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## From the Editorial Committee

We are giving you the next 22nd (1/2015) issue of the Quarterly of the Faculty of Management of the Rzeszow University of Technology entitled “Modern Management Review”.

The primary objective of the Quarterly is to promote publishing of the results of scientific research within economic and social issues in economics, law, finance, management, marketing, logistics, as well as politics, corporate history and social sciences.

Our aim is also to raise the merits and the international position of the Quarterly published by our Faculty. That is why we provided foreign Scientific Council, as well as an international team of Reviewers to increase the value of the scientific publications.

The works placed in this issue include many assumptions and decisions, theoretical solutions as well as research results, analyses, comparisons and reflections of the Authors.

We would like to thank all those who contributed to the issue of the Quarterly and we hope that you will enjoy reading this issue.

With compliments
*Editorial Committee*

MODERN MANAGEMENT REVIEW 2015
MMR, vol. XX, 22 (1/2015), pp. 7-16 January-March

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# PROPOSAL OF EMPLOYEE COMPETENCY IMPROVEMENT

Employee's competencies represent the most powerful tool that leads to an improvement in business. In a changing economic and educational environment which is characterized by global competitive market knowledge is importance of workers developing considered like the corner stone. The world is going through many global changes. The most important changes are informatization, innovation, integration globalization. There is a requirement to identify and describe those competencies that must be applied in many employments and have to allow successfully to overcome the changes. The aim of this paper is to explain and characterize the system leading to a continuous competency improvement. The proposed system of continuous improvement represents a mechanism consisting of several cooperating elements, methods and procedures application of which will be achieved competency improvement in the company. The system is suitable for every company which wants to improve the employee competencies. System of improving employee competencies can be created for specific selected positions at every level in the company and for the company as a whole. Creation of competency model, identification of competency list is not easy. There exist procedures to correctly identify competencies and develop an appropriate competency model. The system of endless competency improvement has to be implemented on the PDCA cycle principle according to Deming.
**Keywords**: employee competencies, competency model, competency list

## 1. INTRODUCTION

Since 70s the society has already known that competency improvement is necessary[5]. Human competencies are discussed from many points of view - in terms of study, career or normal life. There were published research results in 2001. The research lasted about 15 years and was made in about 60 companies, where experts were focused on determination and investigation of competencies. Research has shown that companies that were focused on

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[5] M. Blaško, *Kvalita v systéme modernej výučby*, Aktualizované vydanie, Technická univerzita, Košice 2013. 400 s.

competencies have increased degree of success in recruitment of high-quality employees. There has been shown that the work ethics and success of targets achievement have increased in these companies.

## 2. THEORETICAL EXPLANATIONS OF TERMS

At the beginning it is necessary to define the terms – competency, core competency, competency model and competency matrix.

The term competence has two meanings. Competency as a responsibility is seen as an authorization to do the work. From another perspective, competency is seen as a summary of the human capabilities and his behavior which ensures the quality of fulfillment of working tasks. [6] In the article we pay attention to the second meaning of term competency - skills and abilities which the worker has to have in certain work position.

European Training Foundation defines core competencies as a general set of skills and approaches that may be useful in all work situations - it is one of the surest ways of keeping education and relevant training in a rapidly changing environment[7].

Competency model presents a summary of "key competencies with their behavioral signs that are required for a particular position or level of management. If the model is created for a particular position in a particular company, we are talking about specific model."[8]

Competency models specifically include the following elements:

- “competency names and detailed definitions,
- descriptions of activities or behaviors associated with each competency,
- a diagram of the model presenting of the model in graphical form to help,
- users quickly grasp the key feature of the model”[9].

Bozkurt elaborates the types of competency models. We use job competency models and core competencies models in the paper. “A job competency model describes job or role competencies often those specific to a certain type of job within a specific work unit. These models provide a good foundation for building performance appraisals or individual training and development plans. A job competency model is a description of those competencies possessed by the top performers in a specific job or job family. Models usually contain 8-16 competencies. Core competency models are built through a process of continuous improvement and enhancement. They focus for corporate strategy. Core competencies are those capabilities that are critical to a business achieving competitive advantage. The key core competencies here are those that enable the creation of new products and services. Very important is customer relationship management.”[10]

[6] R. Kocianová, *Personální činnosti a metody personální práce*, 1. vyd., Grada Publishing, Praha 2010, 224 s.

[7] European Training Foundation, *Key Competences*, http://www.etf.europa.eu/web.nsf/pages/Key_competences, 2014 (last viewed: 10.01.2015).

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[9] T. Bozkurt, *Management by Competencies*, http://www.risus-tr.com/risus/wp-content/uploads/managementbycompetenciestulaybozkurt, 2011 (last viewed: 10.01.2015)
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[10] T. Bozkurt, *Management by Competencies*, http://www.risus-tr.com/risus/wp-content/uploads/managementbycompetenciestulaybozkurt110329032120-phpapp02.pdf, 2011. (last viewed: 10.01.2015).

"The competency matrix includes a list of behavioral statements and the associated quality values for each competency at several employee levels as managers, supervisors, executives, subordinates. The purpose is to help employees understand their contribution, through their individual performance, to the companies commitment."[11]

Steps for competency model development process according to Bozkurt:

1. "performance criteria – defining the criteria for superior performance in the role,
2. criterion sample – choosing a sample of people performing the role for data collection,
3. data collection – collecting the sample data about the role for data collection,
4. data analysis – developing hypothesis about the competencies of outstanding performers and how these competencies work together to produce desired results,
5. validation – validating the results of the data and analysis,
6. application – applying the competency model in human resource activities, as needed".

## 3. HOW TO CREATE A SYSTEM OF ENDLESS COMPETENCY IMPROVEMENT?

We know from the definition of the system as a whole that it is necessary to determine the selected elements, among which there are connections and relationships that form the system of continuous competency improvement. Elements of system of competency improvement in the company consist of:

- employees and their competencies,
- processes, activities of employees ,
- equipment that employees need,
- human resource department of a company,
- educational institutions, agencies providing professional courses, literature, internet sources and other sources that support the development of competencies.

Necessary methods, mental and work processes linking elements of the system are described in the upcoming part.

### 3.1. Methods of data collection and their sources

When creating the system it is necessary to cooperate with company to obtain primary data. It is important to get information from the human resource department, the director and the particular workers who are currently working at the working positions, which we want analyze. With help of these workers, HR department and director it is required to do interviews to obtain primary data. Primary data should be obtained from other sources in the form of internal accounting statements for the last years, the Code of Ethics, the Job Code, the Quality Handbook and job descriptions. Using these primary data we can create an analysis of situation in the company and propose solutions for creation of system of endless competency improvement.

### 3.2. Used methods

Several methods were used in the paper. We used theoretical and empirical methods. Among the theoretical methods belong:

[11] *Ibidem.*

- abstraction, concretization,
- analysis, synthesis,
- comparison, interpretation,
- induction, deduction and
- analogical, method.

Among the empirical methods that were used in the paper include:

- content analysis,
- semantic analysis,
- method of managed discussion – interview,
- method of creation of recording sheets and excerpts.

For creation of the system of endless competency improvement it is necessary to use methods of obtaining new knowledge about reality in the chosen company. It is important to perform an analysis of internal documents, the company statutes, the process of recruitment, the Organizational Code, organizational structure, the Quality Handbook, Annual Report for the last year and job descriptions of selected positions. Important is to obtain expert opinion, make an interview and survey of requirements of employers. These belong to the methods of key competencies determining. From the methods of processing of obtained data we recommend to use theoretical methods - analysis, synthesis, comparison, generalization and interpretation. A specialized method of evaluation is necessary. This evaluation is explained in the own model of determining competencies.

Sets of competencies and core competencies are determined by the own model of determining of competencies which consists of three criteria. The own model is shown in the Figure 1. The first criterion is the investigation of the job descriptions according to knowledge of the situation in the company. The second criterion is examination of job descriptions according to professional resources and the third criterion is examination of the job descriptions in terms of knowledge of the author.

Fig. 1. The own model of determining of competencies

| Criterion 1<br>Knowledge of the company situation | Criterion 2<br>Professional resources | Criterion 3<br>Authors knowledge |
|---|---|---|
| • time dimension | | |
| • financial dimension | | |
| • dimension of decision-making | | |
| • dimension of expert opinion | | |

Source: own processing

Criterion 1 – knowledge of the situation in the company:

We recommended to use the own model of determining competencies mentioned in Figure 1. This procedure is based on the analysis of selected job descriptions. Job descriptions present knowledge and skills which the worker has to have and describe activities of this job. Competencies with help of this procedure are analyzed according to the activities that are performed on the particular position. Based on the job descriptions and analysis, it is possible to identify a set of competencies and then a set of core competencies for all selected jobs.

Individual work positions are analyzed according to Criterion 1from four dimensions.

1. Time dimension – individual work activities are distinguished in percentage according to that how much time from daily eight working hours the worker does them. Working activities together constitute 100% of working time. Those activities that reach the most time are considered from this point of view like the most important. Relevant time resolution of activities is done by worker who is working at that position in the time of research.
2. Financial dimension – if the worker decides at some of his activities about financial resources of the company than we assigned to the activity interval ranging from minimum to maximum of money. Activities and their intervals are then ranked from the biggest to the lowest according to that it is possible to determine the importance from this point of view. Determination of the intervals of financial amount is made by worker who is working at that position in the time of research.
3. Dimension of decision-making – work activities have different importance from the decision-making dimension. For this evaluation, we choose a simple upward range from 1, 2, ... x, the number 1 represents the most important activity and number x represents the least important activity. Sequencing of activities from the most important to the least important (from 1 to x) is done by the worker in the position. Worker determines the sequence of activities and their competencies according to individual opinion and to such number x to which he considers the determination of the sequence relevant.
4. The fourth dimension is the expert opinion. Expert identifies competencies the worker should have on the particular job position. He identifies key competencies. As an expert can be considered a worker who works in the particular position for long time (5 years or more).

For thus analyzed activities accrue ranks. From ranked activities according to dimensions of Criterion 1 is possible to identify set of competencies. The set of competencies and their activities compose competency matrix. From the competency matrix we can identify core competencies. This identifying is based on the ranks which are results of analysis according this Criterion 1. The activities, which have the most important evaluation, are considered like core competencies. In following part we pay attention to the selected core competencies.

We need to add to the core competency model competencies which are considered as essential/core according to the professional resources and to knowledge of the author.

Criterion 2 – professional resources:

From this dimension are milestones available literature and internet resources, competencies model that are considered suitable for the selected positions. Various job portals, studied foreign, Slovak literature and internet resources can be used, too. On job portals such as profesia.sk, kariera.zoznam.sk, praca.sme.sk, trenkwalder.sk, job.sk, etc. are searched ads for jobs that are identical or related to the selected positions. A set of key competencies occurs as a summary of information from all these resources.

Criterion 3 – knowledge of the author:

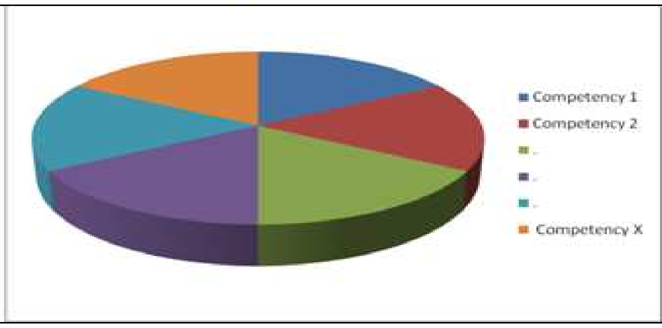
From this dimension we use subjective opinion for determining the core competencies which will be generated on the basis of professional knowledge which were obtained by appropriate education in the area, self studying and interest in the area.

Consequently, it is possible to create core competencies models according to all three criteria of the own model of determining of competencies. According to Bozkurt we know which elements should contain the competency model. These elements must be included in core competencies models, which came into existence by analysis according to the own model of determining of competencies.

Fig. 2. Core competencies model

| *CORE COMPETENCIES MODEL* | | |
|---|---|---|
| *Competency* | *Description* | *Description of activities related to the competency* |
| **Competency 1** | **Description 1** | **Activity 1**<br>**Activity 2**<br>.<br>.<br>.<br>**Activity X** |
| **Competency 2** | **Description 2** | **Activity 1**<br>**Activity 2**<br>.<br>.<br>.<br>**Activity X** |
| .<br>.<br>. | .<br>.<br>. | .<br>.<br>. |
| **Competency X** | **Description X** | **Activity 1**<br>**Activity 2**<br>.<br>.<br>.<br>**Activity X** |

*Diagram of core competencies model*




Source: own processing according to Bozkurt (2011)

The resulting core competencies models are considered ideal. Ideal competencies models are compared with the situation in the company – identified by Criterion 1. This showed which competencies are not developed as they should be developed according to the established ideal models, respectively which competencies are in the set completely missing. To these competencies must be given appropriate attention.

By this procedure is also filled the procedure for creation of competency models by Bozkurt. This is the procedure[12]:

1. performance criteria,
2. criterion sample,
3. data collection,
4. data analysis,

[12] *Ibidem.*

5. validation,
6. application.

Generally the exact number of core competencies in the model is not precisely defined. Based on creation by Bozkurt, the models must contain three elements - a description of competencies, description of activities related to the competency and graphical diagram of model as is shown in Figure 2[13].

### 3.3. Proposals for implementation of the system of endless competency improvement

Standard STN EN ISO 9001: 2009 explains the competency of workers. It is necessary to determine whether the company has implemented mentioned standard. If the standard is implemented, it is necessary to explain how the standard is fulfilled by the company. If it is not implemented, we recommend its implementation to the company.

Recommendation for determining of competencies to the future is also the need of variation of competency analysis methods, e.g. for executive and administrative company units. Competency determining methods are varied according to character of performing activity.

After the core competency determination we need to investigate how the interview is managed, whether it is sufficiently adapted for identification if an adept has competencies important for the job position. If the process of interview does not correspond with this, the company has to customize the process.

Bozkurt showed how the competency model should look. Based on this conception we recommend publishing diagrams of core competency models in offices, building of company. This should motivate the workers to reach and develop these core competencies.

If an adept on job position signs a job contract, he is employee of a company. The worker has to competent for the job. In this case we recommend develop his competencies with help of professional courses and education training.

We recommend do periodical actualizations of activity and competency changes. We support keeping of actual lists of competencies. The actualizations of activities and competencies should be done by the upper mentioned method based on the own model of determining of competencies in the Figure 1. The actualizations should be done by cooperation of CEO, HR department and workers. HR department and CEO have to implement the model. CEO has to supervise the analysis. Periodicity of actualizations depends on the industry in which the company operates dynamics of economic changes and other factors.

The analysis of activities and competencies is possible to perform with time screens. Time screens should provide a cross section of work day. If there are changes in the activities during the month or year, we need to estimate the range of these activities. For this range we can use averaging of all time values. This should be done by HR department of the company. We recommend making time screens periodically. The results of analysis according to the model described in the paper and time screens are possible to compare and then determine the most important competencies.

### 3.4. PDCA cycle as a mean of the system of endless competency improvement

After the explanation of proposals it is possible to describe proposed system like PDCA cycle. It consists of 4 phases – planning, test, control and implementation phase. The phases represent endless, repetitive process. This process with individual steps is

[13] *Ibidem.*

shown in the Figure 3. Here is description of the system of endless competency improvement, which is divided into steps, responsibilities, results and methods.

**Planning phase**

In this phase is necessary to plan steps, identify who is responsible for each step and determine the results and methods. Here is structure of planned activities, which together create the system.

I. Identification of competencies for all working positions - HR department, CEO - lists of core competencies - The own model of determining of competencies, various mentioned methods, time screens;
II. Customization of recruitment process according to core competencies - HR department, CEO, expert - customization of interviews - test, questionnaires;
III. Analysis if current competencies of workers correspond with core competencies - HR department, CEO, expert - current situation in the company - test, questionnaires;
IV. Selection of methods, creation of schedule of core competency improvement - HR department, CEO - selected methods, schedule - professional courses provided by the company or external organization;
V. Actualization of core competencies - HR department, CEO - actual lists of core competencies - The own model of determining of competencies, time screens.

**Test phase**

In the planning phase we recommended 5 basic steps. In test phase is necessary to test these steps.

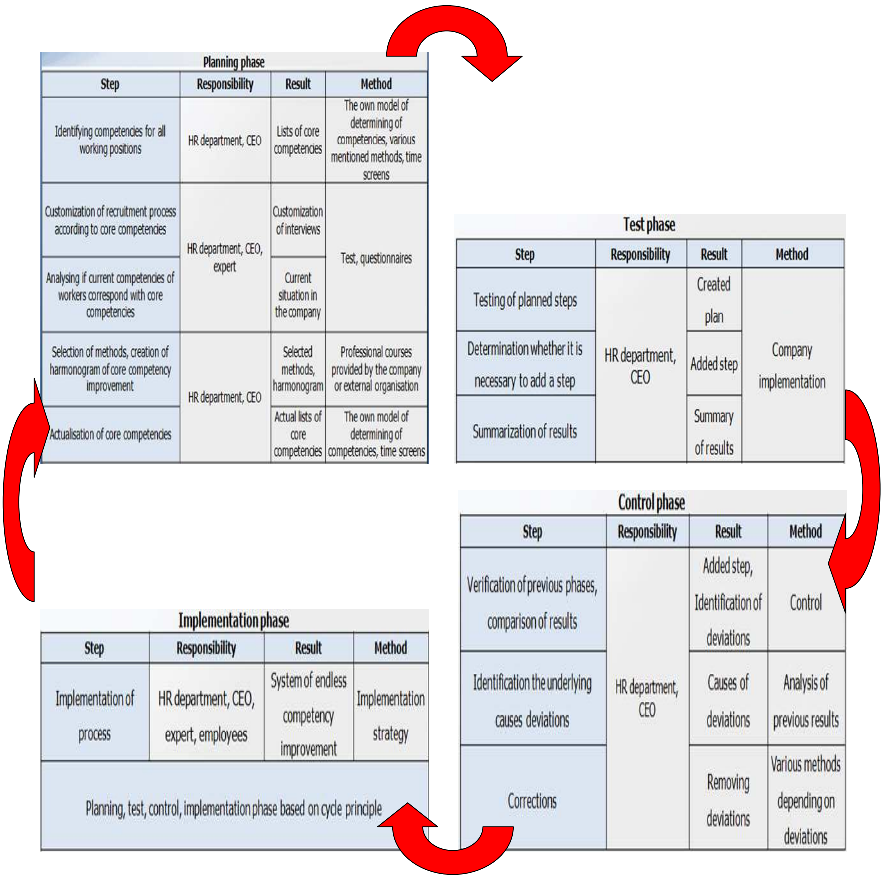
I. Testing of planned steps - HR department, CEO – created plan – company implementation;
II. Determination whether it is necessary to add a step – HR department, CEO – added step – company implementation;
III. Summary of results – HR department, CEO – summary of results – company implementation.

**Control phase**

Control phase should control planning and test phase. Individual steps of the phase are described in following part.

I. Verification of previous phases, comparison of results - HR department, CEO – added step, Identification of deviations – control;
II. Identification the underlying causes deviations – HR department, CEO – causes of deviations – analysis of previous results;
III. Corrections – HR department, CEO – removing deviations – various methods depending on deviations.

Fig. 3. The system of endless competency improvement – PDCA cycle




Source: own processing according to Deming (1993)

**Implementation phase**

Implementation phase must implement planned system into company. The system was in planning phase divided into steps, responsibilities, results and methods. The test phase tests the proposed system in the company. The control phase controls the results of test phase and compares them with planned results. The phase determines the deviations and their corrections. Then the system of endless competency improvement is ready for implementation.

I. Implementation of process – HR department, CEO, expert, employees – system of endless competency improvement – implementation strategy;

II. Planning, test, control, implementation phase based on cycle principle.

## 4. CONLUSION

The base for improving a person's professional career is to develop competencies, develop their competence. The paper is aimed at creating a continuous improvement system of employee’s competencies. One of the proposals that enterprises should consider is the introduction of a comprehensive system of improving employee's competencies, which were treated in the article. The system is based on the infinite process in the form of PDCA cycle and begins the process of selecting employees for the job. For employees who are already working in the business, the system starts in the form of determining the list of key competences at their jobs. In the system we present the various phases of the system, the methods of implementing the various phases and the results of these phases.

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[7] STN EN ISO 9001:2009, *Systémy manažérstva kvality* – Požiadavky, 2009.


## PROPOZYCJA UDOSKONALENIA KOMPETENCJI PRACOWNIKA


Kompetencje pracownicze stanowią jeden z najbardziej pożądanych zasobów, które prowadzą do wzrostu konkurencyjności w biznesie. W zmieniającym się środowisku gospodarczym, które charakteryzuje się konkurencyjnym rynkiem globalnym i bazuje na wiedzy, znaczenie rozwijających się pracowników staje się kluczową kwestią. Świat przeżywa wiele globalnych zmian. Najważniejsze zmiany to: informatyzacja, innowacyjność, integracja globalizacja. Nie jest w zasadzie możliwe, aby zidentyfikować i opisać wszystkie kompetencje, które muszą cechować różne zawody i mają umożliwić sprostanie wyzwaniom zmiany.

Celem niniejszego artykułu jest wyjaśnienie i scharakteryzowanie systemu prowadzącego do ciągłego doskonalenia kompetencji pracowniczych. Proponowany system ciągłego doskonalenia przedstawia mechanizm składający się z kilku współpracujących elementów, metod i procedur. Ich zastosowanie może się przyczynić do poprawy kompetencji pracowniczych w firmie. Zaprezentowany system zastosować można w każdej firmie, która chce podnieść kompetencje pracowników. Takie lub podobne systemy poprawy kompetencji pracowników mogą być tworzone dla konkretnych wybranych stanowisk pracy, dla każdego szczebla hierarchii w firmie, a także dla firmy jako całości.

Stworzenie modelu kompetencji, identyfikacja listy kompetencji nie są prostym zadaniem. Istnieją procedury w celu prawidłowego określenia kompetencji i rozwoju odpowiedniego modelu kompetencji. System niekończącej poprawy kompetencji powinien być realizowany w oparciu na zasadzie, zgodnie z cyklem ciągłego doskonalenia PDCA Deminga. Składa się z czterech faz: planowania, realizacji, kontroli i korekcji. Fazy te stanowią powtarzalny proces będący podstawą niekończącego się doskonalenia kompetencji w zmieniającej się firmie.



**Słowa kluczowe:** kompetencje pracownicze, model kompetencji, listy kompetencji

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**Krzysztof BOROWSKI**[1]

# ANALYSIS OF MONTHLY RATES OF RETURN IN JANUARY AND DECEMBER ON THE EXAMPLE OF SELECTED WORLD STOCK EXCHANGE INDEXES

In today's financial market there is a debate on the efficiency of markets between theoreticians and practitioners. While the former are trying to demonstrate the efficiency of financial markets, the second group believes that financial markets are not efficient. Evidence showing the efficiency of financial markets would also be a proof of the fact that asset portfolio managers would not be able to gain a higher rates of return than the market portfolio rates of return, in the long run. One way to demonstrate the thesis of the inefficiency of the financial markets, it is, among others, examination of calendar effects. Their existence undermines the efficient market theory and allows to construct an investment strategy which permits to obtain positive excess returns (above the rate of return of analyzed stock market index).

The article presents a study of effectiveness of 22 selected stock indices with the use of the rates of return in the months of January and December (so called "January effect" and "turn-of-the-year" effect, respectively). The portfolio replicating the stock index was bought at the close prices on the last session in one month, and sold at the close prices on the last session of the following month. The presence of market inefficiency has been demonstrated in the January in case of two indices: BUX and Nasdaq and in December in the following 15 cases: All-Ord, BUX, CAC40, DJIA, DJTA, DJUA, EOE, FTSE100, MEX-IPC, Nasdaq, Nikkei, Russel, SP500, TSE and WIG. Thus, in the case of some indices, the conclusions of other researchers has been confirmed, but other studies should be regarded as pioneering.

**Keywords:** market efficiency; financial market seasonality; market anomalies; January effect, December effect

## 1. INTRODUCTION

Efficient market hypothesis (EMH), the center of the influential paper of Fama, has been a cornerstone of financial economics for many decades[2]. Although current definitions differ from those developed by Fama, the efficiency of markets prevents systematic beating of the market, usually in a form of above-average risk-adjusted returns. The problem of the financial markets efficiency, especially of equity markets, has been discussed in a number of scientific works, which has led to a sizable set of publications examining this subject. In many empirical work dedicated to the time series analysis of rates of return and stock prices, there were found statistically significant effects of both types, i.e. calendar effects and effects associated with the size of companies. These effects are called "anomalies", because their existence testifies against market efficiency. Discussion of the most

[1] Krzysztof Borowski, Prof. DSc, PhD, Institute of Banking and Business Insurance, Warsaw School of Economics, Warsaw, Al. Niepodległości 162, 02–554 Warsaw, Poland, e: mail: k.borowski@upcpoczta.pl

[2] E. Fama, *Efficient capital markets; a review of theory and empirical work*, "Journal of Finance" 1970/25, p. 48–417.

common anomalies in the capital markets can be found, among others, in Simson[3] or Jajuga and Jajuga[4].

One of the most common calendar anomalies observed on the financial markets are[5]:

A) **Day-of-the-week effect** - daily average rates of return registered on the stock market differ for various days of the week. One of the first works dedicated to this type of effect, was developed by Kelly[6], who proved that the average rate of return of US stock markets on Monday are lower than average rates of return for other days of the week. Empirical work of Hirsch[7] confirmed the existence of the day-of-the-week effect. In his study, he examined behavior of the S&P500 index in the period from June 1952 to June 1985, proving that the index close on Monday was lower in 57% than the index close on the preceding Friday. For other days of the week, the following trend was observed - the index close on one session was higher than the index close on the previous session (Tuesdays/Monday of in 43% observations, Wednesday/Tuesday in 55,6%, Thursday/Wednesday in 52,6%, Friday/Thursday in 58%). The day-of-the-week effect in the US market was also presented, among others, in the works of: Jaffe end Weterfield[8], French[9], Lakonishok and Maberly[10]. The evidence for UK market was examined by: Theobald and Price[11], Jaffe and Westerfield[12], Board and Sutcliffe[13], Agrawal and Tandon[14], Peiro[15], Mills and Coutts[16], Dubois and Louvet[17], Coutts and Hayes[18]. Peiro[19], Agrawal and Tandon[20], Dubois and Louvet[21] and

[3] E. Simson, *Stock market anomalies*, Cambridge University Press, Cambridge 1988.

[4] K. Jajuga, T. Jajuga, *Inwestycje*, Wydawnictwo Naukowe PWN, Warszawa 2006, p. 147–149.

[5] J. Nowakowski, K. Borowski, *Zastosowanie teorii Carolana i Fischera na rynku kapitałowym*, Difin, Warszawa 2005, p. 322–329. This item contains a broad overview of the literature regarding efficiency of financial markets.

[6] F. Kelly, *Why you win or lose: the psychology of speculation*, Houghton Mifflin, Boston 1930.

[7] Y. Hirsch, *Don't sell stock on Monday*, Penguin Books, New York 1987.

[8] J. Jaffie, R. Westerfield, C. Ma, *A twist on Monday effect in stock prices: evidence from the US and foreign stock markets*, "Journal of Banking and Finance" 1989/15, p. 641–650.

[9] K. French, *Stock returns and weekend effect*, "Journal of Financial Economics" 1980/8, p. 55–69.

[10] J. Lakonishok, E. Maberly, *The weekend effect: trading patterns of individual and institutional investors*, "Journal of Finance",1990/45, p. 231–243.

[11] M. Theobald, V. Prince, *Seasonality estimation in thin markets*, "Journal of Finance" 1984/39, p. 377–392.

[12] J. Jaffie, R. Westerfield, *op. cit.*, p. 237–244.

[13] J. Board, C. Sutcliffe, *The weekend effect in UK stock market returns*, "Journal of Business, Finance and Accounting" 1988/5, p. 199–213.

[14] A. Agrawal, K. Tandon, *Anomalies or illusions? Evidence from stock markets in eighteen countries*, "Journal of International Money and Finance" 1994/13, p. 83–106.

[15] E. Peiro, *Daily seasonality in stock returns: Further international evidence*, "Economics Letters" 1994/45, p. 227–232.

[16] T. Mills, J. Coutts, *Calendar effects in the London Stock Exchange FTSE indices*, "European Journal of Finance" 1995/1, p. 79–93.

[17] M. Dubois, P. Louvet, *The day–of–the–week effect: the international evidence*, "Journal of Banking and Finance" 1996/20, p. 1463–1484.

[18] J. Coutts, P. Hayes, *The weekend effect, the stock exchange account and the financial times industrial ordinary shares index 1987–1994*, "Applied Financial Economics" 1999/9, p. 67–71.

[19] E. Peiro, *op. cit.*, p. 227–232.

[20] A. Agrawal, K. Tandon, *op. cit.*, p. 83–106.

[21] M. Dubois, P. Louvet, *op. cit.*, p. 1463–1484.

Kramer[22] provided evidence of negative Monday and Tuesday returns for Frankfurt exchange. In works of Solnik and Bousquet[23], Agarwal and Tandon[24], there was found an evidence of negative Tuesday rates of return in Paris market, while Condoyanni et al.[25] and Peiro[26] demonstrated negative Monday and Tuesday rates or return on the same market and Barone[27] in Milan. Research regarding rates of return on other markets was performed in works of Kato et al.[28], and also by Sutheebanjard and Premchaiswadi[29]. On the Polish market, findings regarding the day-of-the-week effect were conducted among others by: Buczek[30], Szyszka[31] and Czekaj et al.[32].

B) **Monthly effect** – achieving by portfolio replicating the specified stock index, different returns in each month. The most popular monthly effect is called "January effect", i.e. the tendency to observe higher average rate of return of stock market indices in the first month of the year. For the first time, this effect was observed by Keim[33], who noted that the average rate of return on stocks with small capitalization is the highest in January. In the case of large and mid-capitalization companies the effect was not so perceptible. Although January was the best single month in UK, the period from December to April consisted of months, which on average produced positive returns[34]. Bernstein[35], taking into consideration the behavior of the US equity market in the period from 1940 to 1989, gave the interdependence between rates of returns in each month. Modern researches, e.g. Gu[36] and Schwert[37] show that in the last two decades of the twentieth century, phenomenon of the month-of-the-year effect was much weaker. This fact would suggest that the discovery and dissemi-

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[22] C. Kramer, *Macroeconomic seasonality and the January effect*, "Journal of Finance" 1994/49, p. 1883–1891.

[23] B. Solnik, L. Bosquet, *Day–of–the–week effect on the Paris Bourse*, "Journal of Banking and Finance" 1990/14, p. 461–468.

[24] A. Agrawal, K. Tandon, *op. cit.*, p. 83–106.

[25] L. Condoyanni, J. O'Hanlon, C. Ward, *Day of the week effects on stock returns: international evidence*, "Journal of Business Finance and Accounting" 1987/14, p. 159–174.

[26] E. Peiro, *op. cit.*, p. 227–232.

[27] E. Barone, *The Italian stock market: efficiency and calendar anomalies*, "Journal of Banking and Finance" 1990/14, p. 483–510.

[28] K. Kato, S. Schwarz, W. Ziemba, *Day of the weekend effects in Japanese stocks*, [in:] *Japanese Capital Markets*, Ballinger, New York 1990, p. 249–281.

[29] P. Sutheebanjard, W. Premchaiswadi, *Analysis of calendar effects: day–of–the–week effect on the Stock Exchange of Thailand (SET)*, "International Journal of Trade, Economics and Finance" 2010/1, p. 2010–2023.

[30] S. Buczek, *Efektywność informacyjna rynków akcji. Teoria a rzeczywistość*, Szkoła Główna Handlowa w Warszawie, Warszawa 2005, p. 51–55.

[31] A. Szyszka, *Wycena papierów wartościowych na rynku kapitałowym w świetle finansów behawioralnych*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2007, p. 141–146.

[32] J. Czekaj, M. Woś, J. Żarnowski, *Efektywność giełdowa rynku akcji w Polsce*, Wydawnictwo Naukowe PWN, Warszawa 2001.

[33] D. Keim, *Size-related anomalies and stock return seasonality: further empirical evidence*, "Journal of Financial Economics", 1983, 12, p. 13–32.

[34] In works of: M. Rozeff, W. Kinney, *Capital market seasonality: the case of stock returns*, "Journal of Financial Economics" 1976/3, 379–402, and A. Corhay, G. Hawawini, P. Michel, *Stock market anomalies*, Cambridge University Press, Cambridge 1988.

[35] J. Bernsten, *Cycles of profit*, Harpercolins, New York 1991.

[36] A. Gu, *The declining January effect: evidence from U.S. equity markets*, "Quarterly Review of Economics and Finance" 2003/2, p. 495–404.

[37] W. Schwert, *Anomalies and market efficiency*, "Simon School of Business Working Paper" 2002/FR 02–13.

nation of the monthly effect in world financial literature contributed to the increase of market efficiency.

**C) Other seasonal effects** - in the financial literature, there can be found following calendar effects:

1. The weekend effect – Cross[38] found that markets tend to raise on Fridays and fall on Mondays. His findings generated a flood of research, e.g. Lakonishok and Levi[39], Jaffe and Westerfield[40], Condoyanni et al.[41] and Connolly[42]. The literature presents two ways of computing weekend rates of return. In the first case, Friday close and Monday open prices are used, while in the second one Friday close and Monday close prices are employed.
2. The holiday effects – markets before holidays or other trading breaks tend to rise. In the US there is a number of studies elaborating on this issue, e.g., Fields[43], Ariel[44], Lakonishok and Smith[45] and Cadsby and Ratner[46].
3. Within-the-month effect – positive rates of returns only occur in the first half of the month[47].
4. Turn-of-the month effect – average rate of return calculated for the last day of the month and for three days of the next month, was higher than the average rate of return calculated for the month, for which the rate of return of only one session, was taken. Lakonishok and Smidt[48] found that the four days at the turn-of-the-month averaged a cumulative rate of increase of 0,473% versus 0,0612% for and average four days. The average monthly increase was 0,349%, i.e., the DJIA went down during non-turn-of-the-month period.

