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Research Articles

THE USE OF ECONOMIC INDICATORS AS A TOOL FOR PREDICTING S&P 500 STOCK INDEX

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Abstract

World organizations and businesses are struggling to best predict future economic developments. For example, the Organisation for Economic Co-operation and Development (OECD) constructed the Composite Leading Indicators (CLI) and the Conference Board organization (CB) created the Leading Economic Index (LEI) as a tool for prediction of the economy. This article aims to analyze the predictive ability of individual economic indicators, but not with respect to economic development, but in relation to the development of the S&P 500 stock index. The result of the analysis of the indicators' predictive ability, i.e. leading, coincident and possible lagging of the indicator due to the development of the S&P 500 stock index, is subsequently possible to use, for example, in the construction of a company's investment strategy, where the leading indicator serves as an indicator of the future development of the S&P 500 stock index.

Keywords

S&P 500 stock index; Economic indicators; Economic development; Prediction.

Introduction

Prediction of recession, swings and reversals in economic development has been such a strong motive for governments and managers that since about the 30's of the 20th century, increasingly apparent attempts to secure institutionary forecasting tools to ensure regular and comprehensive information about the economic outlook in the upcoming months can be seen in many Western countries. With the development of the appropriate tools of prediction, the forecasting methodology that seeks to synthesize the factors that accompany changes in economic development was also developed. [8]

One result of methodological experimentation is the construction of leading economic indexes that would bring together the partial economic indicators, which have repeatedly shown that their current behavior is closely correlated with changes in the future and report that economic development will change. [8] This study also describes the need for uniform statistical processing and seasonally adjusted data. Both the OECD and CB currently use all the above principles. Comincioli [2] and Umstead [13] show a positive correlation between the S&P 500 stock index and economic development. In these studies, a positive correlation between the S&P 500 stock index and economic development is demonstrated; thus the S&P 500 can be marked as a leading indicator. Kubis and Cicarelli [9] suggest that the S&P 500 stock index reaches average results as a tool for identifying the peaks and troughs of the economic cycle. The S&P 500 stock index predicted peaks of the economic cycle with a 30% probability and troughs with 40% probability. The low predictive ability of peaks or troughs in this article, however, can be influenced by the S&P 500 stock index data transformation.

Today, the leading indexes are far beyond a mere experiment and they already monitor and predict the evolution of the economic cycle and demonstrate possible future risks in the economy. Czesaný and Jeřábková [3], Gyomai and Guidetti [5] demonstrated the effective use of leading indicators as economic indicators. Here, the economic indicator of Money Supply showed excellent predictive capabilities, predicting a peak of economic development of the economy with 75% probability and troughs with 63% probability. Apart from the ability to predict economic development, with the expansion of capital markets, there is an effort to predict the future development of stock indexes using leading indicators. Dovolil [4] and Leger [10] compare the CLI with the S&P 500 stock index. The articles show a positive correlation between the CLI and S & P 500. Within the article, however, CLI does not achieve the highest degree of correlation in advance, but with a delay. Based on these observations the composite CLI index can be marked as a lagging indicator due to the development of the S&P 500.

1 Aims of the Article

The article aims to analyze the predictive ability of individual economic indicators, but not with respect to economic development, but in relation to the development of the S&P 500 stock index. The result of the analysis of the indicators' predictive ability, thus advance, overlapping, and possible delays of the indicator due to the development of the S&P 500 stock index, can subsequently be applied, for example, in the construction of company's investment strategy, where the leading indicator serves as an indicator of the future development of the S&P 500.

The aim of this paper is to analyze the predictive power of economic indicators in relation to the development of the S&P 500 stock index.

2 Methodology and Methods

The predictive capabilities of individual economic indicators in relation to the development of the S&P 500 stock index are analyzed on the basis of historical data for the period from January 2007 to September 2014. Time series of leading indicators and S&P 500 stock index are smoothed and cleaned using the Hodrick-Prescott (HP) filter.

The Hodrick-Prescott filter is one of the best known and most widely used de-trending methods. The filter was first described by Hodrick and Prescott [6]. Nowadays it is also used in the construction of the OECD CLI. In its original form the trend estimate is the result of optimization problem (1), (2).

$$y_t = \tau_t + c_t \tag{1}$$

$$\min \sum_t (y_t - \tau_t)^2 + \lambda \sum_t (\tau_{t+1} - 2\tau_t + \tau_{t-1})^2 \tag{2}$$

where
y_t – initial series,
τ_t – trends,
c_t – cyclical component,
λ – HP filter parameter.

The initial y_t series is decomposed into τ_t, the trend component, and c_t, the cyclical component, with the objective being to minimize the distance between the trend and the

original series and, at the same time, to minimize the curvature of the trend series. The trade-off between the two goals is governed by the λ parameter.

Subsequently, the leading indicators are correlated with the development of the S&P 500 stock index using Spearman's correlation coefficient.

To evaluate the possibility of prediction of economic indicators, the correlation of time series and a subsequent analysis of the leaders, overlapping or delay is used in the time series of the economic indicator. Spearman's correlation coefficient is used to correlate the time series.

Spearman's correlation coefficient is a non-parametric method that uses the calculation of the order of values of monitored variables. This method can be used to describe any dependency, either linear or nonlinear. Spearman's correlation coefficient can be used to measure the strength of the relationship among these variables, where it cannot be expected to assume linearity of the relationship or normal distribution of the variables *x* and *y*. Dependence variables can have both upward and downward character.

The calculation of Spearman's correlation coefficient (r_s) is based on the order (i) and the correlation couples (i_x, i_y) are given by relation (3).

$$r_s = 1 - \frac{6}{n \cdot (n^2 - 1)} \sum_{i=1}^{n} (i_x - i_y)^2 \tag{3}$$

where
r_s – Spearman's correlation coefficient indicating the intensity of the relationship between the two monitored variables,
i_x – the value of the time series *x* in time *i*,
i_y – the value of the time series *y* in time *i*,
n – number of correlation couples.

Methods of scientific work, particularly analysis, synthesis, comparison, deduction, induction, abduction, description and application of mathematical and statistical methods are used in the paper.

3 Research

This paper analyses the partial economic indicators with the development of the S & P 500 stock index to identify leading, coincident and lagging economic indicators. The Standard & Poor's 500 (S&P 500) is an American stock market index based on the market capitalizations of 500 large companies. [12] Development of the S&P 500 stock index is shown in Fig. 1.

3.1 Economic Indicators

Economic indicators can be grouped according to the timing of the turning point in the time series in relation to the reference series, which portrays the actual incidence of turning point. E.g. Kadeřábková and Žďárek [7] divide them into three groups:

- **Leading indicators** are among the most observed, and allow predicting turning points in the economy with some time in advance before their actual implementation.
- **Coincident indicators** have been developed in parallel with the development of reference business cycle series including turning points (GDP can be included among the coincident indicators).
- **Lagging indicators** with a time lag replicate the reference series of economic development.

Subsequently, the indicators are divided in terms of the cycle to:

- **Cyclical indicators** – their informational value increases with increasing economic activity and vice versa.
- **Counter-cyclical indicators** declining with the growth of economic activity and vice versa.
- **Acyclic indicators** do not match the cycle development.

Source: Own from Yahoo[14]

Fig. 1: *S&P 500 stock index*

3.2 Composite Indicators

Organizations dealing with the predictions of economic development combine selected indicators divided into groups according to their timing in the form of aggregates, e.g. indexes. The reason for the formation of aggregates rather than observing time series of one indicator is the fact that the factors that influence the course of a time series may not be decisive for the cycle [11]. Using a larger number of indicators allows for smoothing part of volatility of the components of the index.

3.2.1 Conference Board

In the US, the Conference Board (CB) compiles and publishes a monthly composite index (LCI). Composite indexes are constructed by three groups of indicators differentiated according to timing of turning points in their time series. Leading Economic Index (LEI), Coincident Economic Index (CEI) and Lagging Economic Index (LAG) are constructed from four to ten indicators, some of which are published by state institutions (e.g. the central bank, the statistical offices), others are constructed and published by specialized agencies [1].

3.2.2 OECD

The OECD composite system of indicators (CLI) was created in the 70s of the 20th century and was designed to predict turning points in economic development. CLI and partial leading indicators are based on data available within the countries involved in the index and are used for short-term forecasts of changes in the direction of the economy (6 to 12 months). For each country, slightly different time series of leading indicators and types of leading indicators in the index are chosen [5].

Within this paper, partial economic indicators of United States which have or have not been incorporated into the composite leading index CLI or LEI are selected and subsequently analyzed:

- New residential sale
- New Residential Construction
- Retail Trade and Food Services, ex Auto
- Sales for Auto and Other Motor Vehicles
- Manufacturing Inventories
- Durable Goods Orders
- Purchasing Managers Index, PMI
- Unemployment Rate – Manufacturing
- Labor – Average weekly hours
- Inflation
- Money supply M2
- Mortgage fix rate – 30 years
- Interest rate spread, 10-year Treasury bonds less federal funds

3.3 Economic Indicators Correlated with the S&P 500 Stock Index

The predictive capabilities of individual economic indicators in relation to the development of the S&P 500 stock index are analyzed on the basis of historical data for the period from January 2007 to September 2014. The indicators reference series are analyzed due to date of publishing the indicator data. The date of the disclosure of indicator data is around 1 – 1.5 months later in relation to the time period. For example data for January are being published in late February or in mid-March. Time series are correlated when the indicator value is published.

Tab. 1: *Economic indicator of United States correlated with the S&P 500 stock index*

Economic indicator of United States correlated with the S&P 500 stock index	**The highest Spearman's correlation coefficient**	
	Value	**Time (Leading/Coincident/Lagging Indicator)**
New Residential Sale	0.692	Lagging - 10 months
New Residential Construction	0.860	Lagging - 5 months
Retail Trade and Food Services, ex Auto	0.778	**Leading - 1 month**
Sales for Auto and Other Motor Vehicles	0.991	Coincident - 0 month
Manufacturing Inventories	0.776	Lagging - 5 months
Durable Goods Orders	0.965	Lagging - 5 months
Purchasing Managers Index, PMI	0.860	Lagging - 1 month
Unemployment Rate – Manufacturing	–0.940	Lagging - 7 months
Labor – Average weekly hours	0.831	Lagging - 4 months
Inflation	–0.948	*Leading - 21 months*
Money supply M2	0.998	Lagging - 1 month
Mortgage fix rate – 30 years	–0.980	*Leading - 24 months*
Interest rate spread, 10-year Treasury bonds less federal funds	–0.587	Lagging - 6 months

Source: Own

Economic indicators data correlated with the S&P 500 stock index data is shifted to each reference series. The aim of computation is to find the highest Spearman's correlation coefficient. The highest Spearman's correlation coefficient indicates the closest dependence between reference series of economic indicator and S&P 500 stock index. Based on the highest Spearman's correlation coefficient it is possible to identify the predictive ability of individual economic indicators. The detail of each individual economic indicator, the value of the highest Spearman's correlation coefficient and the predictive ability can be seen in Tab. 1.

All analyzed economic indicators are cyclical with respect to the S&P 500 stock index, except for *Inflation*, the *Unemployment Rate – Manufacturing*, *Mortgage fix rate – 30 years*, and *Interest rate spread*, which are counter-cyclical.

Inflation and *Mortgage fix rate – 30 years* rate reach the highest inverse correlation coefficient with 21 and 24 months of advance notice. However, this is a very long interval within the reporting period, and therefore; the data may be biased due to the time series shortening. For this reason, the relationship between the inflation and the S&P 500 needs to be tested for longer periods of time. The economic indicator *Retail Trade and Food Services, ex Auto* is another indicator which indicates predictive ability of the indicator. The timeline of the prediction ability of this indicator is 1 month. Spearman's correlation coefficient obtains the 0.778 value. The value of Spearman's correlation coefficient indicates a close relationship between reference series of the S&P 500 stock index and the economic indicator *Retail Trade and Food Services, ex Auto*. Coincident indicator was only one – *Sales for Auto and Other Motor Vehicles*. The value of Spearman's correlation coefficient 0.991 indicates a deep relationship among reference series.

Conclusion

From the correlation analysis of economic indicators, four sub-economic indicators showed the highest value of the Spearman correlation coefficient in advance. However three of them have a very long interval. The economic indicator *Retail Trade and Food Services, ex Auto* peaked Spearman's correlation coefficient 0.778 one month in advance. Other economic indicators showed the highest degree of tightness with variously long delays in relation to the S&P 500. This fact is also due to the delay in data publication of partial indicators. On average, the delay in the disclosure of data indicator is around 1 – 1.5 months. Data for January are being published in late February or in mid-March. The highest degree of dependence with the development of the S&P 500 stock index is reported for the retail sales economic indicator of the *Money supply M2* (Spearman's correlation coefficient 0.998).

The result of the analysis of the indicators' predictive ability, i.e. leading, coincident, and possible lagging of the indicator due to the development of the S&P 500 stock index, is subsequently possible to use, for example, in the construction of a company's investment strategy, where the leading indicator serves as an indicator of the future development of the S&P 500 stock index. The results of correlation analysis confirm the statements that the actual S&P 500 stock index is a leading indicator, see Comincioli [2] and Umstead [13].

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VYUŽITÍ EKONOMICKÝCH INDIKÁTORŮ JAKO NÁSTROJ PREDIKCE VÝVOJE AKCIOVÉHO INDEXU S&P 500

Světové organizace a podniky se snaží co nejlépe predikovat budoucí vývoj ekonomiky. Organizace pro hospodářskou spolupráci a rozvoj (OECD) zkonstruovala systém Composite Leading Indicators (CLI) a organizace Conference Board (CB) vytvořila Leading Economic Index (LEI) jako nástroj predikce vývoje ekonomiky. Příspěvek si klade za cíl analyzovat predikční schopnosti dílčích ekonomických indikátorů – nikoliv však vzhledem k vývoji ekonomiky, ale vzhledem k vývoji akciového indexu S&P 500. Výsledek analýzy predikčních schopností indikátorů, tedy předstih, souběh a případné zpoždění indikátoru vzhledem k vývoji akciového indexu S&P 500, je následně možné využít například při konstrukci investiční strategie podniku, kde předstihový ukazatel slouží jako indikátor budoucího vývoje akciového indexu S&P 500.

DIE VERWENDUNG VON WIRTSCHAFTSINDIKATOREN ALS INSTRUMENT ZUR VORHERSAGE DER ENTWICKLUNG DES AKTIENINDEX S&P 500

Die Weltorganisationen und -unternehmen bemühen sich, die zukünftige Entwicklung der Wirtschaft bestens vorherzusagen. Die Organisation für wirtschaftliche Zusammenarbeit und Entwicklung (OECD) hat das System Composite Leading Indicators (CLI) konstruiert, und die Organisation Conference Board (CB) hat den Leading Economic Index (LEI) als Instrument zum Vorhersagen der Entwicklung der Wirtschaft entworfen. Das Ziel des Beitrags besteht in der Analyse der prädiktiven Fähigkeiten der einzelnen ökonomischen Indikatoren, jedoch nicht in Bezug auf die Entwicklung der Ökonomik, sondern in Bezug auf die Entwicklung des Aktienindexes S&P 500. Das Ergebnis der Analyse der prädiktiven Fähigkeiten der Indikatoren, also den Vorsprung, den Gleichlauf und die eventuelle Verzögerung eines Indikatoren gegenüber der Entwicklung des Aktienindexes S&P 500, kann man nachfolgend zum Beispiel beim Konstruieren der Investitionsstrategie eines Unternehmens verwerten, wobei der Indikator des Vorsprungs als Indikator der zukünftigen Entwicklung des Aktienindexes S&P 500 dient.

WYKORZYSTANIE WSKAŹNIKÓW EKOOMICZNYCH JAKO NARZĘDZIA DO PROGNOZOWANIA ROZWOJU INDEKSU GIEŁDOWEGO S&P 500

Organizacje światowe i przedsiębiorstwa starają się jak najlepiej przewidzieć rozwój gospodarki w przyszłości. Organizacja Współpracy Gospodarczej i Rozwoju (OECD) stworzyła system Composite Leading Indicators (CLI) a organizacja Conference Board (CB) opracowała Leading Economic Index (LEI) jako narzędzie do prognozowania rozwoju gospodarczego. Celem artykułu jest przeprowadzenie analizy zdolności prognostycznej poszczególnych wskaźników ekonomicznych, jednak nie w odniesieniu do rozwoju gospodarki, ale w stosunku do kształtowania się indeksu giełdowego S&P 500. Wyniki analizy zdolności prognostycznej wskaźników, a zatem wyprzedzenie, zbieżność i ewentualne opóźnienie wskaźnika wobec rozwoju indeksu giełdowego S&P 500, można później wykorzystać przykładowo w ramach budowania strategii inwestycyjnej firmy, gdzie wskaźnik wyprzedzający służy jako wskaźnik przyszłego rozwoju indeksu giełdowego S&P 500.

