on a context, is synonymous with economic power and addressed at diverse levels, including the level of a nation (Doan, 2021; Terzić, 2021), region (Le, Duy, 2021), sector (Cong, Thu, 2020; Srivastava et al., 2006), and enterprise (Mat, Cevger, 2022; Maráková et al., 2021).

Competitiveness is frequently an object of economists' attention, yet is not defined or interpreted unambiguously. In respect of an enterprise, competitiveness is seen as the degree of interaction between the groups of customers' satisfaction and the value to shareholders by constantly improving service quality, the capability to exploit the potentials, to implement or to respond through financial strength (Asree et al., 2010). It is a feature of an effective enterprise connected with the process of competition whereby firms compete against one another (Liao et al., 2015). It can be assumed, therefore, an enterprise's competitiveness is the ability to realise its own goals and achieve better economic results than its competitors.

The competitiveness of enterprises is a system consisting of four interlinked elements, i.e. (Stankiewicz, 2005, p. 79): competitiveness potential (all material and intangible resources of an enterprise), competitive advantage (the effect of effective utilisation of a configuration of competitive potential components), the instruments of competing (the tools and methods of customer acquisition and goodwill creation), and competitive standing (the result of competing).

An analysis of the relations among the individual dimensions of competitiveness suggests the gaining of a desirable competitive standing is conditional on a competitive advantage, which depends on the competitive potential of an enterprise. The resources and skills held by an entity influence the preparation of its product range, which is evaluated by the market and allows for a competitive advantage. A choice of the instruments of competing should follow a detailed analysis of the enterprise's competitive potential and environment. Only once some appropriate instruments of competing are applied can a specific competitive standing be reached.

An enterprise's potential is commonly defined by the literature as a cluster of abilities, skills, capacities, powers and productivity (of a worker or of machinery, equipment, technology) (Sobolewski, Narojczyk, 2018, p. 38), resources and competences held by an enterprise (Bednarz, 2013, p. 26), a system of tangible and intangible resources that allow

an enterprise to apply some optimum instruments of effective competition in global markets (Klimczuk, 2004, p. 206).

Most definitions of competitive potential comprise the notion of the resource. The resource as the foundation of an enterprise's effectiveness and competitiveness is most clearly highlighted by the research and theoretical trend known as *the resource-based view of the firm* or *resource-based theory of the firm*. It presumes the gaining of competitive advantage by an enterprise depends on its resources (Barney, 1991; Kay 1996). In general, this theory sees an organisation as an entity actively searching for some hard to copy, rare, precious and unique configurations of skills and resources and capable of creating, reproducing, and propagating the same (Peszko, 2016, p. 274).

An enterprise's competitive potential may comprise such parts of an organisation's structure as (Brodkowska-Szewczuk, 2009, p. 91):

1. Human capital – the quality of marketing staff (logistics, distribution, sales), of engineering and financial staff, of management staff (propensity for risk, entrepreneurship, and commitment to quality issues), workers (qualifications, work efficiency, creativity).
2. Physical resources (quality, substitutability, complementarity, structure) – machinery, equipment, means of transport, IT infrastructure.
3. Financial resources – the scale of profits, value of net assets, profitability of equity, financial liquidity, monies, and accounts receivable.
4. Latent resources – information, technologies, innovation, firm's reputation, unique skills, informal links with decision-making centres, patents, licences, work climate, corporate culture, product brands, experience, contacts.
5. Organisational resources – decision-making system, organisation of distribution and logistics network, enterprise size, organisational structure, quality management, links with suppliers and clients, monitoring system.

The resources of an enterprise predetermine its competitiveness at present. Relying on characteristics that enable effective competition, it creates the fundamental sources of competitive advantage. Rivalry among enterprises concerns the resources which are unique and unavailable to others. It should be noted, however, the possession of resources alone, treated as assets at the disposal of an enterprise, is insufficient. Competitiveness is decided not by the quantity of resources, but their quality and ability to use them properly

3. Methods

The hypothesis is verified on the basis of research into 253 Polish enterprises by means of exploratory factor analysis.

The survey was conducted in March 2020. The sample was selected at random and consisted of large enterprises active in the area of Poland. 1600 were drawn from that population so as to guarantee each individual in the general set an equal chance of making it into the sample. The data were obtained using the method of Computer-Assisted Telephone Interview (CATI).