The aim of this article is to examine statistically significance of monthly returns in January and December, with the use of closing prices on the last sessions of two consecutive months in selected financial markets represented by the following 22 stock indices: AllOrd, AMEX, B-Shares, Bovespa Buenos, BUX, CAC40, DAX, DJIA, DJTA, DJUI, EOE, FTSE100, Hang Seng, MEX-IPC, Nasdaq, Nikkei, Rusel, SMI, SP500, TSE and WIG. The secondary aim of the work is to determine the correlation coefficients of rates of return

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[38] F. Cross, *The behavior of stock prices and Fridays and Mondays*, "Financial Analyst Journal" 1973/29, p. 67–69.

[39] J. Lakonishok, M. Levi, *Weekend effect on stock returns: a note*, "Journal of Finance" 1982/37, p. 883–889.

[40] J. Jaffie, R. Westerfield, *op. cit*., p. 237–244.

[41] L. Condoyanni, J. O'Hanlon, C. Ward, *op. cit*., p. 159–174.

[42] R. Connolly, *A posterior odds analysis of the weekend effect*, "Journal of Econometrics" 1991/49, p. 51–104.

[43] M. Fields, *Security prices and stock exchange holidays in relation to short selling*, "Journal of Business" 1934/7, p. 328–338.

[44] R. Ariel, *A monthly effect in stock returns*, "Journal of Financial Economics" 1987/17, p. 161–174, and idem, *High stock returns before holidays: existence and evidence on possible causes*, "Journal of Finance" 1990/45, p. 1611–1626.

[45] J. Lakonishok, S. Shmidt, *Are seasonal anomalies real. A ninety–year perspective*, "Review of Financial Studies" 1988/1, p. 403–425.

[46] C. Cadsby, M. Ratner, *Turn-of-month and pre-holiday effects on stock returns: some international evidence*, "Journal of Banking and Finance" 1992/16, p. 497–509.

[47] R. Ariel, *A monthly effect...*, p. 161–174 and C. Kim, J. Park, *Holiday effects and stock returns: further evidence*, "Journal of Financial and Quantitative Analysis" 1994/29, p. 13–32.

[48] Lakonishok J., Shmidt S., op. cit., p. 403–425.

between foreign stock exchange indices and rates of return of Polish WIG index in January and February. Indices quotations are taken from the websites of Polish Brokerage House DM BOS.

The null hypothesis tested in this paper, states that the average monthly rates of return in January or December, calculated for each of 22 analyzed indices, is equal to zero (for $\alpha = 5\%$). Rejection of the null hypothesis would be tantamount to accept the alternative hypothesis that the average monthly rates of return in these two analyzed months, for a particular stock index, is statistically different from zero. The rejection of the null hypothesis will prove the occurrence of the calendar effect in that month.

## 2. LITEARTURE REVIEW REGARDING JANUARY AND DECEMBER EFFECTS ON EQUITY MARKETS

For the first time the existence of the January effect was described by Wachtel[49], who indicated that the average rates of return of Dow Jones Industrial Average in the period 1927 to 1942, were higher in the first month of the year than in the others. The first advanced statistical tests for the Nasdaq index, in the period 1904-1974 were carried out by Rozeff and Kenney[50] - they have confirmed the existence of the January effect. Other works of Banz[51], Keim[52], Reinganum[53] and Roll[54] demonstrated the presence of this effect in the case of small- and mid-capitalization companies. Modern research of Zilca and Moller[55] proved the existence of dissection of the January rates of return calculated for AMEX and Nasdaq indices. The statistically higher rates of return were registered in the first half of the month.

The presence of the January effect in other markets has been also proven in the following works: Officer[56] - on the Australian market, Gultekin and Gultekin[57] - on 17 different global markets, Tinic and West[58] - on the Canadian market, Aggarwal et al.[59], Kato and

[49] B. Wachtel, *Certain observations on seasonal movements in stock prices*, "Journal of Business of the University of Chicago" 1943/15, p. 184–193.

[50] M. Rozeff, W. Kinney, *op. cit.*, p. 379–402.

[51] R. Banz, *The relationship between return and market value of common stocks*, "Journal of Financial Economics" 1981/9, p. 3–18.

[52] D. Keim, *Size-related anomalies and stock return seasonality: further empirical evidence*, "Journal of Financial Economics", 1983, 12, p. 13–32.

[53] M. Reinganum, *Ten anomalous stock market behavior of small firms in January: empirical tests for tax-loss selling effects*, "Journal of Financial Economics" 1983/12, p. 89–104.

[54] R. Roll, *Vas is das? The turn-of-the-year effect and the return premia of small firms*, "Journal of Portfolio Management" 1983/9, p. 18–28.

[55] S. Zilca, N. Moller, *The evolution of the January effect*, "Journal of Banking and Finance" 2008/32, p. 447–457.

[56] R. Officer, *Seasonality in Australian capital markets: market efficiency and empirical issues*, "Journal of Financial Economics 1975/2, p. 29–51.

[57] M. Gultekin, B. Gultekin, *Stock market seasonality: international evidence*, "Journal of Financial Economics", 1983, 12, p. 469–481.

[58] S. Tinic, R. West, *Seasonality in Canadian stock prices: a test of the tax-loss selling hypothesis*, "Journal of Financial and Quantitative Analysis" 1987/22, p. 561–574.

[59] R. Aggarwal, T. Hiraki, P. Rao, *Regularities in Tokyo stock exchange security returns: P/E, size and seasonal influences*, "Journal of Financial Research" 1990/13, p. 249–263.

Schallheim[60] and Hamori[61] - on the Tokyo Stock Exchange, Nassir and Mohammad[62] – on the stock markets of Hong Kong and Malaysia, Barone[63] - on the Milan Stock Exchange, Ho[64] - on the stock exchanges in: Hong Kong, Korea, Malaysia and the Philippines, Lauterbach and Ungar[65] - on the stock exchange in Israel, Mongoue[66] – on the stock market in Taiwan, Mills et al.[67] - in Greece, Bildisk[68] - in Turkey, as well as Lucey and Whelan[69] - in Ireland. Girardin and Liu[70] demonstrated the existence of January effect on stock exchange in Shanghai. Based on the data for the period 1991 - 2003 for 8 stock exchanges of Central and Eastern Europe, Asteriou and Kovetsos[71] proved the existence of a strong January effect for following markets: Polish, Hungary, Romania and Slovakia.

The December effect was also described in the following studies: Raharjo et al.[72], Choudhary[73] and Fountas and Konstantinos[74]. In turn, Dudzinska-Baryla and Michalska[75], conducted statistical tests for returns of the Warsaw Stock Exchange Index and revealed the existence of the December effect on the Polish financial market.

Among the scientific papers can also be found works that documented the absence of the January effect. Kohers and Kohli[76] demonstrated that the January effect does not appear

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[60] K. Kato, J. Schallheim, *Seasonal and size anomalies in the Japanese stock market*, "Journal of Financial and Quantitative Analysis" 1985/20, p. 243–260.

[61] S. Hamori, *Seasonality and stock returns; some evidence from Japan*, "Japan and the World Economy" 2001/13, p. 463–481.

[62] A. Nassir, S. Mohammad, *The January effect of stock trader in the Kuala Lumpur Stock Exchange: an empirical analysis*, "Hong Kong Journal of Business Management" 1987/5, p. 35–50.

[63] E. Barone, *The Italian stock market: efficiency and calendar anomalies*, "Journal of Banking and Finance" 1990/14, p. 483–510.

[64] Y. Ho, *Stock returns seasonalities in Asia Pacific markets*, "Journal of International Financial Management and Accounting" 1990/2, p. 47–77.

[65] B. Lauterbach, M. Ungar, C*alendar anomalies: some perspectives from the behavior of the Israeli stock market*, "Applied Financial Economics" 1992/2, p. 57–60.

[66] M. Mougoue, *Seasonalities in the Taiwanese stock market,* "American Business Review" 1996/14, p. 73–79.

[67] T. Mills, C. Siriopoulos, R. Markellos, D. Harizanis, *Seasonality in the Athens Stock Exchange*, "Applied Financial Economics" 2000/10, p. 137–142.

[68] R. Bildisk, *Are calendar anomalies still alive? Evidence form Istanbul Stock Exchange,* Istanbul Stock Exchange 2004.

[69] B. Lucey, S. Whelan, *Monthly and semi-annual seasonality in the Irish equity market 1934–2000,* "Applied Financial Economics" 2004/14, p. 203–208.

[70] E. Girardin, Z. Liu, *Bank credit and seasonal anomalies in China stock markets*, "China Economic Review" 2005/6, p. 465–483.

[71] D. Asteriou, G. Kovetsos, *Testing for the existence of the January effect in transition economies*, "Applied Financial Economic Letters" 2006/2, p. 161–174.

[72] A. Raharjo, F. Mabaraq, F. Mundir, *December effect of stock market return in Indonesia Stock Exchange 1998–2012,* "International Journal of Science and Research" 2013/2, p. 708–711.

[73] T. Choudhary, *Month of the year effect and January effect in pre–WWI stock returns: evidence from non-linear GARCH*, "International Journal of Finance & Economics" 2001/6, p. 1–11.

[74] S. Fountas, S. Konstantinos, *Emerging stock markets return seasonalities: the January effect and the tax-loss selling hypothesis*, "Applied Financial Economics, 2002/12, p. 291–299.

[75] R. Dudzińska-Baryła, E. Michalska, *Efekt miesiąca a behawioralne aspekty podejmowania Decyzji*, [in:] *Metody i Zastosowania Badań Operacyjnych*, Wydawnictwo Uniwersytetu Ekonomicznego, Katowice 2010, p. 26–42.

[76] T. Kohers, R. Kohli, *The yearend effect in stock returns over business cycles: a technical note,* "Journal of Economics and Finance" 1992/16, p. 61–68.

in the case of monthly returns calculated for small- and medium-capitalization companies included in the SP500 index and Raj and Thurston[77] showed that the January effect was not observed on the New Zealand stock exchange. The similar conclusions were reached by Hasan and Raj[78] and Li and Liu[79]. Raj and Kumari[80] proved that on the following stock exchanges: Bombay Stock Exchange and National Stock Exchange in India, the January effect was not registered, but the effect of statistically higher rates of return took place in April. The existence of strong January effect and weaker April effect on 18 different stock exchanges was revealed by Agrawal and Tandon[81] – their results were consistent with the previous results obtained by Gultekin and Gultekin[82].

Ritter[83] suggested that at the end of the calendar year high volatility of small- and medium-capitalization companies, which main shareholders are individual investors, is the result of their investment portfolios reconstruction. For instance, the ratio of buy orders to sell orders, placed by individual investors at the Merrill Lynch brokerage house, was high in January, and low in the end of December. Thus, the author tries to explain the existence of the January effect. In turn, the occurrence of the December effect might be explained by payment of capital gains tax. Individual investors liquidate long positions in their portfolios, on which negative rates of return were registered, in order to minimize capital gain tax. Similar approach is presented by Poterba and Weisbenner[84], Sias and Starks[85], Chen and Singal[86], and in the case of small-capitalization companies by Constatidenes[87].

Investors closing their positions in declining in value assets, contribute to deeper fall in assets' market prices[88]. Ogden[89] justifies the existence of the January effect with the use of the company's request for certain cash transactions at the end of the year in order to achieve

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[77] M. Raj, D. Thurston, *January or April? Test of the turn-of-the-year-effect in the New Zealand stock market*, "Applied Economics Letters" 1994/18, p. 81–83.

[78] T. Hasan, M. Raj, *An examination of the tax loss selling behavior in a deregulated pacific financial market.* "American Business Review" 2001/19, p. 100–105.

[79] B. Li, B. Liu, *Monthly seasonality in the New Zealand stock market*, "International Journal of Business, Management and Economic Research" 2010/1, p. 1116–1121.

[80] M. Raj, D. Kumari, D., *Day-of-the-week and other market anomalies in the Indian stock market*, "International Journal of Emerging Markets" 2006/1, p. 235–246.

[81] A. Agrawal, K. Tandon, *op. cit.*, p. 83–106.

[82] M. Gultekin, B. Gultekin, *op. cit.*, p. 469–481.

[83] J. Ritter, *An explanation to the turn of the year effect*, "University of Michigan, Graduate School of Business Administration, Working Paper" 1987, http://dx.doi.org/10.2307/2328193.

[84] J. Poterba, S. Weisbenner, *Capital gains tax rules, tax-loss trading, and turn-of-the-year returns*, "Journal of Finance" 2001/56, p. 353–368.

[85] R. Sias, L. Starks, *Institutions and individuals at the turn-of-the-year*, "Journal of Finance" 1997/52, p. 1543–1562.

[86] H. Chen, V. Singal, *Role of speculative short sales in price formation: case of the weekend effect*, "Journal of Finance" 2003/4, p. 685–705.

[87] G. Constantinides, *Optimal stock-trading with personal taxes: implications for prices and the abnormal January returns*, "Journal of Financial Economics" 1984/13, p. 65–69.

[88] M. Reinganum, *Ten anomalous stock market behavior of small firms in January: empirical tests for tax-loss selling effects*, "Journal of Financial Economics" 1983/12, p. 89–104, and R. Roll, *Vas is das? The turn-of-the-year effect and the return premia of small firms*, "Journal of Portfolio Management" 1983/9, p. 18–28, and J. Ritter, *The buying and selling behavior of individual investors at the turn of the year*, "Journal of Finance" 1988/43, p. 701–717.

[89] J. Ogden, *Turn-of month evaluations of liquid profits and stock returns: a common explanation for the monthly and January effects*, „Journal of Finance" 1990/45, p. 1259–1272.

an adequate liquidity. Chang and Pinegar tried to explain the January effect pointing to the specific macroeconomic data and risk premium seasonality[90]. Similar approach is represented, among others by Kramer[91]. Kohers and Kohli[92] explained the occurrence of January effect referring to anomalies in business cycles. According to Ligon[93], higher rates of return in January are the result of an increase in the trading volume on the financial markets and lower real interest rates. Another explanation for the occurrence of the seasonality effects on the different stock exchanges (including the Warsaw Stock Exchange), may be the capital inflow to the various markets, including emerging markets, e.g. Poland. In this way one can justify positive returns in January (January effect) or in May[94]. The correlation of rates of return observed on various emerging markets and correlation of capital flows registered between them, was investigated among others by Longin and Solnik[95]. In turn, capital transfers between the emerging markets were examined by Bekaert and Harvey[96]. Finally, it should be noted that the presence of positive returns during certain days of the week or month, and negative in others, is a characteristic feature of the financial markets and demonstrates the ineffectiveness of the analyzed market. This approach can be found in the work of French[97], who does not give reasons for negative returns in the US market, considering them to be characteristic for this market and providing its inefficiency. A similar thesis presents Rogalski[98].

## 3. DATA AND METHODS

The calculation of the closing price for two consecutive sessions is often applied in the process of analyzing the seasonal effects of rates of return. In the case of monthly seasonal effects, the rate of return will be computed with the use of closing value of the analyzed market index on the last session of the month $I_t$,, in relation to the closing value of the same index on the last session in the preceding month $I_{t-1}$:

[90] C. Chang, L. Pinegar, *Seasonal fluctuations in industrial production and stock market seasonals*, "Journal of Financial and Quantitative Analysis" 1989/24, p. 59–75, and C. Chang, L. Pinegar, *Stock market seasonal and prespecified multifactor pricing relations*, "Journal of Financial and Quantitative Analysis" 1990/25, p. 517–533.

[91] C. Kramer, *op. cit.*, p. 1883–1891.

[92] T. Kohers, R. Kohli, *The yearend effect in stock returns over business cycles: a technical note*, "Journal of Economics and Finance" 1992/16, p. 61–68.

[93] J. Ligon, *A simultaneous test of competing theories regarding the January effect*, "Journal of Financial Research" 1997/20, p. 13–32.

[94] E.g: P. Polwitoon, O. Tawatnuntachai, *Emerging market bond funds: a comprehensive analysis*, „Financial Review" 2008/1, p. 51–84; O. Al-Khazali, E. Koumanakos, C. Pyun, *Calendar anomaly in the Greek stock market: stochastic dominance analysis*, "International Review of Financial Analysis" 2008/3, p. 461–474; T. Suppa-Aim, *Mutual fund performance in emerging markets: the case of Thailand*, University of Birmingham, Working paper 2010; S. Claessens, S. Dasgupta, J. Glenn, *Return behavior in emerging stock markets*, "The World Bank Economic Review" 1995/1, p. 1–17.

[95] F. Login, B. Solnik, *Is the correlation in international equity returns constant: 1960–1990?*, "Journal of International Money and Finance" 1995/1, p. 3–26.

[96] G. Bekaert, C. Harvey, *Foreign speculators and emerging equity markets*, "Journal of Finance" 2000/2, p. 565–614.

[97] K. French, *op. cit.*, p. 55–69.

[98] M. Rogalski, *Discussion to Keim i Stambaugh*, "Journal of Finance" 1984/3, p. 1603–1614.

$$r = \frac{I_t - I_{t-1}}{I_{t-1}} \qquad (1)$$

The following 22 stock market indices were selected for the study: All-Ordinaries (Sydney Stock Exchange), AMEX (American Stock Exchange), B-shares (Shanghai Stock Exchange), Bovespa (Sao Paulo Stock Exchange), Bueons (Bueons Aires Stock Exchange, BUX (Budapest Stock Exchange), CAC 40 (Paris Stock Exchange), DAX (Frankfurt Stock Exchange), DJIA (Dow Jones Industrial Average), DJTA (Dow Jones Transportation Average), DJUA (Dow Jones Utility Average), EOE (Amsterdam Stock Exchange), FTSE 100 (London Stock Exchange), Hang Seng (Hong Kong Stock Exchange), MEX-IPC (Mexican Stock Exchange), Nasdaq, Nikkei (Tokyo Stock Exchange), Russel (US stock market index), SMI (Zurich Stock Exchange), SP500 (Standard & Poor's 500), TSE 300 (Toronto Stock Exchange), WIG (Warsaw Stock Exchange). Therefore the study group of exchange indexes contains indices of developed countries (e.g. DJIA, TSE 300, SP500), as well as market indices classified to the group of emerging markets (e.g. WIG, BUX, MEX-IPC, Bovespa, Buenos).

Due to the different initial dates of publication of each index, and taking into account the content of the database provided by the brokerage house DM BOS, the analysis of the seasonality effects for each index will take place in different time intervals. The Table 1 presents the first year of historic price data available in the data base. For all examined indices the end date of the analyzed time span was 31.12.2014. For example, in the case of the CAC40 index seasonality effect analysis period extended from January 1995 to December 2014, which is an equivalent of 20 monthly returns in January and December. The longest available time series covering more than 40 years, allowed to calculate 44 returns for Nasdaq index, and 45 for following indices: SP500, Nikkei and DJIA. Transaction costs were not included in the process of analysis of monthly rates of return.The index markings are in accordance with generally accepted abbreviations in the information service of the brokerage house.

After the calculation of December and January rates of return over the analyzed time span for each of 22 analyzed indices, the null hypothesis will be tested. The null hypothesis states that the average monthly rates of return is equal to zero (for $\alpha = 5\%$). Rejection of the null hypothesis would be tantamount to accept the alternative hypothesis that the average monthly rates of return, for a particular stock index is statistically different from zero, which will prove the occurrence of the calendar effect in that month, based on the closing prices of the two consecutive months.

The presence of calendar anomalies in the analyzed month, taking into consideration only the closing prices on the last trading session in two consecutive months, in case of the examined stock index, allows investors to achieve superior returns in the long run (which can be used in practice[99]) and provides evidence for the existence of anomalies and witnesses against the theory of financial market efficiency. Thus, the results of research, can be considered as a voice in the discussion of the efficient market hypothesis, presented by Fama[100].

[99] In the form of investment strategy based on replicating and index portfolio at the close price on the last session in November (December) and liquidating the position at the close prices during the last session in December (January).

[100] E. Fama, *Efficient capital markets; a review of theory and empirical work*, "Journal of Finance" 1970/25, p. 483–417.

Table 1. The beginning year of the calculated monthly rates of return for analyzed indices and the number of monthly returns for each index

| Index | All-Ord | AMEX | B-Shares | Bovespa | Buenos | BUX | CAC40 | DAX | DJIA | DJTI | DJUA | EOE | FTSE100 | Hang Seng | MEX-IPC | Nasdaq | Nikkei | Russel | SMI | SP500 | TSE | WIG[101] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| First year | 1990 | 1995 | 1999 | 1995 | 1997 | 1995 | 1995 | 1995 | 1970 | 1995 | 1995 | 1995 | 1993 | 1988 | 1994 | 1972 | 1970 | 2002 | 1995 | 1970 | 1990 | 1992 |
| Number of rates of return in the calculations | 26 | 20 | 17 | 20 | 19 | 20 | 20 | 20 | 45 | 20 | 20 | 20 | 23 | 28 | 21 | 44 | 45 | 14 | 20 | 45 | 26 | 23 |

Source: own calculations

## 4. ANALYSIS OF RESULTS

The results of the analysis for each index are summarized in Tables 2. In the case the number of observation was lower than 30, Student's t-statistics was applied, otherwise normal distribution was used. The nominal rate of return was calculated as the product of the monthly average rates of return in a given month and the number 12. The following principle was adopted in the row "Null hypothesis verification" in the Table 2 to Table 5.

Table 2. Basic statistical data obtained for January rates of return for the first 11 out of the 22 analyzed stock indices

| Index | All-Ord | AMEX | B-Shares | Bovespa | Buenos | BUX | CAC40 | DAX | DJIA | DJTA | DJUA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly average rate of return | 0,0027 | -0,0031 | 0,0395 | 0,0255 | 0,0712 | 0,0603 | 0,0068 | 0,0062 | 0,0130 | -0,0030 | -0,0043 |
| Standard error | 0,0081 | 0,0086 | 0,0368 | 0,0227 | 0,0349 | 0,0268 | 0,0137 | 0,0144 | 0,0079 | 0,0158 | 0,0105 |
| Median | 0,0131 | -0,0046 | 0,0183 | -0,0195 | 0,0381 | 0,0549 | 0,0226 | 0,0236 | 0,0114 | 0,0161 | -0,0029 |
| Standard deviation | 0,0406 | 0,0374 | 0,1470 | 0,0988 | 0,1481 | 0,1168 | 0,0595 | 0,0628 | 0,0524 | 0,0689 | 0,0459 |
| Variance | 0,0017 | 0,0014 | 0,0216 | 0,0098 | 0,0219 | 0,0136 | 0,0035 | 0,0039 | 0,0027 | 0,0047 | 0,0021 |
| Kurtosis | 1,3154 | -0,6237 | 1,0117 | -1,0788 | 2,5852 | 2,0760 | -0,0715 | 0,8971 | 0,7808 | 0,3976 | 1,3692 |
| Skewness | -1,0011 | 0,2770 | 0,7471 | 0,7578 | 1,3294 | 1,2948 | -0,6590 | -0,9090 | 0,6304 | -0,8476 | 0,4522 |
| Range | 0,1753 | 0,1262 | 0,5683 | 0,2797 | 0,6221 | 0,4578 | 0,2193 | 0,2466 | 0,2325 | 0,2553 | 0,2088 |
| Minimum | -0,1128 | -0,0648 | -0,1733 | -0,0751 | -0,1352 | -0,1052 | -0,1326 | -0,1507 | -0,0884 | -0,1616 | -0,0967 |
| Maksimum | 0,0625 | 0,0614 | 0,3950 | 0,2046 | 0,4868 | 0,3526 | 0,0868 | 0,0959 | 0,1441 | 0,0937 | 0,1122 |
| Sum | 0,0668 | -0,0595 | 0,6314 | 0,4843 | 1,2814 | 1,1454 | 0,1295 | 0,1169 | 0,5724 | -0,0579 | -0,0819 |
| Number of observations | 26 | 20 | 17 | 20 | 19 | 20 | 20 | 20 | 45 | 20 | 20 |
| Confidence level (95,0%) | 0,0168 | 0,0180 | 0,0783 | 0,0476 | 0,0737 | 0,0563 | 0,0287 | 0,0303 | 0,0159 | 0,0332 | 0,0221 |
| Null hypothesis verification | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **FALSE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** |
| **Nominal rate of return (%)** | **3,20%** | **-3,76%** | **47,36%** | **30,58%** | **85,43%** | **72,34%** | **8,18%** | **7,38%** | **15,61%** | **-3,66%** | **-5,17%** |

The null hypothesis verification: "TRUE" - there is no reason to reject the null hypothesis, "FALSE" - the null hypothesis should be rejected in favor of the alternative hypothesis.

Source: own calculations

[101] Due to the fact that the first session on the Warsaw Stock Exchange took place on 04.16.1991, the first monthly rate of return in January for the WIG index was calculated in January of 1992.

If there was no reason to reject the null hypothesis, then the word "TRUE" was placed in the cell, but when the null hypothesis was rejected in favor of the alternative hypothesis - the word "FALSE" was used.

For January average rates of return, the null hypothesis was rejected for the following 2 indices: BUX and Nasdaq. For the first of these indices, the monthly average rate of return is equal to 6,03%, while for the second it mounted to 2,70%. The first of these two indices - BUX is classified in the emerging markets segment, while the Nasdaq index represents one of the stock markets of developed countries. Average monthly rates of return were positive in the case of 15 indices and negative for 7 indices. The highest value of the nominal rate of return equal to 85,43% was observed in the case of Buenos index, and the lowest and equal to -12,22% for FTSE100.

Table 3. Basic statistical data obtained for January rates of return for the second 11 out of the 22 analyzed stock indices

| **Index** | **EOE** | **FTSE100** | **Hang Seng** | **MEX-IPC** | **Nasdaq** | **Nikkei** | **Russel** | **SMI** | **SP500** | **TSE** | **WIG** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly average rate of return | -0,0035 | -0,0102 | -0,0022 | 0,0006 | 0,0270 | 0,0154 | -0,0040 | 0,0011 | 0,0129 | 0,0063 | 0,0442 |
| Standard error | 0,0121 | 0,0097 | 0,0152 | 0,0176 | 0,0097 | 0,0081 | 0,0162 | 0,0113 | 0,0076 | 0,0071 | 0,0270 |
| Median | 0,0108 | -0,0046 | -0,0067 | 0,0044 | 0,0305 | 0,0304 | -0,0111 | 0,0057 | 0,0177 | 0,0080 | 0,0092 |
| Standard deviation | 0,0525 | 0,0456 | 0,0789 | 0,0786 | 0,0638 | 0,0535 | 0,0582 | 0,0493 | 0,0503 | 0,0356 | 0,1296 |
| Variance | 0,0028 | 0,0021 | 0,0062 | 0,0062 | 0,0041 | 0,0029 | 0,0034 | 0,0024 | 0,0025 | 0,0013 | 0,0168 |
| Kurtosis | 1,6995 | -0,2357 | -0,7096 | -0,7466 | -0,4764 | 0,7256 | -0,4929 | -0,0403 | 0,0143 | -0,5113 | 1,9587 |
| Skewness | -1,4567 | -0,4762 | -0,0696 | -0,0582 | 0,1952 | -0,1802 | -0,0235 | -0,2377 | 0,2842 | -0,4724 | 1,0822 |
| Range | 0,1913 | 0,1598 | 0,3001 | 0,2757 | 0,2662 | 0,2735 | 0,2011 | 0,1797 | 0,2174 | 0,1267 | 0,5493 |
| Minimum | -0,1443 | -0,0955 | -0,1567 | -0,1262 | -0,0989 | -0,1121 | -0,1120 | -0,0959 | -0,0857 | -0,0670 | -0,1766 |
| Maksimum | 0,0470 | 0,0643 | 0,1434 | 0,1494 | 0,1672 | 0,1615 | 0,0891 | 0,0837 | 0,1318 | 0,0597 | 0,3727 |
| Sum | -0,0670 | -0,2240 | -0,0588 | 0,0118 | 1,1605 | 0,6754 | -0,0520 | 0,0201 | 0,5695 | 0,1575 | 1,0177 |
| Number of observations | 20 | 23 | 28 | 21 | 44 | 45 | 14 | 20 | 45 | 26 | 23 |
| Confidence level (95,0%) | 0,0253 | 0,0202 | 0,0312 | 0,0368 | 0,0196 | 0,0163 | 0,0352 | 0,0238 | 0,0153 | 0,0147 | 0,0560 |
| Null hypothesis verification | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **FALSE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** | **TRUE** |
| **Nominal rate of return (%)** | **-4,23%** | **-12,22%** | **-2,61%** | **0,71%** | **32,39%** | **18,42%** | **-4,80%** | **1,27%** | **15,53%** | **7,56%** | **53,10%** |

The null hypothesis verification: “TRUE” - there is no reason to reject the null hypothesis, “FALSE” - the null hypothesis should be rejected in favor of the alternative hypothesis.

Source: own calculations

Table 4. Basic statistical data obtained for December rates of return for the first 11 out of the 22 analyzed stock indices

| **Index** | **All-Ord** | **AMEX** | **B-Shares** | **Bovespa** | **Buenos** | **BUX** | **CAC40** | **DAX** | **DJIA** | **DJTA** | **DJUA** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly average rate of return | 0,0188 | 0,0096 | 0,0336 | 0,0357 | 0,0531 | 0,0394 | 0,0199 | 0,0247 | 0,0167 | 0,0161 | 0,0260 |
| Standard error | 0,0051 | 0,0061 | 0,0235 | 0,0199 | 0,0288 | 0,0161 | 0,0089 | 0,0125 | 0,0046 | 0,0069 | 0,0060 |
| Median | 0,0226 | 0,0094 | 0,0179 | 0,0454 | 0,0524 | 0,0247 | 0,0237 | 0,0290 | 0,0143 | 0,0214 | 0,0298 |
| Standard deviation | 0,0259 | 0,0271 | 0,0967 | 0,0888 | 0,1255 | 0,0718 | 0,0400 | 0,0558 | 0,0306 | 0,0310 | 0,0270 |
| Variance | 0,0007 | 0,0007 | 0,0094 | 0,0079 | 0,0158 | 0,0052 | 0,0016 | 0,0031 | 0,0009 | 0,0010 | 0,0007 |
| Kurtosis | -0,1563 | 0,8410 | 1,4421 | 3,4964 | 5,6875 | 0,3762 | 1,9749 | 5,1213 | 0,4667 | -0,6056 | -0,7625 |
| Skewness | -0,2574 | -0,1870 | 1,2255 | -0,6021 | 1,7505 | 1,0955 | -0,0707 | 0,0005 | 0,1823 | -0,3596 | -0,3459 |
| Range | 0,0999 | 0,1210 | 0,3599 | 0,4544 | 0,5844 | 0,2420 | 0,1944 | 0,3089 | 0,1570 | 0,1142 | 0,0959 |
| Minimum | -0,0316 | -0,0535 | -0,0817 | -0,2140 | -0,1254 | -0,0396 | -0,0790 | -0,1288 | -0,0623 | -0,0431 | -0,0300 |
| Maksimum | 0,0683 | 0,0675 | 0,2782 | 0,2404 | 0,4591 | 0,2024 | 0,1155 | 0,1801 | 0,0947 | 0,0710 | 0,0659 |
| Sum | 0,4890 | 0,1919 | 0,5720 | 0,7146 | 1,0097 | 0,7880 | 0,3975 | 0,4942 | 0,7520 | 0,3224 | 0,5206 |
| Number of observations | 26 | 20 | 17 | 20 | 19 | 20 | 20 | 20 | 45 | 20 | 20 |
| Confidence level (95,0%) | 0,0105 | 0,0127 | 0,0497 | 0,0416 | 0,0605 | 0,0336 | 0,0187 | 0,0261 | 0,0092 | 0,0145 | 0,0126 |
| Null hypothesis verification | **FAŁSZ** | **PRAWDA** | **PRAWDA** | **PRAWDA** | **PRAWDA** | **FAŁSZ** | **FAŁSZ** | **PRAWDA** | **FAŁSZ** | **FAŁSZ** | **FAŁSZ** |
| **Nominal rate of return (%)** | **22,57%** | **11,51%** | **40,38%** | **42,88%** | **47,28%** | **23,85%** | **29,65%** | **20,05%** | **19,34%** | **31,23%** | **32,50%** |

The null hypothesis verification: “TRUE” - there is no reason to reject the null hypothesis, “FALSE” - the null hypothesis should be rejected in favor of the alternative hypothesis.

Source: own calculations

In the case of monthly rates of return in December the null hypothesis was rejected for the 15 indices (in parentheses are given respectively, the monthly average rate of return and the level of confidence): All-Ord (1,88%, 1,05%), BUX (3,94%; 3,36%), CAC40 (1,99%; 1,87%), DJIA (1,67%; 0,92%), DJTA (1,61%; 1,45%), DJUA (2, 60%; 1,26%), EOE (2,71%, 2,25%), the FTSE100 (2,15%, 1,27%), MEX-IPC (3,49%, 2,27%), Nasdaq (1,94%, 1,62%), Nikkei (1,74%, 1,54%), Russel (2,41%, 2,12%), SP500 (1,72%, 0,98% ), TSE (2,06%, 1,11%) and WIG (4,34; 4,14%). Among these indices, are classified stock exchange indices of both group of countries: developed countries (e.g. DJIA, DJUA, FTSE100) and the emerging markets (eg. WIG, BUX). Monthly average rates of return in December were positive in the case of all analyzed indices. The highest nominal rate of return of 52,11% was observed for WIG index and the lowest and equal to 11,51% for AMEX.