INTENSITY AND PERCEPTION OF BARRIERS OF CUSTOMER SATISFACTION MEASUREMENT

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Abstract

Although information resulting from measurement of customer satisfaction (CS) belongs to worthy starters of improvement activities in practice of an organization, they face various barriers which prevent measurement to become systematic. The aim of this study is to research intensity and perception of barriers preventing CS measurement. To achieve the goal, statistic processing of the research results which was done in Slovak republic is used. Totally 435 valid questionnaires were processed and relations among individual barriers of CS measurement were identified and quantified. The results showed that occasional measurement of CS and a lack of personnel are considered to be the biggest ones.

Keywords

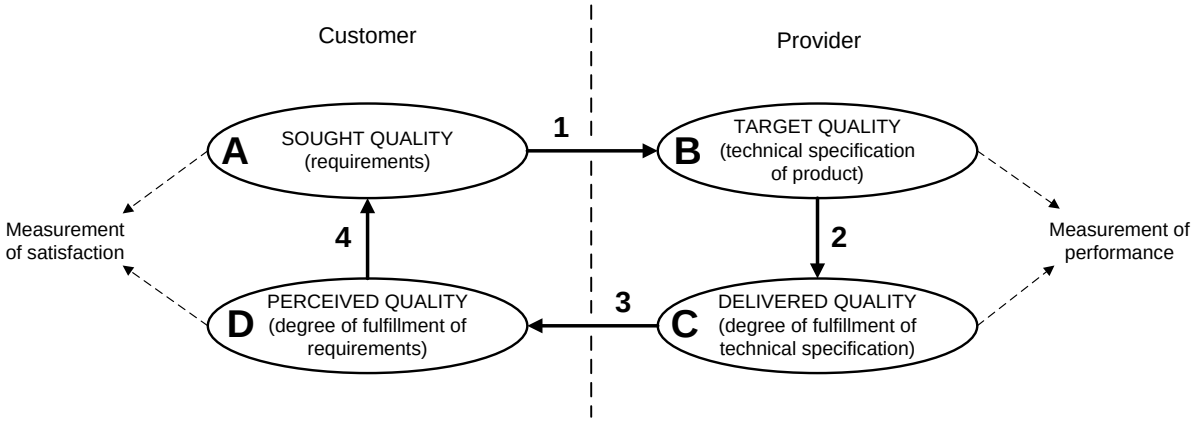
Customer satisfaction measurement; Barriers; Survey.

Introduction

Impacted by globalization growth and hyper-competition existence, quality management theories started to concentrate on customer satisfaction more widely at the beginning of the 80's of the 20th century. Customer satisfaction (CS) as a technical term gets gradually into a higher number of industries (marketing, industrial engineering, service management, etc.) and nowadays it belongs to permanent challenges of every organization. There is empirical evidence confirming that CS is a key determinant of organization market success [15]. Positive effects of high CS often become the object of research of several studies in managerial [12], economic [5] or social areas [2]. At present it would be very difficult to disprove the assertion that focusing on CS high level achievement should belong among marginalized areas related to organization effort [12]. A principle of achievement of high CS was integrated to several managerial standardized and open concepts. One of the best known standards which CS presents as one of key strategic goals is ISO 9001: Quality management systems. The standard explicitly and systematically "navigates" an organization through its processes so that also customer requirements aimed at achievement of their high satisfaction are taken into consideration. Also other concepts like EFQM or its modified version CAF present necessity to focus on CS as the most concerned part.

To get to know how CS "is created" it is necessary to introduce a wider context of quality management process. In the past, summary approaches to analyse, integrate, manage, and improve customer requirements fulfillment were determined and one of the most universal one was created in the area of Service science. Its authors Parasuraman, Zeithaml, and Berry [10] suggested a model based on GAP principle – i.e. differences between expectations and

reality. Later the model was slightly modified getting its universal form and named as quality loop.



Source: Adapted from [4]

Fig. 1: *Quality loop*

Quality loop is a graphic representation of quality management process which presents its elements and relations among them (Figure 1). As can be seen there are usually two concerned parties in quality process – a customer and a provider. To achieve acceptable quality degree, at first, an organization has to know customer requirements (part A) and integrate them into product technical specification (B). Designing techniques such as Quality function deployment [6] is most frequently used in case of product quality integration. Consequently, an organization has to ensure the highest possible degree of technical specification fulfillment (C). After the product delivery, customers are confronted with its technical (inherent) and assigned characteristics and perceive the degree of their own requirements fulfillment (D). Determination of conformity rate between expectations (A) and perception (D) is in the quality theory called measurement of customer satisfaction [9].

1 Aims of Research

In spite of provable benefits of CS measurement, there are still various barriers which prevent the process of CS measurement to become a key process of each organization activities validation. Professional and scientific literature introduces several barriers related especially to economic difficulty of satisfaction measurement process [7], although a deeper analysis which would explain the character and the structure of the barriers with reference to a wider context of organization performance is still missing. The aim of the study is to (1) characterize most frequent barriers of CS measurement, (2) get to know their mutual relations better, (3) identify mutual relations between perceived benefit of CS measurement and perceived importance of CS measurement, (4) explore relations between organization results and emphasis on periodicity and systematic nature of CS measurement and (5) identify and characterize groups of organizations having a similar structure of barriers of CS measurement.

2 Methodology

To deal with the topic, a standard procedure based on four phases of research was proposed, see Figure 2. During the planning phase professional and scientific sources were reviewed and most frequently mentioned CS measurement barriers were extracted. Apart from the above mentioned barriers the questionnaire contains other variables, e.g. indicators of company perceived success, additional ID attributes or appraisal of opinions related to CS measurement. These additional variables enabled deeper stratification of the results aimed at better understanding of CS measurement barriers structure. After that the questionnaire was

made and forms of questions and typology of responses was considered to achieve data of the highest analytical potential. Apart from common scaling in the interval 1 to 5 and 0 to 100, approaches concerning agreement evaluation were used [10], since some of them in specific cases show a more accurate degree of assessment from the point of respondents. When the electronic questionnaire had been processed, a database containing e-mail contacts of organizations operating (performing) in the Slovak Republic was created.

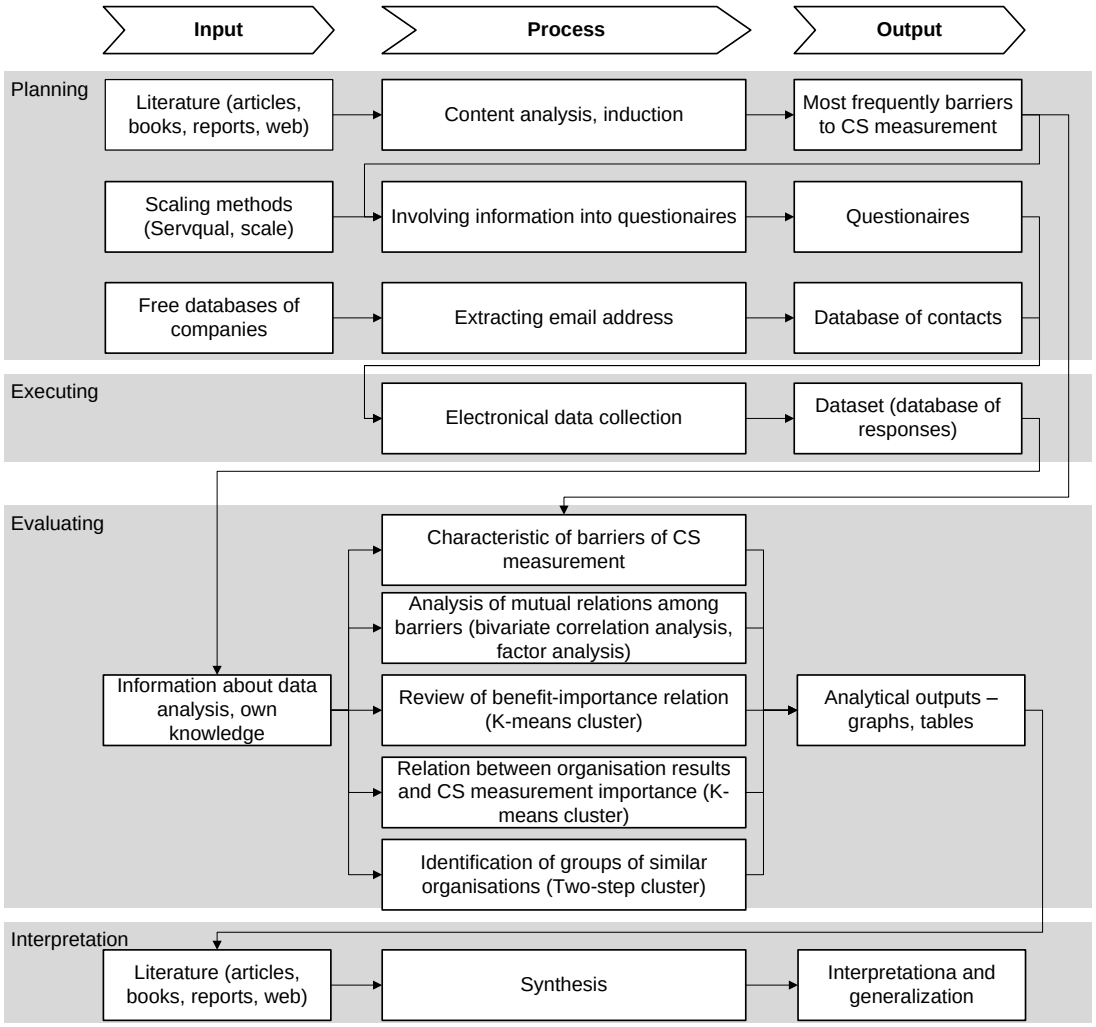


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Fig. 2: *Research design*

During the realization phase the data were gathered in March and April 2016 and the outputs resulting from the responses – after being checked due to data consistency – were exported to formats enabling execution of common (Excel) and more advanced (IBM SPSS Statistics) statistic procedures. These procedures were executed in the phase of results evaluation and reflected research aims named in the final part of Introduction. Based on the acquired data as well as on information from the planning phase, it was possible to explore 5 main areas systematically. The first one was the characteristic of the main barriers of CS measurement and frequency graphs and stratification according to size and sector of organization. The second area of the research was the analysis of mutual relations among barriers by bivariate correlation analysis and later by factor analysis based on principal component analysis. In the next (the third) area, mutual relation between perception of CS measurement importance and expected benefit which a measurement is to bring was reviewed. To do so, *k*-means cluster analysis was used and it was interpreted by a scatter-dot chart. The objective of the fourth area

was to confirm validity of CS measurement by analysis of relation between the results an organization achieves and importance which organization attaches to the process of CS measurement. The last fifth area was aimed at summary characteristic of similar organizations considering their size, sector and barriers.

Analytical outputs in a form of charts and tables were explained during the phase of research interpretation and generalized in discussions and related to the existing knowledge in the area of CS measurement or other wider connections.

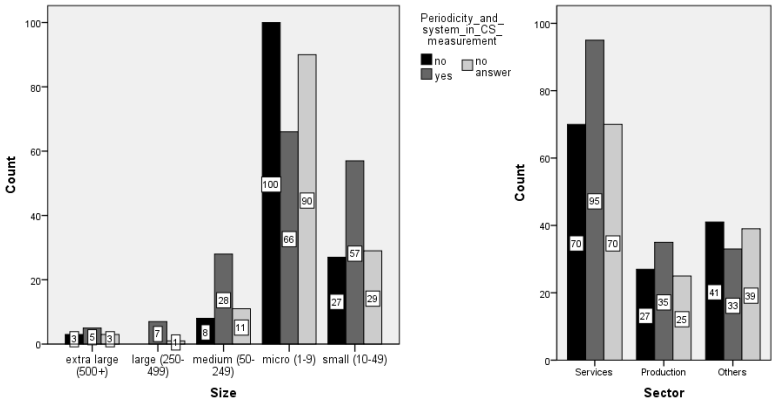
3 Results and Discussion

Electronic survey aimed at data collection was realized within the Slovak Republic during March and April 2016. Totally approximately 10,000 organizations doing business in various areas were addressed and the number of valid responses was 435. Organizations from 21 economic activities were represented in the number of valid responses (categories were adapted from SR Statistical Office classification).

3.1 Main Barriers of CS Measurement

Gathering and evaluation of quantitative and qualitative data has a critical importance for an organization. The structure of data, parameters, indicators or other numerical, graphical or verbal forms of assessment of the past, current, eventually future situation of an organization is usually named a Measurement System. This system is to support decision making based on facts and help an organization to achieve strategic goals [3]. It is neither possible nor reasonable to measure everything and so it is a natural choice of an organization to define what, why and how should be measured. In Figure 3 simple results showing the rate of systematic CS measurement are displayed.

Sector	Frequency	Percent	Sphere
Adminstrative and support service activities	15	3.4	Services
Households activities	1	0.2	Services
Extraterritorial organisation activities	1	0.2	Services
Real estate activities	6	1.4	Services
Electricity, gas, steam and air conditioning supply	4	0.9	Services
Water supply; sewerage, waste management...	5	1.1	Services
Trasportation and storage services	20	4.6	Services
Financial and assurance activities	16	3.7	Services
Information and communication services	29	6.7	Services
Professional, scientific and technical activities	27	6.2	Others
Other activities	86	19.8	Others
Agriculture	15	3.4	Production
Manufacturing	31	7.1	Production
Construction	40	9.1	Production
Mining and quarrying	1	0.2	Production
Accommodation and food service activities	27	6.2	Services
Art, recreation	17	3.9	Services
Wholesale and retail	46	10.6	Services
Public sector	16	3.7	Services
Education	12	2.8	Services
Health	20	4.6	Services
Total	**435**	**100**	



Source: Own calculation

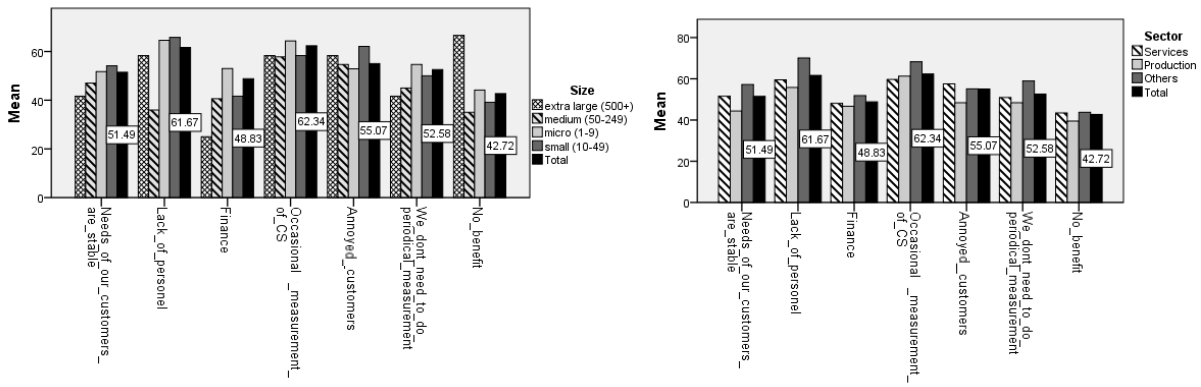
Fig. 3: *Periodicity and system in CS measurement from size of organization and sector points of view*

As one can see, the absence of the system in CS measurement is obvious especially in micro companies. Influenced by increasing number of organization employees also its approach to CS measurement goes up, and majority of medium and large organizations consider their effort in this area as the systematic one. The results also showed that a difference between production and service sector is – from the point of view of ratio between systematic and non-systematic CS measurement – insignificant.