$n = 253$ of correctly filed surveys were received, which means, assuming $\alpha = 95\%$ and $\beta = 6\%$, the analysis results are representative of the general population.

The empirical section employed an original survey questionnaire that consisted of two parts: particulars and contents. Some objective criteria are adopted in the former to characterise the sample, including the organisational and legal form of an enterprise, sector of an enterprise, and the region where the enterprise is seated.

Some comments can be made on the structure of the enterprises studied:

1. The limited liability company was the major legal and organisational format among the firms (68.79% of all), while the fewest (2.37%) limited partnerships were examined.
2. Most entities engaged in services and trade (118, or 46.64% of the total), industrial and chemical manufacturing (74 firms, i.e., 29.25%): they all accounted for ca.76% of the entities surveyed.
3. The enterprises were mostly based in the Mazovian (46 in 2020) and Silesian regions (34 firms in 2020). Fewest enterprises were registered in the lubuskie region (2.37% of all the businesses).
4. More than 75% of the enterprises studied had implemented CSR and used an ERP III integrated IT systems.

6 questions were asked in the other section of the survey and the responses were recorded on 10-point ordinal scales, where 1 denoted a low significance and 10 a high significance. This article discusses the results generated for one problem.

1. Please determine the significance of the particular variables as the factors of enterprise competitive potential on a scale from 1 to 10, where: 1 denotes a low and 10 a high significance (16 observable variables were examined, namely: financial liquidity, profitability, equity level of an enterprise, customer loyalty, the method of distribution, integrated IT system, the quality of management staff, the creativity of workers, the condition of plant and machinery, research and development activities, the technical standard of products, new technologies, the creation of a strong product brand, the availability of materials, the standard of servicing, the implementation of Corporate Social Responsibility).

Exploratory factor analysis serves to verify the research hypothesis. It explains correlations and seeks the causes of covariance generated by shared factors in order to identify all factors that may be actually inherent in the correlations of a given system of variables while preserving as much information contained in primary variables as possible, and then to reduce these factors. The number of components, referred to as factors, is then determined by means of two criteria:

- Kaiser criterion (1960), according to which the factors with eigenvalues above 1, or loaded with a minimum of one observable variable, can be retained.
- Cattell scree test (1966), which presents eigenvalues as a linear diagram. The choice of a number of factors consists in finding a point (quantity of components) where the diagram begins to 'flatten out'. If a descending line becomes horizontal, this is the so-called end of the scree. The components to the right of the scree's end point represent a negligible variance and mostly random noise.

Statistica 12 software and MS Excel 2016 spreadsheet are utilised as the tools of data analysis.

4. Results

Exploratory factor analysis serves to verify the research hypothesis, while Kaiser criterion and Cattell scree test help to determine the number of factors. The analysis applied to trade and service enterprises identifies six factors and to industrial and chemical manufacturing and other sectors, five factors with eigenvalue in excess of 1. Table 1 shows a matrix of eigenvalues for the factors defined.

Table 1.

The matrix of eigenvalues for the factors describing the competitive potential of enterprises with the particular business objects

Factor	Characteristic value	Percentage of general variance	Accumulated characteristic value	Accumulated percentage
Trade and services				
F1	4.58	28.61	4.58	28.61
F2	1.93	12.09	6.51	40.70
F3	1.77	11.17	8.28	51.87
F4	1.21	7.59	9.49	59.46
F5	1.11	6.94	10.60	66.40
F6	1.01	6.36	11.61	72.76
Industrial and chemical manufacturing				
F1	5.28	33.02	5.28	33.02
F2	2.26	14.15	7.54	47.17
F3	1.76	10.98	9.30	58.15
F4	1.38	8.62	10.68	66.77
F5	1.28	8.00	11.96	74.77

Cont. table 1.

Other sectors				
F1	5.57	34.83	5.57	34.83
F2	2.20	13.73	7.77	48.56
F3	1.33	8.32	9.10	56.88
F4	1.10	6.89	10.20	63.77
F5	1.01	6.32	11.21	70.09

Source: own research.