Table 5. Basic statistical data obtained for December rates of return for the second 11 out of the 22 analyzed stock indices

| **Index** | **EOE** | **FTSE100** | **Hang Seng** | **MEX-IPC** | **Nasdaq** | **Nikkei** | **Russel** | **SMI** | **SP500** | **TSE** | **WIG** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly average rate of return | 0,0271 | 0,0215 | 0,0227 | 0,0349 | 0,0194 | 0,0174 | 0,0241 | 0,0118 | 0,0172 | 0,0206 | 0,0434 |
| Standard error | 0,0107 | 0,0061 | 0,0128 | 0,0109 | 0,0080 | 0,0077 | 0,0098 | 0,0089 | 0,0049 | 0,0054 | 0,0200 |
| Median | 0,0279 | 0,0236 | 0,0154 | 0,0376 | 0,0078 | 0,0185 | 0,0225 | 0,0194 | 0,0147 | 0,0195 | 0,0401 |
| Standard deviation | 0,0480 | 0,0293 | 0,0677 | 0,0498 | 0,0533 | 0,0514 | 0,0366 | 0,0396 | 0,0327 | 0,0274 | 0,0958 |
| Variance | 0,0023 | 0,0009 | 0,0046 | 0,0025 | 0,0028 | 0,0026 | 0,0013 | 0,0016 | 0,0011 | 0,0008 | 0,0092 |
| Kurtosis | 2,5739 | 1,2676 | 10,7333 | 2,0351 | 3,9122 | -0,3250 | 0,6021 | 1,8865 | 1,0266 | 5,9956 | 8,8003 |
| Skewness | -0,7636 | -0,3472 | 2,6673 | 0,1539 | 1,3402 | -0,0171 | -0,3703 | -0,9893 | 0,5114 | 1,4649 | 2,4802 |
| Range | 0,2236 | 0,1343 | 0,3771 | 0,2461 | 0,3166 | 0,2111 | 0,1360 | 0,1799 | 0,1719 | 0,1489 | 0,4653 |
| Minimum | -0,1085 | -0,0549 | -0,0743 | -0,0842 | -0,0969 | -0,0826 | -0,0573 | -0,0951 | -0,0603 | -0,0305 | -0,0625 |
| Maksimum | 0,1151 | 0,0794 | 0,3028 | 0,1619 | 0,2198 | 0,1285 | 0,0788 | 0,0848 | 0,1116 | 0,1184 | 0,4028 |
| Sum | 0,5417 | 0,4946 | 0,6360 | 0,7338 | 0,8543 | 0,7851 | 0,3369 | 0,2353 | 0,7755 | 0,5358 | 0,9987 |
| Number of observations | 20 | 23 | 28 | 21 | 44 | 45 | 14 | 20 | 45 | 26 | 23 |
| Confidence level (95,0%) | 0,0225 | 0,0127 | 0,0262 | 0,0227 | 0,0162 | 0,0154 | 0,0212 | 0,0185 | 0,0098 | 0,0111 | 0,0414 |
| Null hypothesis verification | **FAŁSZ** | **FAŁSZ** | **PRAWDA** | **FAŁSZ** | **FAŁSZ** | **FAŁSZ** | **FAŁSZ** | **PRAWDA** | **FAŁSZ** | **FAŁSZ** | **FAŁSZ** |
| **Nominal rate of return (%)** | **32,50%** | **25,80%** | **27,26%** | **41,93%** | **23,30%** | **20,94%** | **28,88%** | **14,12%** | **20,68%** | **24,73%** | **52,11%** |

The null hypothesis verification: “TRUE” - there is no reason to reject the null hypothesis, “FALSE” - the null hypothesis should be rejected in favor of the alternative hypothesis.

Source: own calculations

Table 6 presents the percentage of positive monthly rates of return in January in decreasing order. In all of the analyzed cases, the percentage of positive returns was greater than 50%. The most common positive rate of return was recorded for AMEX - 80%. On the second place were registered two indices: B-Shares and Bovespa - 75% of positive monthly rates of return, and on the third place three indices: Bueons, BUX, CAC40 and DAX - 70%. Least likely of all analyzed indices, positive monthly returns were observed in the case of the WIG index – in 52% of all monthly rates of return.

Table 6. Number and percentage of positive and negative rates of return in January for the analyzed stock indices sorted in descending order for the percentage of positive returns.

| Index | Total number of calculated monthly returns | Number of positive monthly returns | Number of negative monthly returns | Percentage of positive monthly returns | Percentage of negative monthly returns | Sum |
|---|---|---|---|---|---|---|
| AMEX | 20 | 16 | 4 | 80,00% | 20,00% | 100% |
| B-Shares | 20 | 15 | 5 | 75,00% | 25,00% | 100% |
| Bovespa | 20 | 15 | 5 | 75,00% | 25,00% | 100% |
| Buenos | 20 | 14 | 6 | 70,00% | 30,00% | 100% |
| BUX | 20 | 14 | 6 | 70,00% | 30,00% | 100% |
| CAC40 | 20 | 14 | 6 | 70,00% | 30,00% | 100% |
| DAX | 20 | 14 | 6 | 70,00% | 30,00% | 100% |
| DJIA | 22 | 15 | 7 | 68,18% | 31,82% | 100% |
| DJTA | 25 | 17 | 8 | 68,00% | 32,00% | 100% |
| DJUA | 27 | 18 | 9 | 66,67% | 33,33% | 100% |
| EOE | 45 | 30 | 15 | 66,67% | 33,33% | 100% |
| FTSE100 | 45 | 29 | 16 | 64,44% | 35,56% | 100% |
| Hang Seng | 43 | 27 | 16 | 62,79% | 37,21% | 100% |
| MEX-IPC | 45 | 28 | 17 | 62,22% | 37,78% | 100% |
| Nasdaq | 23 | 14 | 9 | 60,87% | 39,13% | 100% |
| All-Ord | 25 | 15 | 10 | 60,00% | 40,00% | 100% |
| Nikkei | 21 | 12 | 9 | 57,14% | 42,86% | 100% |
| Russel | 16 | 9 | 7 | 56,25% | 43,75% | 100% |
| SMI | 18 | 10 | 8 | 55,56% | 44,44% | 100% |
| SP500 | 20 | 11 | 9 | 55,00% | 45,00% | 100% |
| TSE | 13 | 7 | 6 | 53,85% | 46,15% | 100% |
| WIG | 25 | 13 | 12 | 52,00% | 48,00% | 100% |

Source: own calculations

Table 7 presents the percentage of positive monthly rates of return in December in the decreasing order. All of the analyzed cases proved that, the percentage of positive returns was greater than 50%. The highest percentage of positive rates of return was recorded for FTSE100 index – 86,96%. On the second and third place were classified respectively DJUA (85,00%) and TSE (84,62%). The least positive monthly rates of return were registered in the case of Chinese B-Shares index – 58,82% of all observations. It is worth noting that the first seven positions in Table 7 are occupied by indices of developed countries. The first emerging markets index in the table 7 is Mexican Stock Exchange index (MEX-IPC), for which positive monthly return were recorded in 76,19% of all observations. Regarding Warsaw Stock Exchange positive monthly return occurred in 66,67% of the analyzed observations.

Table 7. Number and percentage of positive and negative rates of return in December for the analyzed stock indices sorted in descending order for the percentage of positive returns

| Index | Total number of calculated monthly returns | Number of positive monthly returns | Number of negative monthly returns | Percentage of positive monthly returns | Percentage of negative monthly returns | Sum |
|---|---|---|---|---|---|---|
| FTSE100 | 23 | 20 | 3 | 86,96% | 13,04% | 100,00% |
| DJUA | 20 | 17 | 3 | 85,00% | 15,00% | 100,00% |
| TSE | 26 | 22 | 4 | 84,62% | 15,38% | 100,00% |
| DAX | 20 | 16 | 4 | 80,00% | 20,00% | 100,00% |
| EOE | 20 | 16 | 4 | 80,00% | 20,00% | 100,00% |
| Russel | 14 | 11 | 3 | 78,57% | 21,43% | 100,00% |
| All-Ord | 26 | 20 | 6 | 76,92% | 23,08% | 100,00% |
| MEX-IPC | 21 | 16 | 5 | 76,19% | 23,81% | 100,00% |
| SP500 | 45 | 34 | 11 | 75,56% | 24,44% | 100,00% |
| Bovespa | 20 | 15 | 5 | 75,00% | 25,00% | 100,00% |
| SMI | 20 | 15 | 5 | 75,00% | 25,00% | 100,00% |
| Hang Seng | 28 | 20 | 8 | 71,43% | 28,57% | 100,00% |
| DJIA | 45 | 32 | 13 | 71,11% | 28,89% | 100,00% |
| AMEX | 20 | 14 | 6 | 70,00% | 30,00% | 100,00% |
| CAC40 | 20 | 14 | 6 | 70,00% | 30,00% | 100,00% |
| DJTA | 20 | 14 | 6 | 70,00% | 30,00% | 100,00% |
| Buenos | 19 | 13 | 6 | 68,42% | 31,58% | 100,00% |
| Nikkei | 45 | 30 | 15 | 66,67% | 33,33% | 100,00% |
| WIG | 24 | 16 | 8 | 66,67% | 33,33% | 100,00% |
| BUX | 20 | 13 | 7 | 65,00% | 35,00% | 100,00% |
| Nasdaq | 44 | 26 | 18 | 59,09% | 40,91% | 100,00% |
| B-Shares | 17 | 10 | 7 | 58,82% | 41,18% | 100,00% |

Source: own calculations

Now let us consider the following investment strategy. We build our investment portfolio replicating the specific stock index during the last session in December at the close prices, and sell it at the last session in following January, at the close prices (December – January portfolio). A similar investment strategies are applied concerning investment portfolios that were formed during the last session in November and closed on the last session in December (November – December portfolio). During the remaining months, the financial resources are stored on an interest-free deposit. The 16 years long compound rates of return for each of the indices, except that for which the database is shorter than 16 years (Russell index), is presented in Table 8.

Table 8. The compound rates of return for the strategy of opening long position during the last session in December (November) at close prices and selling it during the last session in January (December) at close prices, in the period 1999-2014

| Index | Compound rates of return for December – January portfolio | Index | Compound rates of return for November - December portfolio |
|---|---|---|---|
| Buenos | 212,36% | Buenos | 145,09% |
| BUX | 65,40% | Bovespa | 111,97% |
| B-Shares | 60,69% | MEX-IPC | 88,42% |
| WIG | 30,69% | B-Shares | 76,45% |
| Bovespa | 15,16% | Nikkei | 52,62% |
| Nasdaq | 13,99% | DJUA | 48,35% |
| TSE | 11,41% | DAX | 46,56% |
| MEX-IPC | 4,37% | EOE | 43,43% |
| All-Ord | -2,44% | BUX | 42,13% |
| DJUA | -8,46% | TSE | 39,68% |
| SP500 | -9,80% | WIG | 38,93% |
| DAX | -10,55% | DJTA | 36,99% |
| SMI | -11,02% | CAC40 | 32,37% |
| CAC40 | -11,24% | FTSE100 | 32,11% |
| DJIA | -16,28% | Nasdaq | 28,39% |
| DJTA | -16,28% | SP500 | 23,77% |
| AMEX | -16,95% | DJIA | 23,54% |
| Nikkei | -17,27% | Hang Seng | 23,30% |
| EOE | -19,53% | All-Ord | 22,58% |
| Hang Seng | -25,06% | AMEX | 17,96% |
| FTSE100 | -29,40% | SMI | 10,79% |

Source: own calculations

The compound rates of return for the December – January portfolio was positive in 8 out of the 21 analyzed indices, i.e. approximately in 38% of all cases, while in the remaining 13 cases was lower than zero. The highest compound rate of return was registered in the case of Buenos index – 212,36%. On the second and third place were classified the compound rates of return for: BUX (65,40%) and B-Shares index (60,69%). The worst result with the use of this strategy was observed for FTSE100 – loss of 29,4%.

The November – December strategy resulted to be more effective - all compound returns were positive. The highest rate of return was recorded, as for the December – January strategy, in the case of Buenos index, which amounted to 145,09%. On the second and the third position other Hispanic stock exchange indexes were classified: Bovespa (111,97%) and MEX-IPC (88,42%). The worst result was achieved for portfolio replicating SMI index – in this case the compound rate of return was equal to 10,79%. The strategy generated profit equal to 38,93% for Warsaw Stock Exchange index.

Table 9. The correlation coefficient of January and December monthly rates of return between WIG and analyzed foreign exchange indices.

| Index | Correlation coefficient in January | Correlation coefficient in December |
|---|---|---|
| All-Ord | 0,66 | 0,42 |
| AMEX | 0,19 | 0,36 |
| B-Shares | -0,11 | -0,09 |
| Bovespa | 0,56 | 0,44 |
| Buenos | -0,06 | 0,05 |
| BUX | -0,18 | 0,61 |
| CAC40 | 0,35 | 0,56 |
| DAX | -0,23 | 0,58 |
| DJIA | 0,59 | 0,28 |
| DJTI | 0,16 | 0,49 |
| DJUA | 0,04 | 0,03 |
| EOE | 0,30 | 0,42 |
| FTSE100 | 0,11 | 0,61 |
| Hang Seng | -0,28 | 0,82 |
| MEX-IPC | -0,20 | 0,61 |
| Nasdaq | -0,41 | 0,35 |
| Nikkei | 0,62 | 0,08 |
| Russel | 0,65 | 0,23 |
| SMI | 0,20 | 0,27 |
| SP500 | 0,43 | 0,23 |
| TSE | 0,70 | 0,41 |

Source: own calculations

The correlation coefficients of monthly returns in January and December between analyzed indices and WIG index are presented in Table 9. The value of the correlation coefficient in January was higher than 0,6 and was recorded for the following indices: All-Ord (0,66), Nikkei (0,62), Russel (0,65) and TSE (0,70). The negative correlation coefficient was obtained for the successive indices: B-Shares (-0,11), Bueonos (-0,06), BUX (-0,18), DAX (-0,23), Hang Seng (-0,28), MEX-IPC (-0,20) and Nasdaq (-0,41). It should be noted that the negative value of the correlation coefficient in January between WIG and BUX indices, as well as relatively high negative correlation coefficient between WIG and two following indices: Nasdaq (-0,41) and DAX (-0,23). This fact proves the hypothesis that external cash flows are not flowing onto the Polish and Hungarian stock exchange in the same moments in January, although both countries constitute parts of emerging markets. On the other hand, the negative values of the correlation coefficients, according to the modern portfolio theory, permit investors to build more efficient portfolios.

Comparison of correlation coefficients between WIG and analyzed foreign indices in December, showed that the value of the ratio was negative only in the case of B-Shares Index (-0,09), while for the other indices was positive. The values of the correlation coefficients higher than 0,6 were obtained for following indices: BUX (0,61), FTSE (0,61), MEX-IPC (0,61). The high value of the correlation coefficient in the month of December calculated for WIG and BUX index, equal to 0,61 allow to present the conclusion that the potential inflows of foreign investment funds onto Hungarian and Polish stock exchanges took place in the same periods of time in December.

## 5. CONCLUSIONS

In financial literature, the presence of the January effect and investors' convincement that the average rates of return of the stock index replicating portfolio is greater than zero in that month, seem to be strongly rooted. Meanwhile, the results obtained in this analysis confirmed the presence of returns statistically different from zero, only if the case of two stock indices, i.e. Nasdaq and BUX. An undoubted surprise, as well as the added value of this paper is the demonstration of the presence of rates of return, statistically different from zero, for stock index replicating portfolios in December. Calculations have shown the presence of the December effect for the following 15 stock indices: All-Ord, BUX, CAC40, DJIA, DJTA, DJUA, EOE, FTSE100, MEX-IPC, Nasdaq, Nikkei, Russel, SP500, TSE and WIG. Thus, it has been proved that for the analyzed stock indices, the seasonal effect was more frequent in December than in January, the latter is well known and widely described in scientific literature. This may provide an important evidence in determining investment strategy by investment funds or pension funds. Moreover it can also be used as a voice in the ongoing debate about the effectiveness of selected world financial markets. The obtained results confirm, to a certain extent, the results of previous studies conducted among others by Rozeff and Kinney[102], Corhay et al.[103], Clare et al.[104] and Gultekin and Gultekin[105] or Bernstein[106].

Further empirical analysis should be carried out in two directions. Firstly, to determine the statistical significance of rates of return on the selected financial markets in other months than analyzed returns in January and December. Secondly, the research should be extended to other world exchange indices.

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## ANALIZA MIESIĘCZNYCH STÓP ZWROTU W STYCZNIU I GRUDNIU NA PRZYKŁADZIE WYBRANYCH INDEKSÓW GIEŁD ŚWIATOWYCH

**JEL Classification:** *G11, G14*

Na współczesnym rynku wciąż miedzy teoretykami a praktykami toczy się dyskusja na temat efektywności rynków. O ile ci pierwsi starają się wykazać efektywność rynków finansowych, o tyle druga grupa wyraża przekonanie, że rynki finansowe nie są efektywne. Przeprowadzenie dowodu pokazującego efektywność rynków finansowych byłoby jednocześnie dowodem na to, że zarządzający portfelami aktywów nie byliby w stanie uzyskać wyższej stopy niż portfel rynkowy w długim terminie. Jednym ze sposobów wykazania tezy o nieefektywności rynków finansowych jest m.in. badanie efektów kalendarzowych. Ich występowanie podważa bowiem teorię rynków efektywnych i pozwala na skonstruowanie strategii inwestycyjnej pozwalającej uzyskiwać nadwyżkowe stopy zwrotu (powyżej stopy zwrotu analizowanego indeksu giełdowego).

W artykule przedstawiono badanie efektywności 22 wybranych indeksów giełdowych przy zastosowaniu miesięcznych stóp zwrotu w styczniu i grudniu (odpowiednio tzw. efekt stycznia i efekt „rajdu św. Mikołaja"). Portfel replikujący określony indeks giełdowy nabyty został na ostatniej sesji w jednym miesiącu, a sprzedany również na ostatniej sesji w następnym (w cenach zamknięcia). Występowanie nieefektywności rynków wykazano w styczniu dla dwu indeksów: BUX i Nasdaq, a w grudniu dla 15 spośród 22 badanych indeksów: AllOrd, BUX, CAC40, DJIA, DJTA, DJUA, EOE, FTSE100, MEX-IPC, Nasdaq, Nikkei, Russel, SP500, TSE i WIG. Tym samym w wypadku niektórych indeksów potwierdzone zostały prace innych badaczy, a w wypadku innych, przeprowadzone badania należy uznać za pionierskie.

**Słowa kluczowe:** efektywność rynku; sezonowość rynków finansowych; anomalie rynkowe; efekt stycznia, efekt grudnia

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# MANAGEMENT PRINCIPLES OF TECHNOPARKS IN TRANSITIVE COUNTRIES UNDER CONDITIONS OF GLOBALIZATION

The aim of work was to investigate the shapes of the innovative environment of the past and the new ones of post-industrial information society, the specificity of technology parks has been allocated. Analysis of the practice of creating industrial parks in the United States, Europe, Israel, Russia and Ukraine showed differences in approaches in the West and former Soviet Union. In the former case, they create a fundamentally new model of innovative processes management, reflecting the specifics of new social system, in the latter there is an attempt to modernize and adapt the old form to new tasks, which increases the gap in science and technology as well as the economic dependence of the post-Soviet countries. Globalization provides both a challenge and new opportunities for the development of countries as well as the global market. Creating technology parks can help transition countries emerge from the crisis and compete on an equal footing with the leading world economy players. Technology parks can collaborate with other types of innovative environment: university laboratories, research institutes, research and production complexes. They can be included as structural subsystems into larger scientific-industrial associations, preserving their own characteristics and autonomy. The proposed theoretical concept of controlling technology parks is adequate to cultural patterns, resource and development needs of the country, finishing their transition to the information society. It may get businesspersons, researchers and political circles interested. Obviously, this model needs to be tested in practice. In case of successful approbation in Ukraine, it may be implied in the innovative environment of other transition countries.

**Keywords:** technoparks, innovation, innovation environment, model of management, globalization

## 1. INTRODUCTION

The most important need of transitive countries is finalization of systematic transformation with the help of innovations to provide further stable development and competition with leading players in the world economy. Under the conditions of globalization, countries that organized effective innovative environment in various forms become leaders. Due to scientific and technology parks, new ideas are realized faster which will boost economy, enhance the quality of life and development of the region. Creation of technology parks in post-Soviet countries slows down because there is no awareness of the essence of new innovational environment and the principles of management of changing process as well as conditions for their application are absent. .

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## 2. MANAGEMENT PRINCIPLES OF TECHNOPARKS UNDER CONDITIONS OF GLOBALIZATION

**Problem statement.** The meaning of such innovational form as technoparks in the post-Soviet countries is poorly studied. Frequently, during the implementation of technoparks , in post-Soviet countries, their authors are trying to breathe new life into old constructions without understanding the fact that management principles and functioning of these organizations are based on different fundamentals.

**Research tasks:** 1. Analysis of laws peculiarities and national specificity of changes brought into social and innovational environment during the transition to information society.2. Comparative analysis principles of scientific organization management in industrial and post-industrial society. 3. Elaboration of conceptual management model for technoparks as a new type of innovational environment organization adequate for transitive post-Soviet countries. 4. Demonstration of perspectives of technology parks as strategic task for catch-up growth countries.

**Research results.** In postindustrial society there is a registered increase in the number and the role of highly skilled specialists in the sphere of IT and science [2]Science, knowledge and education become leading branches of production. Innovations become main and the most precious products. [3]International scientific collaboration is developing (projects such as «Collider», «EU FutureICT», «Living Earth Simulator» and others). Social space turns from the space of places to the space of flows[4].Globalization, international Funds and projects lead to the fact that innovations are produced in various places/countries jointly, they are funded from joint sources and the production base is usually located in the third countries, mostly in "transitive" ones .Integration of professions and sciences, spheres of society life takes place. The world becomes more open and global.

National models of informational society are distinguished by the combination of 4 components determining further development of the country and competitiveness at the world stage:

1) various forms of innovational environment;
2) investment and financing sources;
3) production base;
4) government policy in the sphere of innovations.

According to the experience of 38 world countries, M.Castels singled out eight transformation models of industrial societies [5]

1st model is«Innovational environment», that includes science, capital, variety of small businesses, highly efficient professionals (Silicon Valley and technoparks in the USA) creating a self-developing.

2nd model is«Transnational corporation»(TNC),engaged in own developments. Drawback – corporate isolationism, monopoly of discovery, invention for business purposes.

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3rd model is "Governmental support" of technological innovation through private companies, budgeted by the government and receiving orders for researches that lead to enhancement of foreign technology (many post-Soviet countries).

4th model is "Collaboration of the government with private companies" is similar to the 3rd model, though functions only in open market conditions, including through international groups of scientists. For example, France and the UK develop so.

5th model is "Governmental protectionism", where the country is trying to elaborate new technology from scratch. Examples are India and China.

6th model is "Desire of military superiority" initiates independent development of new technology; however, the principle of free information exchange in the modern society is not compatible with the requirements of military confidentiality. That is why, lagging behind is unavoidable in the long term perspective, as it actually happened in the USSR.

7th. "Interstate cooperation with private investment" – European community, where cooperation is fulfilled at the government level as well as at the level of private companies in the scale of whole Europe and in the national framework.

8th. "Diffusion of Innovations", with the basic principle of implementation of already available foreign modern technology in own country. The main task of the given model is elaboration of already available foreign modern technology to given conditions. This type of development is characteristic of Ukraine, however, there exist features of other models.

Let us analyze the first component which is innovation environment and its organizational models.

To ensure appearance of innovational product, it is necessary to create environment for their production that would integrate activity of specialists in various fields, level of knowledge and scientific experience and would perform synthesizing functions, namely: innovational, economical, production, educational, implementing and other.[6] We consider technoparks to be such environment.

Technopark can be defined as optimally organized scientific and industrial zone where collaboration, exchange of ideas and information between enterprises and scientific organizations is performed with the aim to introduce innovations [7]Such definition unreasonably combines all possible forms of innovational scientific organizations originating in previous epochs and new ones, being at the stage of their spring.

Having analyzed basic forms of organization of inventive activity, **five types of innovational environment organization** can be singled out.

**University laboratories.** Their advantage is a combination of science and education, involvement of students in scientific research, which enhances the quality of knowledge, unites theory and practice, increases motivation in learning and scientific work. Selection of research topics is made by Scientific Councils of universities who also control expenditures and research results. Should the topic of research is inadequate to the formed specialization, the scientists can try to find financing by themselves and use the laboratories of higher educational establishments on contractual basis. The course of research is discussed on weekly seminars; results are published in the open scientific press.

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[6] A. Gore, *Basic Principles for Building an Information Society*, "International Information Communication and Education" 1996/2, p. 226–228.

[7] L. Kompanzheva, *Contsept in formatsion novogo obschestva kak cognitivnaya osnova izmenenuya yazukovoj kartinu mira sovremenogo obschestva*, "Naykovy zapiski. Vypysk" 89/1 (2010), p. 250–254.

Author's rights are shared between the groups of researches and universities or private sponsors on the contractual basis. The requirements to intellectual property rules for a wide access to information have been alleviated. This experience should undoubtedly be applied, but university should not be identified with technoparks, although there is similarity between them. The main task of universities is education, and research work is a means and the source of additional incomewhereas the aim of technopark is "raising" innovational projects and ideas.

**Classical academic science and core scientific and research institutes (SRI)** emerged in the form of national academies of sciences with state protectorate or directly at royal court. They were engaged in fundamental research. Later, specialized SRI emerged (mainly in socialistic countries). They were engaged in applied problems by "state order" or the order of enterprises (economical order). Advantage: concentration of resources and efforts in one spot/enterprise, specialization of topic, strict control of the management – all turned into an obstacle with time.

Narrow specialization and bureaucratization of making solution, dependence on customers, outdated resource base, poor financing, "brain drain", isolation from production – all that turned given form of science organization vulnerable at post-Soviet space. Only SRIs – participants of international projects are still afloat, alongside with institutes of defense designation or scientific centers supported by business. In the latter case, results of scientific research and rights to them belong to the customer and are "commercial secret" which acquired the name "feudalism of knowledge" [7]. [8]In this case they gradually pass into a different form.

**Scientific production complex (SPC)/ or program (SPP) and scientific centers of industrial corporations.** Peculiarities: vast territories and large staff including several administrative and territorial units or large international projects. Advantage: integration of science and production. Several major scientific and production centers, participating in the research, had related or common interdisciplinary theme under the auspices of the government ("Skolkovo" in Russia) or business (TNK). In Ukraine today six similar state-owned SPP are under implementation in the field of power engineering, metallurgy, atomic power engineering, space explorations, ship- and aircraft building and other.[9]

Regional scientific center has complex branched infrastructure and management system, large scale of project realization. The majority of results and the process itself are highly classified. SPC may include technology towns or scientific and technical parks, industrial enterprises-giants, scientific centers and SRI are dispersed. That leads to the notion of "technopark-plant" occurring in the literature, however, this type of innovational environment can hardly be called a technopark. It differs in tasks, level of scientific search, management types and privacy of research results.

**Venture companies** appeared as a response to the necessity to approximate inventors to the potential consumer in the conditions of free competition. Venture company proposes the interconnection of the following components: innovation at the improvement stage; economical and legal aid to scientists to carry the idea to an industrial sample or patent; presence of public demand for the implementation of the given ideas and/or entrepreneur

[8] W.T. Waller, *Ceremonial Encapsulation and Corporative Culture Hegemony*, "Journal Economic Issues" 1987/21, p. 121–128.

[9] T.M. Chipko, *Technoparks in Ukraine*, http://www.geograf.com.ua/geoinfocentre/20-human-geography-ukraine-world/759-tekhnoparki-ukrajini.

ready to base business on it; investor with a spare capital. Venture financing is implemented through either incorporation or crediting. It is rather a form of capital investment in the scientific sphere with an increased level of risk, than an innovational environment itself. The company receives author's rights for the perspective yet unchecked idea (risk factor) and offers other companies a participation in financing. All rights, implementation process, and, eventually, profit is all that the company and its investors undertake. Venture companies carry the idea to implementation or to a patent within a short period of time which is similar to technopark task, but they pursue strictly commercial aims and differ with organizational principles of management.

Analyzed forms of innovational environment emerged in the industrial society. **Technoparks** emerged during the transition to the information society and are **a new type of open innovational environment adequate to new social conditions**. The main goal of scientific technoparks is growth of a local community by the means of promotion of innovation culture, increasing competition of innovation business and scientific organizations. To achieve these goals, technopark stimulates and manages the flows of knowledge and technology between universities, scientific-research institutes, companies and market[10].

In scientific literature the following notions are usually confused: "technopark – plant", "technopark – university", "technopark – SRI", "technopark – target scientific program". They are rather hybrid forms of combination of previous types of innovational environment and a new type. Mechanical attempt to re-build old forms into new ones only leads to the change of the signboard without changing the principles of scientific activity organization and ways of spreading new knowledge.

The prototypes of a technopark are the most successful innovational companies of the present, namely: Google, Apple, Facebook that started as groups of friends, working within the circle of their interests, mutually adding the potential and contribution of participants [5]. Importantly, the closest creative relations in these groups are supported by specially created social environment, partnership of the Customer and scientists, freedom of creativity that provides fruitful invention activity.

Generally, technoparks are "garden/incubator of ideas". Technopark is a system of a new type of innovation, open for visitors, students, tourists and businesspeople. Organizational and management principles combined in themselves the features of "informational society"and"society of knowledge", namely: fair competition of ideas; equal start possibilities for mature, little-known and novice scientists; for separate scientists and groups, free spread of new knowledge.

Having analyzed scientific literature and international practical experience of technoparks establishment, it can be concluded that the notion of **"technological park"** is used as a metaphor for a certain concept of **"garden"/"incubator"**. We can offer the following operative working notion: technopark is an innovational environment where socially significant innovations ready for implementation are "raised" for the sake of the whole society.

A combination of words "techno" and "park" is a matter of principle. Park is a place where something new grows should there be appropriate conditions. During the Contest, projects and groups of researchers are selected on the basis of topical need of the region and, like a gardener, create conditions for productive invention activity. The same people

[10] Ponyatie, funkzhii i zadachi of technoparkov// Expert RA /2015-http://www.raexpert.ru/ researches/technopark/part1.

work at a project during a certain period. The result is an experimental model, technology or service – any new product that can be sold, presented or implemented in production, learning, management, life and leisure. Like harvest in gardens, themes of research and people who do it create stimuli for innovational process fruitfulness. Continuous creation of a new science-intensive product is a basic function of a technopark.

Technopark is a peculiar "incubator" that not only produces innovations (technologies), ready for implementation spread, but also for new names of inventors. Temporary research teams are gathered for the particular project that provides input of fresh forces and ideas. It makes principle distinctive feature of technoparks from other scientific structures and this is what makes success.**Basic principles of technopark management:**

- Different profiles of research topics;
- Competition of topics and research teams on the basis of social needs and expertise;
- Freedom of creativity during project implementation;
- Interchangeability of research groups and projects at the same site;
- Mixed financing principle;
- Public control of the project progress, expenditures and implementation;
- Fast and open access to the results of investigation after sealing author's rights.

This model "considers many strategies for community sustainable development [...] It ranges from the soft infrastructure of policy, finance, economic development and education to the specific technical, recruitment, and management considerations in industrial park design"[11].

Technopark management and fundraising for separate projects and general costs on the project is fulfilled by external managing company (Board or Management). A contract with specific conditions is signed with every research team. Technopark Board includes the most authoritative scientists, patrons, sponsors, managers, lawyers and financers. They also control condition of compliance with contracts and expenditures.

Technopark projects are financed from various sources: state, sponsors, investors of certain projects, own money earned, interest contribution from author's dividends of "graduates".

Author's rights are distributed according to shared principle: major part to the author(s) of the elaboration, a certain share to the technopark for financing new projects and, if provided by the Contract, a certain share to the investor. However, more often investors buy already tested product or technology, "fruit" of technopark. Additional source of technopark financing is the income from exhibitions, seminars, learning centers being an obligatory element of any technopark as well as profits from implementation of new scientific ideas (25–30% of profit as a rule). Besides that, part of the technopark income is due to tourism. That is why, alongside with a scientific zone (laboratories), exhibition and learning pavilions, modules of technoparks are complexes with landscape-park architecture, historical and art-objects attractive to tourists. They are simultaneously shown scientific laboratories and open access workshop. They are told of previously realized and current scientific projects which encourages spread of information regarding innovations

[11] *Eco-Industrial Parks: A Handbook for Local Development Teams*, RPP International 1998, http://gei.ucsc.edu/eco-industrial_parks.html.

and the technopark in the society. This is the main difference of a technopark from commercial and state-owned innovational organizations.

Such model gives possibility not only to receive additional income but also attracts businesspeople to innovational activity. A region that creates technoparks at its territory achieves accelerated development of economy, scientific-production and social structures, attraction of highly qualified professionals, job places, investors and tourists. Technoparks create a social innovational environment of an absolutely new self-developing type. It becomes the main factor of further stable scientific-technological, economic and social developmentof society.

**The authors propose the following principles a conceptual basis of technopark functioning and development for transitive countries**:

- Compactness—daily functional working cycle of small-scale specialized groups is held at objects situated at a distance of 15-minute walk; zones for visitors and guests may occupy territories of 1–2 hours of walk.
- Specialization and confines – technopark territory has got a distinct differentiation: common spaces with open access for everyone; specialized zones for work and study; zones of restricted access, "behind glass" in order to protect author's rights.
- Cluster localization – group of associated territories and people on the basis of specialized functions: inventors, managers, guides, attendants, visitors.
- Matrix organizational structure – cluster localization leads to formation of specialized elements, whose combined groups create basic modules (technopark matrix). The entire functional cycle of a technopark is organized with the help of modules, although modules can be internally transformed and recombined for new targets and tasks.
- Openness, transparency, accessibility –ensure common spaces. Well-organized, open parks are established around functional groups. Exhibition pavilions, conference and seminar halls, common places of rest and communication
- Bright integral image forming a unique "spirit of the place" (a brand) with which technopark and its products will be associated, leaving "memories" from visitors.
- Accessibility of research results reduces time for idea promotion to implementation, fighting the barriers of "feudalism of knowledge" and "commercial secret" and is achieved through educational and exhibition modules of the technopark and tourist excursions. Extensive public control as well as PR–informing about new technologies and products – perform educational and implementation function.
- Equal possibilities in approbation of ideas and technologies for already known scientists and beginners (social fairness) are executed through open contests organized by the Management Board of the technopark.
- Diversification of sources of financing and research theme decreases the risk of failures and ensures supply of resources for further development of a technopark.

## 3. CONCLUSIONS

1. Technoparks are a basic element of informational society and a stimulus for the execution of a creative potential of the country. Establishment of small and medium organizations dealing with elaboration of science-intensive produce in the form of technoparks will help transitive countries recover from the crisis and be competitive in the world arena.

2. Researches, conducted in technoparks, refer to application layer of science. They possess a wide base for implementation and spread. Technopark is a multifunctional system of organization and spreading innovations based on new principles.
3. Despite all diversity of technoparks, there are two fundamental universal features of their practical models: uniqueness and dynamism.
4. Uniqueness is expressed by unique projects and an internal complex of a technopark for various territories, countries, cultures. This peculiarity does not exclude basic principles of technoparks management.
5. The second feature is dynamism which is expressed in flexibility of changes in the organization of technopark activity as a response to changes in needs and conditions. This peculiarity ensures the development of technoparks in time and change management as a system, ready for quick internal structural transformations. Thus, a technopark is a flexible and mobile system of production and spreading of innovations, operatively reacting to new requirements of business, education, state and society, which, in its turn, conditions its further development.
6. Technoparks function as autonomic systems collaborating with other types of innovational environment: universities, SRI, SPC, TNK, international scientific centers and Funds. Technoparks can be part of bigger structures as a substructure, however, in this case they should preserve features of a technopark, or else they will lose their essence.