In literature several reasons confirming insufficient attention of organizations to process of CS measurement can be found [11] and the most frequently mentioned are the following ones:

- **Needs of our customer are stable** – this is an argument used especially by companies offering commodities, or operating in network-regulated industries or in monopolistic environment to state their low interest in CS measurement. In principle, this statement may not be correct since globalization and development trends accelerate tendencies related to increasing requirements of customers [13].
- **Lack of personnel** – a frequent reason especially in organizations with cumulated functions and a low number of employees [14].
- **Finance** – reasons that CS measurement is costly belong among most frequently presented ones [14].
- **Occasional measurement of CS** – reactive attitude of an organization is behind this reason and the organization uses CS measurement only in a situation when a sudden initiator usually has a negative character emerges (e.g. massive complaints, decline in sales, etc.). In this way organizations use CS measurement as a tool to diagnose the cause of a negative situation [8].
- **Annoyed customer** – organizations are afraid that CS measurement will make customers annoyed and this fact is seen as a barrier to use CS measurement systematically [4].
- **We do not need to do periodical measurement of CS** – a role in systematic implementation of CS measurement is also played by superior conviction of managers that CS measurement does not have to be regular and should have only supportive character [8]. The main adversaries of quality are a lack of interest and a lack of knowledge – the barrier presenting the former one.
- **No benefit** – the second adversary of quality is a lack of knowledge. There are several studies pointing out that managers are not often aware of strategic importance of CS measurement [8].

These seven main causes evaluated by organizations which measure CS non-systematically or do not measure it at all became the object of analysis researching the rate of influence of individual barriers of CS measurement. Results in Figure 4 show that the biggest barrier is "Occasional measurement of CS" (average barrier intensity was 62.3 calculated in scale 0 to 100). A finding that organizations are aware of benefits resulting from CS measurement is considered to be positive information and this is proved by relatively low intensity of "No benefit" barrier (average barrier intensity 42.2). An exception is a group of respondents presenting extra-large organizations but since only a very low number of such organizations were involved in the research it is not possible to define any conclusions.



Source: Own calculation

Fig. 4: *Intensity of CS measurement barriers; stratification according to size (on the left) and sector (on the right)*

Problems related to insufficient capacity of personnel to measure CS ("Lack of personnel") achieved relatively high level in micro and small organizations. Stratification of the results according to the size brought only relatively consistent results. Stratification of the results according to the sector showed differences between service and production sector. Belief that "needs of our customers are stable" and that CS measurement will make our customers annoyed ("Annoyed customers") is higher in case of service sector. To verify statistical significance of this difference Two-sample *F*-test for variances in combination with *t*-test were used. Statistical procedure based on *F*-test applying stratification of both mentioned barriers resulted to a partial conclusion that variances of both samples are identical and that Two-sample *t*-test assuming equal variances is suitable to verify statistical significance. In both cases it confirmed that values t_{stat} are lower than t_{crit} (in the first case t_{stat}/t_{crit} results were at the level –1.20/1.98, in the second one –1.65/1.98) and so it is possible to state that a difference between production and services is not statistically significant.

3.2 Relations Among Barriers of CS Measurement

To understand internal structure of barriers in customers' minds better it is appropriate to research their mutual relations (connections, links). For this purpose, approaches based on correlation indexes/coefficients are used most frequently [1]. Best known are correlation and factor analysis. In the first phase relations among individual barriers were examined by bivariate correlation analysis, which presents intensity of mutual dependencies by Pearson correlation coefficient p moving in the interval <–1; 1>.

There are results of bivariate correlation analysis in Table 1 that do not show strong explicit relations among investigated barriers. Barriers with $p \leq -0.5$ or $p \geq 0.5$ are considered as strong ones. Absence of strong explicit relations may not mean that there are no latent relations presented by latent variables among barriers. To research this option factor analysis is applicable too. That is why a data set was subjected to a factor analysis procedure.

Tab. 1: *Results of bivariate correlation analysis*

Variable	**G No benefit**	**F**	**E**	**D**	**C**	**B**
A Needs of our customers are stable	0.132	0.170	–0.050	0.129	0.058	–0.049
B Lack of personnel	0.096	0.095	0.014	0.072	0.345	
C Finance	0.277	0.149	0.161	0.138		
D Occasional measurement of CS	0.112	0.326	0.292			
E Annoyed customers	0.291	0.317				
F We don't need to do periodical measurement	0.462					

Source: Own calculation

During examining seven barriers the factor analysis procedure identified, three components (latent variables) in which values lower than 0.2 were hidden (for clarity reason) in Figure 5. Considering the intensity of their relations with barriers they were named as (1) Concerns of consequences, (2) Capacity constraints, and (3) Illusion of status quo. These three components explain in total 62.65% of variables variability. The component "Concerns of consequences" mostly consists of barriers like "Annoyed customers", "We do not need to do periodical measurement", "Occasionally measurement of CS" and "No benefit". It concerns general barriers which result from not knowing benefits and worries of something the effect of which is not seen immediately but after some time. The second identified component was "Capacity constraints" which mostly contains two barriers – "Lack of personnel" and "Finance". It concerns closely connected barriers which, as the previous analysis proved in Chapter 3.1, are

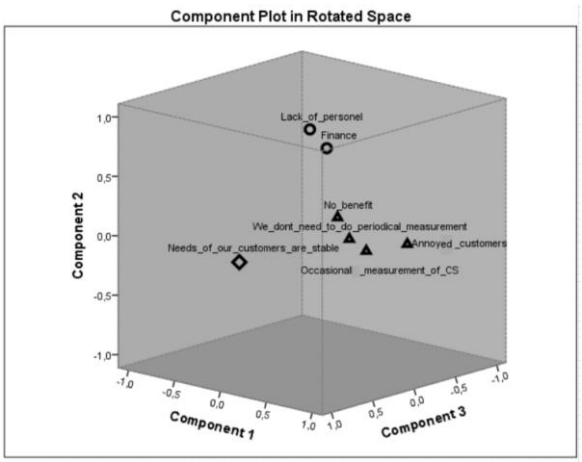
characteristic especially for micro and small organizations. The last identified component was "Illusion of status quo", i.e. belief that "Needs of our customers are stable". In a large extent this component consisted only of one barrier of the same name. This in principle not totally appropriate attitude of respondents may result from either self-conviction about perfect market knowledge, organization monopolistic position or simply from not being aware of the growing requirements of customers in market environment.

Rotated Component Matrix[a]

	Component		
	1: Concerns of consequences	2: Capacity constraints	3: Illusion of status quo
Annoyed_customers	0.781		-0.284
We_dont_need_to_do_periodical_measurement	0.696		0.322
Occasionally_measurement_of_CS	0.609		
No_benefit	0.563	0.296	0.318
Lack_of_personel		0.834	
Finance	0.223	0.769	
Needs_of_our_customers_are_stable			0.917

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.



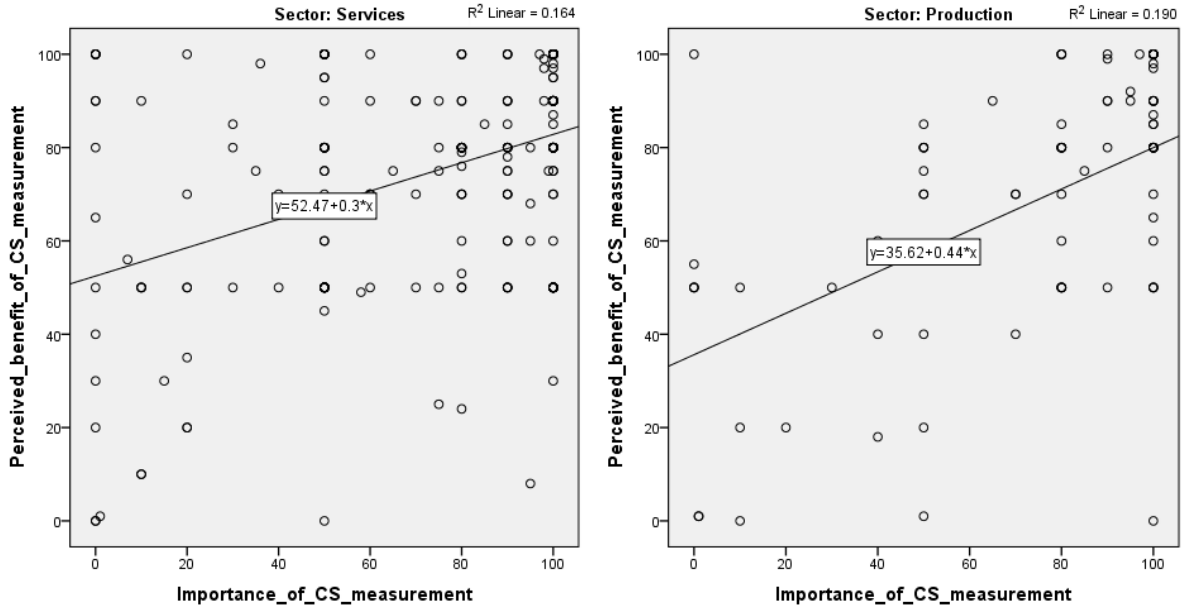
Source: Own calculation

Fig. 5: *Identification of latent variables by factor analysis*

3.3 Relation Between Perceived Benefit and Attributed Importance of CS Measurement

Literature brings a lot of logical and empirical reasons to make organizations pay systematic attention to CS measurement. But how do organizations perceive it? One of the aims of this paper is to clarify it in part. To do so, two individual variables (questions in the questionnaire) were used. The first one was perceived benefit of CS measurement. It may be assumed that organizations will pay more effort to activities bringing demonstrable benefit. The second question was to set the importance of CS measurement. This is not duplicity of the first question since this one helps understand positioning of "measurement of CS" activity in the hierarchy of all organization activities. Respondents could response to both questions in a scale 0–100 and consequently a scatter-dot graph enabled to display mutual configuration of individual cases, see Figure 6.

Scattering of individual cases in a two-dimension system was used to enable linear regression (in both cases it has growing character). In case of the production sector a regression curve has a steeper inclination that in the service sector. It means that setting the importance of CS measurement is higher in the production sector. It may be assumed that the reason is one particular feature of services, i.e. a direct contact with the customer/target consumer. Since in case of services this contact is more frequent than in case of production, it may be predicted that customers' requirements are recorded immediately in the process of services provision and potential corrections in service characteristic might be done relatively quickly. CS measurement might be perceived only as complement to customers´ requirements understanding. But in case of the production the final product is validated after its production has been finished and for an organization CS measurement is a way to identify the degree to which a product meets customers' requirements.



Source: Own calculation

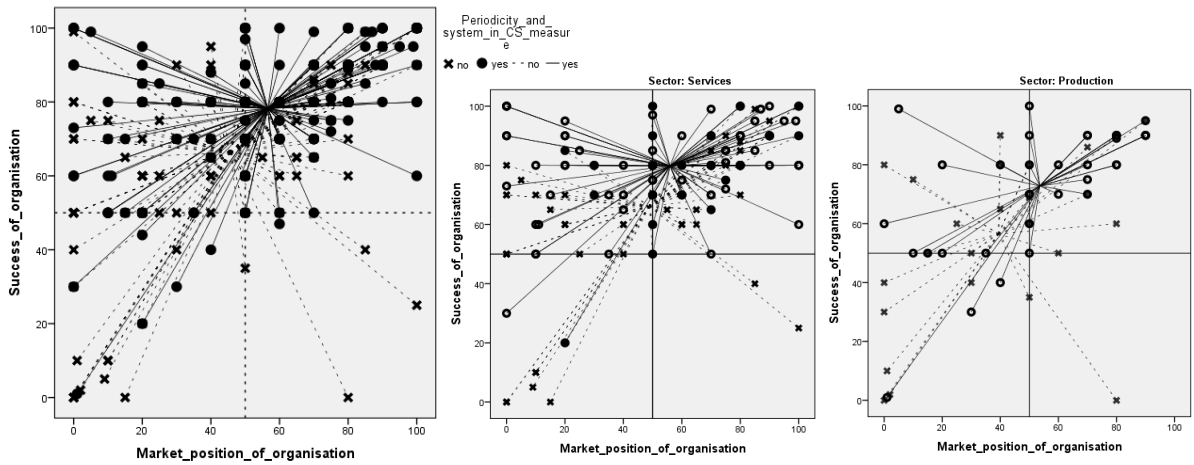
Fig. 6: *Relation between perceived benefit and importance of CS measurement; service sector (left), production sector (right)*

Several risks are to be mentioned due to the above mentioned statements. They are related to arguments strength. Relatively low value of R^2 (coefficient of determination) which determines how close the data are to the fitted regression should be considered, and so these interpretations should be taken as possible explanation.

3.4 Relation Between Organization Results and Emphasis on CS Measurement

Several positive examples confirmed that organizations which pay systematic attention to CS measurement achieve better market results [8]. The research which was a part of this presented one was a very good opportunity to verify the stated results empirically. Since the electronic way of questioning was anonymous, only subjective indicators of organization results were obtained. To prevent problems concerning results comparison, since organizations have different results indicators across sectors and also different ones due to their size, it was decided to use a scale 0–100 to evaluate their own results. The results were evaluated by two variables: success of organisation and market position of an organisation. Responses were divided into two categories, the first one being presented by organizations which pay systematic attention to CS measurement and the second one including organizations which do not measure CS systematically. The results were processed in a form of scatter-dot chart utilizing the principle of cluster analysis, see Figure 7.

The coordinate system might be divided into four quadrants. There are unsuccessful organizations with a low market position (power, share) at the left bottom. At the right bottom there are several organizations whose market power is very high but are not considered to be successful – they are supposed to operate in monopolistic environment. On the left top there are usually small organizations with a relatively low market position but considered as rather successful. On the right top there are market leaders from both points of view – their market position and perception of their own success.



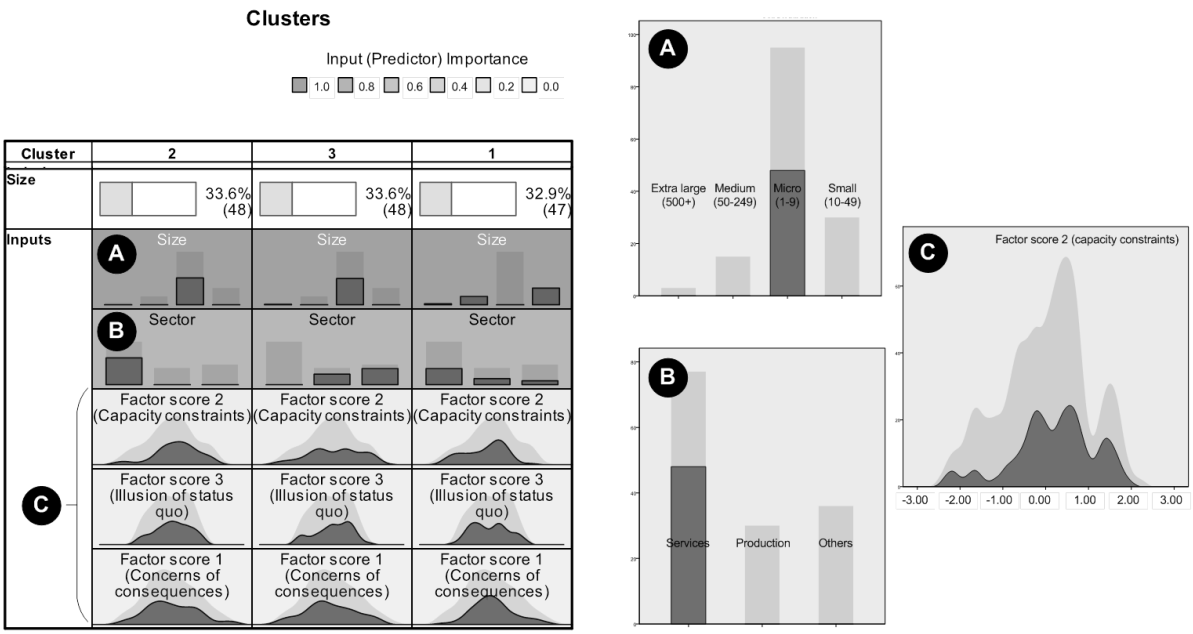
Source: Own calculation

Fig. 7: *Achievement of organization results due to periodicity and system in CS measurement; all the organizations (on the left), service sector (in the middle) and production sector (on the right)*

Individual organizations are represented in the coordinate system by corresponding points distinguished according to the fact whether an organization (1) pays or (2) does not pay systematic attention to CS measurement. Calculation of centroid of these two groups results to average position of organizations. In the coordinate system (x; y) the centroid of organizations paying systematic attention to CS measurement was in the right top quadrant and its coordinates were (56.6; 78.2) and the centroid of organizations which do not measure CS systematically was in the left top quadrant and its coordinates were (45.6; 66.3). Based on this, it may be stated that CS measurement has an impact on organization results particularly on their success (in higher extent) and later also on their market position (in lower extent). Similar conclusions may be induced from data stratification for the service as well as for the production sector, see Figure 7 in the middle and on the right.