The figures imply the subsequent eigenvalues, or parts of the variance explicated for the particular six factors (determined for trade and service enterprises) are in the range <1.01;4.58>; for the five factors determined for industrial and chemical manufacturing, enterprises, <1.28;5.28>; and for the five factors determined for other enterprises, <1.01;5.57>. The accumulated eigenvalues for these factors are 11.96, 11.21, and 11.21. respectively. This means this system of factors defining the competitive potential of trade and service, industrial and chemical manufacturing, and other enterprises explains 72.76%, 74.77%, and 70.09% of the total variance, respectively.

In order to arrive at the so-called simple factor structure, the matrix of factor loads is subject to Varimax rotation to simplify the factor interpretation by minimising the number of variables needed to explicate a given factor. Table 2 presents a matrix of factor loads for the factors describing the competitive potential of enterprises, or the correlation between observable variables and the factors introduced. The minimum correlation qualifying as significant is assumed to be 0.7.

Table 2.

The matrix of factor loads for the factors describing the competitive potential of enterprises for business objects

Factor loads (normalised Varimax)						
Principal components (the loadings are greater than 0.7)						
Variable	F.1	F.2	F.3	F.4	F.5	F.6
Trade and services						
V.1	0.08	0.93	0.06	0.15	0.12	0.13
V.2	0.06	0.93	0.10	0.16	0.08	0.04
V.3	0.03	0.24	-0.29	0.06	0.71	0.32
V.4	0.14	0.36	0.73	-0.05	0.07	0.16
V.5	0.17	0.07	0.32	0.22	0.77	-0.11
V.6	-0.05	0.22	0.10	0.80	0.17	-0.05
V.7	0.03	-0.01	0.80	0.04	-0.17	-0.03
V.8	0.12	-0.02	0.77	0.16	0.23	0.16
V.9	0.75	0.16	0.08	-0.23	0.03	0.20
V.10	0.67	-0.06	0.30	0.14	0.11	-0.24
V.11	0.79	0.01	-0.03	0.09	0.17	0.23
V.12	0.72	0.09	0.01	0.40	-0.12	0.06
V.13	0.49	0.08	0.31	0.43	0.06	0.12
V.14	0.15	0.08	0.19	-0.01	0.16	0.86
V.15	0.40	0.06	-0.01	0.58	0.17	0.15
V.16	0.23	0.19	0.05	0.51	-0.15	0.59

Cont. table 2.

Industrial and chemical manufacturing					
V.1	0.08	0.89	0.03	0.01	0.25
V.2	0.04	0.87	0.07	0.19	0.15
V.3	-0.02	0.80	0.06	0.09	-0.21
V.4	0.35	0.10	-0.20	-0.07	0.76
V.5	0.07	0.10	0.41	0.15	0.69
V.6	0.72	0.16	0.05	0.14	0.06
V.7	0.87	-0.09	0.22	0.10	-0.05
V.8	0.73	-0.01	0.11	0.28	0.40
V.9	0.59	0.04	0.39	0.11	0.42
V.10	-0.10	-0.02	0.36	0.39	0.53
V.11	0.16	0.11	0.91	0.15	0.16
V.12	0.33	0.06	0.88	-0.06	0.01
V.13	0.20	0.01	0.33	0.70	0.29
V.14	0.09	0.23	0.06	0.80	0.22
V.15	0.53	0.03	0.20	0.63	0.04
V.16	0.16	0.11	-0.24	0.75	-0.21
Other sectors					
V.1	0.02	0.95	-0.03	0.01	0.06
V.2	0.05	0.90	-0.04	0.14	0.08
V.3	0.08	0.04	0.14	0.90	0.08
V.4	0.23	0.22	0.10	0.03	0.80
V.5	0.18	0.61	0.34	-0.17	0.08
V.6	-0.10	0.20	0.51	-0.05	0.65
V.7	0.31	-0.08	0.80	0.09	0.09
V.8	0.49	0.09	0.37	0.20	0.46
V.9	0.76	0.15	0.26	0.08	-0.03
V.10	0.49	0.06	0.44	-0.26	0.23
V.11	0.86	-0.09	-0.01	0.04	0.18
V.12	0.63	-0.01	-0.00	0.15	0.56
V.13	0.67	0.13	0.29	0.21	0.41
V.14	0.07	0.10	0.73	0.11	0.11
V.15	0.47	-0.15	0.04	-0.01	0.60
V.16	0.54	0.28	0.15	-0.23	0.14

Source: own research.