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[4] Chipko T.M., *Technoparks in Ukraine*, http://www.geograf.com.ua/geoinfocentre /20-human-geography-ukraine-world/759-tekhnoparki-ukrajini.

[5] *Eco-Industrial Parks: A Handbook for Local Development Teams*, RPP International 1998, http://gei.ucsc.edu/eco-industrial_parks.html.

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[11] *Ponyatie, funkzhii I zadachi of technoparkov*, “Expert RA” 2015, http://www.raexpert.ru/researches/technopark/part1.

[12] *Technoparki stran mira: organizazhiya deyatelnosti I sravnenie*, ed. V.A. Barinovoy, “Delo” RANXiGS 2012.

[13] Waller W.T., *Ceremonial Encapsulation and Corporative Culture Hegemony*, “Journal Economic Issues” 1987/21, p. 121–128.

## ZASADY ZARZĄDZANIA PARKAMI TECHNOLOGICZNYMI W KRAJACH TRANSFORMUJĄCYCH SIĘ W WARUNKACH GLOBALIZACJI

Celem artykułu jest badanie form innowacyjnego środowiska w przeszłości i w nowych warunkach postindustrialnego społeczeństwa informacyjnego, ze szczególnym uwzględnieniem specyfiki parków technologicznych. W analizie praktyki tworzenia parków technologicznych w Stanach Zjednoczonych, Europie, Izraelu, Rosji i na Ukrainie pokazano różnice w podejściach na Zachodzie i w państwach należących do byłego Związku Radzieckiego. W pierwszym wypadku tworzony jest zupełnie nowy model zarządzania procesami innowacyjnymi, obrazujący specyfikę nowego systemu społecznego; w drugim – podejmuje się próbę modernizacji i adaptacji starych form do nowych zadań, co zwiększa opóźnienie w dziedzinie naukowo-technicznej i ekonomiczną zależność krajów poradzieckich.

Globalizacja jest jednocześnie wyzwaniem i szansą dla rozwoju kraju i dla rynku światowego. Tworzenie parków technologicznych może pomóc krajom przechodzącym transformację wyjść z kryzysu i konkurować na równi z czołowymi graczami światowej gospodarki. Parki technologiczne mogą współpracować z innymi typami innowacyjnego środowiska: laboratoriami uniwersyteckimi, instytutami naukowymi, kompleksami naukowo-przemysłowymi. Jako strukturalne podsystemy mogą wchodzić w większe naukowo-wytwórcze ugrupowania, zachowując swoją indywidualność i autonomię. Proponowana teoretyczna koncepcja zarządzania parkami technologicznymi odpowiada kulturowym wzorcom, zasobom i potrzebom rozwoju państw w końcowym stadium przejścia do społeczeństwa informacyjnego. Koncepcja ta może wzbudzić zainteresowanie w środowiskach biznesmenów, naukowców i polityków. Z pewnością model wymaga weryfikacji w praktyce. W wypadku jej udanej akceptacji na Ukrainie może być wdrażana w innowacyjnym środowisku innych krajów transformujących się.

**Słowa kluczowe:** parki technologiczne, innowacje, środowisko innowacyjne, model zarządzania, globalizacja

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# THE INFLUENCE OF EFFECTIVENESS OF PACKAGING ELEMENTS ON THE CONSUMERS' PREFERENCES WITH THE USE OF MARKETING EYE-TRACKING TECHNIQUE

Packaging is a modern tool of integrated marketing and one of the most important attributes of a product influencing purchasing preferences of the consumers. Therefore, modern effective packaging is treated as a tool of effective communication with a potential consumer. The aim of this work is to define the influence of the effectiveness of packaging elements on consumers` buying predictions. The conducted research results of energizer drinks` packaging with the use of the eye-tracking method has been presented. The method allows for reflection of real factors determining purchasing preferences of potential buyers. The research was conducted with the use of the eyetracker Tobii X2-30 Tobii Studio Version 3.2. software. 30 people at the age of up to 25 took part in the research done in 2014 year. They are so called young consumers. The range of the conducted research concerned determining the areas of visual layer of energizers` packaging on which the consumers` sight was concentrated and determining the importance of these elements on the basis of the eye-tracking base measures such as: scanning path, the number of fixations and the total time of fixation. The eye-tracking research results showed that among the analysed elements of the energizers` packaging, the dominating element focusing significant resources of consumers` attention is logo/logotype. Another crucial element of the packaging`s visual layer, which also possesses the ability to attract attention, are graphic elements. The name of the product on the packaging is the element that is not so attractive.

**Keywords:** packaging effectiveness, marketing communication, eye-tracking, consumer's preferences

## 1. INTRODUCTION

At present, packaging is treated as a tool of integrated marketing and as an important marketing activities instrument. Beginning that a purchaser mainly perceives a product by a prism of the packaging, it is included to be one of the most important attributes of a product influencing the consumers` preferences[3,4].

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The development of economy, changes in the people`s lifestyle or the growth of awareness and the requirements of the consumers force the entrepreneurs to constantly develop and search for new solutions of effective products presentation and promotion growth (for example flash mobs)[5]. An interesting form, original choice of colour or interesting graphics are eye catching and are easily remembered. Packaging`s role is to create a desired image of a product, which will be trustworthy and persuade a customer usage. It influences identity of a given brand-name product, differentiates the same articles of different producers, contributes to communication and educates. Moreover, the packaging is an integral part of the product. As a communication medium, it plays the role of a given brand-name product`s identifying element[6]. What is more, it directly influences to consumer's perception of the product, and can influence their purchase decision. That is why effective packaging is treated like a tool of efficient communication, and the source of experiences[7]. Packaging is also perceived as one of the basic elements of having an effect on the market, companies` promotion and sale activation[8].

The aim of this work is to determine the influence of the effectiveness packaging elements on the purchasing predictions of the consumers with the use of the eye-tracking technique. This technique allows to reflect the real factors determining potential buyers` purchasing preferences [9].

## 2. THE ROLE OF THE ELEMENTS OF EFFECTIVE PACKAGING IN CREATING THE PRODUCT'S UNIQUENESS

The need to create the uniqueness of packaging is strictly connected to striving for distinguishing products in the background of a rich market offer. Usage unique packaging is mainly based on innovational projects of visual layer of packaging, which is a crucial medium of encoded market statements. Thanks to its communicative value, the visual layer is so called the packaging`s language, which should lead to notice the product, decode the message, cause interest, make a decision about purchasing and to remember it permanently[10].

The products` uniqueness assurance by the packaging is possible thanks to taking into consideration proper elements` correlation, so called PEF-Packaging Effectiveness Framework suggested by A.K. Pradeep. The PEF-Packaging Effectiveness Framework has been presented in the fig. 1.

[5] M. Gębarowski, *Flash mob – istota zjawiska oraz determinanty wykorzystania w działaniach promocyjnych podmiotów rynkowych*, "Modern Management Review" 18/2 (2013), p. 33–42.

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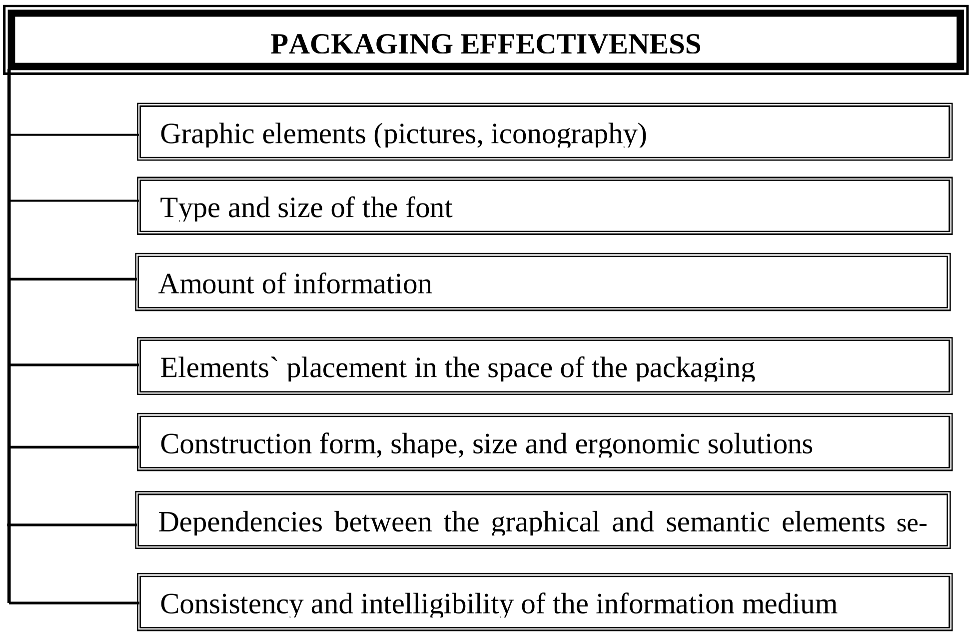


Fig. 1. PEF-Packaging Effectiveness Framework
The source: own elaboration based on[11].

On the basis of the packaging effectiveness framework presented the drawing 1, neurobiological assessment of the key elements deciding about the ability to distinguish and attract attention on the packaging, can be done. One of the links of so-called packaging effectiveness framework are visual layer`s graphic elements, which efficiently distinguish the packaging on the shelf in the shop and stimulate emotional associations of the consumers[10].

Another link creating the packaging effectiveness framework is a type of font. The font plays an important role from the point of view of the packaging`s ability to differentiate and create uniqueness of the wrapping. The type of the used font on the packaging can influence the image about the product. Some fonts aim is to subconsciously associate with a certain product or brand. Thanks to them, packaging distinguishes itself better, because a potential consumer can define the “identity” of the product before reading and processing the text by the brain. Moreover, a very important issue is the size of font used on the packaging or its labels. In order to ensure better readability of information on the wrappings, a legislator under the regulation nr 1169/2011 defined the minimum font`s size, which gives obligatory information on the labels. The height of lowercase letters should be at least 1,2 mm. Capital letters and the letters such as for example k, p, y, j, g, d and f, according to the general spelling rule, should be proportionally bigger than x. In

[11] A.K. Pradeep, *Mózg na zakupach. Neuromarketing w sprzedaży*, Helion, Gliwice 2011.

case of packaging, where the biggest space is smaller than 80 $cm^2$, minimum "the height of x" can be at least 0,9 mm[12, 13].

On the other hand, the number of pieces of information are connected to the level of gathering the content on the packaging, which must be processed and understood. The quantity of information indicates a close connection with so called processing fluency phenomenon, which depends on the number of sets of objects or words. The research conducted by A. Pradeep showed that fewer elements (about three) highly streamline the processes of information transport[10.]

The packaging effectiveness is also strictly connected to the layout and mutual distribution of the graphic and semantic elements in the packaging space. Correct distribution of the elements on the packaging influences the speed of information processing and contributes to creation of positive emotional impression in the consumer`s mind.

The construction form, shape, size and ergonomic solutions are other elements influencing the packaging effectiveness. The shape of the packaging can relevantly strengthen natural brain`s tendency to stimulate the impression of the contact with the packaging. What is more, the higher level of stimulation is noted down for ergonomic packaging, that is adjusted in shape and measurements to a man`s anthropometrical features. Furthermore, there is a proved connection between the constructional form, shape and perceived value and the acceptance level of the price of the wrapped product[14.]

Effectiveness of the packaging is also connected to the dependency between the graphic and semantic elements. The research conducted by P. Silayoi and M. Speece prove that efficiency of the packaging to attract attention of a potential consumer is the result of cooperation of the graphic background and the verbal transfer placed on it[9].

Another crucial component of so called packaging effectiveness framework is consistency and understandability, of the informational transfer. The packaging should make a certain impression about the product or brand on a potential customer, simultaneously transferring unambiguous verbal communication. Consistent packaging should directly refer to such elements like impressions, values, benefits and metaphor.

All mentioned and characterized elements influence the effectiveness of the packaging, which translates to the efficiency of realization of a certain, intended effect, as an influence on a potential consumer.

## 3. THE SUBJECT AND METHODOLOGY OF THE RESEARCH

The subject of the research was the packaging of energizers available on the polish market. This kind of products were chosen due to the fact that it is a special group of soft drinks. They are not a products necessary to satisfy the nutritional needs of consumers, however this market is still growing. Chosen brands was leaders on the energetic drinks

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[12] Rozporządzenie Parlamentu i Rady (UE) 1169/2011 z 25 października 2011 r. w sprawie przekazywania konsumentom informacji na temat żywności, Dz.U. L304/18.

[13] M.I. Suero, P.J. Pardo, A.L. Perez, *Individual Differences in Colour Vision*, [in:] *Color Perception: Physiology, Processes and Analysis*, Neuroscience Research Progress Series, ed. D. Skusevich and P. Matikas, Nova Science Publishers, New York 2010.

[14] L. Garber, E. Hyat, U. Boyna, *The effect of package shape on apparent volume: an exploratory study with implication for package design*, "Journal of Marketing Theory and Practice" 2009/17.

market in Poland[15]. Visually differentiated packaging was chosen to the research (drink containers varied in construction form, a kind of packaging material, shape, colour, graphics, size, a type of font, ergonomic solutions and different security systems). The subject of the research has been presented in the photo number 2.

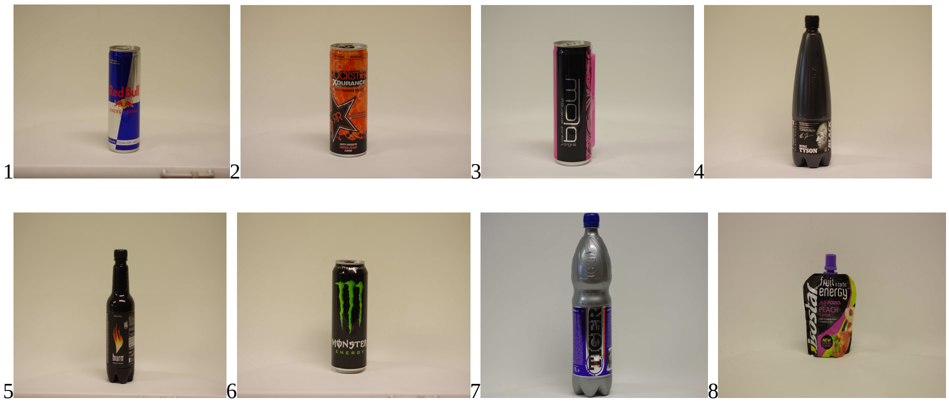


Photo 2. Energy drink's packaging
The source: photographed by A. Kawecka

In order to research the elements of visual layer of the above presented energizers` packaging, the eye-tracking method has was used. It involves following the eyeballs movements of the respondents and simultaneously analyzing sakads[16] and fixations[17]. This method allows to complete the usefulness research in objective knowledge, achieved on the basis of the analysis of the respondents` real behaviour and not only subjective opinions[18] Usage enables to determine the way of perceiving certain visual layer elements of the packaging by potential consumers, so it allows knowing the visual perception of the potential consumers. Because of to such activities it can be found out, among others, on which areas a consumer`s sight is focused on and which are completely omitted by them[19].

The research was conducted with the use of the eyetracker Tobii X2-30 Tobii Studio Version 3.2. software. 30 people at the age of up to 25 took part in the research done in 2014 year. They are so called young consumers (20 women and 10 men), all Poles. The

[15] http://www.portalspozywczy.pl/napoje/wiadomosci/wzrosl-popyt-na-energetyki, 110085.html (data dostępu: 15.06.2015).

[16] Sakads – intensive movements of an eyeball, involving very fast movements of the concentration point of sight from one place to the other.

[17] Fixations – relatively constant position of an eyeball, involving small vibrations. It is assumed that a cognitive process 9that means the information reaches the bran and is consciously processed) takes place during the fixation.

[18] J. Grobelny, K. Jach, M. Kuliński, Michalski R., *Śledzenie wzroku w badaniach jakości użytkowej oprogramowania. Historia i mierniki*, Unpublished paper presented at Interfejs użytkownika – Kansei w praktyce Conference, Warszawa 2006.

[19] J. Świda, B. Kabaja, *Wykorzystanie technik neuromarketingowych do badań postrzegania opakowań produktów*, "Marketing i Rynek" 2013/11.

research group declared consumption of those products. The range of the conducted research concerned determining the areas of visual layer of energizers` packaging on which the consumers` sight was concentrated and determining the importance of these elements on the basis of the eye-tracking base measures such as: scanning path, the number of fixations and the total time of fixation.

The achieved results of the research has been presented in the form of thermal maps, which are dispersion of attention directed at the researched area of interest, with the possibility to distinct noticed and omitted elements while scanning the usage sight. The thermal maps use colours to show average image of the areas of the packaging, on which the respondents directed-usage their attention. The places where the sight was focused most frequently have been marked in red. The areas where the respondents did not look so frequently have been marked in yellow. However, the places where the number of looks was the fewest, in green. The colours of the map present a cumulative number and time of fixation of the respondents, in this case points, in which the sight has stopped in a given spot in the picture. Moreover, the path of sight scanning has been used to analyse the achieved research results. It shows the order of the sight activity of the respondents within the delineated area of interest (AOI).

## 4. THE ANALYSIS OF USAGE RESEARCH

The research results presented in the literature conducted by J. Clement[20], V. Butkevicience, J. Stavinskiene, A. Rutelione[21], L. Garber, E. Hyatt, U. Boyna[22], M. I. Suero, P.J. Parolo and A. L. Perez[12] prove that among the elements, which create a visual layer of the packaging, visual and verbal elements and the features understood as the way of perceiving the packaging play a crucial role from the point of view of the packaging effectiveness and its marketing role.

In order to identify the packaging attracting the biggest attention of potential consumers by its visual layer, the analysis of free, unrestricted, looking of the respondents has been done. Photos were presented in random order, one packaging on one photo. Each photo was presented only one for 30 seconds. The results of the sight perception analysis with the use of the chosen eye-tracking measures have been presented in the table 1.

[20] J. Clement, *Visual influence on in-store buying decision: an eye-track experiment on visual influence of packaging design*, "Journal of Marketing Management" 23/9–10 (2007).

[21] V. Butkevivience, J. Stavinskiene, A. Rutelione, *Impact of consumer package communication on consumer decision making process*, "Engineering Economics" 2008/1.

[22] L. Garber, E. Hyat, U. Boyna *The effect of package shape on apparent volume: an exploratory study with implication for package design*, "Journal of Marketing Theory and Practice" 2009/17.

Table 1. The results of the sight perception analysis with the use of the chosen eye-tracking measures

| **The energizers packaging analysis** | **Eye-tracking measures** | | |
|---|---|---|---|
| | **The number of fixations** | **The time of the first fixation [s]** | **The time of fixation [s]** |
| 1 | 21,9 | 0,01 | 2,04 |
| 2 | 26,4 | 0,02 | 1,99 |
| 3 | 26,4 | 0,01 | 1,72 |
| 4 | 20,1 | 0,01 | 1,72 |
| 5 | 21,6 | 0,04 | 1,87 |
| 6 | 20,7 | 0,01 | 1,62 |
| 7 | 27,3 | 0,00 | 2,19 |
| 8 | 21,6 | 0,20 | 1,87 |

The source: own work.

The analysis of the results received from the free looking test showed, that all the researched wrappings attract potential consumers` attention. The sum of all fixations shaped in the range from 20,1 to 27,3. In case of the analysed energizers` packaging, the packaging nr 7 – „Tiger" raised the biggest interest. It had the usage of fixations (27,3). This packaging characterised big importance and was the most noticeable in the process of the sight scanning for the respondents. The lowest number of fixations was noted , however, for the packaging number 4- „Tyson".

Analyzing the research results of the ability to concentrate attention has been noted as low so called time to the first fixation, which is from 0,00 to 0,04 s. Similarly to the number of fixations, the lowest time to the first fixation has been noted for the packaging number 7. The eye-tracking descriptive statistics results confirm that this packaging not only attracted the biggest attention of the respondents but it also was the packaging, which was noticed the fastest.

The supplement of the analyses of packaging`s perception was the results interpretation of the fixation duration in the marked area of activity. The duration of the fixation is treated as a measure of the imposed requirements of the cognitive processing the gathered information. In case of the analyzed packaging of energizers the duration of the fixation shaped in the range from 1,62 to 2,19 s. The packaging number 7 was looked at the most frequently. The shortest time of attention was dedicated to the packaging number 6. However, the respondents spent similar time looking at the packaging number 3 and 4 in the eye-tracking process.

In order to distinguish the elements of the visual layer of the energizers` packaging, which attract the most attention of potential consumers, the analysis of people`s perception has been done. It has been based on the thermal maps analysis. The achieved eye-tracking results have been presented in the photo number 3.

Photo 3. The heat maps of the analyzed energizers` packaging
The source: own work.

The total variety analysis of intensity of attention by using colour allowed to define the level of concentration on the packaging from the highest degree of attention concentration (marked in red), by the medium (marked in yellow), up untill small (marked in green). Explication of the respondents` sight activity on the basis of the average areas of the packaging`s image showed that in case of all analyzed energizers` packaging, the people who were questioned in the study focused their sight mainly on the packaging's elements which had highly convincing and provoking to choose character. These elements may significantly influence a potential buyer by making certain impressions on them and creating the intended atmosphere what can be confirmed by the conducted research results by[23].

In order to define the order of perceiving images, that is the direction of sight scanning, the presented thermal maps of the energizers' packaging research have been additionally enriched in the canning path interpretation, which has been presented in the photo 4.

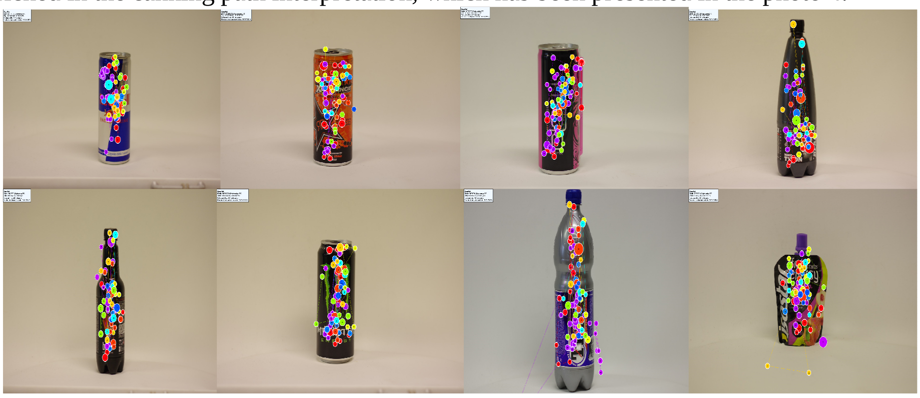

Photo 4.The scanning paths of the sight concentration areas of the analyzed energizers' packaging
The source: own research.

[23] R.D. Wright, L.M. Ward, *Orienting of Attention*, Oxford University Press, New York 2008.

The analysis of the created sight concentration areas on the scanning path defined as *gaze plots* confirmed that in case of all analyzed energizers` packaging suggestive elements of the packaging invoke so called pendulum effect. O the basis of the scanning path analysis of the areas of interest, it has been showed that the element which concentrated most of the attention of the respondents was the logo/logotype. The second element in order on which the respondents paid the least attention was the name of the product.

In order to confirm the elements` hierarchy of visual layer of the chocolate packaging, created on the basis of the sight scanning path analysis, an attempt has been made to define the relevance of the packaging`s visual layer elements analysis of bars of chocolate on the basis of the number and the total fixation time. The achieved eye-tracking research results, including the chosen descriptive statistics parameters have been correlated in the table 2.

Table 2. The eye-tracking results of the energizers' chosen elements

| **The analysed energisers` packaging** | **Measurement** | **Packaging`s area** | | |
|---|---|---|---|---|
| | | **Graphic elements** | **Logo/Logotype** | **Name of the product** |
| | | **Descriptive statistics** in total [Stdev] | | |
| **1** | The number of fixations | 45<br>1,35 | 186<br>2,1 | 15<br>0,58 |
| | The fixation time | 4,82<br>0,38 | 9,1<br>0,19 | 1,18<br>0,15 |
| **2** | The number of fixations | 87<br>2,28 | 108<br>2,28 | 6<br>0,00 |
| | The fixation time | 6,24<br>0,10 | 8,7<br>0,14 | 0,45<br>0,09 |
| **3** | The number of fixations | 27<br>1,5 | 183<br>1,5 | 21<br>1,53 |
| | The fixation time | 0,65<br>0,16 | 6,25<br>0,17 | 2,64<br>0,68 |
| **4** | The number of fixations | 36<br>0,95 | 12<br>1,41 | 0,00<br>0,00 |
| | The fixation time | 3,24<br>0,29 | 0,93<br>0,10 | 0,00<br>0,00 |
| **5** | The number of fixations | 45<br>0,85 | 24<br>0,55 | 3<br>0,00 |
| | The fixation time | 2,96<br>0,12 | 1,89<br>0,11 | 0,25<br>0,00 |
| **6** | The number of fixations | 111<br>1,49 | 36<br>1,30 | 12<br>0,58 |
| | The fixation time | 9,85<br>0,14 | 2,61<br>0,11 | 0,45<br>,0,05 |
| **7** | The number of fixation | 40<br>5,2 | 38<br>5,38 | 12<br>0,58 |
| | The fixation time | 9,17<br>0,11 | 8,84<br>1,31 | 1,04<br>0,27 |
| **8** | The number of fixations | 36<br>0,93 | 117<br>0,93 | 66<br>1,13 |
| | The fixation time | 3,32<br>0,23 | 10,01<br>0,19 | 5,36<br>0,34 |

The source: own work.

The eye-tracking research results analysis presented in the table 2, showed that among the analyzed areas of energizers` packaging, the element, which concentrates the biggest attention is the logo/logotype. The highest number of fixations has been noted down for this packaging element (704 fixations). Among the analyzed energizers` packaging elements, the total time of fixations shaped from 0,93 to 10,01seconds.

Taking into consideration the criterion sum of all fixations, the second analyzed energizers` packaging area, which attracted the respondents` attention, were the graphic elements. The total number of fixations for this area was 427. The biggest number of fixations has been noted for the packaging number 6 (111 fixations). However, the packaging number 3 got the smallest number of fixations (27 fixations). The total time of fixation duration for the analysed graphic elements of energizers` packaging was from 0,65to 9,85 seconds. The shortest fixation time was noted for the packaging number 3 (0,65 second). However, the longest fixation time was achieved by the packaging number 6 ( 9,85 seconds), which means that the sight analysis of the graphic elements of this packaging distinguished by a much higher depth of data processing being in sight. For the analyzed energizers` packaging graphic elements, a big span of values in the range of the total fixation time in a given area of the packaging, has been identified. It can result from crucial differences in patterns appearing in certain elements of the visual layer such as: graphics, size, a type of font, colour, which finds its confirmation in the research conducted among others by D.Gelici-Zeko, R. Lutters, T. Klooster, P. Weijzen. Moreover, the identified differences in perceiving the analyzed chocolate packaging can result from the respondents` gender. The research conducted by J.B. Taylor and L. Brizendine showed, however, that women`s brains are antynomically. Women contrary to men, have different preferences and they decode and store information in a specific way[10].

Moreover, the analysis of the presented in the table results showed, that in comparison to the logo/prototype and graphic elements, the name of the product attracts the fewest people. For the element of the visual layer, in case of the energizers` packaging from 3 to 66 fixations have been noted, taking into consideration that the total fixation time was from 0,00 to 1,13 second.

The analysed chosen elements of packaging effectiveness based on the eye-tracking priority measures, have been completed by the Stdev indicator analysis as the representative of the descriptive statistics. The Stdev indicator is a statistical measure of changeability and shows how much the analyzed measures differ from the average value. In case of the factor value analysis, which supports the Stdev for the number of fixations in the analyzed areas of interest, relatively big data discrepancies have been achieved: 0,85-5,2 (for the graphic elements), 0-55-5,38 (for the logo/logotype) and 0,00-1,53(for the product`s name). However, much smaller discrepancies have been observed in case of the Stdev value factor for the appointed fixation time. The appointed fixation time for the graphic elements (0,00-0,68) and the products` names (0,00-0,68) were characterized by the smallest variability. The biggest changeability was noted for the fixation time measured for the logo/logotype of the analyzed packaging.

In order to define the influence of the packaging effectiveness on the respondents` purchasing preferences, such elements like: construction form, shape, size and ergonomic solutions as well as packaging`s informativeness have been analyzed. In the conducted test of free look, the respondents pointed by clicking on packaging, which according to them had the most preferred construction form, shape, size and ergonomic solutions. The analysis of the achieved research results showed very low so called time to the first fixation from 0,00 to 0,04s. The shortest time to the first fixation has been noted to the packaging number 7. The eye-tracking descriptive statistics prove that the packaging is analyzed basing on the construction form criterion, shape, size and ergonomic solutions is the most preferred by potential consumers. It raises the major interest of the respondents and is the packaging, which is noticed in the more quick way.

In turn, the energy drinks packaging information range conducted on the basis of the fixation time length showed, that the longest time of concentration of attention of the respondents has been noted for information on the packaging number 8 -„Isostar- Fruit &carbs energy" (24,05 seconds). This gives evidence that there is too much information, which cause lack of its clarity and necessity to dedicate more time in order to read and understand it. However, the shortest fixation time has been noted for the packaging number 2 „Rockstar Xdurance" (16,88 seconds). According to the respondents, the information included on the packaging was legible and understandable and there was a clear layout.

**SUMMARY**

Serious fight of enterprises to increase a competitive position influences the necessity to distinguish their products on the rich market offer. Leveraging packaging, the companies position their products and create a desired product/brand`s image. At present, effective packaging is one of the most efficient tools of marketing communication and purchasing decisions` simulator. Trough to the proper elements` composition and their features, packaging can influence its existence, create imagination about the level of products` quality, and suggest certain benefits. Effective packaging provides useful, hedonistic and semiotic benefits to a potential customer[24].

The achieved research results analysis of perceptive behaviour of the respondents proved that there is influence of the scheme elements of packaging effectiveness on consumers` perceptions. There are a lot of authors such as: Underwood, Ozanne (1998)[25], Orth, Malkewitz (2006)[26] and Silayoi, Speece (2007)[10] are analyzing influence of packaging on final buying decision. However this paper is focusing only on perception on packaging, elements focusing consumers sight, which might not have directly translate on purchase decision.

Simultaneously, the research results showed that untypical elements of the energizers` packaging visual layer are accepted by potential consumers and can even be a crucial element influencing purchasing decisions. Moreover, the detailed analysis of the respondents` sight activity enriched in interpretation of the number and the total fixation time allowed to define the areas, which concentrate the biggest attention of potential consumers. The eye-tracking research results showed that among the analysed elements of the energizers` packaging, the dominating element focusing significant resources of consumers` attention is logo/logotype. Another crucial element of the packaging`s visual layer,

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[24] P.H. Bloch, *Product design and marketing: reflection after fifteen years*, "Journal of Product Innovation Management" 2011/28.

[25] R. Underwood, J. Ozanne, *Is your package an effective communicator? A normative framework for increasing the communicative competence of packaging*, "Journal of Marketing Communications" 1998/4.

[26] R. Orth, K. Malkewitz, *Packaging design as resource for the construction of brand identity*, 3rd International Wine Business Research Conference, Montpellier, 6–8 July 2006.

which also possesses the ability to attract attention, are graphic elements. The name of the product on the packaging is the element that is not so attractive

Summing up, it can be stated that despite the hierarchy of elements of the energizers` packaging visual layer from the point of view of possibilities to attract attention of potential consumers, it should be born in mind that perceiving packaging and its elements is a resultant of many factors. A potential consumer`s preferences are connected to the aspects correlation concerning the realization of the needs in the range of the energizers` packaging. Furthermore, they are dependent on the sociological and individual consumers` predilections.

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[19] http://www.portalspozywczy.pl/napoje/wiadomosci/wzrosl-popyt-na-energetyki, 110085.html (data dostępu 15.06.2015).

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## BADANIE WPŁYWU ELEMENTÓW EFEKTYWNOŚCI OPAKOWANIA NA PREFERENCJE KONSUMENTÓW Z WYKORZYSTANIEM TECHNIKI MARKETINGOWEJ EYE-TRACKING

Opakowanie to nowoczesne narzędzie zintegrowanego marketingu i jeden z ważniejszych atrybutów produktu wpływających na preferencje zakupowe konsumentów. Stąd współczesne, efektywne opakowanie traktowane jest jako narzędzie skutecznej komunikacji z potencjalnym konsumentem. Celem pracy jest określenie wpływu elementów efektywności opakowania na predykcje zakupowe konsumentów. W pracy przedstawiono wyniki przeprowadzonych badań opakowań napojów energetycznych z wykorzystaniem metody *eye-traking*, która pozwala odzwierciedlić rzeczywiste czynniki determinujące preferencje zakupowe potencjalnych nabywców. Do badania elementów warstwy wizualnej zaprezentowanych opakowań napojów energetycznych zastosowano metodę *eye-tracking* polegającą na śledzeniu ruchów gałek ocznych uczestników badania przy jednoczesnej możliwości analizy sakad[27] i fiksacji. Badania przeprowadzono z wykorzystaniem eyetrackera Tobii X2-30 z oprogramowaniem Tobii Studio Version 3.2. W przeprowadzonym w 2014 r. badaniu udział wzięło 30 osób w wieku do 25 lat – tzw. młodych konsumentów. Zakres przeprowadzonych badań dotyczył określenia obszarów warstwy wizualnej opakowań napojów energetycznych, na których skupiał się wzrok konsumentów, oraz określenia ważności tych elementów na podstawie bazowych miar eyetrackingowych takich jak: ścieżka skanowania, liczba fiksacji oraz całkowity czas trwania fiksacji. Wyniki badań eyetrackingowych wykazały, że spośród analizowanych elementów opakowań napojów energetycznych dominującym elementem skupiającym znaczące zasoby uwagi konsumentów jest logo/logotyp. Kolejnym istotnym elementem warstwy wizualnej opakowań, który również ma zdolność przyciągania i koncentracji uwagi, są elementy graficzne. Natomiast nazwa produktu umieszczona na opakowaniach napojów energetycznych jest elementem, który w mniejszym stopniu zwraca uwagę badanych.