3.5 Groups of Similar Organizations

The survey which had been performed enabled execution of further statistical procedures clarifying uncertainties concerning causes barriers of CS measurement. Relatively valuable information is the identification of type representatives, i.e. groups of comparatively homogeneous subjects whereby these groups are mutually heterogeneous. For this purpose, it is best to use cluster analysis and in this paper two-step cluster analysis was applied. Five variables entered the procedure of clustering: the size of the organization, sector, concerns of consequences, capacity constraints and illusion of status quo. Last three variables presented an output from factor analysis introduced in Chapter 3.2. The results of this clustering are displayed in Figure 8.



Source: Own calculation

Fig. 8: *Results of two-step cluster analysis*

Three types (groups) of organizations were identified; they were relatively equal when it comes to their representation. In Figure 8 a character of inputs/variables (i.e. characteristics) of organizations involved in a particular cluster may be seen. Since SPSS output options did not enable to name individual bar charts (lines A and B) and show scale for histograms (lines marked as C), an example of deployment of the first column (marked as cluster 2) can be found in the right part of the Figure. Based on these results, three types of organizations can be characterized briefly. The first group (marked as cluster 2) is represented by micro organizations especially from the area of services and which significantly perceive especially capacity constraints but are not afraid of negative impacts related to CS measurement (negative value of factor score prevails). The second group (marked as cluster 3) is made up of micro organizations from the area of production and other industries but the opinion is that their customers´ needs do not change (positive value of factor score 3 prevails). The last group (marked as cluster 1) consists of small, medium and large organizations usually from the service sector which do not consider systematic CS measurement to be important since they are obviously not aware about its processes and benefits.

Generalization of these findings should be relativized and the size of sample set should be considered because the cluster analysis procedure can deal only with the cases which meet the requirement concerning a complete number of dimensions, in this case 5. Also for this reason a lot of cases with missing values were excluded by this procedure.

Conclusion

CS measurement is a process of validation of main, supportive and managing processes of an organization and may help its diagnostic aimed at its performance potential. So it is desirable to pay attention to searching barriers which make CS measurement more difficult or more complicated. The aim of the presented study was to discuss the main barriers and their representation in a selected sample. Considering possible methodological, realization and interpretation risks, several main findings of the study may be summarized:

- More than a third of organizations do not pay CS measurement systematic attention and "Occasional measurement of CS" and "Lack of personnel" are considered to be the biggest barriers.
- In principle there are three main causes of why CS is not measured systematically: (1) Concerns of consequences, i.e. general prejudices and concerns concerning measurements results usually resulting from insufficient knowledge or experience; (2) Capacity constraints – internal restrictions making the measurement process more difficult, normally from the point of view of a lack of personnel or finance; (3) Illusion of status quo – an excessive belief that customers' needs stay stable whereby the belief may result from overestimation of own abilities or ignorance.
- Evaluation of CS measurement significance is on a higher level in a production sector in comparison to a service sector since the validation of product based on feedback is more problematic than in the case of service.
- It was proved that organizations which pay systematic attention to CS measurement perceive their results (success and market position) on a higher level than organizations which do not pay adequate attention to it.
- There are three types of organizations from the point of view of barriers evaluation: (1) micro organizations in which especially capacity constraints prevent to measure CS; (2) micro organizations which rely too much on the belief that customers' needs are stable and never change; (3) organizations with the number of employees higher than 10 which do not attach high importance to CS measurement.

The results of the presented research could support scientific discussion related to CS measurement and also to plans to ensure the process but also strengthen professional education of practitioners who work in the area of quality management.

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INTENZITA A VNÍMANIE BARIÉR MERANIA SPOKOJNOSTI ZÁKAZNÍKOV

I keď informácie z merania spokojnosti zákazníka (CS) patria medzi cenné spúšťače zlepšovacích aktivít, v praxi organizácie narážajú na rôzne bariéry, ktoré zabraňujú aby bolo meranie systematické. Predkladaná štúdia si kladie za cieľ preskúmať intenzitu a samotné vnímanie bariér brániacich meraniu CS. K tomuto cieľu je využité štatistické spracovanie výsledkov prieskumu realizovaného v rámci Slovenskej republiky. Spracovaných bolo celkovo 435 platných dotazníkov, prostredníctvom ktorých boli identifikované a kvantifikované vzťahy medzi jednotlivými bariérami merania CS. Výsledky ukázali, že za najväčšie bariéry možno považovať nepravidelnosť merania spokojnosti zákazníka a nedostatok personálu.

INTENSITÄT UND WAHRNEHMUNG DER MESSUNG DER ZUFRIEDENHEIT DER KUNDEN

Wenngleich die aus Messungen der Kundenzufriedenheit (CS) gewonnenen Informationen zu den wertvollen Auslösern von Verbesserungsaktivitäten zählen, stoßen sie in der Praxis auf verschiedene Barrieren, welche eine systematische Messung verhindern. Die vorgelegten Studien haben sich zum Ziel gesetzt, die Intensität und die eigentliche Wahrnehmung der Barrieren zu erforschen, welche eine Messung der Kundenzufriedenheit erschweren. Zu diesem Zweck wird eine statistische Verarbeitung der Ergebnisse einer Forschung genutzt, welche im Rahmen der Slowakischen Republik durchgeführt worden ist. Insgesamt wurden 435 gültige Fragebögen bearbeitet, mittels welcher die Beziehungen zwischen den einzelnen Barrieren der CS-Messung identifiziert und quantifiziert wurden. Die Ergebnisse zeigten, dass als die größten Messungshemmer eine dünne CS-Messfrequenz sowie eine unzureichende Personaldecke zu betrachten sind.

NATĘŻENIE I POSTRZEGANIE BARIER BADANIA SATYSFAKCJI KLIENTA

Chociaż informacje wynikające z badania satysfakcji klienta należą do cennych bodźców działań udoskonalających, w praktyce organizacje napotykają się na różne bariery uniemożliwiające systematyczne przeprowadzanie ww. badania. Przedstawiane w artykule badania mają na celu sprawdzenie natężenia i postrzegania barier uniemożliwiających przeprowadzanie badań satysfakcji klienta. W tym celu wykorzystano statystyczne opracowanie wyników badań przeprowadzonych w ramach Republiki Słowackiej. Opracowano łącznie 435 ważnych ankiet, za pośrednictwem których zidentyfikowano oraz skwantyfikowano zależności pomiędzy poszczególnymi barierami dla badań satysfakcji klienta. Wyniki wskazały na fakt, że jako największe bariery można potraktować badania okazjonalne oraz niedobór personelu.

PERSONNEL MARKETING IN THE CZECH ECONOMY: PAST AND PRESENT

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Abstrakt

Derived from HR management, personnel marketing today is an independent field with a marketing view of employees as customers. The article presents a large project that identifies the emergence of personnel marketing in the world and its gradual implementation in the transforming Czech economy. Following a comprehensive review of sources, a primary study was conducted with the quantitative and qualitative collection of data to analyse the current use of personnel marketing in the Czech Republic. The study was focused on leading Czech firms, and the result is an overview of tools used by these companies in the field of personnel marketing. The results were subjected to a statistical evaluation that assigned importance to the identified tools of personnel marketing and helped uncover latent factors.

Keywords

Human resources; Corporate communication; Personnel marketing; Content analysis; Factor analysis.

Introduction

The sweeping changes occurring in today's business environment are also accompanied by a transformation in the labour market. The competitive strength and success of companies today depend on more than just the products they offer to satisfy the needs of customers; they are also closely tied to how companies act in the role of employers [1][2][3]. A skilled and qualified work force is the most valuable source firms have and which they can appreciate in value. Qualified and motivated employees can help companies weather difficult periods and contribute to economic growth [4][5][6]. An innovative tool focused on employees and based on the idea that employees are the most valuable resource that companies have is called personnel marketing [7]. Personnel marketing views employees, both current and potential, as customers. This idea was also confirmed by Philip Kotler [8] in his work Principles of Marketing, in which the author states that employees can be understood as customers. The term personnel marketing first appeared in literature in Germany [9] in connection with the labour shortage during the post-war economic boom. In the 1960s, this term was tied to recruiting labour, specifically on a labour market with a lack of university-educated employees [10]. In the face of this labour shortage at the time, company management began to realise the importance of qualified employees and the competitive advantage they produce. As a result, the 1970s saw the establishment of personnel marketing as a distinct part of human resources. Personnel marketing began to be viewed from the perspective of traditional marketing based on the marketing mix. In the 1980s, the term HR marketing emerged in the United States and Western Europe, and with its implementation employees, the bearers of human labour, began to be viewed by some as the most important production factor [11]. In this phase of development, Wöhe [12] pointed out that if human performance is significantly decreased by poor working conditions, inadequate compensation or by impediments to professional growth, the result is a reduction in labour productivity. By the 1990s, HR

marketing was already divided around the world into internal and external, with the focus not only on recruiting but also on retaining employees [13]. Although it is far easier for firms in the period of the Internet and social media to lure skilled employees from competitors, there is a higher premium on caring for employees recruited in this manner [14], and this has already become a key aspect of HR marketing.

But while HR marketing has been developing for sixty years around the world now, the planned economy in place in this country in the second half of the twentieth century did not permit tracking of this trend. The missing information on the development and current status of HR marketing in the Czech Republic after 1990, when the transformation of the Czech economy began, was the motivation for the presented project. The authors attempt to identify the fundamental tools that lead to the stabilisation of existing employees in the country. These primarily involve working conditions, company climate, the evaluation system, remuneration and management-worker relations [15][16][17].

1 Objective

The lack of information led to the establishment of the main objective, which was divided into four individual goals.

1.1 Main Objective

The main objective of presented research is to record the transformation in the development of work with human resources into HR marketing and to identify the main tools that serve to stabilise existing employees today.

1.2 Individual Goals

1. To describe HR marketing in the Czech Republic from its emergence to the present day.
2. To define the tools used by firms in current HR marketing.
3. To identify the degree to which personnel marketing is utilised in the Czech Republic today.
4. To identify latent HR marketing factors influencing the stabilisation of employees in the Czech Republic.

The project can be chronologically divided into three parts: The first is a review of research databases, domestic and foreign literature, general Internet sources and enterprise information systems. The acquired information was used for the second part, which was a primary qualitative study employing an in-depth interview. The results served as the foundation for the third part – a quantitative primary study performed by means of an electronic survey. All of the project parts followed the given chronology. The four individual goals addressed in the project have been summarised into the main project objective.

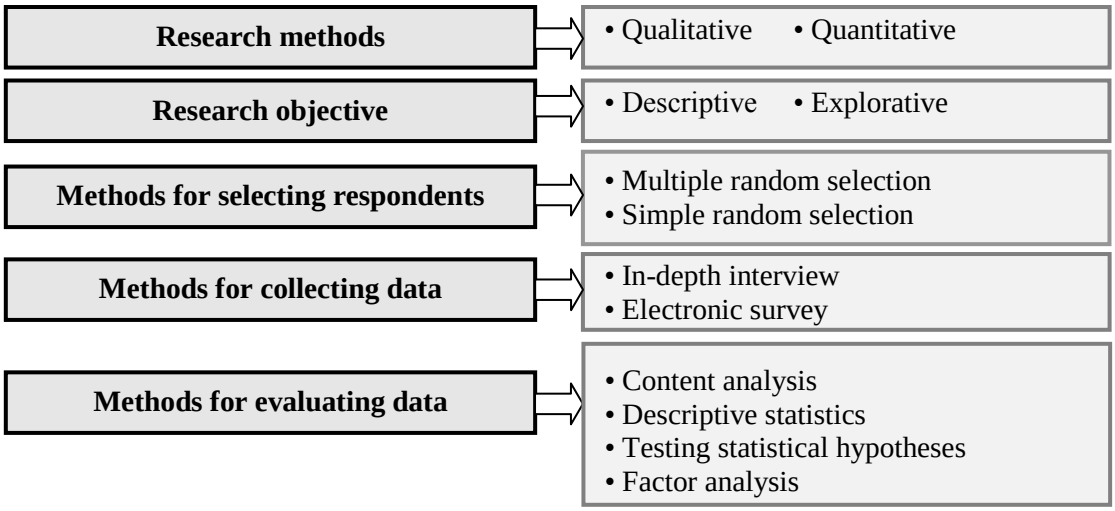
2 An Overview of Literature

The term personnel marketing began to appear in the professional literature in the Czech environment in the mid-1990s. The first records of its use in practice appeared at the turn of the millennium when personnel marketing was being implemented by firms. At the beginning it was perceived in the majority of transformed economies as a tool for recruiting employees [18]. In this spirit, the aim of company experts was ‘to sell’ the position in the firm, an approach that made a suitable candidate the customer. One of the first definitions of personnel marketing in the country was provided by Koubek [19]. In personnel marketing this concerns personnel activities connected with recruiting and stabilising employees by means of market

analysis (the offer of working resources and competing job opportunities), the presentation of the company on the labour market and the creation of a good employment reputation for the company. A change in the original perception of the term personnel marketing from a tool for recruiting new employees to one based primarily on the idea that employees are actually customers of the company and that they should be treated as such occurred in 2002. In his work "Personální marketing" [Personnel Marketing] [20], J. Stýblo wrote that it was not only a method for attracting future workers on the labour market but mainly an approach focused not only around the firm but directly at it. In the same way we turn to customers when introducing new products and services, in the processes of filling open work positions it is necessary to ask: 'What are and what will be the needs and wishes of potential employees and what can a future firm offer them?' In his definition, Stýblo points out the close connection between the work of human resources and marketing. In the same way that customers and the satisfaction of their needs are the focus of marketing, employees, both existing and potential, are the centre of interest for personnel marketing. Dvořáková [21] helped expand the view of personnel marketing pointing out that personnel marketing can be viewed from two perspectives, one broader and one narrower. In a narrower sense, personnel marketing can be understood as recruiting human resources from the external labour market and creating a positive image of the employer on the labour market, in a broader sense as a measure aimed at increasing the stabilisation of existing employees, i.e. at resolving problems concerning work motivation, employee management, personnel development, remuneration and care for employees. She defined personnel marketing as one of the functions of personnel management from the perspective of marketing goals or as a personnel concept encompassing all personnel activities. Further development occurred in 2005, when, within the philosophy of marketing, personnel marketing became a means for transitioning from the unspecified recruitment of workers to targeted efforts on the labour market [22]. Kociánová [23] continued with this view, stating that 'personnel marketing involves the pursuit of skilled people, strengthening their organisational loyalty and their stabilisation in the organisation. A key task is the creation of the organisation's good employment reputation, as an attractive employer that positively influences interest in working for the organisation'. This perception of HR marketing in the Czech Republic led to the development of a new term used in connection with personnel marketing: 'employer branding'. Menšík [24] explained the term by defining employer branding as 'a concept in the area of personnel marketing focused on building and managing the employer's brand in the eyes of its own employees'. Today personnel marketing is viewed as a set of activities aimed at potential and existing customers (employees), and employer branding is one activity within a targeted and well-designed strategy [25]. Štefko and Šlapák [26] accurately characterise the current view of personnel marketing in their work "Praktický personální marketing" [Practical Personnel Marketing], in which they perceive the management of human resources in labour relation contexts. They describe personnel marketing as a 'management process that helps recruit, retain and develop "proper" customers = employees'.

3 Methodology of Primary Research

This chapter introduces the research process, which for the sake of greater clarity is rendered in graphic form (figure 1). The research was based on a literary and electronic review, the results of which served as a basic information source for compiling the research process. The research process is composed of five phases: research methods, research objective, methods for choosing respondents, methods for collecting data and methods for evaluating the data. The entire process is based on the sequence of individual phases.



Source: Own

Fig. 1: *Research process*

3.1 Research Methods

Both quantitative and qualitative methods were used in connection with one another in the study, with the qualitative method preceding the quantitative method [27]. The logic of the qualitative study was inductive. The qualitative study served for a new understanding of the research subject – personnel marketing [28]. Thanks to the fact that the study was conducted in natural conditions, a complete image was created of current personnel marketing in a real environment [29]. The logic of the quantitative study was deductive. Quantitative research requires strong standardisation to ensure a high degree of reliability. The purpose of the quantitative study was to determine the frequency of the variable [30].

3.2 Research Objective

Given the aim of the work, in the research it is possible to identify an explorative objective that directly examines the degree of importance. An explorative objective is used in cases in which there is a lack of preliminary knowledge of the problem being studied. A descriptive objective mapping the current situation and mapping the frequency and degrees of association was used for predicting the occurrence of the phenomenon [31].

3.3 Selection of Respondents

Respondents were chosen for the qualitative study using the method of multiple random selection in which the basic set was further divided into four groups based on the relevant corporate culture. A representative was chosen from each category for an in-depth interview. A simple random selection was chosen for the quantitative study, with each unit of the basic set having the same probability of being chosen [32].