The values above 0.7 are shown in bold in Table 2. In this way, it is easier to note the variables loading the particular factors.

Six factors are specified with regard to trade and service enterprises. The first (F.1) explains 28.61% of the total variance and is represented with three variables numbered 9, 11, and 12, that is, the condition of plant and machinery, the technical standard of products, and new technologies. Factor two (F.2) explains 12.09% of the total variance and is represented with two variables numbered 1 and 2, i.e., financial liquidity and profitability of enterprise. The third factor (F.3) explains 11.17% of the total variance and is represented with three variables numbered 4, 7, and 8, or customer loyalty, the quality of management staff, and creativity of workers. The fourth (F.4) explains 7.59% of the total variance and is represented with a single variable numbered 6, that is, integrated IT system. The fifth factor (F.5) explains 6.94% of the total variance and is represented with two variables numbered 3 and 5, namely, equity level and method of distribution. The sixth (F.6) explains 6.36% of the total variance and is represented with one variable numbered 14, the availability of materials.

Five factors are determined in respect of industrial and chemical manufacturing enterprises. Factor one (F.1) explicates 33.02% of the total variance and is represented with three variables numbered 6, 7, and 8, i.e., integrated IT system, the quality of management staff, and the creativity of workers. The second (F.2) explicates 14.15% of the total variance and is represented with three variables numbered 1,2, and 3, i.e., financial liquidity, profitability of enterprise, and its equity level. Factor three (F.3) explicates 10.98% of the total variance and is represented with two variables numbered 11 and 12, namely, the technical standard of products and new technologies. The fourth factor (F.4) explicates 8.62% of the total variance and is represented with three variables numbered 13, 14, and 16, that is, the creation of a strong brand, the availability of materials, and implementation of Corporate social Responsibility concept. The fifth factor (F.5) explains 6.80% of the total variance and is represented with a single variable numbered 4, customer loyalty.

Five factors are designated for the enterprises involved in the remaining sectors. The first (F.1) explains 34.83% of the total variance and is represented with two variables numbered 9,11, that is, the technical standard of products and the condition of plant and machinery. The second factor (F.2) explains 13.73% of the total variance and is represented with two variables numbered 1 and 2, financial liquidity and profitability of enterprise. Factor three (F.3) explains 8.32% of the total variance and is represented with two variables numbered 7 and 14, that is, the quality of management staff and the availability of materials. The fourth factor (F.4) explains 6.89% of the total variance and is represented with one variable numbered 3, or equity level in an enterprise. Factor five (F.5) explains 6.32% of the total variance and is represented with a single variable numbered 4, customer loyalty.

As suggested by the literature, the factor names are derived from the variables with maximum factor loads or from a shared characteristic. The names of factors describing the competitive potential of enterprises considering their business objects are listed in Table 3.

Table 3.

The factors describing the competitive potential of enterprises as per their business objects

Factor name	The business objects of enterprises		
	Trade and services	Industrial and chemical manufacturing	Other
Innovative machinery and equipment	F1	F3	F1
Financial condition of enterprise	F2	F2	F2
Human capital	F3	F1	F3
Integrated IT system	F4		
Availability of materials	F6	F4	
Equity level in enterprise			F4
Method of distribution	F5		
Customer loyalty		F5	F5

Source: own research.

Relying on the data supplied by the respondents, six factors loaded with 12 observable variables are identified for trade and service enterprise; five loaded with 12 observable variables for industrial and chemical manufacturing, and five loaded with 8 observable variables for the remaining enterprises.

A comparative analysis of the results for the individual sectors suggests:

1. Three factors, i.e., innovative machinery and equipment, financial condition, and human capital, are the chief components of competitive potential for all the enterprises regardless of their business objects.
2. On a review of the data, three more factors (integrated IT system, availability of materials, method of distribution) are identified for trade and service enterprises and two additional factors, namely, availability of material and customer loyalty as well as equity levels and customer loyalty are determined for industrial and chemical manufacturing enterprises and other enterprises, respectively.
3. Only in respect of trade and service enterprises are two more factors, that is, integrated IT system and method of distribution, identified as the key components of competitive potential, whereas one such factor is specified for the enterprises active in other sectors, namely, equity level in the enterprise.