**Słowa kluczowe:** efektywność opakowania, komunikacja marketingowa, *eye-tracking*, preferencje konsumentów

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[27] Sakady – intensywne ruchy gałki ocznej, polegające na bardzo szybkim przemieszczaniu punktu koncentracji wzroku z jednego miejsca na inne.

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# CARACTÉRISTIQUES ENTREPRENEURIALES ET DÉCISION DU DIRIGEANT-CRÉATEUR D'ENTREPRISE

Concernant les décisions au sein des organisations, il y a celle particulière de créer sa propre entreprise et d'en assurer le fonctionnement et la pérennité. Il est alors indispensable de s'intéresser aux caractéristiques entrepreneuriales du créateur en tant que déterminants de ses décisions. Les travaux relatifs à l'inventaire des caractéristiques entrepreneuriales (Gasse, 1996; 2003) nous offre cette possibilité. Celles-ci permettent de cerner le potentiel entrepreneurial du créateur. Mais une recherche plus approfondie conduit à les exploiter comme déterminants de la décision d'être dirigeant créateur. C'est cette option qui fait l'objet de notre article. Après avoir identifié les caractéristiques des entrepreneurs sur la manière d'opérer le choix de créer une entreprise à partir de leurs propres perceptions ou d'image de soi. Cette démarche a été adaptée à une enquête réalisée auprès de 172 dirigeants créateurs de PME en activité avec une perspective de pérennité au dernier trimestre 2009. La finalité essentielle d'une telle enquête est d'inventorier et de classer les caractéristiques entrepreneuriales et, par la suite, d'établir une typologie des entrepreneurs. Compte tenu des caractéristiques de l'enquête, l'analyse consiste à différencier la perception de leur décision de créateur d'entreprise.

Les résultats de notre étude nous conduisent à trois catégories d'entrepreneurs au vu de leurs opinions sur les caractéristiques déterminant leurs comportements décisionnels. Nous rapprochons ces résultats aux travaux de Baumol (1968). Ainsi nous pouvons positionner les décideurs non routiers entre les créateurs gestionnaires et les créateurs entrepreneurs. Le cheminement que peut effectuer le créateur gestionnaire (ou exclusivement routinier) vers le créateur entrepreneur (ou véritablement non routinier) incite à la mise en place de pédagogies d'accompagnement plus adaptées.

**Les mots clés:** Entrepreneuriales, Motivations,Décision, Valeurs, Entrepreneuriat

## 1. INTRODUCTION

Concernant les décisions au sein des organisations, il y a celle particulière de créer sa propre entreprise et d'en assurer le fonctionnement et la pérennité. Dans ses travaux Schumpeter (1936; 1942) a qualifié l'entrepreneur comme «le pivot autour duquel tout tourne». Aujourd'hui, les chercheurs affirment que nous sommes dans «l'ère de l'entrepreneur» (Goffee et Scase, 1987); on s'intéresse aux caractéristiques entrepreneuriales du créateur et aux déterminants de l'entrepreneuriat. En fait, les nouvelles entreprises sont perçues comme une source de nouveaux emplois et, finalement, comme le pivot de la croissance et du développement économique (Blanchflower et Oswald, 1990). Ceci justifie l'abondance de travaux publiés sur l'esprit d'entreprise au

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cours des vingt dernières années (Acs et Audretsch, 2003; Audretsch, 2002; Casson, 1982, 2003; Gartner, 1990;Glancey et McQuaid, 2000; Shane, 2000; Storey, 2000; Swedberg, 2000; Westhead et Wrigth, 2000; etc). Bull et al. (1996) suggèrent cinq grandes catégories de publications: la littérature qui ne s'intéresse pas directement à la théorie, mais qui se concentre sur la tentative de donner une définition au mot «Entrepreneur», l'analyse des traits psychologiques des personnes définies comme des entrepreneurs, des enquêtes sur la formation de nouvelles entreprises, des études sur les stratégies reconnues comme essentielles afin d'expliquer le succès des entreprises commerciales, et les œuvres sur les facteurs environnementaux qui influent sur les actions de l'entreprise. Cependant, l'esprit d'entreprise est toujours «l'une des formes de comportement économique les plus insaisissables et moins comprises» (Eboli, 1997). D'où la nécessité d'identifier les caractéristiques entrepreneuriales des créateurs d'entreprise. C'est l'optique des travaux relatifs à l'inventaire des caractéristiques entrepreneuriales (Gasse, 1996; 2003). Celles-ci permettent de cerner le potentiel entrepreneurial du créateur mais aussi les déterminants de sa décision d'être dirigeant créateur. C'est cette dernière option qui fait l'objet de notre article.

Comme le suggère Baumol (1968), il est nécessaire de cerner la position de l'entrepreneur pour comprendre le comportement de son entreprise. D'où la distinction entre le créateur gestionnaire et le créateur entrepreneur**.** Le premier supervise les activités en cours: la répartition des investissements, les contrôles des horaires et les contrats à respecter, etc. Il est en charge de l'activité de routine. Inversement, la fonction d'entrepreneur concerne l'élaboration et la mise en œuvre de nouvelles idées: il est «l'innovateur de Schumpeter» qui perçoit les besoins non satisfaits (Kirzner, 1983). Il travaille plus dur que le gestionnaire (De Fraja, 1996). Il fournit de nouvelles idées, de nouveaux produits et de nouvelles manières de faire les choses (Iyigun et Owen, 1998). La distinction entre l'entrepreneur et le gestionnaire reflète les deux types de fonctions sous-tendant le choix d'être dirigeant créateur: les décisions de routine et les décisions non courantes. Peut-on trouver une telle distinction à partir des caractéristiques entrepreneuriales particulières selon les types de créateurs?

Pour répondre à cette interrogation, il nous paraît intéressant d'observer les caractéristiques des entrepreneurs sur la manière d'opérer le choix de créer une entreprise à partir de ses propres perceptions ou d'image de soi. L'approche retenue est celle de l'adaptation de l'Inventaire des Caractéristiques Entrepreneuriales (ICE) du professeur Yvon GASSE (1996; 2003). Cette démarche a été adaptée à une enquête réalisée auprès de 172 dirigeants créateurs de PME en activité avec une perspective de pérennité au dernier trimestre 2009.

Nos questionnements fondamentaux sont simples, voire triviaux. On peut, en effet, se demander s'il existe ou non un ou plusieurs profil(s) type(s) de dirigeants créateurs de PME à partir de leurs caractéristiques entrepreneuriales. Il s'agit également de savoir si l'entrepreneur appartient à une certaine catégorie sociale ou familiale ou à un profil psychologique précis l'aidant dans sa décision de devenir dirigeant créateur. Enfin, on est en droit de chercher si l'élaboration d'un tel profil peut aider à combler certaines lacunes d'un porteur de projet de création d'entreprise. Nous avons diligenté une enquête sur les caractéristiques entrepreneuriales auprès de 172 créateurs de PME du littoral dunkerquois 2009 (Nord de la France) au dernier trimestre 2009. La finalité essentielle d'une telle enquête est d'inventorier et de classer les caractéristiques entrepreneuriales et, par la suite, d'établir une typologie des entrepreneurs. Compte tenu des caractéristiques de l'enquête, l'analyse consiste à différencier la perception de leur décision de créateur d'entreprise Autrement dit, deux objectifs principaux sous-tendent cette étude.

- Cerner les caractéristiques entrepreneuriales qui accompagnent la décision de devenir dirigeant créateur d'entreprise; les composantes d'une telle décision relèvent des représentations, a posteriori, que le dirigeant créateur se fait de ses propres caractéristiques entrepreneuriales.
- Déterminer s'il y a des différenciations entre les entrepreneurs au regard des modes décisionnels mis en évidence.

C'est une phase d'étude qui aidera à comprendre les personnalités des entrepreneurs et permettra d'apporter les premiers éléments de réponse à ces deux objectifs relatifs à une meilleure connaissance des entrepreneurs face aux modes décisionnels. La démarche méthodologique retenue (voir encadré) nous permet d'articuler l'article autour de trois points.

- Importance des caractéristiques entrepreneuriales dans la décision du dirigeant créateur.
- Pertinence des interactions entre le comportement entrepreneurial du dirigeant créateur et ses caractéristiques intrinsèques.
- Positionnement des caractéristiques entrepreneuriales dans les décisions de routine et les choix non courants au regard des représentations que le dirigeant se fait de son contexte d'action.

## 2. APPROCHES METHODOLOGIQUES

Les approches méthodologiques de cette étude sont fondées sur les méthodes statistiques de traitement d'une base de données d'enquête. Partant des résultats de la base d'enquête mise en place, il s'agit d'extraire les informations essentielles en utilisant les techniques statistiques d'analyse exploratoire multidimensionnelle et d'établir une première vue d'ensemble sur les liens éventuels entre les identifications des entrepreneurs et leurs perceptions du choix de créateur d'entreprise.

### 1. ***Description de la base de données d'enquête***

Afin de mener à bien cette étude, un questionnaire a été rempli par 172 créateurs de PME du littoral dunkerquois. Il s'agit ici d'identifier et d'établir la typologie des entrepreneurs. Ce questionnaire se décompose en deux parties. Une première partie concerne les identifiants des entrepreneurs enquêtés: nom, prénom, coordonnées, sexe, âge, plus haut degré de scolarité, catégorie socioprofessionnelle et l'expérience professionnelle avant la création d'entreprise. La deuxième partie du questionnaire est composée de 120 questions (variables) relatives aux quinze types de caractéristiques entrepreneuriales. Il s'agit de quinze dimensions clés articulées autour de cinq axes.

**Axe des motivations** : accomplissement, pouvoir et autonomie ;

**Axe des aptitudes** : confiance en soi, énergie, persévérance, tolérance au stress et capacité conceptuelle (imagination, intuition conceptuelle) ;

**Axe des intérêts** : innovation (aimer et réaliser des innovations) et action (faire agir et faire soi-même) ;

**Axe des attitudes** : attitudes face à la concurrence et face au changement ;

**<u>Axe du comportement</u>** : affectivité (s'intéresser aux autres, écouter et apprécier les autres), cognition (veille informationnelle et recherche de nouvelles connaissances) et co-action (conception et réalisation de projet, saisie d'opportunités).
Chacune des 120 questions est codée en 4 modalités mutuellement exclusives qui vont de la modalité de totalement en accord à la modalité de totalement en désaccord selon une échelle de Likert. C'est dire que quinze nouvelles variables (dites variables clés : composantes des cinq axes ci-dessus) ont été générées à partir des 120 questions. Chaque variable clé est obtenue en calculant un score moyen des réponses des dirigeants ayant répondu au questionnaire écrit administré en face à face.

### *2. Méthodes de traitement*

Après recodage de certaines variables de la base d'enquête et suppression des informations manquantes, nous disposons d'une base de données qualifiée comportant 172 dirigeants créateurs de PME évalués selon 8 variables d'identification et 95 variables de perception. Cette base de données sous Excel a par la suite été importée sous SPAD et sous SPSS. Au-delà de cette base de données sous Excel, nous disposons ainsi de deux versions de la même base de données d'enquête permettant d'avoir des traitements statistiques plus complets pour l'analyse.
Deux types de traitement statistiques ont été menés. Un premier traitement a consisté en une analyse exploratoire simple afin de décrire les différentes variables de l'enquête. Un deuxième traitement a conduit à une analyse statistique multiple. Cette dernière analyse est obtenue grâce aux méthodes statistiques exploratoires multidimensionnelles (Analyse des Correspondances Multiples (ACM) et Classification Ascendante Hiérarchique (CAH)) disponibles dans le logiciel SPAD. Il s'agit essentiellement d'extraire les grandes tendances de perception de soi des dirigeants créateurs de PME et de les regrouper dans un certain nombre de classes d'entrepreneurs.

### *3. Indications sur les caractéristiques des dirigeants enquêtés*

Tableau1. Quelques indications sur l'histoire de vie des dirigeants de PME enquêtés

| Sexe | | Age | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Hommes** | **Femmes** | **Moins de 25 ans** | **25/29 ans** | **30/34 ans** | **35/39 ans** | **40/44 ans** | **45/49 ans** | **50 ans et plus** |
| **69%** | **31%** | **3%** | **8%** | **10%** | **16%** | **20%** | **18%** | **25%** |
| Niveau scolaire et expérience professionnelle | | | | | | | | |
| **Etudes primaires** | **BEPC ou niveau** | **Bac ou niveau** | **Bac+2** | **Bac+3 et plus** | **Parents entrepreneurs ou indépendants** | **Parents non entrepreneurs ou non indépendants** | **Expérience de salarié dans une PME** | **Aucune expérience de salarié en PME** |
| **6%** | **45%** | **17%** | **21%** | **11%** | **47%** | **53%** | **63%** | **37%** |

Les hommes représentent près des deux tiers des dirigeants de PME enquêtés (69%) tandis que les femmes en représentent le tiers (31%). Les dirigeants de plus de 50 ans ont le plus fort pourcentage par rapport aux autres tranches d'âge. Ainsi, 79% de nos entrepreneurs ont plus de 35 ans. Nous observons que plus de la moitié de ces individus ont plus de 40 ans et qu'aucun n'a moins de 20 ans.

Près de la moitié de ce groupe de responsables a le BEPC et au-delà. Compte tenu de la répartition de l'âge de ces entrepreneurs, nous pourrions penser que les individus les plus âgés soient les moins diplômés et inversement : que les plus jeunes soient les plus diplômés.

On remarque également que 47% des parents des personnes enquêtées possèdent ou ont possédé une entreprise ou ont déjà travaillé à leur propre compte c'est-à-dire près d'une personne sur deux. L'expérience de salarié dans une PME est une réalité pour 63% d'entre eux. Plus d'un entrepreneur sur deux (59%) a créé une micro-entreprise (de 1 à 9 salariés), un tiers (34%) est plutôt chef d'une petite entreprise (de 10 à 49 salariés) et 7% ont créé une entreprise moyenne (de 50 à 249 salariés)[2].

## 3. POIDS DES CARACTERISTIQUES ENTREPRENEURIALES DES REPRESENTATIONS SYMBOLIQUES DANS LA CREATION D'ENTREPRISE

Ces caractéristiques constituent les items proposés aux dirigeants enquêtés. Ils les ont évaluées à partir de leurs propres représentations. Rappelons que la notion de représentation sociale, introduite au début des années soixante par Serge MOSCOVICI (1961), confère à l'action et au contexte social un rôle heuristique significatif dans l'appréciation des choix et des comportements effectifs des acteurs engagés dans la vie sociale et organisationnelle, notamment dans la création d'activité ou d'entreprise. Elle renvoie aux interactions sujet/objet représenté dans un contexte socio-économique mouvant.

Il n'est pas inutile de préciser que dès 1898 Emile DURKHEIM (1898) donne à la notion de représentation ses dimensions sociologiques et psychologiques contemporaines. En effet, les développements les plus récents de la psychologie sociale sont venus confirmer l'importance des éléments subjectifs qui naissent dans le quotidien des interactions sociales et qui sont partiellement indépendants des structures et des processus cognitifs individuels. Partiellement indépendants, parce que la compréhension, la construction et la production de sens, qui guident l'action, ne résultent pas uniquement d'activités purement cognitives. Des nombreuses et complexes interactions qui caractérisent un champ socio-économique tel que la création d'entreprise émergent des discours, des pratiques, des idées, des valeurs, des idéologies, des cultures et des schèmes de pensée qui sous-tendent les conduites des entrepreneurs et donnent sens à leurs comportements. Les décisions qu'ils prennent ou les choix qu'ils sont amenés à effectuer relèvent d'une rationalité située et construite (Zaoual, 1996). Celle-ci intègre objectivité et subjectivité, rationalité et irrationalité ou certitude et incertitude à travers leurs caractéristiques entrepreneuriales.

Ainsi, le champ de représentations de l'entrepreneur se construit et se restructure en permanence sous l'influence d'une multitude de facteurs psychosociologiques, cognitifs et symboliques qui se combinent, se croisent et accentuent la complexité des systèmes de représentations par le jeu des interactions. Tandis que, la notion d'interaction dynamique et récursive, qu'introduit la pensée complexe appliquée à la création et à la gestion des entreprises, nous fait découvrir un sujet connaissant (le dirigeant créateur) agissant et agi

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[2] Nos entreprises moyennes ont plutôt entre 50 et 120 salariés

par les relations physiques et virtuelles qu'il entretient avec le monde qui l'entoure et qu'il filtre grâce aux caractéristiques entrepreneuriales. Celles-ci sont articulées autour des cinq dimensions qu'il convient de rappeler. Il s'agit des motivations, des aptitudes, des intérêts, des attitudes et du comportement entrepreneurial[3].

### 3.1 Du rôle des motivations

A propos de «l'**accomplissement**», les entrepreneurs sont en grande majorité motivés de mener à terme les projets exigeants, d'être meilleurs que les autres dans leur domaine, d'avoir le plein contrôle des ressources nécessaires au travail mené, de vouloir que tout travail comporte de nouveaux savoirs et que les projets retenus aient de la valeur. Ils ont presque tous une volonté absolue à fixer leurs propres objectifs. Mais un tiers d'entre eux, opposé au reste, tolère aussi bien que quiconque l'inefficacité, n'a pas une volonté absolue d'accomplir les choses difficiles et préfère choisir des amis plutôt que des experts comme partenaires de la conduite d'un projet.

Concernant «le **pouvoir**», la majorité des entrepreneurs enquêtés sont enclins à être patron, pensent être meilleur que les autres dans leur domaine, ont une préférence pour les travaux à fortes responsabilités, influencent les autres et les amènent, autant que possible, à faire ce qu'ils souhaitent. Il apparaît également qu'un tiers de ces entrepreneurs ne se conforme pas facilement aux directives reçues et est très peu motivé pour diriger des groupes de travail. Pour «l'**autonomie**» deux tiers des entrepreneurs ont une préférence pour décider seul, ne se conforment pas facilement aux directives reçues, ont un sentiment de gêne par des contraintes et des restrictions obligatoires et préfèrent les activités n'obligeant pas des directives préétablies. Ils sont dans l'ensemble à l'aise pour prendre des décisions autonomes et en grande majorité, considèrent qu'avoir une bonne marge de manœuvre est une source d'efficacité. Mais ces mêmes entrepreneurs sont attachés au respect des conventions ; ils sont également prêts à accepter les démarches des autres au détriment de leurs propres méthodes. De ce fait, l'autonomie est une caractéristique entrepreneuriale évaluée favorablement par les dirigeants enquêtés avec l'apparition de certaines contradictions.

***Dans l'ensemble, les dirigeants créateurs sont concordants au niveau des composantes de l'accomplissement et du pouvoir et sont plutôt divergents sur celles de l'autonomie. Il apparaît donc que ces responsables soient essentiellement motivés par le besoin d'accomplissement et par le pouvoir exercé sur les autres en tant que chef d'entreprise. C'est déterminant dans leur choix d'être dirigeant créateur d'entreprise.***

### 3.2 La persévérance : la clef de la délivrance entrepreneuriale

De par la variable «**confiance en soi**», les dirigeants créateurs enquêtés ont une aisance dans l'expression de leurs opinions, ont confiance dans la réussite de toute activité entreprise et se sentent à la hauteur de leur tâche. Ils sont à l'aise dans les discussions avec leurs confrères même en cas de désaccord et sont certains de mener à bien un projet planifié. Mais un tiers des entrepreneurs n'est pas à l'aise devant les personnes en autorité, ne juge pas obtenir de bons résultats par rapport aux moyens décidés et n'est pas à l'aise dans la prise de parole devant un groupe ni dans la prise de décisions.

Il en est de même de la variable «**énergie**». Nos dirigeants créateurs de PME ont, dans

[3] Les opinions positives développées par la suite sont émises par plus des deux tiers des enquêtés

l’ensemble, une volonté de travail de longs moments sans interruption et sont toujours en situation de forte activité. Seul un tiers d’entre eux ne peut accomplir des tâches multiples et ne pense pas disposer de beaucoup plus d’énergie que les autres. Concernant la «**persévérance**», ils ont une volonté d’aller jusqu’au bout de la tâche à accomplir peu importent les obstacles ou les difficultés. Ils fournissent un maximum d’efforts et travaillent de longues heures sans interruption pour la réussite d’un projet entrepris et refusent l’échec. Mais ils doivent gérer leur «**stress**» pour maintenir leur niveau de productivité et leur sérénité devant des conditions de travail difficiles ou face à la complexité de multiples tâchent à accomplir. Par ailleurs, ils s’adaptent facilement face à des changements importants et ont une vision toujours positive des choses. La «**capacité conceptuelle**» y joue un rôle important. Ainsi, les entrepreneurs enquêtés ont en grande majorité une vision nette des résultats avant le démarrage de toute opération, une volonté de participation à des travaux nécessitant un ajustement à des compétences différentes. Ils considèrent qu’il est plus efficace de résoudre un problème avec la prise en compte de plusieurs choix. Ils ne prennent uniquement en compte que les grandes étapes d’un projet. Ces mêmes deux tiers des enquêtés empruntent fréquemment des exemples à d’autres champs d’activité et sont habiles à dénouer des situations très complexes.

***Les réponses des entrepreneurs enquêtés sont essentiellement en accord avec les composantes de la persévérance tandis qu’elles sont plus divisées sur celles de la confiance en soi, de l’énergie, de la tolérance au stress et de la capacité conceptuelle. Ainsi, la persévérance est la seule aptitude entrepreneuriale sur laquelle plus des deux tiers des dirigeants créateurs de PME ont un avis convergent.***

### 3.3 Les intérêts : innovation et création

Les enquêtés, dans l’ensemble, imaginent constamment d’autres méthodes pour mieux exercer leur métier de dirigeant, sont enclins à produire des idées originales et pensent important de suivre les projets de leur début jusqu’à leur fin. Un tiers de ces entrepreneurs ne génère pas constamment des idées nouvelles, n’imaginent pas de multiples utilisations à des objets d’usage courant et ne sont guère attentifs aux nouveautés hors de leur champ d’activité. Etre le premier à essayer les nouveaux produits qui sortent sur le marché n’est pas un critère déterminant, selon eux, pour être dirigeant créateur car seulement la moitié de ces entrepreneurs pensent innovateurs.

Environ un créateur sur deux accepterait de recommencer l’aventure entrepreneuriale en cas d’échec. Dans leurs réponses, deux tiers des entrepreneurs agissent sous l’impulsion du moment quitte à se réajuster par la suite. En majorité, ils sont impatients lors de réunions tardant à entrer dans le vif du sujet, à l’aise et prennent du plaisir à être au cœur de l’action.

***On se rend compte que les réponses des entrepreneurs présentent des avis divergents sur certaines composantes de l’intérêt pour l’innovation et l’action.***

### 3.4 Les attitudes: compétition et création

«**Face à la concurrence**», la compétition est majoritairement considérée comme un stimulant d’efficacité dans les affaires. C’est un des ressorts essentiels du métier de dirigeant créateur de PME. Dans l’ensemble, les entrepreneurs ont une facilité «**d’adaptation aux changements**» importants. Mais ils trouvent les contraintes et les restrictions auxquelles il faut se plier comme contraires à leur volonté d’agir. Au même

moment, ils avouent avoir une volonté de participation à des travaux nécessitant un ajustement à des compétences différentes avec la possibilité d'introduire des changements à tous les niveaux de leur entreprise.
***De telles réponses montrent que les entrepreneurs semblent avoir une perception commune sur leurs attitudes face à la concurrence et au changement.***

### 3.5 Le comportement entrepreneurial : perception positivement convergente

Il s'agit des opinions que les enquêtés ont émis sur leurs propres comportements. Ils déclarent se sentir à l'aise dans les discussions discordantes avec leurs confrères et avouent disposer d'un talent de mobilisateur. Ils sont profondément ancrés dans leurs rôles et ont du mal à se mettre à la place des autres. Le poids de la variable «**affectivité**» est donc limité. Ce n'est pas le cas de la «**cognition**». En effet, une grande majorité des entrepreneurs pensent importantes les méthodologies d'action débouchant rapidement sur des résultats, consultent régulièrement les publications liées à leur champ d'activité, pensent possible de retirer quelque chose d'intéressant de n'importe quelle situation, ont une volonté de participation à des travaux nécessitant un ajustement à des compétences différentes. Par ailleurs, ils estiment que les projets retenus doivent avoir de la valeur, que les expériences concrètes sont une meilleure source d'apprentissage, et qu'il est plus efficace de résoudre un problème avec la prise en compte de plusieurs choix. De plus, ils considèrent les résultats issus des phases de mise en œuvre de projet comme une source de nouvelles connaissances. Enfin, ils sont presque unanimes à considérer que les résultats obtenus constituent une source d'évaluation des progrès personnels et de l'efficacité du système de veille informationnelle. C'est aussi le point d'ancrage de leur «**comportement dans l'action**». Ainsi, les enquêtés avouent faire preuve d'une volonté constante de saisir les occasions susceptibles de se présenter et de prise d'initiative. Pour eux, toutes les circonstances peuvent être source de profit. C'est pour cela qu'il leur est indispensable d'être à l'aise au niveau du travail nécessitant des décisions rapides et des contacts avec des personnes ressources dans la mise en œuvre des projets de l'entreprise. De la même manière, deux tiers d'entre eux pensent que l'intuition a un fort impact sur les décisions prises. Ils sont ainsi amenés à agir sous l'impulsion du moment avec réajustement par la suite même s'ils pensent avoir de l'influence ou une bonne marge de manœuvre sur leurs événements personnels.

## 4. INTERACTIONS ENTRE LE COMPORTEMENT ENTREPRENEURIAL DU DIRIGEANT CREATEUR ET SES CARACTERISTIQUES INTRINSEQUES

Après la phase d'exploration simple, la base de données qualifiée a été soumise à une chaîne d'analyses exploratoires multidimensionnelle utilisant les 8 éléments d'identification et les 95 questions non agrégées de l'enquête. Le but principal de cette chaîne d'approches exploratoires est de rechercher et de structurer les grandes tendances des perceptions que les enquêtés ont de leur décision d'être dirigeant créateur. Il s'agit de caractériser ces grandes tendances selon les 8 éléments d'identification.
Afin de pouvoir identifier au mieux les diverses perceptions des entrepreneurs, nous avons créé un tableau numérique de 172 lignes correspondant aux entrepreneurs enquêtés et de 113 colonnes dont 8 correspondent aux éléments d'identification et les 95 restantes aux questions non agrégées. Ensuite, nous avons soumis ce tableau numérique aux techniques statistiques d'analyse de données dite factorielle (Analyse des Correspondances

Multiples) complétées par une technique de classification hiérarchique ascendante pour séparer et regrouper les entrepreneurs en différentes classes. Ces méthodes sont destinées à fournir des représentations graphiques simples et des groupes plus ou moins homogènes. Nous avons utilisé les logiciels statistiques SPAD_5.0 et SPSS 10.0.

Afin d'identifier au mieux les entrepreneurs, nous nous sommes focalisés dans un premier temps sur les 8 éléments d'identification des entrepreneurs et les 95 variables non agrégées (questions).

Pour comprendre au mieux les entrepreneurs enquêtés, des tendances doivent être dégagées de l'ensemble des données à analyser c'est-à-dire que dans un premier temps, il s'agit de rechercher un ou plusieurs axes principaux (tendances) pour pouvoir classer et établir la typologie des entrepreneurs en plusieurs groupes de mêmes caractéristiques d'identification et de perceptions du métier de dirigeant de PME au sens du potentiel entrepreneurial. Ces tendances sont générées (en utilisant le logiciel SPAD_5.0) et consignées dans le tableau n°1.

Tableau 1. Pourcentages des quatre premières valeurs propres

| **Numéro** | **Valeur propre** | **Pourcentage** | **Pourcentage cumulé** |
|---|---|---|---|
| 1 | 0,2005 | 7,24 | 7,24 |
| 2 | 0,0962 | 3,48 | 10,72 |
| 3 | 0,0579 | 2,09 | 12,81 |
| 4 | 0,0553 | 2,00 | 14,81 |

Les deux premières valeurs propres recueillent à elles seules 10,72% d'information. Elles correspondent aux deux tendances les plus importantes. Les autres valeurs propres ne contiennent qu'un faible pourcentage d'information comparée aux deux premières et n'apportent guère d'éléments significatifs supplémentaires. Afin de mener à bien cette étude, nous étudierons les deux premières tendances.

### 4.1 Description de la première tendance : domination des facteurs de motivation

La première tendance correspond au premier axe factoriel. Cet axe factoriel a un taux d'inertie de 7,24 % c'est-à-dire que cette première tendance regroupe 7,24% d'information[4].

[4] La faiblesse de ces informations rendues est normale et caractéristique de la technique ACM (Analyse en Composantes Multiples) qui opère généralement sur des tableaux de grandes tailles avec de faibles valeurs.

Tableau 2. Première tendance des caractéristiques entrepreneuriales significativement perçues

| **Libellé des caractéristiques entrepreneuriales** | **Libellé de la modalité** | **Pourcentage de la question dans l'axe** | **Pourcentage de la caractéristique dans la dimension** | **Dimension clé à laquelle se rapporte la caractéristique** |
|---|---|---|---|---|
| A l'aise pour prendre des décisions autonomes | Totalement en accord | 2,1 | 59,52 | Autonomie |
| Volonté d'aller jusqu'au bout de la tâche à accomplir peu importe les obstacles | Totalement en accord | 2,04 | 66,18 | Persévérance |
| Volonté absolue à fixer ses propres objectifs | Totalement en accord | 1,89 | 61,38 | Accomplissement |
| Aisance au niveau du travail nécessitant des décisions rapides | Totalement en accord | 1,86 | 67,74 | Coaction (conception et réalisation de projet) |
| Volonté absolue à mener à terme les projets exigeants | Totalement en accord | 1,82 | 44,51 | Accomplissement |
| Etre meilleur que les autres dans son domaine | Totalement en accord | 1,6 | 53,75 | Accomplissement et Pouvoir |
| Aisance à accomplir plusieurs tâches | Totalement en accord | 1,57 | 42,68 | Energie et Stress |
| Bonne marge de manœuvre comme source d'efficacité | Totalement en accord | 1,56 | 58,97 | Autonomie |

Cette première tendance est caractérisée essentiellement par le total accord des entrepreneurs au niveau de sept dimensions clés : autonomie, persévérance, accomplissement, coaction, pouvoir, énergie et tolérance au stress. Ces sept dimensions cumulent 14.44% de l'information sur ce premier axe factoriel. On peut les articuler autour de trois types de variables.

- **Variables de motivation**: accomplissement, autonomie et pouvoir, avec plus de 62% de l'information (8.97% sur 14.44%);
- **Variables d'aptitude au sens de capacité professionnelle**: énergie, persévérance et stress, avec 25% de l'information (3.61% sur 14.44%);
- **Variables d'action**: coaction (conception et réalisation de projet), avec près de 13% de l'information (1.86% sur 14.44%).

Nous observons que l'accomplissement est une variable fréquente dans cette première tendance (près de 37% de l'information. S'y ajoute l'autonomie (plus de 25% de l'information). Autrement dit, les variables de motivation dominent ce premier axe factoriel.

### 4.2 Description de la deuxième tendance : prééminence des facteurs d’aptitude

La deuxième tendance correspond au deuxième axe factoriel. Cet axe regroupe 3,48% de l’information.

Tableau 3. Deuxième tendance des caractéristiques entrepreneuriales significativement perçues

| **Libellé des caractéristiques entrepreneuriales** | **Libellé de la modalité** | **Contribution de la question sur l'axe** | **Pourcentage de la caractéristique dans la dimension** | **Dimension clé à laquelle se rapporte la caractéristique** |
|---|---|---|---|---|
| Concurrence comme source d'efficacité | Totalement en désaccord | 3,48 | 55,46 | Concurrence |
| Facilité d'adaptation face à des changements importants | Plutôt en désaccord | 3,39 | 39,82 | Changement |
| Concurrence comme source de stimulation compétitive dans les affaires | Totalement en désaccord | 2,91 | 80,41 | Concurrence |
| Toutes circonstances comme source de profit | Plutôt en désaccord | 2,9 | 61,72 | Coaction (conception et réalisation de projet) |
| Volonté de connaître les nouveautés dans mon champ d'activité | Plutôt en désaccord | 2,62 | 43,13 | Cognition |
| Préférence pour les travaux à fortes responsabilités | Totalement en désaccord | 2,53 | 61,66 | Pouvoir |
| Aisance dans les discussions avec des dirigeants même en cas de désaccord | Totalement en désaccord | 2,46 | 64,23 | Confiance en soi et Affectivité |
| Imagination de multiples utilisations à des objets d'usage courant | Totalement en désaccord | 2,44 | 52,05 | Innovation |
| Volonté d'aller jusqu'au bout de ce qui est commencé peu importent les difficultés | Totalement en désaccord | 2,41 | 71,37 | Persévérance |

Cette deuxième tendance met en évidence les attitudes face à la concurrence et au changement, le comportement dans l’action, la cognition, le pouvoir, la confiance en soi, le comportement affectif, l’innovation et la persévérance.

Contrairement à la première tendance, les entrepreneurs associés à cette deuxième tendance sont totalement ou plutôt en désaccord avec certaines idées proposées. Nous les regroupons en trois catégories de variables :

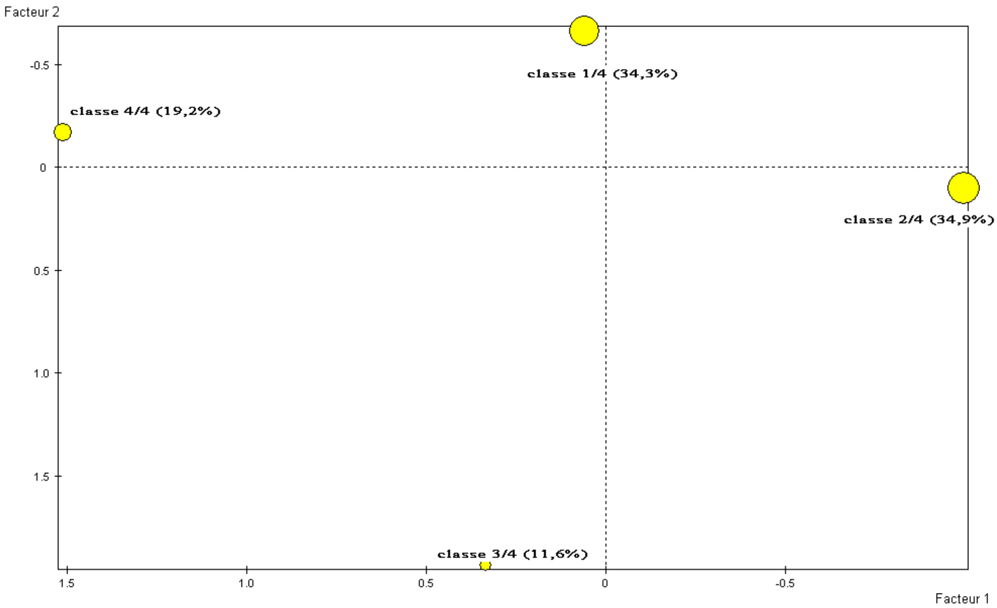
- **Variables d'aptitude au sens de capacité professionnelle**: capacité de différenciation (attitude face au changement et à la concurrence, et intérêt pour l'innovation), confiance en soi, affectivité et persévérance;
- **Variables de motivation**: pouvoir;
- **Variables d'action**: coaction (conception et réalisation de projet) et cognition.