3.4 Data Collection Method

An in-depth interview was conducted for the qualitative study, and it was necessary to consider the content of questions, their formulation, order and interview length in advance. These matters were resolved in the preparatory part with detailed planning, testing and the final assembly of the scenario. The basic objective in specifying questions was formulating them to reduce forced answers to the greatest extent. The questions were therefore open, neutral and clear [33]. The electronic survey used for the quantitative study followed up on the preceding agreement in person or by phone.

3.5 Methods for Evaluating Data

The methods for evaluating data were based on the research objective and the type of investigated data. The acquired data were evaluated using the Statgraphics 16 statistical program. The evaluation methods can be divided into four groups:

1. **Content analysis** captures the respondents' answers in their natural form, which is the basic principle of a qualitative study [34]. The responses from group interviews were subjected to a professional group content analysis with the involvement of human resource and marketing experts.
2. **Descriptive statistics** determines and summarises information processed in the form of graphs and tables and calculates their numerical characteristics. Data processing methods are used in the study: average, dispersion, percentiles, mode, mean and confidence interval.
3. **Testing of statistical hypotheses** serves to confirm a certain hypothesis. The aim is to decide whether it is possible to accept or reject a certain hypothesis concerning the basic data set. Analysis of variance (ANOVA) is a method which tests whether the continuous variable *Y* depends on the categorical variable *X*. For an explanatory variable, that acquires "to" the categories and is also indicated as a factor, the name "one-way analysis of variance" is used. Analysis of variance defines the overall variability of variable *Y* as the sum of intra-group and inter-group variability of this variable, wherein the individual groups are formed according to the categories of factor *X*.
4. **Factor analysis** focuses on the analysis of the structure of internal relationships between a large number of variables with the use of a set of a smaller number of latent variables – factors. The aim was to summarise and reduce variables with a minimum loss of information. In order to conduct a factor analysis, Bartlett's test of sphericity and the KMO index (Kaiser-Meyer-Olkin) had to be fulfilled. Factor rotation (i.e. the redistribution of the explained variation for each factor) was performed to improve the interpretation of data. Rotation was conducted using the varimax method of orthogonal rotation, as the goal was to reduce the number of original variables. Moreover, it was empirically demonstrated that varimax creates loading that can be easily explained. Factors were interpreted using factor loading, which was represented as the correlation coefficient between the original variable and the factor. Correlation higher than ± 0.5 was considered significant. If the variable did not reach these values, they were eliminated and the analysis was conducted once more or several more times until the correlation coefficients of all variables reached a minimum value of ± 0.5. The aim of this approach was to obtain an optimal number of variables. The acquired factors were named after the composition of variables [35].

4 Evaluation of Study

The evaluation of the primary study is divided into three connected parts. The first part is the evaluation of the qualitative study by means of a content analysis. This evaluation produced basic attributes that served for the quantitative study. The results of the quantitative study conducted by means of an electronic study are processed by means of descriptive statistics, followed by the testing of statistical hypotheses and, finally, an evaluation using a multivariate method in the form of factor analysis. The entire study and evaluation were conducted between April and December 2015.

4.1 Content Analysis

The qualitative study involved contacting firms that had already used HR marketing. Firms were chosen strictly according to the sorting parameters, i.e. the type of corporate culture. The point of the division was to obtain the same view of behaviour and actions of the members of the given group. In-depth interviews were used to capture responses from respondents in their natural environment. Table 1 presents a more detailed presentation of the division and specification of respondents.

Tab. 1: *Sorting parameters of respondents*

Respondent	Subject of business	Origin of corporate culture
Company A	Services	Czech
Company B	Mechanical engineering	German
Company C	Mechanical engineering	American
Company D	Mechanical engineering	Japanese

Source: Own

For the in-depth interviews, cooperation was established with four leading Czech employers. The aim was to achieve maximum differentiation between individual companies from the perspective of applied corporate culture. Company A is a service provider headed from the beginning by Czech management and is a typical representative of the application of the Czech corporate culture. The other three companies are typical representatives of businesses in the field of mechanical engineering. These firms are in the automotive industry, which is a dominant branch in the Czech Republic. These firms differ by their corporate culture, which is tied to the origin of their foreign parent company. According to Goffee and Jones [36], corporate culture in the automotive industry can be divided into three types – German, American, and Japanese. Based on this division, individual representatives were approached for an in-depth interview. The names of the companies have been changed to protect their information from competitors (the companies were promised that this measure would be taken). The results of the content analysis are presented in Table 2.

Tab. 2: *The tools of present-day personnel marketing*

Attribute	
1. Transparent wage categories	10. Provision of benefits
2. Building relationship with superior	11. Adjusting work description
3. Providing work position security	12. Adjusting workload
4. Offering employees self-improvement opportunities	13. Providing work diversity
5. Building the social prestige of the work position	14. Possibility to increase qualifications
6. Ensuring the good name of the company	15. Building friendly relations among colleagues
7. Possibility to apply one's own initiative	16. Workplace layout
8. Ensuring effective company management	17. Transparent career growth
9. Flexible working hours	18. Possibility to share a position with a colleague

Source: Own

A team composed of HR and marketing specialists was involved in evaluating the in-depth interviews. The results of the content analysis were 18 attributes on which the evaluating team agreed. It can be stated that the application of personnel marketing can be positively confirmed in all four companies, which was a basic condition for the selection of firms for the study. The identified tools can already be the ultimate starting point for dealing with actual employees. These tools can be incorporated into a personnel strategy aimed at increasing the satisfaction of existing employees. The resulting attributes collectively define the possibilities utilised by HR marketing. Nevertheless, the identified tools cannot be classified by the level of their importance, and therefore a further study was conducted.

4.2 Descriptive Statistics

The most prominent companies from the Czech Republic from all branches were included in the second phase of the project, total 169 companies. The companies were first contacted in person or by phone for the purpose of establishing cooperation. The subject of the first contact was to verify the use of personal marketing, as its use was a condition for the inclusion of a company in the study. This first contact confirmed that 65% of the companies contacted in the Czech Republic use the term personnel marketing. These 110 companies formed the basic set. Firms that already use HR marketing to stabilise their existing workforce were subjected to an electronic survey. A total of 59 completed surveys were returned and included in the evaluation. The survey contained the results of the in-depth interview, i.e. eighteen identified attributes. These attributes were rated on a scale of 1 to 7, with one denoting maximum importance and seven designating maximum insignificance. These questions were supplemented with a sorting parameter representing the size of the company. An evaluation of ordinal and cardinal variables without the influence of parameters is provided in Table 3 which summarises the responses to an individual question independent of other attributes.

Tab. 3: *Evaluation of variables without the influence of parameters*

Attribute	**Mean** $\bar{x}$	**SD** σ	$\bar{x} - t\frac{s}{\sqrt{n}}$	$\bar{x} + t\frac{s}{\sqrt{n}}$	**Median** $\tilde{x}$
2. Building relationship with superiors	1.5	0.63	1.3	1.7	1
1. Transparent wage categories	1.6	0.93	1.3	2.0	1
3. Providing work position security	1.6	0.89	1.3	1.9	1
16. Workplace layout	1.8	0.71	1.5	2.1	2
4. Offering employees self-improvement opportunities	1.9	0.84	1.6	2.3	2
6. Ensuring the good name of the company	1.9	0.91	1.6	2.3	2
15. Building friendly relations among colleagues	1.9	0.97	1.5	2.2	2
10. Provision of benefits	2.1	0.88	1.8	2.4	2
11. Adjusting work description	2.1	0.94	1.7	2.4	2
7. Possibility to apply one's own initiative	2.2	0.94	1.9	2.6	2
8. Management effectiveness	2.2	1.11	1.8	2.6	2
9. Flexible working hours	2.2	0.89	1.9	2.5	2
12. Adjusting workload	2.3	0.87	1.9	2.6	2
13. Providing work diversity	2.4	1.10	2.0	2.8	3
14. Possibility to increase qualifications	2.4	0.93	2.1	2.7	2
17. Transparent career growth	2.4	1.03	2.0	2.8	2
5. Building the social prestige of the work position	2.7	1.05	2.3	3.1	3
18. Possibility to share a position with a colleague	3.9	1.36	3.3	4.4	4

Scale: 1 = maximum importance; 7 = maximum insignificance listed by mean value
Source: Own

The evaluation of the study led to the determination of individual attributes in the application of personnel marketing. If the response is viewed as an ordinal discrete variable, the most important aspect of the evaluation is the mean value. A reason is taken as important if its median is in the interval of <1; 2>; a reason of neutral importance has a median in the interval <3; 4>; a reason is insignificant if it has a median in the interval <5; 6>. According to identified importance, there are three attributes in the neutral interval: 'providing work diversity', 'building the social prestige of the work position' and the 'possibility to share a position with a colleague'; the respondents indicated that all of the other attributes are important to them.

If results are viewed as a cardinal variable, the evaluation is similar, with seventeen attributes regarded as important by respondents. The three most important attributes of the surveyed companies were 'operative remuneration change', 'building relationship with superiors' and 'providing work position security'. In contrast, the weakest attribute among those ranked as least important was the 'social prestige of the work position'. The companies agree on the mean importance of the other fourteen attributes in the range of 1.9 to 2.7, which can be regarded as relatively high values of importance. Highly similar results were found in the evaluation of confidence intervals. The first three attributes ranked the highest again differ in importance, while on the other hand the final attribute is borderline. It can be stated from the calculation of the standard deviation that the respondents to the greatest extent agree on the two attributes of 'building a relationship with their superior' and 'workplace layout'. In contrast, the greatest variation in the opinion of the companies is in 'sharing a work position'. The evaluation of the quantitative study clearly confirmed the conclusions of the in-depth interviews, and a distinct importance was demonstrated among seventeen generated attributes. The lone disputable attribute is 'sharing a work position', which is evaluated neutrally, i.e. as neither very important nor very insignificant. However, this attribute is viewed as highly heterogeneous, as is seen in the calculated variance, meaning that some companies perceived this attribute as important; therefore, it should not be fully excluded from the application of personnel marketing. In conclusion, it can be stated that the quantitative study demonstrated the distinct importance of the investigated attributes.

Questions concerning the importance of attributes were supplemented with a sorting parameter representing the size of the company. A total of 19 companies ranging in size from 50-249 employees (32.8%) were included in the evaluation, 39 companies with at least 250 employees (67.2%). The dividing line is determined according to the Association of Small and Medium-Sized Companies in the Czech Republic. Hypothesis H_0 was established for the evaluation and tested:

H_0: The size of the company does not impact the resulting values of rated importance.

H_1: non H_0.

The testing of the hypothesis was conducted at a level of significance of $\alpha = 0.05$. Table 4 shows the *p*-values for the conclusions of the Analysis of variance (ANOVA).

Following the analysis of mean values using the Analysis of variance (ANOVA), it can be stated that there is a statistically significant difference in the evaluation of importance with attribute No. 4, 7, 14, 16. The resulting *p*-value is the lowest value compared to the borderline value of 0.05. In the case of these attributes it is possible to state that at the level of significance $\alpha = 5\%$, null hypothesis H_0 on the independence of individual traits is rejected and hypothesis H_1 is accepted. The perception of the importance of the other 14 attributes is not statistically significant since the *p*-value is not below the borderline value of 0.05. The evaluation indicates that the null hypothesis H_0 about the independence of individual traits is not rejected and that hypothesis H_1 is not accepted.

Tab. 4: *Evaluation of variables without the influence of parameters*

Attribute number	Company size	ANOVA *p*-value	Attribute number	Company size	ANOVA *p*-value
1	medium/large	0.932	10	medium/large	0.370
2	medium/large	0.122	11	medium/large	0.686
3	medium/large	0.650	12	medium/large	0.618
4	medium/large	0.036	13	medium/large	0.194
5	medium/large	0.091	14	medium/large	0.026
6	medium/large	0.072	15	medium/large	0.140
7	medium/large	0.004	16	medium/large	0.014
8	medium/large	0.597	17	medium/large	0.164
9	medium/large	0.746	18	medium/large	0.480

Source: Own

4.3 Factor Analysis

The content of the factor analysis builds on the preceding subchapters and draws on their results. The aim of the factor analysis is to determine the attributes that are important to companies. The factor analysis was conducted in two rotations. The first rotation produced nine factors, from which attributes with statistically significant loading in factors were removed, albeit only with one variable. Attributes without statistically significant loading in any of the factors were also removed. This process was meant to reduce attributes and extracted factors to the 'optimal level', i.e. to the number of factors that play the greatest role in applying personnel marketing. Table 5 summarises the results of the individual phases of the factor analysis.

Tab. 5: *Results of factor analysis*

Parameters		Phase 1	Phase 2
Cronbach's alpha		0.836	0.909
95% confidence interval		(0.743; 0.928)	(0.866; 0.953)
Kaiser-Meyer-Olkin measure		0.714	0.850
Bartlett's test of sphericity	Chi-squared test	113.88	322.07
	Degrees of freedom	76.5	72
	Level of significance	0.0	0.0
Number of variables entering factor analysis		18	9
Number of factors		9	5
Cumulative percentage of variability		81.8	75.4

Source: Own

Cronbach's alpha is fulfilled in both phases and clearly exceeds the value of 0.7 with values of 0.84 and 0.91. The construction of the confidence interval is the finding of an interval into which a random quantity falls with a pre-chosen high probability of $1 - \alpha$, which was confirmed, as the interval in the first phase is (0.80970; 0.85087), in the second phase (0.866; 0.953). The condition for reaching the Kaiser-Meyer-Olkin (KMO) measure is 0.5 and higher. In the first phase the evaluation is 0.714, in the second phase 0.85. Bartlett's test of sphericity was also fulfilled in both phases.

In the first phase of the factor analysis attribute 10 (it lacks statistically significant loading) and attributes 6, 7, 8 and 9 were removed (they have statistically significant loading in factors where there are no other variables). The second phase produced thirteen attributes divided

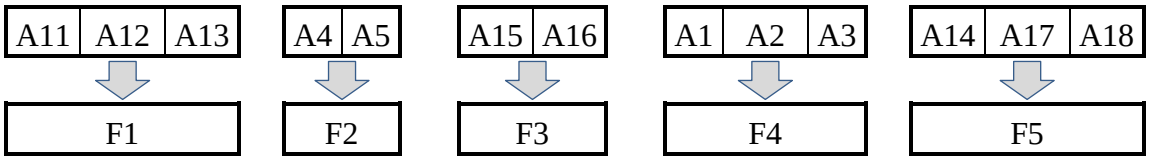
into five factors providing 75.4% of cumulative variability. Table 6 also includes the percentage of variation of individual factors.

Tab. 6: *Resulting matrix of varimax analysis*

Attribute	**F1**	**F2**	**F3**	**F4**	**F5**
1. Transparent wage categories	–0.070	–0.211	0.021	0.613	0.130
2. Building relationship with superior	0.233	0.387	0.277	0.828	0.069
3. Providing work position security	0.116	0.157	0.010	0.737	0.156
4. Offering employees self-improvement opportunities	0.340	0.853	0.245	0.086	0.290
5. Building the social prestige of the work position	0.283	0.517	0.218	0.068	0.221
10. Provision of benefits	0.783	0.262	0.292	0.145	0.260
12. Adjusting workload	0.762	0.237	0.299	0.131	0.132
13. Providing work diversity	0.623	0.317	0.398	–0.060	0.318
14. Possibility to increase qualifications	0.347	0.338	0.814	0.063	0.266
15. Building friendly relations among colleagues	0.242	0.215	0.103	0.314	0.859
16. Workplace layout	0.257	0.329	0.320	0.246	0.633
17. Transparent career growth	0.387	0.480	0.557	0.061	0.474
18. Possibility to share position with colleague	0.210	0.080	0.567	0.103	0.049
Percentage of variability	**0.176**	**0.150**	**0.148**	**0.141**	**0.139**
Cumulative variability	**0.176**	**0.326**	**0.474**	**0.615**	**0.754**

Source: Own

Factors were named after the evaluation of the factor analysis. The names of the factors came from the group evaluation with marketing and HR specialists. The factors are listed by the size of variability they explain; they are presented in Figure 2 for the sake of clarity.



Source: Own

Fig. 2: *Resulting determination of variables into five variables*

The resulting factors were analysed in detail and are presented in the following text following the subsequent synthesis. Their order is based on the explained variability.