The exploratory factor analysis shows both some similarities and differences in the structure of factors defining the competitive potential of enterprises depending on their business objects. This implies the hypothesis H1: the scope of business objects affects the selection of enterprise competitive potential components, cannot be upheld.

5. Discussion

The competitive potential of enterprises has been the subject of research by Polish authors (e.g., Stankiewicz, 2005; Trąpczyński et al., 2016; Łada, 2020; Łukiewska, Juchniewicz, 2021).

K. Łukiewska and M. Juchniewicz (2021) published their results concerning dependences between the elements of competitive potential and competitive standing of food enterprises in the European Union, examined by means of econometric models using panel data. The models enable an empirical verification of dependences between some selected components of competitive potential and the competitive standing of an enterprise. The results confirm a substantial impact of manufacturing potential on the share of exports, profitability, and a synthetic indicator of competitive standing, the effect of work productivity on all the indicators of competitive standing analysed. The analysis has proven the competitive standing of food enterprises in the European Union is to a large extent determined by work productivity.

M. Łada (2020) published her assessments of the competitive potential of advanced technology enterprises in the European Union. The potential is characterised with the following indicators: work productivity, labour costs, and the share of advanced technology enterprises in a given country in the total number of this sector's enterprises in the EU. An analysis using a synthetic indicator helps to assess the total competitive potential of the advanced technologies sector and to identify the countries with the highest potential: the Netherlands, Italy, and Germany, given the high shares of the numbers of advanced technology enterprises in the total number of enterprises in the EU. Work productivity is high in the Netherlands, too. This is the only country to exhibit both a high productivity and a high share of technologically advanced enterprises. The Lithuanian, Latvian and Bulgarian economies show minimum competitive potentials. The productivity and share ratios there are low. Poland ranks high among the countries displaying medium competitiveness given a high share of enterprises in the sector and a low productivity.

Analysing their study of 162 industrial processing entities, H. Sobolewski and S. Narojczyk (2018) found quality management and manufacturing to be the strengths of the competitive potential of these enterprises. The firms in the sector, therefore, should primarily build their competitiveness on factors associated with product manufacturing and the possession or creation of effective quality management systems. The entrepreneurs rate research, development, and marketing most poorly.

The specialist literature often defines the components of competitive potential as the sources of competitive advantage, such as innovation (Harris et al., 2000), the financial condition of an enterprise (Wen-Cheng et al., 2011), human capital (Cherkesova et al., 2016), CSR (Abernathy et al., 2017), or organisational structure (Petison, Johri, 2006). This implies the key components of competitive potential are utilised to reach a better competitive standing in the market. This author's results affirm innovative machinery and equipment, financial condition, and human capital are statistically significant components of competitive potential regardless of the business objects pursued by an enterprise.

6. Conclusion

Any enterprise, regardless of its objects, strives for market success, that is, above-average performance in a given sector. Resources suited to the operations of a specific enterprises may become key to its market standing and desirable economic results.

Taking an appropriate advantage of an enterprise's potential and application of suitable instruments of competing lead to competitive advantage and a better competitive standing in the market. It seems very important, therefore, to identify the essential components of the

potential and to explore the effect of business objects on the selection of enterprise potential components.

These results of my survey of 253 large enterprises active in the Polish economy fill a gap in the research into the impact of a sector on the selection of enterprise potential components.

This study has identified statistically significant factors that constitute the competitive potential of trade and service, industrial and chemical manufacturing, and other enterprises. Three factors, i.e., innovative machinery and equipment, financial condition, and human capital are statistically significant components of competitive potential without regard to the business objects of an enterprise. It is also demonstrated enterprises take advantage of some factors unique to their sectors. Trade and service enterprises utilise two additional factors, namely, integrated IT system and the method of distribution, as the main components of their competitive potential, whereas those engaged in other activities utilise a single factor, the equity level.

Exploratory factor analysis clearly indicates the scope of business objects (sector) affects the selection of competitive potential components, since three components shared by all the enterprises studied are identified beside the potential components characteristic of given sectors. This implies the research hypothesis cannot be validated unambiguously

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