Nous observons que les variables d'aptitude caractérisent mieux cette deuxième tendance. Elles représentent près de 70% (17.09% sur 25.14%) de l'information que l'ensemble des caractéristiques entrepreneuriales significativement perçues concentre sur le deuxième axe factoriel. La prise en compte de la concurrence y est fortement représentée, avec plus du quart de cette même information soit 6.39% (3.48+2.91) sur 25.14%.
Le contenu de ces deux premières tendances fondamentales montre que le comportement entrepreneurial du dirigeant de PME résulte des variables de motivation et d'aptitude. Les résultats fournis par l'analyse des correspondances multiples sont significatifs. En fait, cette technique permet de partir des énoncés en les considérant comme des variables à par entière. Des recombinaisons sont effectuées et réorientées vers les dimensions. Même s'il s'agit d'une technique exploratoire, elle a le mérite de réduire le nombre d'énoncés et de résumer les relations entre les variables à l'aide d'un ensemble de facteurs aussi restreint que possible qui est censé discriminer les données de manière à être facilement interprétable. Elle est complétée par la classification ascendante hiérarchique qui s'interprète en termes de partitions. Une partition n'est intéressante que si les classes sont nettement individualisées, c'est-à-dire qu'elles doivent former chacune un tout cohérent, bien caractérisé (compacité) et être distinctes les unes des autres (séparabilité). C'est en vertu de ces considérations méthodologiques que nous retenons les quatre classes les plus stables. La prise en compte de leur contenu nous autorise à proposer une typologie de trois groupes d'entrepreneurs en termes de comportements décisionnels.

## 5. DIFFERENCIATION DES COMPORTEMENTS DECISIONNELS ISSUE DES CARACTERISTIQUES ENTREPRENEURIALES

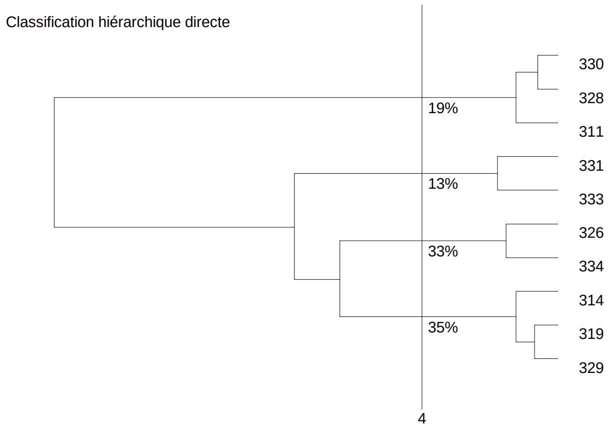
Après avoir déterminé les deux grandes tendances de ces entrepreneurs, il s'agit ici de les regrouper et d'établir une typologie de classes d'entrepreneurs par éléments d'identification et par variables clés traduisant leurs comportements décisionnels. Afin de mener à bien cette étude, ce traitement de données a été effectué à l'aide d'une Analyse des Correspondances Multiples suivie d'une Classification Ascendante Hiérarchique sur le logiciel SPAD_5.0. Quatre classes résultent de cette analyse et se positionnent comme suivant sur le graphique des deux grandes tendances réalisé précédemment.

Graphique 1 - Projection plane des quatre classes d’entrepreneurs




Ces quatre classes bien distinctes suivent les tendances étudiées précédemment (facteurs 1 et 2). En effet, la classe 1/4 (59 personnes) est opposée à la classe 3/4 (20 personnes) sur le premier axe factoriel et la classe 2/4 (60 personnes) à la classe 4/4 (33 personnes) sur le deuxième axe factoriel. L’étude de ces classes équivaut à rechercher des profils d’entrepreneurs décideurs plus ou moins complets. Afin de compléter ces premières tendances et de regrouper au mieux les entrepreneurs enquêtés, nous avons effectué une classification hiérarchique ascendante sur les deux facteurs étudiés précédemment (axes).

Graphique 2 - Arborescence selon l’histoire de vie et les perceptions des entrepreneurs



Cet arbre montre le mode de rattachement des entrepreneurs les uns aux autres. Nous ne présentons ici que les dix derniers nœuds autrement dit les branches supérieures car nous étudions quatre classes. Nous remarquons l'existence d'une classe relativement stable comprenant 19% des entrepreneurs c'est-à-dire qu'elle se rattache aux autres branches de l'arbre à son sommet. Cette classe correspond à la classe 4/4. De plus, un tel constat suppose une certaine stabilité des réponses des entrepreneurs composant cette classe. Nous retrouvons également les trois autres classes 1/4, 2/4 et 3/4. Par ailleurs, l'Analyse des Correspondances Multiples détermine les questions ainsi que les modalités associées qui caractérisent au mieux les classes. Cette analyse fournit des contenus identiques pour les clases 1/4 et 2/4. Nous pouvons ainsi les agréger dans un seul groupe d'entrepreneurs. En définitive, nous obtenons trois catégories d'entrepreneurs au vu de leurs opinions sur les caractéristiques déterminant leurs comportements décisionnels.

### 5.1 Les entrepreneurs de décisions non courantes - 68 % de l'effectif enquêté

Ils sont issus de l'addition des classes 1/4 et 2/4 compte tenu de la quasi-concordance au niveau de leurs caractéristiques entrepreneuriales. Ils s'apparentent aux créateurs gestionnaires de Baumol (1968) et sont au cœur d'un construit systémique et socialement organisé. Leurs caractéristiques semblent être liées à un comportement plus actif vis-à-vis de l'environnement de leur entreprise.

Tableau 4. Principales caractéristiques entrepreneuriales (classe 1/4 et classe 2/4)

| **Libellés des caractéristiques entrepreneuriales** | **Libellés des modalités** | **Poids (%) de la caractéristique dans l'échantillon** | **Poids (%) de la caractéristique dans le groupe** | **Dimension clé à laquelle se rattache la caractéristique** |
|---|---|---|---|---|
| Volonté de connaître les nouveautés dans mon champ d'activité | Totalement en accord | 47.10 | 69.50 | Cognition |
| Capacité à créer des changements organisationnels comme source de réussite de l'entrepreneur | Plutôt en accord | 46.51 | 75.00 | Changement |
| Volonté absolue à fixer ses propres objectifs | Plutôt en accord | 57.56 | 85.00 | Accomplissement |
| Toujours plus productif avec un niveau de stress élevé | Plutôt en désaccord | 41.86 | 70.00 | Stress |
| Importance de suivre les projets de leur début jusqu'à leur fin | Plutôt en accord | 44.19 | 71.67 | Innovation et Changement |
| A l'aise pour prendre des décisions autonomes | Plutôt en accord | 53.49 | 80.00 | Autonomie |
| Concurrence comme source d'efficacité | Plutôt en accord | 40.12 | 66.67 | Concurrence |
| Volonté de mener jusqu'au bout un projet entrepris même difficile | Plutôt en accord | 39.53 | 65.00 | Persévérance |
| Enclin à être patron | Plutôt en accord | 41.28 | 66.67 | Pouvoir |
| Résultats obtenus comme source d'évaluation des progrès personnels | Plutôt en accord | 48.84 | 73.33 | Cognition |
| Volonté d'aller jusqu'au bout de ce qui est commencé peu importe les difficultés | Plutôt en accord | 50.58 | 75.00 | Persévérance |

Les entrepreneurs de la première sous classe ne sont pas identifiables par leur sexe car à 1% près, les effectifs d'hommes et de femmes de la classe 1/4 et de l'échantillon sont égaux. Leur âge est significatif. En moyenne, ces entrepreneurs sont plus âgés que ceux de l'échantillon. En effet, la différence de pourcentage est de 11% pour les personnes de plus de 40 ans. De même, ces entrepreneurs semblent être plus diplômés que ceux de l'échantillon (Bac +2 à Bac +3 ou plus). Ces entrepreneurs ont tendance à être propriétaires de leur entreprise. Leurs parents n'ont pas exercé d'activité à leur propre compte et n'ont jamais possédé d'entreprise. De plus, ils n'ont pas plus d'expérience professionnelle dans une PME que les entrepreneurs de l'échantillon ni d'expérience multiple de créateur d'entreprise. Enfin, ils accordent deux fois plus d'importance aux variables d'aptitude par rapport aux facteurs de motivation. Mais ils se différencient des autres par ***leur forte motivation à acquérir de nouvelles connaissances (cognition) au regard de leur contexte d'action***. En fait, certaines composantes des trois dimensions clés de la motivation (accomplissement, autonomie et pouvoir) sont corrélées avec la cognition.

Dans la deuxième sous classe, les hommes ont une très légère tendance à être plus nombreux que dans l'échantillon. Leur âge semble se situer plus particulièrement entre 35 et 45 ans tandis qu'ils ont une scolarité de niveau BEPC ou de niveau Bac. Ces dirigeants d'entreprise ont une culture d'indépendant du fait des parents entrepreneurs et/ou d'avoir eux-mêmes l'expérience antérieure de création d'entreprise. Ils sont 6% de plus à avoir créé une entreprise de très petite ou de petite taille que ceux de l'échantillon. Ils en sont souvent à leur deuxième expérience. Souvent, ils se refusent de s'arrêter sur des schémas acquis et tentent de nouveaux modèles afin d'aller au-delà des choix routiniers.

***- Une prééminence des décisions non routières***

Les analyses modernes de l'entrepreneur développent la vision de Say en disant que l'organisation, la production et la combinaison des apports de ressources nécessitent des compétences d'un autre ordre que ceux du travail de routine. Des chercheurs tels que Schumpeter (1936 ; 1942), Knight (1921) et Kirzner (1983) fournissent une caractérisation de l'entrepreneur de telle sorte que la fonction d'entreprise appartient à la sphère de la prise de décision « non-routinière »: les décisions d'entreprise ne sont pas suffisamment semblables, et ne reviennent pas assez souvent, pour justifier l'élaboration de procédures de routine. L'absence d'un rôle actif de l'entrepreneur dans l'économie néoclassique dérive directement sur l'hypothèse de l'équilibre du marché: des changements peuvent se produire, mais les variations ont été parfaitement anticipées et les attentes ne pourront jamais être déçues. Selon Knight (1921), cependant, le changement ne donne pas lieu à des bénéfices, mais l'incertitude et la possibilité d'inexactitude des attentes oui.

L'incertitude souligne la volonté de l'entrepreneur et sa capacité à assumer la responsabilité de la prise de décision: en particulier, «l'incertitude de Knight" se réfère à une situation où il n'y a pas d'expérience factuelle pour soutenir la fixation de probabilités objectives à des évènements pertinents (par rapport au cas de risque, lorsque les probabilités peuvent être attribuées). Si c'est l'incertitude qui caractérise l'environnement, le problème n'est plus représenté par l'exécution effective de l'activité: la question est de savoir quoi faire et comment le faire. Cette «fonction principale» est l'essence même de l'esprit d'entreprise: l'effort de décider comment les différents objectifs seront atteints et de prévoir que les objectifs soient réalisés par l'entrepreneur, "le spécialiste prêt à supporter le coût de l'incertitude» (Knight, 1921). Les théories récentes, en particulier, soulignent que l'entrepreneur ne se contente pas de faire face à la conséquence de la connaissance imparfaite, mais vise plutôt la récompense de la découverte et l'utilisation de nouvelles connaissances. La décision d'entreprise repose sur le génie, la personnalité et le talent d'innovateur-entrepreneur avec le souci permanent d'un comportement actif vis-à-vis des contextes interne et externe.

***- Permanence d'un construit systémique et socialement organisé***

La conception décisionnelle du dirigeant créateur non routinier serait l'œuvre d'une construction cognitive complexe. Autrement dit, la représentation qu'il se fait de ses caractéristiques entrepreneuriales résultent de ses expériences sensibles et cognitives avec une certaine pertinente que celle déduite par l'esprit rationnel et précis. Ce qui veut dire aussi qu'une telle représentation réintroduit l'entrepreneur dans l'acte de construction de la connaissance (Le Moigne , 1995, p. 97). En réalité, nous pensons que les interactions entre le cheminement de pensée et de la praxis, entre la réflexion et l'action, donnent un sens aux activités, aux conduites et aux comportements des entrepreneurs. Elles conditionnent d'une façon dynamique non linéaire (au fil du temps, des actions et des résultats obtenus) leurs structures et leurs processus cognitifs et organisationnels (Stacey, 1995) sous-tendus par les caractéristiques entrepreneuriales évoquées.

C'est dire qu'au niveau de la création d'entreprise, nous admettons que des intentionnalités multiples et diverses engagées dans un flux d'actions s'appuient sur des expériences sensibles et des connaissances fonctionnelles tangibles et intelligibles (Raux, 1995 p. 210 et s.) qui, à leur tour, confirment ou altèrent les structures et les processus cognitifs des sujets pensants et agissants qui animent l'organisation créée et ponctuent sa dynamique. C'est par cette dialectique entre *Empirie* et *Epistémé* (Le Moigne, 1995 p. 104) ou encore entre *praxis* et *conceptulis*[5], que les dirigeants créateurs non routiniers se sentent guidés à la fois par un savoir-faire, une connaissance pertinente préalable à l'action. Ceci est dû au fait qu'ils apprennent consciemment ou tacitement dans et de l'action elle-même. D'où cet appel insistant de Michel CROZIER (1989, pp. 48-50) à réconcilier les deux dimensions de la « réalité » des systèmes sociaux :

« *Les problèmes d'organisations sont à la fois conceptuels et existentiels. Le vécu précède l'idée, mais seule l'idée permet de comprendre le vécu et donc de le formaliser, de le développer et de reculer des limites du possible (p. 49)... Les entreprises ne font pas émerger de nouveaux principes par génération spontanée. Elles ont besoin de la stimulation qu'apporte l'introduction d'un raisonnement formalisé. Mais ce raisonnement formalisé n'a pas de chance de réussir s'il est imposé à partir d'une réflexion technocratique détachée de l'expérience (p. 50)* »

### 5.2 Les entrepreneurs de décisions de routine - 13 % de l'effectif enquêté

Ils semblent s'éloigner à la fois des créateurs gestionnaires et des créateurs entrepreneurs de Baumol (1968). Ils sont au cœur d'un construit contextuel fort mais limité aux activités quotidiennes. Leurs caractéristiques semblent être liées à un comportement plus passif vis-à-vis de l'environnement de leur entreprise.

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[5]On lira quelques-uns des travaux de Abraham A. MOLES, notamment « *Les sciences de l'imprécis* » Édition du Seuil, série, Science ouverte, Paris, 1990, « *Théories des actes. Vers une écologie des actions* » Casterman, Paris, 1977 ou encore « *Labyrinthes du vécu* » Klincksieck, Paris, 1982.

Tableau 5. Principales caractéristiques entrepreneuriales (classe 3/4)

| **Libellés des caractéristiques entrepreneuriales** | **Libellés des modalités** | **Poids (%) de la caractéristique dans l'échantillon** | **Poids (%) de la caractéristique dans le groupe** | **Dimension clé à laquelle se rattache la caractéristique** |
|---|---|---|---|---|
| Premier à essayer les nouveaux produits qui sortent sur le marché | Totalement en désaccord | 10.47 | 50.00 | Innovation |
| Vision toujours positive des choses | Totalement en désaccord | 3.49 | 25.00 | Stress |
| Volonté absolue à accomplir les choses difficiles | Totalement en désaccord | 9.88 | 40.00 | Accomplissement |
| Volonté d'aller jusqu'au bout de ce qui est commencé peu importe les difficultés | Totalement en désaccord | 2.33 | 20.00 | Persévérance |
| Aisance dans les discussions avec des dirigeants même en cas de désaccord | Totalement en désaccord | 2.33 | 20.00 | Confiance en soi et Affectivité |
| Concurrence comme source de stimulation compétitive dans les affaires | Totalement en désaccord | 4.07 | 25.00 | Concurrence |
| Aisance à influencer les autres et à les conduire à faire ce que je veux qu'ils fassent | Totalement en accord | 17.44 | 50.00 | Cognition |

Les questions de modalité 1 (totalement en désaccord) caractérisent fondamentalement ce troisième groupe. Même si cette perception du potentiel entrepreneurial du dirigeant de PME n'est pas grandement affirmée, les avis des entrepreneurs de cette classe convergent sur la modalité totalement en désaccord : ces entrepreneurs semblent évaluer de façon faible les dimensions de motivation et d'aptitude relative à leur potentiel de dirigeant. Parmi ces dirigeants, les femmes sont fortement représentées avec une différence de 19% par rapport à l'ensemble de l'échantillon. Ils ont significativement entre 30 et 40 ans voire entre 20 et 40 ans. Leur niveau scolaire se situe à celui du BEPC ou quelque fois au Bac +2; ceci laisse à penser que les entrepreneurs les plus âgés sont diplômés d'un BEPC tandis que les plus jeunes ont Bac +2. Le pourcentage de travailleurs à leur compte est également significatif. Très peu ont eu d'expérience professionnelle dans une PME avant leur acte de création d'entreprise. Cet élément d'identification est très nettement caractéristique de ce groupe au vu de la grande différence avec l'ensemble de l'échantillon. De même, cette classe a tendance à ne pas avoir eu d'expérience antérieure de créateur d'entreprise. Ils sont à leur première création, au sens de profession libérale (travailleur à son compte) ou de micro entreprise. Ils ont tendance à se limiter aux modèles connus et déjà expérimentés avec le souci permanent de mieux coordonner les ressources et moyens existants.

***- Une prééminence du rôle de coordinateur***

Dans les modèles traditionnels de l'entreprise, l'entrepreneur a le rôle de coordinateur dans une situation où les ressources sont rares. La coordination peut être analysée d'un point de vue général ou partiel. Des études sur l'équilibre général montrent des modèles purement théoriques de marchés qui fonctionnent comme des instruments d'allocation des ressources. Dans ce contexte, le système économique est donc caractérisé par un savoir parfait et les entreprises sont considérées comme des boîtes noires, comme par exemple la transformation d'investissements en production. Lorsque le rôle des entrepreneurs est une simple fonction de coordination des ressources, il reste peu de place pour une théorie de l'esprit d'entreprise: en gros, l'équilibre de l'existence d'un esprit d'entreprise n'est pas nécessaire, étant donné que toutes les ressources sont organisées et affectées de manière efficace (Barreto, 1989). Dans cette ligne de pensée, Leibenstein (1966, 1979) dans sa théorie X-efficacité souligne l'organisation de la fonction de l'entrepreneur. L'entrepreneur qui réussit est celui qui parvient à minimiser les inefficacités qui surgissent inévitablement dans le processus de coordination des facteurs de productions. Le rôle de l'entrepreneur est donc d'améliorer l'efficacité de l'information des flux dans ces marchés, et à «combler l'écart», qui est étroitement apparenté à la fonction d'arbitrage. Ce type d'approche suppose implicitement que la différence entre l'arbitrage simple et la mise en place d'une entreprise réside dans le degré de complexité et le type de contrats en cause plutôt que dans une différence de développement économique. Dans les deux cas, les ressources sont réaffectées, et si cette réaffectation détermine des avantages pour tous, «l'entrepreneur peut faire un grand bénéfice pour son entreprise» (Ricketts, 2002).

L'idée que les gens commencent de nouvelles entreprises comme un moyen d'augmenter leur richesse personnelle sous-tend ce volet de recherche en entrepreneuriat: l'entrepreneur coordonne seulement des ressources, et la possibilité d'allouer ces ressources de façon optimale représente le seul déterminant de la décision entrepreneuriale. La représentation néo-classique de l'entrepreneur se réfère à une personne "qui maximise l'objet du profit de diverses manières " (Day et Sunder, 1996). Des facteurs tels que les revenus de l'entreprise, la rentabilité, la création de richesses personnelles, la croissance et la durabilité sont utilisées comme indicateurs de la réussite entrepreneuriale (Amit et al., 2000), et les critères qui guident la décision entrepreneuriale dans la littérature sont essentiellement la maximisation des profits attendus, l'utilité espérée de maximisation du profit, et la maximisation des entreprises en valeur boursière (Kihlstrom et Laffont, 1979).

***- Importance du contexte dans la construction de la décision***

Une réelle prudence émerge des représentations que les dirigeants créateurs routiniers se font de leurs caractéristiques entrepreneuriales. Tout laisse à penser qu'ils sont très sensibles aux oscillations de leurs marchés, à l'écoute qu'ils prêtent aux partenaires et adversaires internes et externes, aux crises et aux événements que traversent leurs organisations (Crozier M., 1989, p. 48), au temps et aux efforts qu'ils aménagent pour répondre aux besoins stratégiques de celles-ci (Eisenhardt K. M., 1992), aux faiblesses et aux réussites qu'ils décèlent intuitivement ou analytiquement dans la stratégie des concurrents (Peters T. et R. Waterman, 1983). Ainsi, ils font le choix d'apprendre peu à peu à accommoder leurs capacités cognitives et leurs représentations afin d'agir efficacement face à la volatilité intrinsèque des environnements incertains et en évolution rapide (Simon H. A. 1993, 134). Ils acceptent de "stabiliser" leur connaissance et apprennent à s'apercevoir des lacunes qui les empêchent de se réaliser chaque fois qu'ils agissent ou qu'ils réfléchissent sur une situation qu'ils perçoivent comme étant significative.

En effet, l'action concrète s'accompagne d'une emprise cognitive confirmative, correctrice, révélatrice et apprenante à la fois. Mais de telles situations deviennent rapidement fréquentes et familières qu'elles ne suscitent plus suffisamment leur curiosité intellectuelle. Il s'agit de situations qui structurent la vision et la compréhension du monde qui nous entoure et mettent notre connaissance théorique et notre vécu pratique en étroite symbiose. Pire, elles peuvent nous conduire aux formules standards et aux modèles préétablis dont nous savons pertinemment l'inefficacité face à la singularité des situations concrètes et à la proactivité face aux faits entrepreneuriaux.

### 5.3 Les entrepreneurs proactifs - 19 % de l'effectif enquêté

Ils s'apparentent aux créateurs entrepreneurs de Baumol (1968). Ils sont au centre d'un construit issu des connaissances constamment renouvelées. Leurs caractéristiques semblent être liées à un comportement plus proactif de l'environnement de leur entreprise

Tableau 6. Principales caractéristiques entrepreneuriales des entreprenants (classe 4/4)

| **Libellés des caractéristiques entrepreneuriales** | **Libellés des modalités** | **Poids (%) de la caractéristique dans l'échantillon** | **Poids (%) de la caractéristique dans le groupe** | **Dimension clé à laquelle se rattache la caractéristique** |
|---|---|---|---|---|
| Volonté d'aller jusqu'au bout de la tâche à accomplir peu importe les obstacles | Totalement en accord | 33.14 | 87.88 | Persévérance |
| Volonté absolue à fixer ses propres objectifs | Totalement en accord | 37.79 | 87.88 | Accomplissement |
| Aisance au niveau du travail nécessitant des décisions rapides | Totalement en accord | 32.56 | 81.82 | Coaction (Conception et réalisation de projets) |
| Volonté de participation à des travaux nécessitant un ajustement à des compétences différentes | Totalement en accord | 23.26 | 66.67 | Capacité conceptuelle, Cognition et Changement |
| Compétition comme stimulant d'efficacité | Totalement en accord | 33.14 | 78.79 | Concurrence |
| A l'aise pour prendre des décisions autonomes | Totalement en accord | 38.95 | 84.85 | Autonomie |
| Volonté constante de prise d'initiative | Totalement en accord | 40.12 | 84.85 | Coaction (Conception et réalisation de projets) |
| Assurance dans l'expression des opinions | Totalement en accord | 24.42 | 66.67 | Confiance en soi |
| Préférence pour les travaux à fortes responsabilités | Totalement en accord | 31.98 | 75.76 | Pouvoir |
| Importance des méthodologies d'action débouchant rapidement sur des résultats | Totalement en accord | 28.49 | 69.70 | Cognition |

Cette classe est fortement caractérisée par une réponse de modalité 4 (totalement en accord) aux questions énumérées ci-dessus. Les pourcentages de ces questions sont très largement supérieurs à ceux de l'échantillon, ce qui confirme une perception très convergente des entrepreneurs de cette classe.
Ce sont en grande majorité des hommes de 50 ans et plus, voire entre 25 et 35 ans. Contrairement à toute attente, ils sont de niveau scolaire soit études primaires soit Bac +3 ou plus c'est-à-dire qu'ils sont très bien ou aucunement diplômés.
Ils sont à leur première création d'entreprise (notamment de petite ou de moyenne taille) après une expérience professionnelle en PME. Mais ils ne sont pas issus de milieu familial d'indépendants ou d'entrepreneurs même s'ils semblent affirmer une position très forte des dimensions de motivation et d'aptitude relative à leur potentiel de dirigeant. Ils se différencient complètement des autres groupes de dirigeants à travers une espèce de «***permanence d'un construit de décision issu des connaissances constamment renouvelées***».

La nature des représentations que les dirigeants créateurs entreprenants se font de leurs caractéristiques entrepreneuriales fait apparaître l'importance du construit dans et par l'action et la réflexion. Un tel construit résulte des représentations tangibles et intelligibles à partir de «*leurs expériences sensibles et cognitives*» (Le Moigne, 1995, p. 97) sous-tendues par les caractéristiques entrepreneuriales considérées comme des connaissances utiles à la prise de décision. Le «*pragmatisme*» et «*l'artefact*» de Herbert A. SIMON sont deux concepts qui attribuent à la formation d'une connaissance fonctionnelle, celle qui naît dans et des interactions des créateurs entreprenants ou projectifs, un rôle fondamental dans la modélisation du cheminement entrepreneurial.
En considérant le produit des interactions entre les caractéristiques entrepreneuriales des créateurs et les objets de leurs actions dans le processus d'apprentissage, nous prenons en compte les dimensions constructives et créatives de la connaissance que tire l'entrepreneur de son expérience. Ceci dit, nous ne sommes pas loin des propositions factuelles (*fact*) de H. A. SIMON, où les énoncés d'une science se réfèrent « *à des faits (ce qui est), à l'expérience, à des événements qui se produisent, ou ne se produisent pas* » (Fiol et Sole, 1993, p. 88).
Nous ne réinventons pas l'entrepreneuriat en disant qu'une étude sur le cheminement des entrepreneurs, qui se veut globalement satisfaisante, ne peut se permettre d'ignorer la bipolarité des relations qui lient l'entreprise à son contexte d'action et de réflexion, autrement dit à son environnement. Traditionnellement donc, la notion d'environnement est très importante pour comprendre simultanément la dynamique interne des firmes et leurs comportements externes. Dans un souci de clarté et d'approfondissement de la recherche sur les relations Environnement-Entreprise nous proposons un enrichissement du concept à partir de ses composantes. Du point de vue explicite, l'environnement de l'entrepreneur est fait d'entités distinctes comme : le marché, le secteur économique ou industriel, la branche d'activité, les niveaux hiérarchiques, les ateliers de production, le poste de travail, la société, les institutions gouvernementales, les boutiques de gestion, les organisations syndicales, patronales, professionnelles et éducatives, les organisations concurrentes directes et potentielles, les firmes-clientes, les firmes-fournisseuses, les institutions financières, etc. Au-delà des représentations que l'entrepreneur fait de ces entités, celles-ci constituent des sites symboliques au regard des réalités économiques, sociologiques et culturelles passées,

actuelles ou pressenties (Dearborn et Simon, 1958; Zaoual, 1996). Il les intègre dans le processus décisionnel compte tenu de ses capacités et aptitudes cognitives et celles propres à son entreprise. A savoir, une extension cognitive, psychologique et sociologique des notions qui le composent : le *champ*, les *entités distinctes*, les *interactions* auxquelles nous ajoutons les *délais* d'action.

Chaque entité est *perçue* différemment des autres. Très certainement selon les objectifs de l'observateur (Dearborn et Simon, 1958) mais aussi les comportements de l'organisation observée, ses statuts, ses métiers, ses sites, la composition de son personnel, de son équipe de direction, l'évolution de sa structure, de sa stratégie, de sa production, de son réseau d'influence, etc. Des *interactions* multiples et diverses entre des entités distinctes se traduiraient par des rapports directs ou indirects d'échange, d'interdépendance et/ou de dépendance; la nature des transactions et la disponibilité ou la rareté des ressources de tout genre y sont déterminantes (Pfeffer et Salancik, 1978; Mintzberg, 1986).

Pratiquement, les créateurs entreprenants seraient plus attentifs aux phénomènes quotidiens suivants: l'asymétrie informationnelle, l'ambiguïté des données, des discours et des comportements organisationnels, l'incertitude des préférences managériales, les choix stratégiques et leurs conséquences. Ils seraient plus conscients du fait que leurs limites cognitives conjuguées à leur partialité de jugement et de décision donneraient des perceptions différentes de "la réalité". Ils seraient plus enclins aux interprétations parfois contradictoires de ce qui paraîtrait semblable dans l'espace et le temps et finiraient par une diversité de comportements élaborés et soutenus face à cette réalité caractérisée par sa complexité et sa variabilité.

## 6. CONCLUSION ET PERSPECTIVES DE RECHERCHE

### *Eléments de conclusion*

Les résultats de notre étude nous conduisent à trois catégories d'entrepreneurs au vu de leurs opinions sur les caractéristiques déterminant leurs comportements décisionnels. Nous rapprochons ces résultats aux travaux de Baumol (1968). Ainsi nous pouvons positionner les décideurs non routiers entre les créateurs gestionnaires et les créateurs entrepreneurs. Nous qualifions ces derniers d'entrepreneurs proactifs. De tels entrepreneurs proactifs déclarent avoir totalement confiance en eux et se considèrent comme fortement innovants. Ils associent les modalités relatives à l'autonomie et à la cognition. Leurs réponses aux questions liées à l'accomplissement sont concordantes à celles relatives au comportement dans l'action. Ils cherchent à aller juste qu'au bout des projets qu'ils initient peu importent les difficultés et saisissent souvent les occasions qui se présentent. Ils tentent à mettre tout en oeuvre pour augmenter leur chance de réussite et refusent l'échec. Inversement, les entrepreneurs routiniers évaluent faiblement les questions liées à la confiance en soi et celles relatives à l'innovation. Ils s'efforcent très peu de connaître les nouveautés de leur domaine d'activité. Les projets exigeants les découragent au vu des réponses fournies aux questions liées à la persévérance et à l'accomplissement. Ils limitent le nombre d'activités à accomplir simultanément et avouent avoir du mal à appréhender les occasions d'affaires dans les événements qui surviennent dans leur environnement.

Il nous semble qu'à travers les interactions avec des éléments de son champ d'intérêt et d'aptitudes, l'entrepreneur apprend à observer, à agir, à réagir, à discerner, à anticiper des comportements et à adapter ses objectifs et ses actions. C'est dans l'action complexe orientée par la recherche d'efficacité satisfaisante, d'indépendance, de coopération, de domination, évitant des menaces perçues et profitant d'opportunités éphémères, que l'entrepreneur réactualise à dessein ou instinctivement sa "connaissance" du monde qui l'entoure. Ses représentations se font et se défont au fur et à mesure que les résultats de ses *interactions* avec les *entités distinctes* de son *champ* d'intérêt. Autrement dit, ses prédispositions cognitives et psychologiques confrontées à ses expériences quotidiennes confirment, infirment ou altèrent les représentations qu'il se fait de ses caractéristiques entrepreneuriales, qui guident ses actions et leur donnent une persistance, une réorientation ou une érosion. Le démarrage, la survie, la performance et la croissance de son entreprise deviennent alors tributaires de la vitesse et de la manière dont le couplage Entreprise-Environnement sera assuré du fait des caractéristiques entrepreneuriales.

***Perspectives de recherche: l'incontournable pédagogie d'accompagnement***

La perception des caractéristiques entrepreneuriales met en évidence l'importance d'une démarche incitative voire démonstratrice d'un système de compétences structuré et explicatif de type de décision: routinier ou non routinier. Le cheminement que peut effectuer le créateur gestionnaire (ou exclusivement routinier) vers le créateur entrepreneur (ou véritablement non routinier) doit encourager l'apprentissage dans une perspective systémique. La technique ou la pédagogie d'accompagnement souhaitée est révélatrice d'un état d'esprit de progrès et de mise en relation avec les caractéristiques entrepreneuriales de base. Il apparaît qu'avec le dispositif d'accompagnement, les valeurs et attitudes désirées se nourrissent des méthodes de structuration des compétences entrepreneuriales, d'analyse stratégique et de gestion de l'innovation. Ces méthodes apparaissent comme des compléments indispensables à l'intuition managériale des futurs créateurs. Ils sont conscients du chemin à parcourir en termes de connaissance sous-tendue par des caractéristiques particulières. Celles-ci favorisent une certaine emprise sur l'environnement souvent multiforme et changeant.

Dans cette optique, l'accompagnateur, à partir de ses missions (de conseil, de formateur et de concepteur d'outils ou de modèles) doit jouer un double rôle (Baron, 1989, cité par Stern et Tutoy, 1998): le rôle de réserve d'énergie (apport au niveau de la méthode, du choix de projet stratégique, de l'explication et de la mise en œuvre de ce projet) et celui de catalyseur (développement d'une opération de changement, notamment culturel). Alors, il peut introduire progressivement des changements au niveau de la vision stratégique du dirigeant créateur, de ses méthodes, de ses conduites et du système organisationnel dans son ensemble. Il est également clair que le point d'entrée de chaque programme d'accompagnement doit rester spécifique. L'ouverture à d'autres compétences comporte des limites qui doivent être étudiées et cernées par les acteurs du réseau mis en place. On sait que l'introduction d'une innovation qui conduit à de nouveaux produits, process ou à de nouveaux marchés fait appel à la plupart des études et des conditions non courantes. L'approche se veut souvent globale ou systémique avec les dimensions cognitives, psychologiques et sociologiques de l'environnement de l'entrepreneur qui se positionne dans un statut contextuel et intuitif.