1. The first factor named '**work organisation**' is composed of three attributes forming 17.6% of the total variability. All of the attributes in this factor are related to the organisation of work activities. *The term 'work organisation' designates the sum of activities and factors related to securing the optimal functioning of the human factor in production.* This identified factor is composed of the attribute 'provision of benefits', which falls under the organisation of work activities, as well as 'adjusting the workload', which is dependent on the organisation of work activities. The organisation of work at the workplace also includes ensuring 'work diversity', which is the third attribute of this factor.
2. The second factor named '**self-improvement opportunities**' is composed of two attributes explaining 15% of total variability. *Self-improvement at work is understood as*

satisfaction from work that is meaningful and has valuable results and in which the employee can further develop their talents. This factor was directly named after the considerably stronger attribute from which the factor is composed. The descriptive evaluation revealed that the average response for the attribute 'offering employees self-improvement opportunities' was 1.9 and that the average response for the attribute 'building the social prestige of the work position' was 2.7. This distinct difference in determining the importance of attributes was the reason the factor was given its specific name.

3. The third factor named '**workplace atmosphere**' is composed of two attributes explaining 14.8% of total variability. *Workplace atmosphere is created by the interplay of two elements. The first is the interaction between team members; the second is the external conditions that create the environment.* This identified factor is composed of the attribute 'building friendly relations among colleagues', i.e. how people feel in the workplace, how they are able to support one another and communicate well with one another. The second attribute, 'workplace layout', concerns the assessment of impacts on the health of employees and is directly connected with relations in the workplace and personnel fulfilment.
4. The fourth factor named '**work security**' is composed of three attributes explaining 14.1% of total variability. *Work security is a situation in which work requirements are secured for the long-term. The employee perceives work stability as stable employment, adequate pay and the opportunity for career growth.* The attributes from which this factor is composed had the best average evaluation in the study and were ascribed the highest importance by respondents. Although the attribute 'building relationship with superiors' belongs more to factor three, the respondents see in their responses a connection with the attributes 'transparent wage categories' and 'work position security'. Despite the certain disparity among the attributes, this factor is very interesting due to the very high ranking of attribute importance.
5. The fifth factor named '**work flexibility**' is composed of three attributes explaining 13.9% of total variability. *Work flexibility is a general term for the employer/employee relationship based on the possibility to modify the situation and tasks assigned by the employer to the employee* [37]. The attributes 'possibility to increase qualifications' and 'transparent career growth' are very closely connected with the possibility to freely adapt to the work. The third attribute, 'possibility to share position with colleague', is not often applied in Czech conditions, which was also confirmed in the study of importance, where it ranked the lowest. However, from the perspective of content it falls precisely under this factor, since the possibility to share a work position is directly the content of work flexibility.

Conclusion

The article presents the new field of personnel marketing, offering various views of the discipline combining marketing and personnel management. The subject of the first individual objective of the work, the development of HR marketing primarily in the Czech Republic, was addressed in Introduction. Information was drawn from reviews of literature, research databases and the Internet. The term personnel marketing appeared in Germany in the 1960s as a result of a lack of educated employees. The next stage was the growth in the perception of HR marketing from an external focus concerning potential employees to an internal focus aimed at a company's own employees. In the 1980s, personnel marketing began to expand from Germany to other European countries and abroad. HR marketing began to appear in the Czech Republic in the 1990s and in practice at the turn of the millennium in firms that were

subsidiaries of multinational enterprises. The Czech economy experienced great growth in GDP (average yearly growth of 5.6%), and this expansion was tied to a higher demand for skilled employees. Personal marketing became established in this period. During the global economic crisis after 2008, HR marketing had mainly an internal focus in order to build loyalty in uncertain times. After the Czech economy stabilised after 2010, the majority of large industrial employers implemented personnel marketing in the HR programmes. The presented primary research also confirmed this fact.

Following a summary of the development of HR marketing and a comparison with global development, the study focused on an identification of the current use of HR marketing in Czech companies. Although present-day HR marketing is divided into internal and external parts, the article provides a detailed presentation of the internal part focused on stabilising current employees. The aim of the second individual objective was to determine the tools that current HR specialists include in HR marketing. This information was obtained from in-depth interviews of HR managers representing prominent companies. A total of 18 possibilities applied within present-day HR marketing (Table 2) were generated. Although HR marketing and classic HR use many of the same tools, the tactics for using the individual tools differ considerably. HR marketing places a maximum emphasis on the needs and wishes of employees, whereas classic HR prioritises the needs and wishes of employers. The resulting tools can be used to plan human resources and for implementing a strategy focused on employee satisfaction.

The third individual objective identified the current level of use of personnel marketing in the Czech Republic, which is 65% of the surveyed companies. This fact had an impact on the number of companies addressed in the quantitative study; a total of 58 companies that use HR marketing were included in the study. Table 3 comparing mean and variance indicated that HR managers view seventeen attributes as important; only one attribute was ascribed marginal importance. This result is important because the ‘possibility to share a position with a colleague’ is highly popular abroad but not in the Czech environment. The first three attributes from Table 3 clearly had the highest ranking, with a large consensus among respondents (standard deviation) on the high importance of attributes (average, mean). These three HR marketing tools should be used by all companies interested in employee satisfaction; ideal, however, is the use of all the determined tools in the personnel strategy, as their importance was empirically confirmed.

The fourth individual goal was to uncover the latent factors influencing the stabilisation of employees during the application of HR marketing. The research team wished to discover the hidden links between the attributes and to narrow their number in order to improve the effectiveness of the HR strategy. The result was five factors explaining 75% of total variability. These five factors (Table 6), the content of which is explained in Chapter 4.3, should definitely be used by companies applying HR marketing to increase the satisfaction of their employees.

The main goal of the study presented herein was to record the emergence and development of HR marketing in the world and especially in the Czech Republic. Despite the relative youth of this discipline and the existence of a limited number of publications, this overview could be provided in the theoretical part of the article thanks to a thorough review of the literature. Following the definition of terms and a description of the development of HR marketing, a primary study of the current state of use of HR marketing in the Czech Republic was conducted. The evaluation of this study showed that HR marketing is a familiar discipline in the Czech Republic, one that is pursued by a large number of companies with the aim of stabilising their workforce. The work has great theoretical benefits thanks to the recording of the development and the discovery of interesting links between the studied attributes. The

application of the results in practice is a great asset; the work clearly defines tools leading to higher employee satisfaction. The application of HR marketing is based on a change in the understanding of employees in a subordinate role to a main role. This change in perception leads to higher employee satisfaction and loyalty, which, ultimately, is the goal of every company in their work with human resources.

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VÝVOJ A SOUČASNOST PERSONÁLNÍHO MARKETINGU V PROSTŘEDÍ ČESKÉ EKONOMIKY

Personální marketing je v současnosti samostatný obor, který se vyčlenil s HR managementu a přebral marketingový pohled na zaměstnance jako na zákazníka. Příspěvek prezentuje rozsáhlý projekt, který identifikuje vznik personálního marketingu ve světě a postupnou implementaci do transformující se České ekonomiky. Po komplexní rešerši byl proveden primární výzkum, složený z kvantitativního a kvalitativního sběru dat, který analyzoval současné využívání personálního marketingu v ČR. Výzkum byl zaměřen na nejvýznamnější české podniky a výsledkem je přehled nástrojů, které tyto podniky v oblasti personálního marketingu užívají. Výsledky byly podrobeny statistickému vyhodnocení, které přiřadila identifikovaným nástrojům personálního marketingu důležitost, a pomohlo odkrýt latentní faktory.

PERSONALMARKETING IN DER TSCHECHISCHEN WIRTSCHAFT: VERGANGENHEIT UND GEGENWART

Abgeleitet vom Personalmanagement ist Personalmarketing heute ein eigenständiger Bereich mit einer Marketing-Sicht der Mitarbeiter als Kunden. Der Beitrag stellt ein großes Projekt vor, das die Entstehung des Personalmarketings in der Welt und ihrer schrittweisen Umsetzung der Transformation der tschechischen Wirtschaft identifiziert. Im Anschluss an eine umfassende Überprüfung der Quellen wurde eine primäre Studie mit quantitativen und qualitativen Erfassung von Daten durchgeführt, um die aktuelle Nutzung des Personalmarketings in der Tschechischen Republik zu analysieren. Die Studie wurde auf führende tschechische Firmen fokussiert, und das Ergebnis ist ein Überblick über die Werkzeuge, die von diesen Unternehmen im Bereich des Personalmarketings verwendet werden. Die Ergebnisse wurden einer statistischen Auswertung unterzogen, welche den identifizierten Tools des Personalmarketings die Bedeutung zuordnet und hilft, latente Faktoren aufzudecken.

ROZWÓJ I STAN OBECNY MARKETINGU PERSONALNEGO W WARUNKACH REPUBLIKI CZESKIEJ

Marketing personalny stanowi obecnie osobną dziedzinę, wyodrębnioną z zarządzania kapitałem ludzkim, która przyjęła marketingowe podejście do pracownika traktowanego jako klienta. W artykule zaprezentowano obszerny projekt identyfikujący powstanie marketingu personalnego na świecie i stopniowe jego wdrażanie w podlegającej przemianom Republice Czeskiej. Po kompleksowej kwerendzie przeprowadzono podstawowe badania, obejmujące gromadzenie danych jakościowych i ilościowych, które miały na celu przeanalizowanie obecnego stosowania marketingu personalnego w Czechach. Badaniami objęto najważniejsze czeskie przedsiębiorstwa. Na podstawie przeprowadzonych badań opracowano listę narzędzi stosowanych w zakresie marketingu personalnego przez te przedsiębiorstwa. Wyniki badań poddano następnie statystycznej ocenie, w ramach której do zidentyfikowanych narzędzi marketingu personalnego przyporządkowano rangę, co pomogło w ustaleniu utajonych czynników.

Miscellanea

ANALYSIS OF THE ELECTRICITY MARKET FROM THE PERSPECTIVE OF PRODUCTS OFFERED TO HOUSEHOLDS IN THE TARIFF RATE D25D IN PERIOD 2011-2016

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Abstract

The electricity market in the Czech Republic has been changing every year since the liberalization of the market in the year 2002 for companies and since the year 2006 for households. Although we may think that the electricity consumption must be rising due to the development of electrical equipment, in reality the consumption had been rising till the year 2008. Afterwards it fell down in connection with the financial crises; and the next rise was not as big as before in the Czech Republic. Thus, the prices of the electricity consumption should be decreasing. The situation of the electricity market and the products offered to households in the tariff rate D25d in the period 2011-2016 are analyzed in this article, in order to find out the main trends of each part of the total electricity consumption cost of households.

Keywords

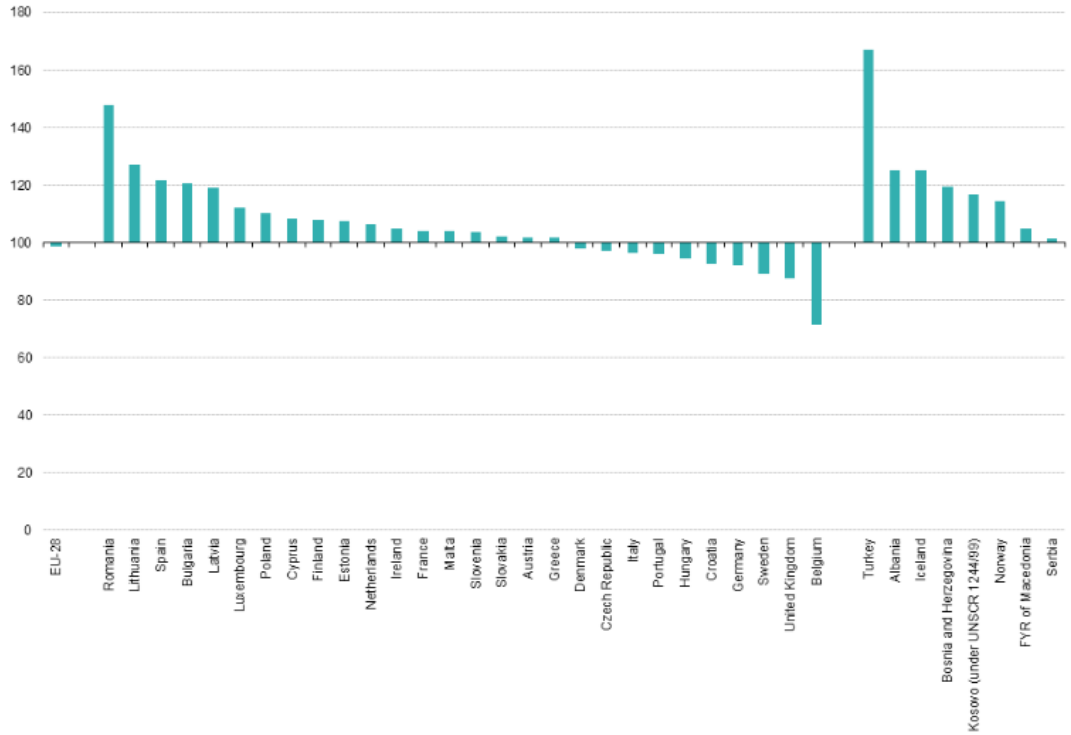
Electricity consumption; Households; D25d tariff rate; Suppliers.

Introduction

Electricity belongs to the essential commodities that have been necessary for our lives since the beginning of the last century. The development of new electrical tools might have caused the rising necessity of the electricity usage. On the other hand, the electrical equipment is more and more ecological in the sense of lower electricity consumption. Due to these facts, the trends in the electricity generation and consumption are different in different countries. When we compare the situation in Europe [1] we can see the falling electricity generation in the European Union countries in the last years. The fall is evident in majority of the EU member states but in some of them (Slovenia, Bulgaria, Romania) the net electricity generation is still rising. The trends in electricity consumption by households in the EU countries are different (Figure 1) – in the period 2004-2014 in Belgium, UK or Sweden (and also in the Czech Republic) the consumption was falling; but in Romania, Lithuania or Spain it was rising. Outside the EU the highest rise can be seen in Turkey.

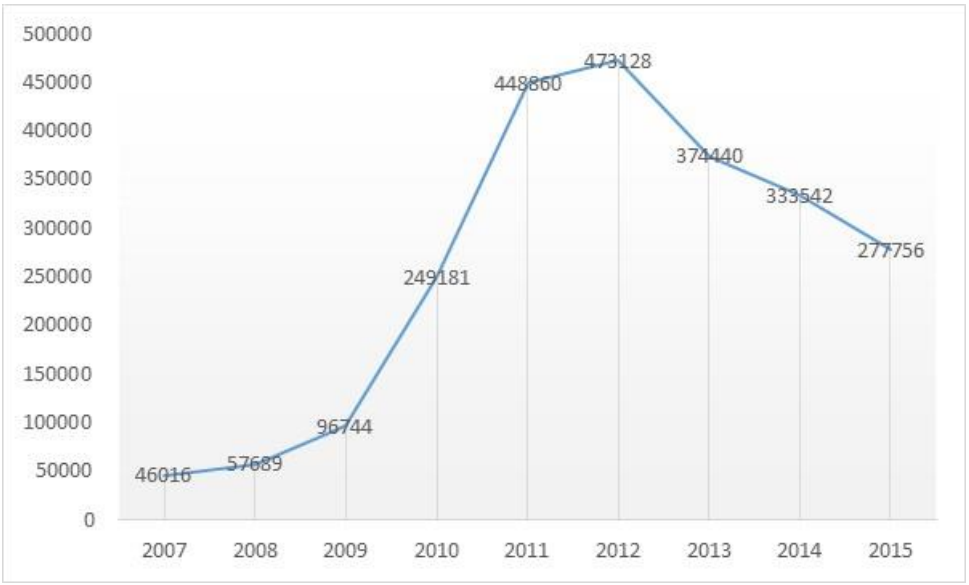
The first period of the liberalization process of the electricity markets in Europe started around the year 1990 in the United Kingdom and it initiated the possibility to choose the electricity supplier by companies [2]. The second period – from 2003 to 2009 – of the liberalization process gave the same possibility to small customers and households. Also in the Czech Republic the process of deregulation started in 2002 for companies; and since 2006 Czech households have had the possibility of choosing an electricity supplier on the retail market as well. In 2007 the liberalization of the retail market in EU was finished, and now households can freely choose an electricity supplier or switch from one to another. However, consumers' option to choose the best supplier is limited even in a transparent markets and the

switching can be also lower in the countries where the market is more stabilized and consumers are satisfied with their suppliers (like in Austria, France or Germany).