D'un côté, du fait des phénomènes perceptifs, l'environnement de l'entrepreneur n'est pas figé à l'image instantanée du réel et contient des potentialités d'action et de réflexion qui ne coïncident pas forcément avec d'autres observations intervenant parallèlement dans le même espace /temps. L'environnement entrepreneurial paraît comme une construction virtuelle à l'image des potentialités que révèle l'activité cognitive des acteurs et que nourrissent les interactions quotidiennes de leurs actions. Lors de cette construction, le système de représentations qui se nourrit de perpétuels construits externes joue le rôle de filtre et de générateur d'idées en même temps.

D'un autre côté, du fait de la complexité qui entoure l'entrepreneur, des domaines cruciaux de l'environnement sont détectés en rapport avec un espace d'interactions, des entités distinctes qui l'occupent, la nature des interactions qui l'animent et le temps nécessaire pour percevoir, interpréter et incorporer les changements. L'entrepreneur les organise en fonction des représentations qu'il en fait et des attentes perçues. Il s'agit d'un environnement en construction /destruction circulaire, aussi vrai que les multiples interprétations que se font des décideurs agissant dans des conditions réelles, singulières incertaines et non linéaires.

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## ENTREPRENEURSHIP AND DECISIVENESS OF A MANAGER– A CREATOR OF AN ENTERPRISE

Concerning decision making within organizations, there is a particular person who creates his own business and ensures its' functioning and sustainability. It is therefore necessary to investigate personal creative entrepreneurial characteristics as determinants of decision making. We can do this by working on the inventory of entrepreneurial characteristics (Gasse, 1996; 2003). Entrepreneurial characteristics allow us to identify the entrepreneurial potential of each creator. Further research leads to their use as determinants of creative decision making, which is the subject of this article. The characteristics of entrepreneurs were identified as to how they made the choice of starting a business from their own perceptions or self-image. This approach has been adapted to a survey of 172 executives of SMEs in creative activity regarding business sustainability in the last quarter of 2009. The essential purpose of such a survey is to make an inventory and classify entrepreneurial characteristics and, subsequently, put forward a typology of entrepreneurs. Given the characteristics of the survey, the analysis differentiates the perception of their decision to becoming an entrepreneur.

The results of our study lead us to three categories of entrepreneurs given their opinions concerning the characteristics that determine their behavioral decision making. The results were compared to the work of Baumol (1968). In this way we can differenciate creative entrepreneurs and creative managers hence the study path for creator managers or creative entrepreneurs can be differenciated enabling development of appropriate teaching methods and enabling teachers to provide appropriate guidance.

**Keywords:** Entrepreneurial characteristics, motivation, decision, values, entrepreneurship

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# ОПРЕДЕЛЕНИЕ ДЛИНЫ ПЕРЕХОДНО-СКОРОСТНОЙ ПОЛОСЫ НА ДОРОЖНЫХ РАЗВЯЗКАХ В РАЗНЫХ УРОВНЯХ

В работе представлен метод расчета длины переходно-скоростной полосы на дорожных развязках в разных уровнях при разгоне автомобилей. Увеличение интенсивности движения на автомобильных дорогах вызывает необходимость реконструкции автомобильных дорог, частью которой является строительство дорожных развязок в разных уровнях. Одним из основным элементов решения является длина переходно-скоростных полос при торможении и разгоне автомобилей. Переходно-скоростная полоса при торможении выполняет роль освобождения полосы движения на главной дороге и уменьшения скорости движения на переходно-скоростной полосе.

Переходно-скоростная полоса движения при разгоне автомобилей применяется для достижения средней скорости движения, равной скорости на основной дороге и обеспечивает вливания автомобилей с переходно-скоростной полосы (ПСП) в полосу движения на основной дороге. Основным показателем является изменение полосы движения с ПСП на полосу движения главной дороги, которое зависит от интенсивности движения на главной дороге и временного интервала между автомобилями. Выполнение манёвра автомобиля при смене полосы движения состоит из времени для его выполнения и длины участка дороги, на котором он выполняется. В работе представлены результаты исследования как времени на выполнение манёвра , так и длины участка дороги на котором он выполняется. Полученные результаты исследований применяются как для проектирования дорожных развязок в разных уровнях, так и для обоснования её типа. При значительной интенсивности движения на главной дороге возникает необходимость удлинения ПСП, а при невозможности въезда - строительство вспомогательной полосы движения.

**Ключевые слова**: дорожные развязки в разных уровнях, переходно-скоростная полоса, полоса движения, временной интервал движения.

## 1. ВВЕДЕНИЕ

Чтобы обеспечить нормальные условия съезда и вхождения второстепенного потока в основной, проектируют переходно-скоростную полосу разгона, которая позволяет получить такое смещение «фаз» в пространственном распределении интервалов между автомобилями основного и второстепенного потоков, который создаёт условия для безопасного вхождения второго в первый. Поэтому для дальнейших расчетов за основу берём длину переходно-скоростной полосы. Схема переходно-скоростных полосы показано на рисунке 1.

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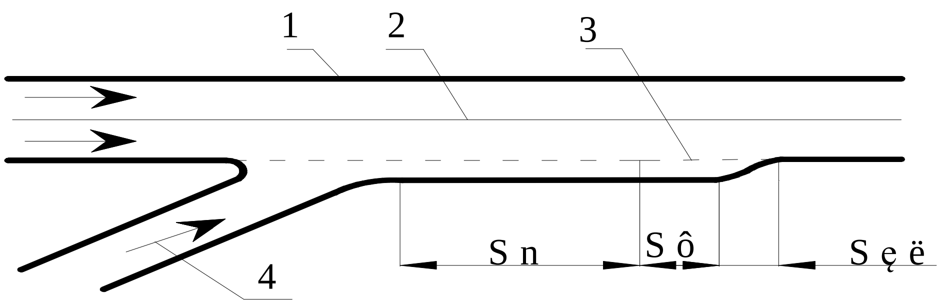


Рис. 1. Переходно-скоростная полоса для выхода со съезда (1 - краевая разметка, 2 - сплошная разметка 3 - прерывистая разметка, 4 - съезд).

Переходно-скоростная полоса разгона состоит из трех участков: клина разгона, фазового участка и шлюза ускорения:

$$L_{ВИХ}=S_n+S_Ф+S_{КЛ}, \tag{1}$$

где $L_{ВИХ}$ – полная длина переходно-скоростной полосы разгона, м;

$S_{КЛ}$ – длина клина отгона, м;

$S_n$ – длина шлюза ускорения, м;

$S_Ф$ – длина фазового участка, м.

Минимальная длина скоростного шлюза:

$$S_n = \frac{v_Г^2 - v_c^2}{2\cdot(a_c)} \tag{2}$$

где -$v_Г$ - скорость движения на крайней полосе главной дороги, м / с;
$v_с$ - скорость движения автомобилей на съезд, м / си;
$a_c$ –среднее ускорение при разгоне автомобиля, м / с.
Минимальная длина фазовой участка определяется по формуле:

$$S_ф = v_0 \cdot \frac{n}{А_0} \tag{3}$$

где $v_0$ – средняя скорость движения, на которой выезжают автомобили со съезда;
$n$ –среднее количество автомобилей в очереди;
$А_0$ – пропускная способность крайней полосы движения на основной дороге, на которую выезжает со съезда автомобиль.

$$n = \psi \cdot \frac{1+n_0\frac{\psi_0}{\psi}}{1-\psi_0-\psi} \tag{4}$$

$$\psi = \frac{N_с}{А_0-N_0} \tag{5}$$

$$\psi_0 = \frac{N_0}{А_0} \tag{6}$$

$$n_0 = \frac{\psi_0}{1-\psi_0} \tag{7}$$

где $N_с$ - часовая интенсивность движения автомобилей на съезде, авто / ч;

$N_0$ - интенсивность движения на крайней полосе основной дороги, на которую выходят автомобили со съезда, авто / ч.

Необходимая длина клина отгона рассчитывается по формуле:

$$S_{КЛ} = 2 \times \sqrt{R_0 \times b} \tag{8}$$

где $R_0$ - минимальный радиус горизонтальной кривой без устройства виража на основной дороге, м;

$b -$ ширина переходно-скоростной полосы, м.

Даный метод не учитывает интервалы движения автомобилей на главной дороге, поэтому возникла необходимость разработки более точного метода.

## 2. ИССЛЕДОВАНИЕ МАНЁВРА ВЛИВАНИЯ АВТОМОБИЛЕЙ НА ГЛАВНУЮ ДОРОГУ

В зависимости от состава транспортного потока определяется интенсивность движения на главной дороге по крайней полосе движения и временной интервал движения.

Если интенсивность на второстепенной дороге будет больше, чем свободных интервалов на главной дороге ($N_{осн}$ на главной дороге), транспортный поток на второстепенной дороге не успеет выполнить манёвр вливания (то есть будут возникать задержки на переходно-скоростной полосе). В таком случае необходимо будет увеличивать длину переходно-скоростной полосы или устраивать дополнительную полосу движения.

Исследование было выполнено на дорожной развязке на объездной дороге г. Бровары Киевской области. Определялись скорость движения и длина участка дороги, необходимая для смены полосы движения.

Результаты экспериментальных данных для вливания в основной поток показаны на графиках.

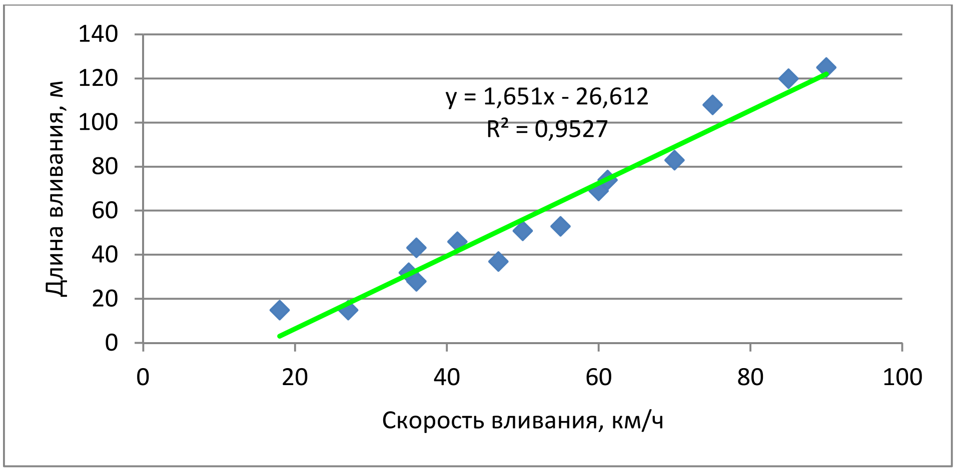


Рис. 2. Экспериментальные данные для вливания легковых автомобилей в транспортный поток ($l_{авто}$= 4 м)

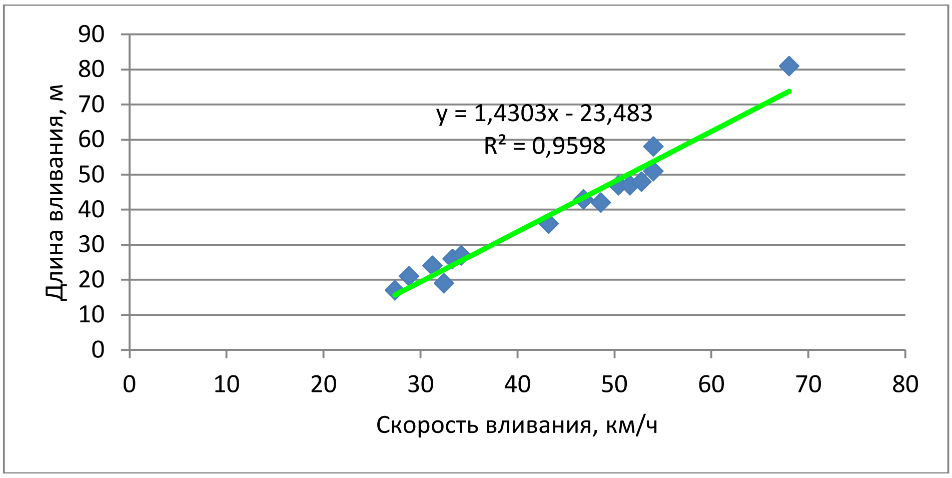


Рис. 3. Экспериментальные данные для вливания грузовых автомобилей в транспортный поток ($l_{авто}$= 7 м)

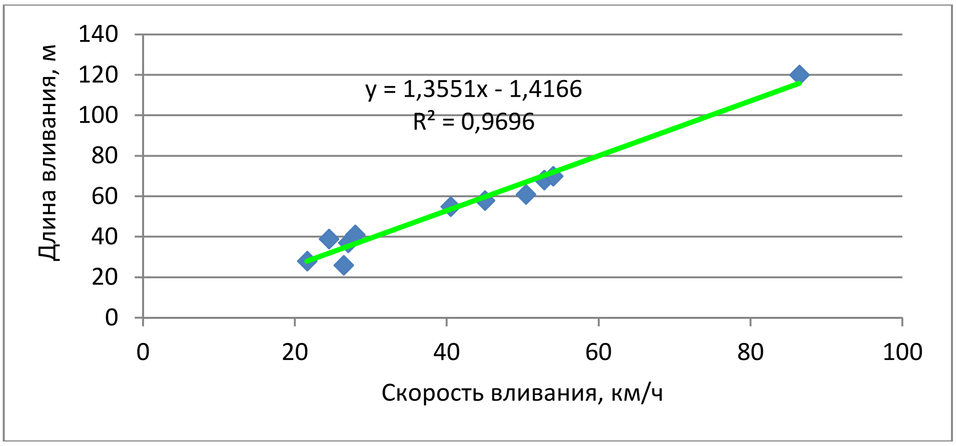


Рис. 4. Экспериментальные данные для вливания автопоездов в транспортный поток ($l_{авто}$= 12 м)

В конечном итоге, получена формула для определения времени, необходимого для выполнения манёвра в зависимости от скорости ($v$) и состава транспортного потока ($l_{cp}$- средняя длина автомобиля):

$$t = (0{,}0164 \times l_{cp} + 0{,}0069) \times v^2 - (0{,}0112 \times l_{cp} + 0{,}4364) \times v +$$

$$+0{,}0276 \times l_{cp} + 2{,}1475 \qquad (9)$$

где $v$ – средняя скорость транспортного потока, (м/с).

## 3. ИССЛЕДОВАНИЕ ВРЕМЕНИ СМЕНЫ ПОЛОСЫ ДВИЖЕНИЯ

На основании выполненых исследований получено функциональные зависимости «интервал-интенсивность» на главной автомобильной дороге для определения времени, необходимого для выполнения манёвра вливания.

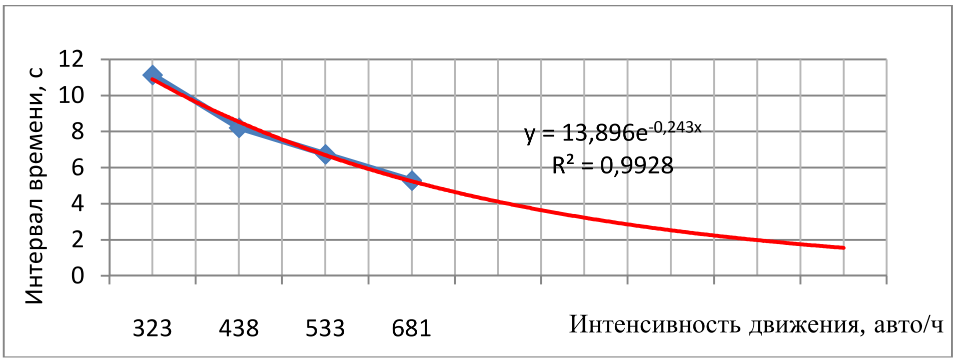


Рис. 5. Зависимость «интервал-интенсивность» для легковых автомобилей отечественного производства ($l_{авт}$ = 4,5 м)

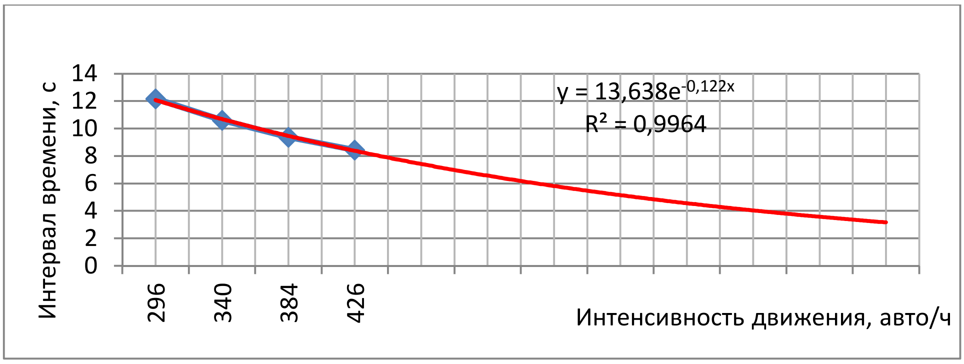


Рис. 6. Зависимость «интервал-интенсивность» для грузовых автомобилей ($l_{\text{авт}} = 7{,}0$ м)

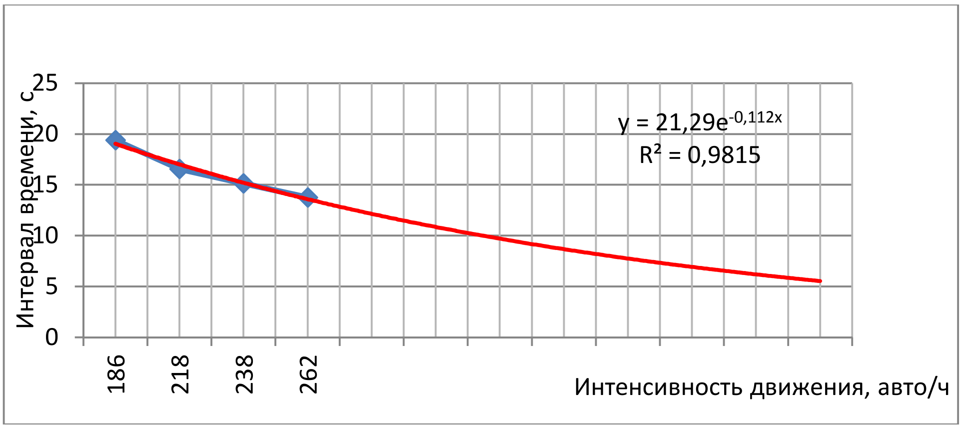


Рис.7. Зависимость «интервал-интенсивность» для автопоездов ($l_{\text{авт}} = 12$ м)

В результате исследования получено значение времени, необходимого для осуществления манёвра по смене полосы движения, в зависимости от интенсивности на съезде:

$$\boldsymbol{T} = \mathbf{19,142} \times \boldsymbol{e}^{-\mathbf{0{,}078}\times\boldsymbol{N}}, \tag{10}$$

где $\boldsymbol{T}$ —необходимое время для осуществления манёвра, с;
$\boldsymbol{N}$ — интенсивность на съезде, авто / ч.

## 4. ИССЛЕДОВАНИЕ ДЛИНЫ УЧАСТКА ДОРОГИ ДЛЯ СМЕНЫ ПОЛОСЫ ДВИЖЕНИЯ ПРИ НАЛИЧИИ ПЕРЕХОДНО-СКОРОСТНОЙ ПОЛОСЫ

В зависимости от количества автомобилей в группе, определённого на основе системы массового обслуживания, и средней скорости транспортного потока на основной дороге, необходимая длина для удлинения переходно-скоростной полосы составит:

$$S = v_{\text{гол}} \times \bar{n}, \tag{11}$$

где $v_{\text{гол}}$ — скорость движения транспортного потока на крайней полосе главной дороги, м/с;

$\bar{n}$ – количество автомобилей в группе.

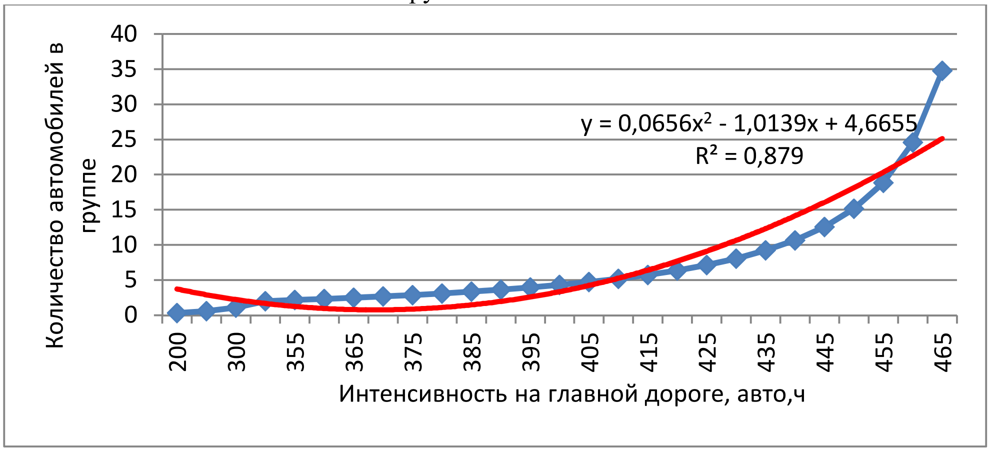


Рис. 8. График зависимости количества автомобилей в группе от интенсивности на основной дороге.

Согласно графика (рис. 8), построенного на основе системы массового обслуживания, согласно интенсивности движения на крайней полосе главной дороги, определяем количество автомобилей в группе. Согласно формуле (11), определяем необходимую длину переходно-скоростной полосы. Например, если интенсивность движения на крайней полосе главной дороги 400 авто / ч. при скорости движения автомобилей 60 км / ч (16,7 м / с), то количество автомобилей в группе - 5, в соответствии удлинить переходно-скоростную полосу необходимо на 5х16,7 = 83 м.

## 5. ВЫВОДЫ

1. Разработана модель въезда автомобилей на основную (второстепенную) дорогу с переходно-скоростной полосы.
2. Исследовано время ожидания автомобилей для выполнения манёвра вливания в транспортный поток.
3. Разработаны уравнения для определения необходимой длины удлинения переходно-скоростной полосы для вливания автомобилей в основной поток.

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[4] Довгополюк Л.А., *Необходимость определения времени ожидания при проезде дорожной развязки на разных уровнях*, Материалы 68 науч. конф. профессорско-

преподавательского состава, аспирантов, студентов и структурных подразделений университета: тезисы докладов, НТУ, Киев 2012, С. 158.
[5] Пальчик А.М., *Транспортные потоки*, НТУ, Киев 2010.

## DETERMINE THE LENGTH OF ACCELERATION AND DECELERATION LANES ON ROAD INTERCHANGES IN DIFFERENT LEVELS

This paper presents a method for calculating the length of the acceleration and deceleration lanes at road junctions at different levels during acceleration. Increasing traffic on the roads calls for reconstruction of roads, part of which is the construction of road junctions at different levels. One of the main elements of the solution is the length of the acceleration and deceleration lanes during braking and acceleration of vehicles. Acceleration and deceleration lanes during braking serves as a release of the lane on the main road and reduce the speed of traffic on acceleration and deceleration lanes.
Speed change lane during acceleration is used to achieve an average speed equal to the speed on the main road and provides an infusion of cars with acceleration and deceleration lanes (CAP) in the lane on the main road. The main indicator is changing lanes on a PSP lane main road, which depends on the traffic on the main road and the time interval between cars. Performing maneuver the vehicle when changing lanes consists of the time for its implementation and long sections of road on which it is running. The paper presents the results of the study as time to perform the maneuver, and the length of the section of the road on which it is running. The results obtained are used for the design of road junctions at different levels, and to justify its type. With significant traffic on the main road there is a need lengthening the CAP, and if you can not enter - the construction of auxiliary lanes.

**Keywords:** road junctions at different levels, acceleration and deceleration lanes, lane, traffic composition, the average speed of traffic flow.

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# INTERNET MARKETING RESULTING FROM INCREASING CONSUMER E-COMMERCE SPENDING FROM THE VIEW OF ADOPTION BENEFITS AND BARRIERS

In contemporary marketplace customers no longer engage in purchasing through traditional brick-and-mortar stores, but have the choice of electronic marketplace, which has been gaining popularity throughout the years. The benefits of online market engage more customers to start making their purchases online, and many often entirely substitute the traditional shopping channel with electronic shopping ones. Companies that want to be ahead of customer preferences need to observe closely the changes and often adhere their marketing strategies and approach to customers. Changes in business strategies can only be done after a thorough analysis of the benefits and barriers resulting from e-commerce adoption. The research shows that there are multiple benefits for customers resulting from an easy access to the Internet. However, there are also barriers that can influence consumer decision-making process and the actual buying activity. An analysis of these benefits and barriers can greatly impact the retailers and their market strategies. Taking into consideration all of these aspects, there are several actions companies can take to improve their online marketing strategies to keep their customers satisfied. These are related to online customer experience and combining the in-store experience with digitalism. Other key relevant recommendations are related to stronger focus on customization, improving user interface and integrating all channels more smoothly.

**Keywords**: electronic commerce, electronic marketplace, Internet adoption, benefits and barriers of internet adoption, consumer behavior

## 1. INTRODUCTION

There is an apparent crisis in retail. Research by Forbes has been indicating that during the 2013 holiday shopping season, American retailers received half the foot traffic they experienced in previous years. This leads to conclusion that since consumer spending does not decrease, these are shopping patterns that change[3]. Consumers have evidently shifted the way they shop and buy. Such change, particularly increasing popularity of online shopping leads companies to rethink and often re-evaluate their marketing strategies.

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[3] J. Bogaisky, *Retail In Crisis: There are The Changes Brick-And-Mortar Stores Must Make*, "Forbes" 2014, www.forbes.com/sites/jeremybogaisky/2014/02/12/retail-in-crisis-these-are-the-changes-brick-and-mortar-stores-must-make/

According to Okonkwo, the world is experiencing the digital revolution[4]. The number of Internet users is growing all around the world, not only in developed countries, but also in the emerging countries that some years ago did not even have access to technology[5]. One of the levers of such increase of Internet use is the general digitalism of consumers who no longer see Internet as convenient add-on to their everyday lives, but a necessary part of routine activities[6]. The increase of consumers' digitalism has strong impact on consumer behavior, which in economic context brings consequences facing industries and directly companies.

## 2. CONSUMER SPENDING

Back in the days consumer spending was limited only to one channel - traditional shopping in a physical store, so-called the brick-and-mortar. The physical visit to the store, as a shopping process, had no trade-off, as there were no other options for customers to perform their shopping activity. And while they benefited from the choice at the store and possibility to physically inspect their potential purchases there, there were already noticeable disadvantages of such shopping channel. Consumers had to commute to particular store to engage in shopping activity. Once they reached the shopping destination, they could potentially face the lack of particular product or limited product selection. These are only a few disadvantages of brick-and-mortar visits, as the list could be extended to many more aggravations of this purchasing channel. Throughout the years, consumers have been noticing more inconveniences of such shopping channel, and this paved the way for the subsequent popularity of electronic commerce. The notion of electronic commerce needs to be defined to gain a clear understanding of the phenomena from the consumer point of view.

### 2.1. Electronic commerce and consumer behavior defined

Electronic commerce (e-commerce) can be explained by many different meanings and distinctive definitions, however a rather exclusive definition has been selected for this discussion. Electronic commerce will be regarded as "*involving the buying and selling of goods and services over the Internet, and related information provision and gathering*"[7]. E-commerce will be looked at not only in the context of its growing presence in the lives of consumers and their shopping activities, but also because it can have an influence on the shape of various industries, and thereby organizational decision making. Electronic commerce has the possibility to change the industry structures and impact the ways businesses compete for markets. Such effects are already apparent in many industries and specific business organizations[8]. This change is being felt by every society in all aspects, and will continue to resonate in business sectors regardless of whether technology-driven or unreceptive to transformation[9].

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[8] *Ibidem*.

[9] K. Wiedmann, N. Hennings, A. Siebels, *Value-Based Segmentation of Luxury Consumption Behavior*, "Psychology & Marketing" 26/7 (2009), s. 625–651.

## 3. E-COMMERCE ADOPTION AND CONSUMERS

One of the fundamental assumptions regarding customer choice in economics is that individuals act rationally, making their choices to best suit their objectives, budget constraints, and earning power; and being predominantly interested in value maximization[10]. Many marketing researches show that the value perceived by customer is a determinant of consumers' purchase intentions and decision-making process. These also explain the understanding of consumer behavior. Some of the researchers, like Anckar (2003) argue that while value considerations can be linked to the overall pre-purchase evaluation of the utility of the product, the fundamental idea of the concept should be correspondingly relevant to the analysis of the advantages coming from commercial media, technological advancements, electronic distribution channels etc.[11]. In this context, the conventional value equation as a tradeoff of benefits and quality compared to costs is too simple to create an understanding of the most important motivators and inhibitors to the e-commerce adoption. It is suggested that the value concept should be interpreted based on the trade-off between the get and the give components, and not in the monetary aspects. Anckar indicates that consumers who act rationally make the decision on channel adoption or rejection based on the channel net value they perceive. This means that their decision is a tradeoff between all the advantages customer acknowledges by using electronic channels as compared to the traditional options, as well as the barriers that customer comes across when using the electronic channels[12].

### 3.1. The benefits

The reasoning behind the consumer shift towards the electronic channels of purchase is clearly related to the benefits that the consumers acknowledge. As researched by Forbes (2014), online and mobile commerce continue to grow for both traditional and Web-based retailers, and based on the statistics from the holiday season of 2013, the number of electronically engaged customers is growing enormously[13]. There is a lot of available literature regarding the benefits of the electronic commerce over the traditional purchase channel. A Detailed overview of the key benefits and barriers has been compiled and will be presented further in the form of tables including the descriptions and explanations of the characteristics, as well as the relevant literature where the characteristics can be found and researched further. An understanding of these benefits and barriers allows for a better evaluation of the growing movement of online shopping in relation to Internet marketing, as well as other economic aspects.

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[10] B.M. Josiam, J.S.P. Hobson, *Consumer Choice in Context: The Decoy Effect in Travel and Tourism*, “Journal of Travel Research” 34/1 (1995)., p. 45–50.

[11] B. Anckar, () *Drivers and Inhibitors to eCommerce Adoption: Exploring the Rationality of Consumer Behavior in the Electronic Marketplace*, “ECIS 2003 Proceedings” 2003/24.

[12] see 9.

[13] see 1.

Table 1. The benefits

| The benefit | Characteristics of the benefit | Relevant literature |
|---|---|---|
| *Accessibility and convenience* | Internet as the possibility to shop anytime, from everywhere | *Jarvenpaa & Todd 1996-1997*[14], *Kangis & Rankin 1996*[15] |
| *Global choice* | No geographical boundaries of e-commerce, consumers benefit from wide selection of products and vendors, also for hardly available products or difficult to find offline | *Benjamin & Wigand 1995*[16], *Hoffman et al. 1995*[17] |
| *Possibilities for comparison shopping* | Shopping in many places, almost at the same time, conducting product and price comparisons;<br>Internet shopping reducing costs of search - for pricing and product information | *Hoffman et al. 1995*[18]<br>*Bakos 1998*[19] |
| *Real-time factor* | Real-time information on prices, availability, delivery times, etc. | *Franz 2000*[20] |
| *Time savings* | Advantage of faster shopping process, due to the speed of search and fast transaction processes | *Benjamin & Wigand 1995*[21] |
| *Access to extensive information* | Online access to greater amounts of dynamic information, supporting queries for decision-making of consumers;<br>Information about products not only on original brand's websites but from social networks, blogs, etc. | *Hoffman et al. 1995*[22]<br>*Okonkwo 2010*[23] |
| *Privacy and anonymity* | Purchasing process offers consumers privacy and anonymity/pseudonymity | *Parsons 2002*[24] |
| *The asocial nature of purchasing* | Some consumers may prefer impersonal purchasing process for asocial reasons, or when they see verbal contact with seller as time consuming. The lack of physical contact with sellers | *Zellweger 1997*[25] |

[14] S.L. Jarvenpaa, P.A. Todd, *Consumer Reactions to Electronic Shopping on the World Wide Web*, "International Journal of Electronic Commerce" 1/2 (1996–1997), p. 59–88.

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[17] D.L. Hoffman, T.P. Novak, P. Chatterjee, *Commercial Scenarios for the Web: Opportunities and Challenges*, "Journal of Computer-Mediated Communication" 1/3 (1995).

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[21] see 14.

[22] see 14.

[23] see 2.

[24] A.G. Parsons, *Non-Functional Motives for Online Shoppers: Why We Click*, "Journal of Consumer Marketing" 19/5 (2002), p. 380–392.

[25] P. Zellweger, *Web-based Sales: Defining the Cognitive Buyer*, "Electronic Markets" 7/3 (1997), p. 10–16.

| | | |
|---|---|---|
| | creates no pressure to buy | |
| *Competitive prices* | Price as key factor in consumer decision making for purchase on the Internet; | *Radón 2012*[26] |
| | Price reductions benefit from increased competitions of more suppliers competing online, or due to lower operational/transaction costs, and manufacturers internalizing activities; | *Turban et al. 1999*[27], *Benjamin & Wigand 1995*[28] |
| | Option to utilize price comparison sites and shopping agents' sites to obtain and compare prices, increasing the pressure on brand prices as lower price levels become transparent | *Radón 2012*[29] |
| *Personalization/ customization* | Direct online contact with companies, opportunities for personalized interactions, product customization, easier as in physical marketplaces | *Anckar 2003*[30] |

Source: Authors' own study.

All the benefits listed above, encourage consumers to be active participants of the online market, either by purchasing goods online, or by using the web as a source of information. It has been shown that customers who have not decided to use the Internet to purchase goods, claimed to having used it as an information source that ultimately lead them to purchase items through traditional channels[31]. For some customers, Internet is the sole source information and the preferred shopping channel, while others combine the experience of online and offline shopping. An example of combining the two channels is the practice of 'showrooming' - where customers first visit a physical store to experience the product in person, and then make their purchase of that product online[32]. This means that the Internet can have impact on the consumer decision making process from two viewpoints. On one hand, giving consumers the opportunity to find out more about products, research the reviews and use comparison tools, leading them to purchase online or offline. The other view is when consumers research and try the products in physical stores, then make purchases of those particular products online.