Source: Eurostat [1]

Fig. 1: *Electricity consumption by households 2014 (2004=100)*



Source: OTE [5] and [6]

Fig. 2: *Number of executed changes of electricity supplier in the Czech Republic*

The average switching rate during the years 2008-2012 in the Czech Republic was about 4% [3] but the top was reached in 2012 and since that time the number of executed changes of electricity supplier has been falling down (Figure 2). Each change of a supplier requires a new registration of the point of delivery/transfer (OPM) in the Market Operator's system which ensures recording of the electricity supplied and consumed [6]. As well as in other countries, the liberalization of the market led to an increasing number of suppliers and their products [7]

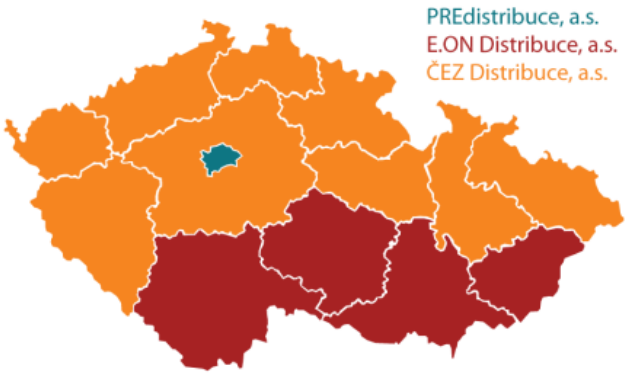
(it will be described in the next chapters). ERO has provided the licence to the distributors, to OTE (for 25 years) and also to the suppliers (for 5 years) on the basis of Act No 458/2000 on the Conditions for Business and State Administration in the Energy Industries and Amending Certain Laws ("the Energy Act") and on the Act No 165/2012 on Promoted Energy Sources and Amending Certain Laws, as amended, the Energy Regulatory Office issues its Price Decision on prices for related services [8]. Except for ERO, the Ministry of Industry and Trade controls the electricity production and distribution. Due to the limited number of significant producers, traders or distributors, the market is usually viewed as an oligopoly one. Hence, the whole market can be studied via game theory and oligopoly models such as Cournot or Stackelberg ones described in [9], [10] or in so called EMELIE model to analyse the market in Germany and the EU [11]. The three biggest distributors are connected with their distribution areas; therefore, from the distributor's point of view it is a monopoly market. The liberalisation leads to more companies as suppliers entering the market and that is why it changes from the oligopoly to more competitive one (but still there are barriers for entering this market).

This paper does not analyse the market as an oligopoly with the game theory models. It tries to describe the changes in prices from the households' point of view (as the electricity consumption cost forms a significant part of the household expenses). It continues with the analyses of the electricity market from the households' perspective and with respect to the D25d tariff rate usage. Inspired by the [12] the previous studies were aimed at the simulation model [13], [14], also multi-criteria decision making approach was published in [13] inspired by [15] and afterwards the optimization models for the supplier selection for the years 2015 and 2016 were solved in [16] and [17] and finally the disadvantages of the new conditions suggested by Energy Regulatory Office (ERO) for the year 2017 were confirmed in [18]. The optimization consisted in the search for the electricity consumption ranges for each product just to minimize the annual electricity consumption cost. The electricity consumption of one household was analyzed to compare the final prices for all suppliers and their products in all three distribution regions (CEZ, PRE, E.ON) in 2015 and 2016 when the tariff rate D25d and D02d could be used. In this paper the situation on the market with respect to the tariff rate D25d and the products offered by the suppliers is analyzed. The main aim is to find out the differences between distribution regions and to compare the changes in the components of the final costs.

1 Description of the Czech Electricity Market

The Czech electricity market can be described from various points of view. According to OTE [6], the active part in the electricity market take these subjects: balance responsible parties, suppliers, participants with an access to the balancing market, providers of ancillary services, distribution system operators, transmission system operators and producers. From the household (as a consumer) perspective, the most important subjects are suppliers, distributors, ERO and OTE. The Czech Republic is divided into three regions operated by three distributors (PRE, CEZ, E.ON.), see Figure 3.

According to the supplier's conditions, each household has its own tariff rate. The number of suppliers and their offer of the products in each tariff rate change every year. The complete list of the products with the prices can be found on the ERO web pages [7]. As the final costs of the electricity consumption are influenced not only by the electricity take-off amount and the customers region but also by the suppliers prices connected with the tariffs and circuit breaker type, it is hard to choose the appropriate product for an individual consumer.



Source: TBZ info [19]

Fig. 3: *Distribution regions in the Czech republic*

Generally, the price of the electricity consumption (for all tariff rates) can be divided into two components. The first one is the controlled charge for services related to electricity transport from the generator to the final customer. This charge is annually given by ERO. It covers [7]:

- monthly lease for the circuit breaker,
- price per megawatt hour (MWh) in high tariff (HT),
- price per megawatt hour in low tariff (LT),
- price per system services,
- price for the support of the renewable energy purchase,
- charges for the electricity market operator,
- electricity ecological tax (28.30 CZK per 1 MWh).

The second part of the total price is given by the electricity supplier. It covers:

- fixed monthly fee for the selected product,
- price per megawatt hour (MWh) in high tariff (HT),
- price per megawatt hour in low tariff (LT),

The final price is increased by VAT. Till 2012 it was 20%; and since 2013 it has been 21%.

2 Data

The comparison of the products offered to households is determined by the consumption level and the types of electrical equipment in a household which is connected with the circuit breaker amperage. A typical tariff rate for households with very low consumption level (under 1.5 MWh per year) is D01d, for higher consumption (about 2.5 MWh per year) D02d tariff rate is used [19]. These two tariff rates are so-called single tariff rates as all the consumption during the day is paid using the same price per MWh (high tariff price). Other tariff rates are connected with the electrical equipment – for example D25d is given to households where the electricity is also used for the accumulative heating and hot water heating for lower and middle yearly offtake with operative management of the validity period of the low tariff for 8 hours. It is a so-called dual tariff rate as it has 2 periods (high tariff, low tariff) during the day. Similar tariff rate with higher consumption level is D26d (when electricity can also be used for heating). Basically, regardless the tariff rate the prices for the electricity consumption differ because of the circuit breaker used (the level amperage of the circuit breaker is dependent on the electrical equipment). Due to these facts, for a general household it is not easy to understand the calculation of the final cost connected with the electricity consumption, not speaking about finding a better supplier.

As the previous analysis was aimed at the tariff rate D25d usage, this paper continues with the same type. Till the year 2016 the prices have been slightly influenced by the circuit breaker – the offer of the ERO to change that policy since 2017 was criticized and in the analysis [18] it was proved that it would increase the costs in most households. In our previous analysis [16] and [17] we compared the products for the tariff rate D25d with the electricity consumption about 10 MWh annually, 45% energy in high tariff and 55% in low tariff and with the circuit breaker 3x25A. According to the comparability of results, the same parameters were used in this article when necessary.

The formula for the annual cost calculation for each supplier's product till the year 2015 was (1) ([18] according to [7]).

$$COST_{ij} = (1+VAT)\begin{bmatrix} 12\left(mf_{ij} + mf_{j}\right) + p_{HT}c\left(ph_{ij} + ph_{j}\right) + \\ + p_{LT}c\left(pl_{ij} + pl_{j}\right) + c(os+t) \end{bmatrix} \quad (1)$$

where
i – product, i =1, …, m,
j – distributor, j = 1, …, 3,
VAT – value added tax,
mf – fix monthly fee,
c – annual consumption in MWh,
ph – price in high tariff per 1 MWh,
pl – price in low tariff per 1 MWh,
p_{HT} – percentage of the consumption in high tariff,
p_{LT} – percentage of the consumption in low tariff,
os – price for other services per 1 MWh,
t – electricity tax per 1 MWh (t = 28.3 CZK).

For the year 2016 there is a small change in the formula (1) when the price for other services is not paid per 1 MWh but a part of it is paid monthly.

The number of products offered to households changes every year and also the number of suppliers is changing. Table 1 describes the number of products in the tariff rate D25d. Although the changes in last few years seem to be minimal, the fact is that during recent years some companies have left the market and some have come into existence or fused. On these bases, the analysis of the trends for the given period can be performed, using linear regression functions.

Tab. 1: *Number of products offered by suppliers in the tariff rate D25d*

Year	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Number of products	29	44	62	57	60	57

Source: Own calculations according to [7]

According to all offered products in each selected years it is possible to calculate average fees and prices for all distribution areas (Table 2). It is evident that the suppliers' monthly fee averages are nearly the same during all years. The average prices offered by suppliers in high and low tariff are decreasing as well as the distributors' prices in high tariff. The remaining prices and fees (circuit breaker monthly fee, distributors' prices in low tariff, distributors' prices for other services) are increasing. In the next part they are analyzed separately.

Tab. 2: *Suppliers' average prices and fees and distributors' prices and fees in 2011-2016*

Year	Distribution region	Suppliers monthly fee average	High tariff average price per 1 MWh	Low tariff average price per 1 MWh	Circuit-breaker monthly fee	Distributor's high tariff price per 1 MWh	Distributor's low tariff price per 1 MWh	Distributor's other services price per 1 MWh
2011	E.ON	44.241	1722.172	1022.966	105	1846.39	27.63	530.15
	PRE	48.069	1666.310	1046.759	98	1582.83	19.90	
	CEZ	42.483	1716.241	1008.897	120	1978.50	32.85	
2012	E.ON	40.295	1794.136	1098.864	98	1667.65	27.63	569.97
	PRE	47.886	1730.114	1139.091	98	1553.79	19.90	
	CEZ	40.295	1786.886	1087.886	120	1972.84	32.89	
2013	E.ON	43.468	1674.666	1021.788	98	1697.42	30.08	722.75
	PRE	50.983	1598.650	1059.587	105	1650.04	25.49	
	CEZ	42.532	1659.016	1017.321	120	1991.98	37.36	
2014	E.ON	43.616	1508.339	893.272	90	1592.04	30.59	621.8
	PRE	50.500	1462.345	896.622	98	1563.66	24.45	
	CEZ	44.675	1484.310	886.743	105	1731.93	36.38	
2015	E.ON	43.092	1396.748	862.512	95	1518.43	29.99	607.21
	PRE	46.708	1376.031	859.079	102	1508.54	24.37	
	CEZ	43.925	1382.631	856.546	110	1727.62	36.94	
2016	E.ON	41.134	1288.873	844.495	104	1479.08	68.78	78.96 This price is per 1 month, not per 1 MWh.
	PRE	43.763	1278.178	840.399	113	1466.12	67.22	
	CEZ	42.096	1279.310	838.870	121	1647.54	60.96	

Source: Own calculations according to [7]

3 Results and Discussion

The comparison may start with the monthly fee given by each supplier. When we calculate the average from all the suppliers' offers we can see the differences among the regions in Figure 4 – left. In this factor the PRE region is the most expensive but the trend is decreasing; while in other two regions the average fees are nearly the same (for ČEZ the trend is rising a little, the linear regression model estimates it by 0.317 CZK per year).

Figure 4 – right shows similar situation but there are the fix monthly fees for the circuit breaker given by the distributor. Therefore, it is clear that they are nearly two times higher and that the most expensive region is ČEZ distribution area.

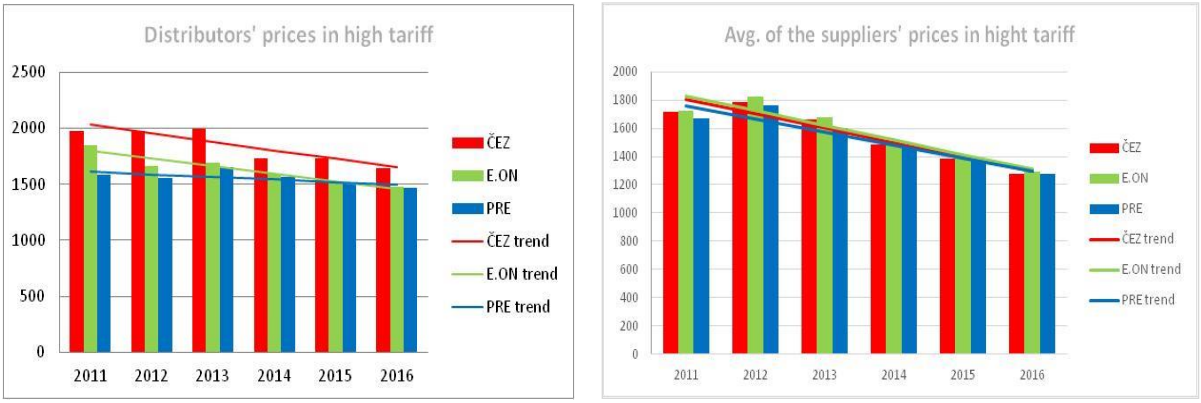
These prices seem not to be so high but they are important in a situation with very low (nearly zero) consumption. For the hypothetical case of the zero consumption according to formula (1) the annual cost ranged between 1500-2700 CZK in 2011, 1300-2500 CZK in 2013 and 1800-3000 CZK in 2016. Hence, it is evident that the choice of the worse product could nearly double the cost.

Source: Own calculations according to [7]

Fig. 4: *Average monthly fee for the circuit breaker given by the suppliers and the trends in each distribution regions (left) and monthly fee for the circuit breaker given by the distributor and the trends for each distributor (right)*

Different trends can be seen in the high tariff prices comparison in Figure 5 – left. The most expensive distributor is again ČEZ, but compared to the previous trends the prices have been decreasing since 2013. According to the linear regression results, the decrease per one year is equal to 75.7 CZK for ČEZ, 68.2 CZK for E.ON and 23 CZK for PRE distributor.

The situation of the prices in high tariff offered by suppliers seem to be similar in all three distribution areas – the average prices are nearly equal in Figure 5 – right and the trends are decreasing. The change in average prices is about 100 CZK per each year (linear regression functions). The histograms for each year (ČEZ area as example in Figure 6) confirm the change in averages (but the prices are not always normally distributed in each year).



Source: Own calculations according to [7]

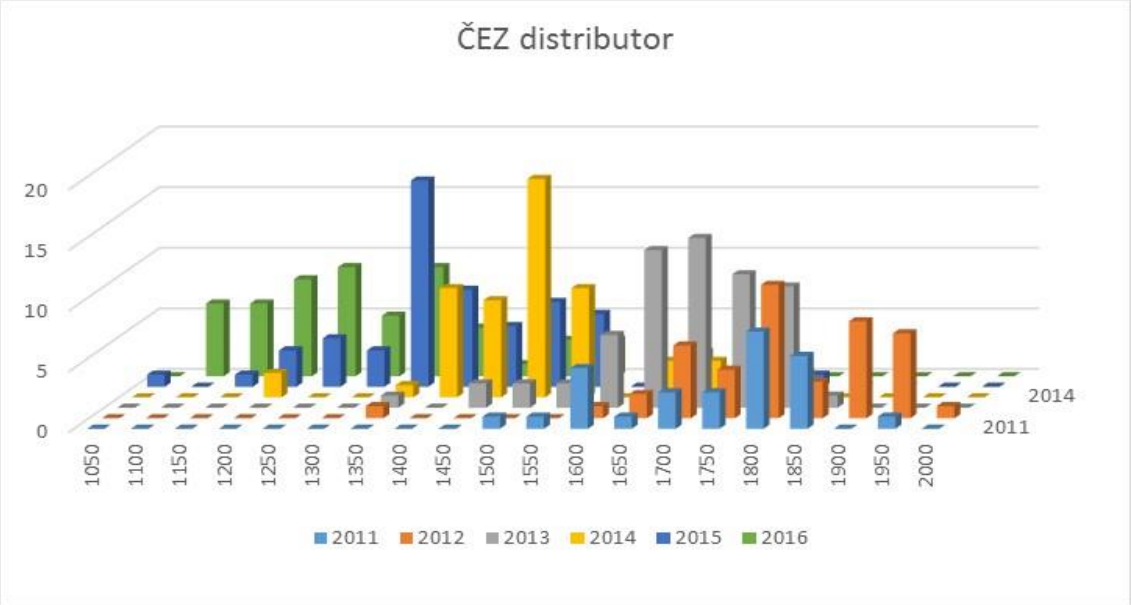
Fig. 5: *Distributors' prices in high tariff per 1 MWh (left) and average prices per 1 MWh in the suppliers products in high tariff (right)*

The last analyzed issue is connected with the low tariff prices. The situation is similar with previous cases till 2015 (again ČEZ area was the most expensive distributors' region) but the prices were slightly increasing. It differs in the year 2016 when the distributors' prices doubled (Figure 7 – left). With respect to this fact, the trends expressed by the linear regression lines are increasing. The reason for the rise could be connected with the change in other parts of the final electricity consumption costs. As it is mentioned in Table 2, the distributors' prices of other services were decreasing in the period 2013-2015 but they are incomparable with the same ones in 2016 as in this year the price is not dependent on the

consumption (price is per 1 month) so the final effect can be dissimilar in different households.

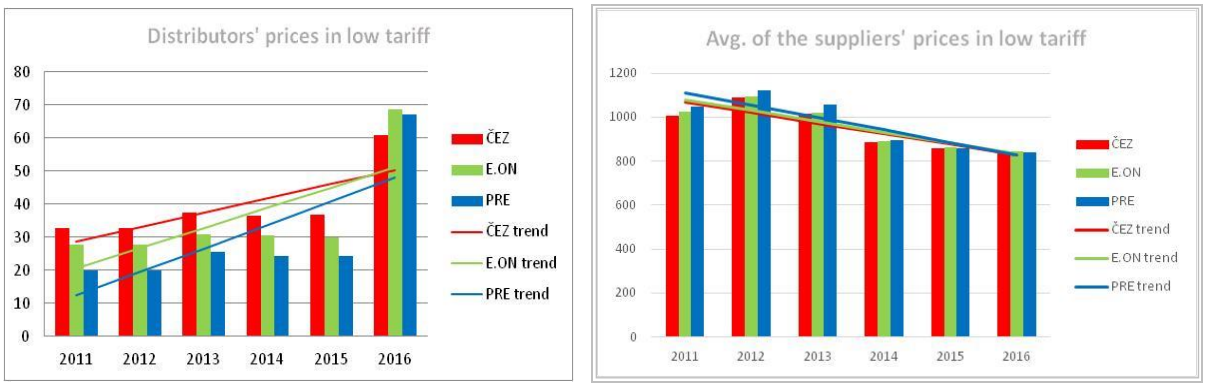
The situation of the suppliers' prices of the low tariff is similar to the high tariff – since 2012 the average prices has been decreasing. This part is the only one where the ČEZ distribution region is not the most expensive one (Figure 7 – right). On the basis of the linear regression function it is possible to say that the average prices are cut at about 50 CZK each year.

Except of the change in low tariff on the distributors' side, all the other prices are decreasing. The reasons for this trends might be various – higher competition on the market from the suppliers point of view, easier change of the supplier or the legislative changes connected with electricity and the ERO policy [6]. The effect for the final customer is positive in the sense of lower annual electricity consumption cost.



Source: Own calculations according to [7]

Fig. 6: *Histograms for the suppliers' high tariff rate prices for the period 2011-2016*



Source: Own calculations according to [7]

Fig. 7: *Distributors' prices in low tariff per 1 MWh (left) and average prices per 1 MWh in the suppliers products in low tariff (right)*

The analysis described above can be seen from the microeconomic point of view as the oligopoly models described and studied in [9], [10] and [11]. The distribution of the electricity is provided solely by three companies. This condition fulfils the definition of the oligopoly where only few subjects on the market can influence prices. As there is no competition among the distributors, they might influence prices. In the described tariff rate the

decrease of the high level prices given by distributors is much slower than in case of the suppliers' high prices; the trends in low prices are different. Distributors have a local monopoly in their distribution areas and so the role of ERO as the regulator of the market is important. The situation with the suppliers is more competitive – there are more companies offering similar products, nowadays consumers can change the supplier easier than before. Because of the specific product, there are still barriers for the companies to enter the market. As the electricity consumption in the last years was nearly constant as well as the number of households, the higher number of suppliers leads to lower suppliers' prices on the market. To be able to explain other changes and trends on the market, deeper analysis of the electricity consumption is needed. This will be a subject of another research.

Conclusion

The situation on the Czech electricity market from the households' perspective has been changing since 2006. With respect to the tariff rate D25d conditions it is possible to say that the total costs had been increasing till 2012 and then they were decreasing (despite of the higher VAT). The analysis of each part of the total electricity cost formula showed that the trends were not similar not only in the components of the total costs but also between distributors and suppliers. The fixed monthly fees were nearly stable on both sides (suppliers' and distributors'), the prices of the electricity consumption in high tariff were falling down also in the suppliers' products and distributors' conditions. The distributors' prices of other services (given by ERO) were more or less decreasing. The main difference in trends can be seen in low tariff prices where the distributors doubled the price in the year 2016; while the suppliers were still cutting it down as in previous years. The distribution region ČEZ is the most expensive one almost in all prices and fees. Due to these facts the arrangement of the contract fixing the prices for more than one year can be disadvantageous for the Czech households as it can increase the annual electricity consumption cost (when D25d tariff rate is used). This is valid especially for higher consumption. The final effect of the changed prices is dependent on the consumption level – for the consumption close to zero MWh per year the total cost might be increasing.

Acknowledgements

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Analýza trhu s elektřinou z pohledu produktů nabízených domácnostem v tarifu D25d v období let 2011-2016

Trh s elektřinou se v České republice mění zejména od roku 2002 s počátkem jeho liberalizace. Od této doby mohly firmy volně volit dodavatele elektřiny. Domácnosti mají tuto možnost od roku 2006. Ačkoli lze předpokládat, že spotřeba elektřiny by měla stoupat vzhledem k rozvoji nových elektrospotřebičů, ve skutečnosti spotřeba v České republice rostla pouze do roku 2008, následně ve spojitosti s ekonomickou krizí poklesla a další nárůst již je velmi mírný. Vzhledem k této skutečnosti by i ceny spojené se spotřebou elektřiny měly být spíše klesající. Tento článek je zaměřen na situaci na trhu s elektřinou z pohledu nabídky produktů domácnostem v tarifu D25d v období let 2011-2016. Cílem je popsat trendy ve vývoji jednotlivých složek celkových nákladů domácnosti spojených se spotřebou elektřiny.

Analyse des Strommarktes aus der Sicht der Produkte, welche den Haushalten (Tarif D25d) im Zeitraum von 2011-2016 angeboten wurden

Der Strommarkt befindet sich seit dem Jahre 2002, als dessen Liberalisierung einsetzte, in einem Prozess der Veränderung. Seit dieser Zeit können die Firmen den Stromanbieter frei wählen. Die Haushalte haben diese Möglichkeit erst seit dem Jahre 2006. Obschon man davon ausgehen kann, dass der Stromverbrauch im Hinblick auf die Entwicklung neuer elektrischer Geräte steigen wird, stieg er de facto lediglich bis zum Jahr 2008. Hernach sank er im Zusammenhang mit der Wirtschaftskrise und der weitere Anstieg fiel sehr mäßig aus. In Anbetracht dieser Tatsache wäre eigentlich ein sinkender Strompreis zu erwarten. Dieser Artikel befasst sich mit der Situation auf dem Strommarkt aus der Sicht des den Haushalten unterbreiteten Produktangebots (Tarif D25d) im Zeitraum zwischen 2011 und 2016. Er hat sich zum Ziel gesetzt, die Trends in der Entwicklung einzelner Komponenten der Gesamtkosten der Haushalte zu beschreiben, die sich aus dem Stromverbrauch ergeben.

Analiza rynku energii elektrycznej z punktu widzenia produktów oferowanych gospodarstwom domowym w taryfie D25d w okresie 2011-2016

Rynek energii elektrycznej w Republice Czeskiej zmienia się od 2002 roku wraz z zapoczątkowaniem jego liberalizacji. Od tego czasu firmy mogły swobodnie wybierać sobie dostawców energii. Gospodarstwa domowe mają taką możliwość dopiero od 2006 roku. Choć można by się spodziewać, że zużycie energii elektrycznej powinno stale rosnąć, ze względu na rozwój nowych urządzeń elektrycznych i sprzętu AGD, to w rzeczywistości zużycie w Republice Czeskiej rosło tylko do 2008 roku a następnie w związku z kryzysem gospodarczym spadło, a kolejny wzrost jest już minimalny. Ze względu na to, ceny związane ze zużyciem energii elektrycznej powinny również raczej maleć. W niniejszym artykule opisano sytuację występującą na rynku energii elektrycznej z punktu widzenia oferty produktów dla gospodarstw domowych w taryfie D25d w latach 2011-2016. Celem jest przedstawienie trendów w rozwoju poszczególnych składowych całkowitych kosztów gospodarstw domowych związanych ze zużyciem energii elektrycznej.

PROJECT "REGIONAL VALUE CHAINS IN THE CONTEXT OF ECOSYSTEM SERVICES AND BIODIVERSITY – BASED ON THE EXAMPLE OF CZECH-POLISH-SAXON PROJECT COLLABORATION"

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Abstract

The article presents an international project "Regional Value Chains in the Context of Ecosystem Services and Biodiversity – Based on the Example of the Czech-Polish-Saxon Project Collaboration". The project involves partners from Czech Republic, Germany and Poland, among others: NETSCI Prof. Dr. Kramer GmbH, Faculty of Economics, Management and Tourism in Jelenia Góra of Wroclaw University of Economics, Jan Evangelista Purkyne University in Usti nad Labem, LANU (Saxon Foundation for Nature and Nature). The project is supported by DBU (German Federal Foundation for Environment). The main objective of the project is to support economic development in the border areas of the three countries: Czech Republic, Poland and Germany, by the empowerment of the value chains, including ecosystem services. This form of cooperation brings many economic benefits not only for the individual companies participating in the project, but also for the whole border region.

Keywords

Czech-Polish-Saxon project collaboration; Regional value chains; Ecosystem services; Biodiversity.

Introduction

Since 1 December 2015, The Department of Quality and Environment Management (Wroclaw University of Economics, Faculty of Economics, Management and Tourism in Jelenia Gora) has been implementing the second phase of the international project entitled. "Regional Value Chains in the Context of Ecosystem Services and Biodiversity – on the Example of Polish-Czech-Saxon Project Cooperation". Implementation of the second phase of the project is planned for two years until 30th November 2017. The first phase lasted from 1st June 2015 to 30th November 2015 and was ended with the conference "The Potentials of Regional Value Creating through the Ecosystems Services", which took place in the International Meeting Centre in the monastery of St. Marienthal in Ostritz (near Zgorzelec), on 24th November 2015.

The project involves partners from the Czech Republic, Germany and Poland: NETSCI Prof. Dr. Kramer GmbH, Faculty of Economics, Management and Tourism of Wroclaw University of Economics, Jan Evangelista Purkyně University in Ústí nad Labem, LANU (Saxon Foundation for Nature and Nature), UFZ (Helmholtz-Zentrum für Umweltforschung), Leibniz University in Hannover, International Meeting Centre in St. Marienthal in Ostritz. The project is co-financed by DBU (German Federal Foundation for Environment). The aim of the article is to present the objectives of the project and the description of the conference, which was organized in the framework of the project.

1 Characteristic of the Project

The main objective of the project is to support economic development in the border areas of the three countries: Poland, Czech Republic and Germany, by the empowerment of the value chains, including ecosystem services. This form of cooperation gives many economic benefits not only for the individual companies, participating in the project, but also for the whole region – the local economy and regional identity will be reinforced, there will be positive effects on the labor market created and the purchasing power and the financial ability will remain in the region. The project can also help to reduce pressure on the natural environment. A catalog of indicators developed during the project will provide enterprises knowledge about their interactions with ecosystems, and it will help them to specify steps towards their development and to inform customers about an appropriate way about the values of biodiversity. This all will increase competitiveness and contribute to sustainable development of the region.

Dozens of companies from the border region have accessed the project activities to take advantage of the potential offered by regional value chains and ecosystem services. It is still possible to access the project for further enterprises.[1]

2 Conference "The Potentials of Regional Value Creating Through the Ecosystems Services"

Over 100 guests from Poland, Czech Republic and Germany took part in the conference – enterprises, regional government, scientist, students and other regional entities. The aim of the conference was not only to present the results of first phase of the project and objectives of the second phase, but also to present the possibilities and examples of sustainable management and exchange of experience between the companies which are interested in participating in the project. The conference was also an excellent opportunity to establish international business contacts between companies, which are forming regional value chains.

Among the speakers were representatives of famous sustainable companies such as for example Hipp or Neumarkter Lammsbräu. They presented the benefits of regional ecological value chain for their firms and for their regions and pointed out the importance of ecosystem services in management. Also, small and medium-sized enterprises of the border region presented their policies for sustainable development and their contribution to the strengthening of the regional economy.

In a very friendly atmosphere, new contacts were established, national and international regional products were tested and the guests discussed the potential of the "triangle" region development. The conference was an informative and motivating meeting, which showed new possibilities and directions of the development of the border region.

Conclusion

The results of the project "Regional Value Chains in the Context of Ecosystem Services and Biodiversity – on the Example of Polish-Czech-Saxon Project Cooperation" could be used for sustainable development of Polish-Czech-Saxon border region. The end-results of the project will be presented at the conference in autumn 2017.

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PROJEKT „REGIONÁLNÍ HODNOTOVÉ ŘETĚZCE V KONTEXTU EKOSYSTÉMOVÝCH SLUŽEB A BIODIVERZITY – NA PŘÍKLADU ČESKO-POLSKO-SASKÉHO PROJEKTU SPOLUPRÁCE“

Tento článek představuje mezinárodní projekt „Regionální hodnotové řetězce v kontextu ekosystémových služeb a biodiverzity – na příkladu česko-polsko-saského projektu spolupráce”. Projektu se zúčastní partneři z České republiky, Německa a Polska, mezi jinými to jsou: NETSCI prof. dr. Kramer GmbH, Fakulta ekonomiky, managementu a cestovního ruchu v Jelení Hoře, Wroclavská ekonomická univerzita, Universita Jana Evangelisty Purkyně v Ústí nad Labem, LANU (Saská nadace pro Přírodu). Projekt je podporován DBU (Německou federální nadací pro životní prostředí). Hlavním cílem tohoto projektu je podpora ekonomického rozvoje v příhraničních oblastech těchto tří zemí: České republiky, Polska a Německa, a prosazování hodnotových řetězců včetně ekosystémových služeb. Tato spolupráce přinese řadu ekonomických výhod, a to nejen pro jednotlivé firmy, které se projektu zúčastní, ale pro celou příhraniční oblast.

REGIONALE WERTSCHÖPFUNGSKETTEN IM KONTEXT VON ÖKOSYSTEMLEISTUNGEN UND BIODIVERSITÄT

Der Artikel charakterisiert das internationale Projekt „Regionale Wertschöpfungsketten im Kontext von Ökosystemleistungen und Biodiversität – am Beispiel einer tschechisch-polnisch-säch-sischen Projektkooperation“. Das Projekt engagiert Partner aus Tschechien, Deutschland und Polen, u.a.: NETSCI Prof. Dr. Kramer GmbH, Fakultät für Wirtschaft, Management und Tourismus in Jelenia Góra der Wirtschaftsuniversität in Wrocław, Universität J. E. Purkyně in Ústí nad Labem, LANU (Sächsische Landesstiftung Natur und Umwelt). Das Projekt ist durch die DBU (Deutsche Bundesstiftung Umwelt gefördert). Das Hauptprojektziel ist die Förderung der wirtschaftlichen Entwicklungsfähigkeit im Grenzraum von drei Ländern d.h. Tschechien, Polen und Deutschland, durch die verstärkte Realisierung von regionalen Wertschöpfungsketten unter Beachtung von Ökosystemleistungen. Diese Kooperationsform eröffnet zahlreiche wirtschaftliche Vorteile, nicht nur für die einzelnen beteiligten Unternehmen, sondern auch für die Region insgesamt.

REGIONALNE ŁAŃCUCHY TWORZENIA WARTOŚCI W KONTEKŚCIE USŁUG EKOSYSTEMÓW I BIORÓŻNORODNOŚCI

W artykule scharakteryzowano międzynarodowy projekt „Regionalne łańcuchy tworzenia wartości w kontekście usług ekosystemów i bioróżnorodności – na przykładzie czesko-polsko-saksońskiej współpracy projektowej”. W projekcie uczestniczą partnerzy z Czech, Niemiec i Polski, m.in.: NETSCI Prof. Dr. Kramer GmbH, Wydział Ekonomii, Zarządzania i Turystyki w Jeleniej GórzeUniwersytetu Ekonomicznego we Wrocławiu, Uniwersytet Jana Ewangelisty Purkyniego w Usti nad Łabą, LANU (Saksońska Fundacja Natura i Przyroda). Projekt jest dofinansowany przez DBU (Niemiecka Fundacja Federalna ds. Ochrony Środowiska. Głównym celem projektu jest wsparcie rozwoju gospodarczego na obszarze pogranicza trzech krajów Czech, Polski i Niemiec dzięki wzmocnieniu łańcuchów tworzenia wartości, z uwzględnieniem usług ekosystemów. Taka forma współpracy daje wiele korzyści gospodarczych, nie tylko poszczególnym, uczestniczącym w projekcie przedsiębiorstwom, ale także całemu regionowi.

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