Apart from the recognition of the key benefits of online shopping, there has been research carried out regarding the importance of the particular benefits to customers. Studies by Anckar showed that in respect to importance and significance, the most valued benefit for customers is the convenience and accessibility - based on statements of over 80% of surveyed customers[33]. Other studies by Activmedia and Greenfield (2000) show that price is another extremely important factor in the customer decision to make purchase online, especially in case of clothing purchases - 60% of clothing purchases online have been

[26] A. Radón, *Counterfeit Luxury Goods Online: An Investigation of Consumer Perception*, "International Journal of Marketing Studies" 4/2 (2012), p. 74–79.

[27] E. Turban, J. Lee, D. King, H.M. Chung, *Electronic Commerce: A Managerial Perspective*, Prentice-Hall, USA 1999.

[28] see 14.

[29] see 24.

[30] see 9.

[31] see 24.

[32] Accenture, *Luxury Shopping Survey*, Accenture Management Consulting, November 2012, www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Luxury-Shopping-Survey-Key-Findings.pdf.

[33] see 9.

driven by the price factor[34]. All of these advantages and the hierarchy of the relevance of those benefits are greatly recognized by customers, and strongly influence their channel choices. However, the consumer perception of the electronic marketplace is not complete without the disadvantages and the barriers that customers notice and experience, and these will be analyzed further.

### 3.2. The barriers

Previously in the discussion the benefits of electronic market have been shown as a very strong influence on the customer choice. Following Anckar's proposition of analyzing the consumer decision-making, it is essential to look into the barriers of the online purchase channel, as the consumers tend to evaluate their preference based on the weighted comparison of the benefits and barriers. The key important influencers in regards to online marketplace impediments have been presented below.

Table 2. The barriers

| The barrier | Characteristics of the barrier | Relevant literature |
|---|---|---|
| *Quality evaluation* | Quality evaluation barrier as difficulty to ensure that tangible products presented online have the desired features | *Kangis and Rankin 1996*[35] |
| *Security risks* | Transaction security over Internet | *Rose et al. 1999*[36] |
| *Lack of trust* | Fear to be cheated when shopping online and the risk of loss | *Jarvenpaa & Todd 1996-1997*[37], *Hoffman et al. 1999*[38] |
| *Service barrier* | Lack of personal service online | *Kangis & Rankin 1996*[39] |
| *Delivery times* | Delivery times and the waiting time for delivery | *Anckar 2003*[40] |
| *Search difficulties* | Difficulties with locating stores, products and information online, as a result of limited online skills of the users, and from poor site usability | *Jarvenpaa & Todd 1996-1997*[41], *Rose et al. 1999*[42] |
| *Time-consumption* | E-commerce as time consuming incl. time used for locating product, price and product comparisons, registration to access services for purchases, etc. | *Anckar & Walden 2002*[43] |
| *Lack of enjoyment* | Physical shopping experience found by customers relaxing and enjoyable, electronic shopping cannot substitute the same leisure experience | *Jones 1999*[44] |

[34] see 24.

[35] see 13.

[36] G. Rose, H. Khoo, D.W. Straub, Current Technological Impediments to Business-to-consumer Electronic Commerce, "Communications of the Association for Information Systems"1 1/16 (1999).

[37] see 12.

[38] see 15.

[39] see 13.

[40] see 9.

[41] see 12.

[42] see 34.

[43] B. Anckar, P. Walden, *Self-Booking of High- and Low-complexity Travel Products: Exploratory Findings*, "Information Technology & Tourism" 4/3–4 (2002), p. 151–165.

[44] M.A. Jones, *Entertaining Shopping Experiences: An Exploratory Investigation*, "Journal of Retailing and Consumer Services" 6/3 (1999), p. 129–139.

| | | |
|---|---|---|
| *Cost of entry* | Cost of acquiring or getting access to a computer or Internet | *Anckar 2003*[45] |
| *Limited experience* | Difficulties operating computer or browsing websites. Low bandwidth connections, increased time consumption and customer dissatisfaction | *Anckar 2003*[46] |

Source: Authors' own study.

Regarding Anckar's previous studies applying to the importance of the barriers to the customers, the key issue for the online shopping in the view of customers is the quality evaluation barrier. This means that the customers tend to fear that once they receive the product they bought online, they will not be satisfied with its quality. Kangis and Rankin (1996) indicate that the need to touch and feel the product could be a dominating factor for the customers to stay away from online purchasing. Another important aspect in the view of customers is related to the security risk and lack of trust to the electronic sellers. Customers fear that there might be a case of fraud when buying online.

## 4. CONSUMER PREFERENCES AND MARKETING

While on one side, the growing popularity of internet and online shopping seem to bring only some benefits to the retailers buy increasing their sales and gaining new consumer segments and wider clientele, there are theories that the Internet may harm the brands. Researchers, including Sinha (2002) state that the spreading availability of information possible to be obtained online about the products, prices and features can be a threat to brands. This is explained as consumers gain too much information regarding the cheapest price options as a dangerous information transparency in the electronic market. Chen (2001) claims that the possibility to compare products makes the information that brands provide redundant. He thinks that the key role of brands is to represent the quality of their products and showcase features that differentiate a product or service from competitive offerings[47]. The thread of the Internet in this context is not only related to the modern online shopper, but also to the traditional customer who still prefers the brick-and-mortar, now however the consumer can be influenced by the Internet as the information provider, not the shopping channel.

### 4.1. The consequences of electronic channels

Regardless of the preferred shopping channel for the customers, the growing popularity of Internet, and the visible benefits of the Internet not only as a market place, but also as an information place, can greatly impact the retailers and their market strategies, thereby marketing actions. There have been a lot of studies regarding the decreasing customer presence in the brick-and-mortar stores, and how to improve the numbers of visiting customers. These include increasing the appearance of the physical store, creating the real shopping experience in the store, limiting the availability of some products online and selling them online on the spot. The companies, however, have to face the changes and adhere their strategies not to lose more customers but to gain from the increasing e-commerce popularity. As consumers increasingly engage online and make fewer and

[45] see 9.

[46] see 9.

[47] see 24.

fewer trips to stores and shopping malls, there are serious inquiries about how brick-and-mortar shops that used to be the centers of consumerism can transform[48].

Taking into consideration the view of adoption benefits and barriers, there are several actions companies can take to improve their online marketing strategies to keep their customers satisfied.

1. Make the Internet sites a true customer experience. There is a big group of consumers who still prefer traditional shopping, but they use of the digital world for the source of information. This group of customers should be addressed as well. Improving the brand website by the company, providing more product information, better visual presentation, special digital applications for quick product comparisons, etc. could only benefit information-seeking customers. By creating real online experience on the company website, the retailer would not only improve the brand image of the company, but also increase the confidence in consumers to purchase a particular product and greatly influence the information seeking consumer. As some of the buyers avoid discussions with the brick-and-mortar stores employees, and do not like to engage in real-life conversations, having the possibility to digitally interact with the brand through online-chats and using a variety of applications for product search and product comparisons can only enhance their shopping experience.

2. Combine the in-store experience with the digitalism. Some of the retailers have been neglecting the importance of the in-store experience, by focusing mainly of nice presentation of their goods and positive store atmosphere. Retailers have to focus on the experiences in their stores. This is extremely important especially for the customers who practice showrooming. Leaving the shop with positive feelings about the display of the products, well-informed staff and in general great in-store experience, ensures that customers are more likely to engage in online purchase of that brand. Therefore, when customers enter the store, they should be rewarded with memorable experience - both regarding the brand and service. Salespeople should be equipped with most modern means of technology, tablets or mobile devices to better serve customers. If the shoppers want to order out-of stock or customized items - the store and its employees should be capable of fulfilling their needs.

3. Focus on customization. Ordering the one and only, customized product has become a big trend among online customers. Leveraging online marketing towards that trend, could only improve the brand image and encourage customers to buy more products. This can be done by addressing and targeting specified customer segments online and giving them more selection opportunities and customization options. This is related not only to product itself, but also to delivery options, return possibilities, etc. Companies who show flawless service have better chances to fulfill customers' needs.

4. Improve user interface. While some of the online customers are technologically advanced, and easily operate in the online environment, there are still some clients that find it difficult to navigate through the online marketplace. Simple and easy use of online website ensures that the customers find pleasure in online shopping. Clear information and simple navigation are crucial. Customer experience can also be improved by having the possibility to quickly receive help and support throughout the process of online shopping.

[48] see 1.

5. Integrate channels smoothly. There is a need for the retailers to look at their selling systems as the entire landscape and no longer differentiate between the online versus offline shopping experience. Companies should focus on the broader benefits and get the understanding of full customer engagement across all touch points with the company to optimize the customer experience. This approach requires systems that can serve all interactions, and quickly adapt to changes, and this is the role of the commerce platform. Retailers who understand customers, respond to changes faster and the leverage on technology have the opportunity to thrive.

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## MARKETING INTERNETOWY WYNIKAJĄCY Z ROSNĄCYCH WYDATKÓW KONSUMENTÓW NA E-COMMERCE Z UWAGĄ NA KORZYŚCI I BARIERY ADAPTACJI INTERNETU

Współczesny rynek oferuje klientom nie tylko zakupy w tradycyjnych fizycznych sklepach, lecz także daje możliwość wyboru rynku elektronicznego, który zyskuje popularność na przestrzeni lat. Korzyści z rynku online zachęcają więcej klientów do podjęcia ich pierwszych zakupów w internecie, a często powodują zupełne zastąpienie tradycyjnych kanałów handlowych przez klientów, którzy dokonują wszystkich ich zakupów na rynku elektronicznym. Firmy, które chcą wyprzedzić preferencje klientów, powinny uważnie obserwować zmiany na rynku i zastosować nowe strategie marketingowe oraz zmienić obecne podejście do klientów. Takie zmiany w strategiach biznesowych mogą jednak być dokonane dopiero po wnikliwej analizie korzyści i barier wynikających z przyjęcia *e-commerce* przez konsumentów. Z badań wynika, że istnieje wiele korzyści dla klientów wynikające z łatwego dostępu do internetu. Jednak można również napotkać bariery, które mogą wpływać na proces decyzyjny konsumenta i rzeczywistej aktywności nabywczej. Analiza tych korzyści i barier może w dużym stopniu wpływać na sprzedawców detalicznych i ich strategie rynkowe. Biorąc pod uwagę wszystkie te aspekty, istnieje kilka działań, które firmy mogą podjąć w celu poprawy ich internetowych strategii marketingowych, aby ich klienci byli zadowoleni. Są one związane z dbaniem o doświadczenie klienta online oraz łączeniem doświadczeń konsumenckich w tradycyjnych sklepach z doświadczeniami na rynku elektronicznym. Inne kluczowe zalecenia są związane z większym naciskiem na dostosowanie i poprawę interfejsu użytkownika i płynnej integracji wszystkich kanałów konsumenckich.

**Słowa kluczowe:** handel elektroniczny, rynek elektroniczny, korzyści i bariery internetu, zachowanie konsumenckie

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# UKRAINIAN LABOUR MARKET FROM THE PERSPECTIVE OF POLES – STEREOTYPES OR NEGATIVE EXPERIENCES?

Short- and long-term migration for economic purposes became, within the last decade, a typical and inseparable part of the Polish labour market. The most frequently chosen destinations include, in most cases, Western European countries like Norway, while the United States are chosen less frequently. What is important, the eastern neighbours of Poland almost never become the migration destination. A question can thus appear about the reason for the above mentioned aversion to take up employment in this part of the continent. Is it caused solely by factors of economic nature, or does the source lie also in the area of the usually quite negative image of Eastern European countries? The purpose of this article is to attempt to assess, using the example of the Ukrainian market, how the Polish employees perceive the eastern labour markets and, moreover, to verify, to what extent these perceptions are a derivative of the functioning stereotypes, or a consequence of own professional experience. Obtained results show that the aforementioned market is perceived in a clearly negative way, especially in the area concerning work, its conditions, and professional opportunities. Nonetheless, it should be pointed out that in fact some stereotypes do exist – employees who had actually visited Ukraine, had the tendency to evaluate the local labour market slightly better than those who had never been there.

**Keywords**: Ukraine, labour market, polish employees' opinions

## 1. INTRODUCTION

Migration for economic purposes, both temporary and long-term, has become a permanent aspect of the Polish labour market. According to the estimation of the Central Statistical Office, at the end of 2013, 2 million 196 thousand Poles stayed outside the borders of Poland[4], which constitutes almost 6 % of the population. It should also be emphasized that, in recent years, this amount has been growing, and more than 75 % of temporary migrants remain beyond the country for at least 12 months. It can thus be presumed that work in the country becomes less attractive prospect, both for structural reasons, reasons related to the labour market, as well as due to some social and cultural conditions.

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The literature indicates various reasons for this situation. In the area of labour market, the following processes can be specified:[5] growth in the area of temporary work (employment for definite time), low level of net wages, low level of minimum wage, and a significant growth in the number of people belonging to the category of the so-called working poor. Also important are the fiscal and social care solutions, which are more beneficial in other countries[6], as well as, naturally, the difficulties with finding employment observable in Poland[7].

As it was indicated by the statistics, the dominant emigration destinations include the European Union countries[8]. 1.789 million employees found employment therein, which constitutes more than 81 % of the leaving population. Norway is the most important labour market among the countries from outside the European Union. It is worth mentioning that there are no former Eastern Bloc countries on the list, including Baltic republics.

Reluctance to emigrate in search of work to the countries of the Eastern Europe - among others to Ukraine, being the subject of interest of this article - should be primarily ascribed to the conflict with the abovementioned basic drivers, encouraging people to seek work abroad. The most important discouraging factor is most likely the low - from the point of view of a Polish employee - wage level. It is also worth emphasizing that the system solutions applied there, as well as the mentality of the employers, do not support personal initiative of the employees and do not build the sense of job security. The willingness to invest in trainings and development of relations between employees and employer is also missing, which ultimately is a strongly discouraging factor affecting the employees[9]. Finally, one should note that people prefer countries with higher standard of living, higher economic growth and higher gross domestic product as the destination of their migration movement.

At the same time, it should be emphasized that the Ukrainian labour market, both on the part of employees, as well as the employers, struggles with a number of problems of legal, financial and organizational nature, which directly translate into how it is perceived and assessed, both locally and on the international arena. These problems may include, among others, corruption, constituting a great burden for the entities[10], and organized crime, in particular crime of economic nature[11], or the tendency to run business operations

[5] G. Firlit-Fesnak, *Polityka społeczna w Polsce wobec współczesnych procesów migracyjnych. Próba diagnozy i rekomendacje*, „Studia Migracyjne – Przegląd Polonijny” 39/149 (2013), s. 22.

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[8] See e.g. *Informacja o rozmiarach i kierunkach emigracji…*

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without registration and informal employment, as methods to avoid contact with the tax administration, which is not always fair[12].

There are no studies on the scale of emigration for financial reasons to this country, both long-term and short-term. The subject literature, when discussing the issues of migration movements between Poland and Ukraine, focuses usually on Ukrainian employees, coming to Poland and returning to Ukraine, ignoring - probably for justified reasons - the Poles[13].

A question can thus appear of how this market would be perceived in the event of offering a wage level attractive for the Polish employee. Is the observed unwillingness to emigrate there only caused by financial factors, or is it a derivative of other variables?

The purpose of this article is the assessment of how the Polish employees perceive the Ukrainian labour market, both in its financial aspects, as well as in non-financial areas – related to the image and social aspects, and therefore to answer three research questions: what is the perception of (1) image and culture-related factors, (2) professional and work environment, and (3) social and personal areas of local labour market, and how that perception correlates with the fact, that employee had or had not previously visited that country.

At the same time, an attempt was made to answer the question of: to what extent this perception is a reflection of the objective situation on the discussed market, and to what degree it is the result of the prevailing prejudices and the functioning stereotypes. Additionally, the hypothesis that employees' evaluation of consecutive areas improve in groups of people who visited Ukraine once and more than one time had been tested.

## 2. THE ADOPTED RESEARCH METHODOLOGY

The research on the perception of the Ukrainian market became a part of a greater research project, the goal of which was to assess the attractiveness and potential destinations, as well as perspectives of cooperation between the border areas of Poland and Ukraine - from the point of view of employees, employers and social dialogue institutions. The part devoted to opinions of employees contains data obtained by way of surveys, carried out by means of a questionnaire covering 92 variables, concerning both the opinion of the surveyed persons with regard to the considered market itself, their susceptibility to take up employment, as well as their expectations and experience, both these of employment nature, as well as others – educational, or tourist ones. At the same time, it should be emphasized that, due to the fact that this market is demonstrably hardly encouraging in terms of economic incentives, the study covered also the potentially important macro-environment factors, going beyond the classic models that explain migration movements. As shown by research, these models, based only on the existence of appropriate disproportions between the achieved, and the potential possible incomes[14], do not

[12] P. Rodgers, C. Williams, J. Round, *Workplace crime and the informal economy in Ukraine: Employee and employer perspectives*, "International Journal of Social Economics" 35/9 (2008).

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[14] See e.g. A. Czarnecki, *Atrakcyjność rynków pracy małych miast w Polsce (dla ludności miejscowej i dojeżdżających)*. „Studia Ekonomiczne/Uniwersytet Ekonomiczny w Katowicach" 144/1 (2013).

explain in a complex manner the susceptibility of employees to search for employment outside the place of residence, as well as to possibly return[15].

Perceiving the Ukrainian labour market by Polish employees was assessed in three functional areas. The first one concerned the image- and culture-related aspects and covered such variables, as observance of legal regulations and public order, personal safety of citizens, legal protection on the part of the state, attitude of the community towards foreigners, access to information, situation of the economy, and quality of the public administration's operation. The second examined assessment area was the set of socio-economic variables, taking into account efficiency of the traffic and transport system, ease in communication and ease in establishing personal contacts, possibilities of spending free time, standard of living, freedom of belief and freedom of speech, living costs, as well as access to Polish-language press and television, and Internet access. The third area focused around employment and its conditions, and included wage level, compliance with regulations of the labour law and occupational health and safety (OHS), stability of employment, possibility to find employment, protection of an employee on the part of the state, career opportunities, honesty of the employers, as well as atmosphere in the work environment. The respondents were also asked to make a general evaluation of the Ukrainian labour market. All variables were subjected to measurement using ten-step scales, low values of which represented negative evaluation, high values – positive evaluation. The research tool was subject to validation, and tested during the pilot audit carried out on a small group of respondents.

The research sample was selected in a purposeful manner[16] from among the inhabitants of the Lubelskie Voivodeship. Such a method of sample selection resulted from the need to reach and recruit a fraction of people, who had an experience with contacts with Ukraine, both of employment nature, as well as other nature, for example tourist contacts. The research had been conducted in 2013 – therefore it should be noted that it evaluates the situation before the unrests that started in February 2014.

3129 respondents took part in the discussed survey, including 1640 (52.4 %) women and 1440 (46 %) men. The remaining group (1.6 % of the sample) did not indicate their gender. The respondents included 892 persons in the age of 18 to 25 years, 744 persons of 26 to 35 years of age, 1053 persons aged from 36 to 55 years, and 271 people above 56 years of age. 169 respondents did not answer the question about their age.

The surveyed group included persons representing subsequent possible levels of education, as well as various professional statuses – persons working on a full-time job, as well as students, unemployed persons or persons running their own business operations. From among all persons covered by the research, 1394 (44.55 % of the sample) declared at least one trip to Ukraine, a vast extent of which were tourist trips, and the remaining part of which was business trips, commercial trips and trips related to participation in training courses. At this point, it should be pointed out that tourist trips were dominant among persons who have visited Ukraine up to three times, whereas the persons visiting

[15] See O. Verkhohlyad, G.N. McLean, *Applying organizational commitment and human capital theories to emigration research*, "European Journal of Training and Development" 36/2–3 (2012), or D.S. Massey, J. Arango, G. Hugo, A. Kouaouci, A. Pellegrino, *Worlds in Motion: Understanding International Migration at the End of the Millennium*. Oxford University Press, Oxford 1999.

[16] G.A. Churchill, *Badania marketingowe. Podstawy metodologiczne*. Wydawnictwo Naukowe PWN, Warszawa 2002, s. 500.

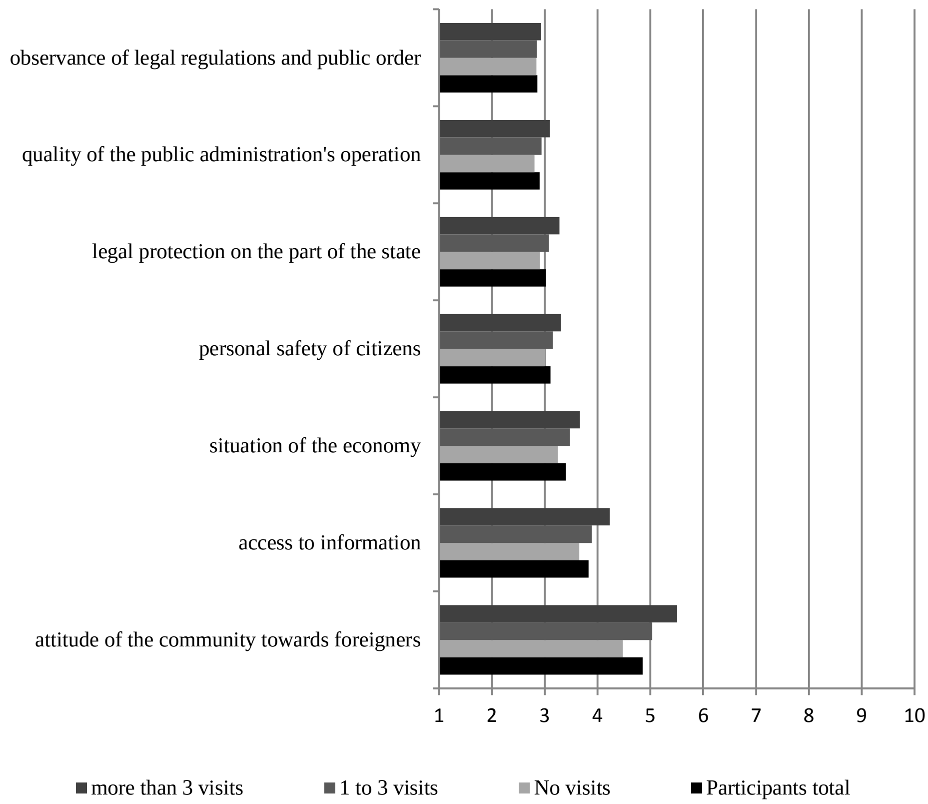
this country more often, declared conducting business and commercial activities as the basic goals of the visits, as well as participation in or conducting trainings.

For further discussion, an assumption has been adopted that a situation, in which the persons who have visited Ukraine evaluate the given issues better than the persons who have never been in this country, proves the functioning of a specific stereotype, which - in the course of the visit - was verified.

## 3. PERCEPTION OF THE UKRAINIAN LABOUR MARKET

The first analysed area includes the opinions with regard to the image and culture-related aspects of Ukraine and the Ukrainian labour market (graph 1).

Graph 1. Perception of the Ukrainian market – the image and culture-related aspects

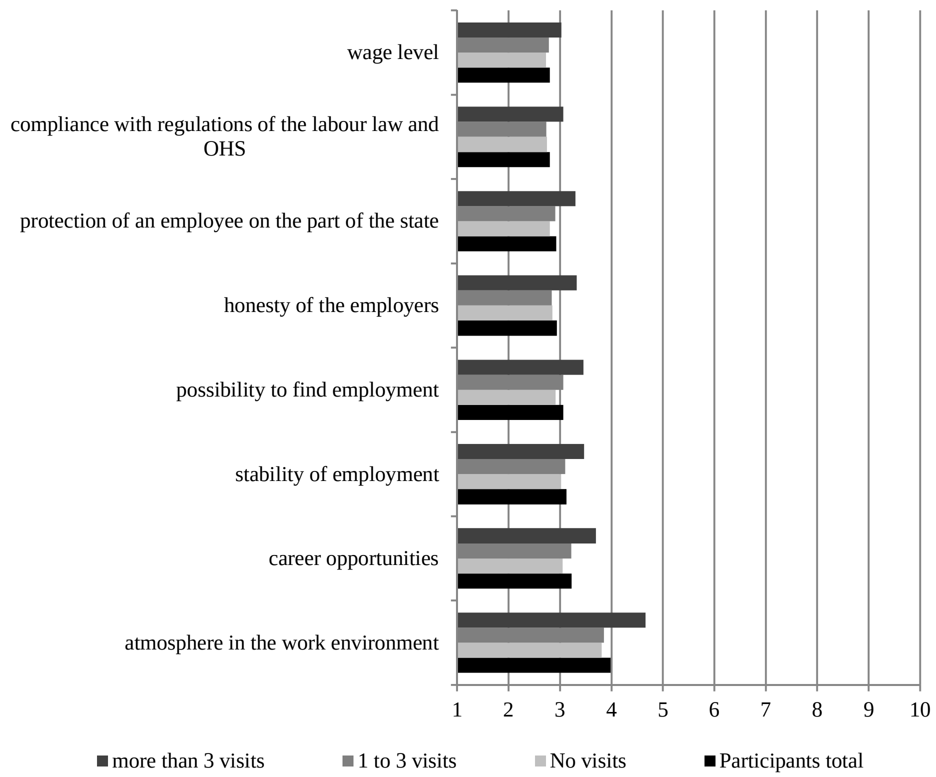



Source: prepared by the author.

The most important conclusion arising from the acquired empirical material is an extremely low assessment of all aspects subject to analysis - as it can be seen, practically none of the studied areas obtained the average rating higher than 5.0. A certain exception is the attitude of the local community towards foreigners, in the case of which the average rating reached the value of 4.86 and is significantly dependent on the fact of visiting Ukraine – the persons, who have never visited this country, assessed this attitude significantly lower (4.48) than the persons, who have visited between one and three times (5.03) and more often (5.51). Lower ratings were given to access to information (3.83), situation of the Ukrainian economy (3.40), personal safety (3.11), and legal protection of citizens (3.03), although in all these factors an insignificant increase in their evaluations can also be seen by groups, which have visited Ukraine. The lowest ratings were given to quality of the public administration's operation (2.91) and observance of law and order (2.86).

At the same time, it should be emphasized that, in most of the surveyed aspects, the presented negative evaluation seems to be, to some extent, a derivative of the popular stereotype. The conducted survey (due to the nature of the adopted scales, the U Mann-Whitney's test) demonstrated the statistically significant ($p<0.05$) differences in average ratings between a group of people, who have never visited Ukraine, and a group of people, who have visited this country at least once, for all the presented variables, except for observance of law and order ($p = 0.93$) and quality of the public administration's operation ($p=0.13$).

Graph 2. Perception of the Ukrainian market – professional aspects



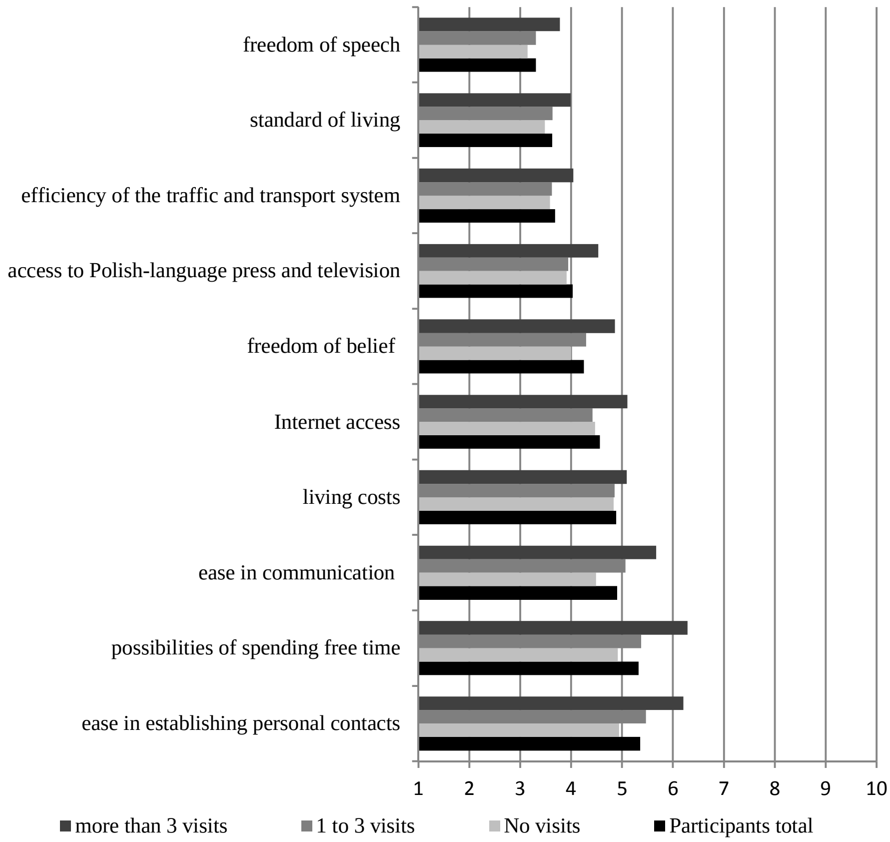

Source: prepared by the author.

Extremely negative evaluations were also shared by the second of the examined areas, concerning work in Ukraine and its conditions (graph 2 – professional aspects). In this case, again, none of the average ratings exceeded the value of 5.0, and for half of the examined variables, the average rating was below 3.0. Considering the abovementioned significant meaning of the economic factors and the factors related to work conditions, these results seem to explain the reluctance of Polish employees towards the local labour market to a significant extent.

In the discussed area, the highest ratings were given to atmosphere in the work environment (average rating in the whole surveyed group was 3.98), slightly lower - career opportunities (3.22) and stability of employment (3.13). The lowest obtained ratings were for wage level (2.80) and compliance with the labour law (also 2.80).

Comparison of average ratings, calculated separately for the group of people, who have never visited Ukraine and people, who have visited this country at least once, again leads to the conclusion of the existence of statistically significant differences between them. They take place for all analysed variables, except for compliance with labour law ($p = 0.44$) and honesty of the employers ($p = 0.25$).

Graph 3. Perception of the Ukrainian market – socio-personal aspects




Source: prepared by the author.

It is worth mentioning that, in this case, the opinions of people who have never visited Ukraine, and those who have visited the country up to three times, are relatively comparable. Better ratings can be seen only among persons, who have visited this country more often. The presented situation most likely results from the fact that, on the one hand, the question within this area related to work environment, while on the other hand, as it was previously mentioned, from among the people from the second group (1 to 3 trips), most of the visits have been of a tourist or training nature, therefore, these persons could not have the occasion to learn the specific character of the raised issues.

The last analysed area on the perception of the Ukrainian market included its socio-personal aspects (graph 3). Firstly, it should be noted here that the perception of the subsequent analysed issues was significantly better than previously, although it was still quite negative. The highest rating in this case was obtained by ease in establishing contacts, for which the average rating calculated for the whole examined sample reached the value of 5.35. The respondents gave a slightly lower rating to possibilities of spending free time (4.90) and living costs (4.88). The lowest ratings were given to freedom of speech (3.31), standard of living (3.63) and efficiency of communication (3.69).

As previously, discrepancies in opinions can be also seen of the surveyed persons, who have never visited Ukraine, and of those, who have visited the country at least once. Statistically significant differences were observed in all of the examined aspects, except for living costs ($p = 0.35$). At the same time, it should be noted that:

[1] In the case of freedom of speech, standard of living, efficiency of communication, access to Polish-language press and television, as well as Internet access, the observable differences correspond to the respondents, who have visited the country in question at least four times. The respondents, who have visited Ukraine up to three times, assessed the mentioned aspects similarly to those, who have never visited this country;

[2] In the case of freedom of belief, ease in communication, possibilities of spending free time, as well as ease in establishing contacts, the ratings get systematically higher along with the increase in the number of times the surveyed persons have visited Ukraine.

## 4. SUMMARY

The conducted survey validates drawing a number of conclusions with regard to the way Polish employees perceive the Ukrainian labour market. The first issue that can be observed is that this market is perceived in a clearly negative way. This fact is proved by both the previously presented evaluation of the results of the particular analysed issues, as well as the comprehensive assessment of its attractiveness – the average value of answers to the question given to the respondents concerning a general attractiveness assessment of the Ukrainian labour market amounted only to 3.70 on a ten-grade scale of measurement.

Nonetheless, it should be noted that this strongly negative assessment seems to be, at least to some extent, a derivative of the stereotype prevalent among Poles. The first thing that may prove its existence is the positive shift in the opinion about the Ukrainian labour market, which appears along with the increase in the number of visits to Ukraine, noticeable both in a considerable part of the analysed detailed issues, as well as in the case of a general attractiveness assessment. The average general rating given by people, who have visited this country at least once, but less than four times, was 3.81, whereas the rating given by people, who have visited at least four times, reached the value of 4.25.

On the basis of the previous discussion, the areas subject to analysis of the way the Ukrainian labour market is perceived can be divided into three categories:

[1] Not related to the functioning stereotypes, or related to very strong stereotypes, difficult to challenge even during a personal stay. These may include any variables, in the case of which there was no difference in assessment between people which have not visited Ukraine, and those, who have visited Ukraine, namely: observance of law and order, quality of the public administration's operation and living costs.

[2] Potentially related to a functioning stereotype, the verification of which takes place during a visit to the discussed country. This group includes all variables, in the case of which the ratings given by persons, who have visited Ukraine are clearly higher than those given by persons, who have never been there. These include particularly attitude of community towards foreigners, ease in establishing contacts, ease in communication, access to information, situation of the economy, freedom of belief and possibilities of spending free time.

[3] Potentially related to a functioning stereotype, the verification of which requires a stay related to a deeper contact with the labour market or the business environment. This group includes the majority of variables from the group of professional aspects, in particular atmosphere in the work environment, but also Internet access and access to Polish-language press and television.

Secondly, it is worth emphasizing that, although it can be presumed that a set of stereotypes functions to some extent, they do not correspond in any way to the clearly negative receipt of the discussed market. The positive shift in the opinion about the Ukrainian labour market among people having experiences with the Ukraine is not significant and does not validate putting forward a thesis that the perception of the surveyed persons is highly inconsistent with reality. An exception to this conclusion seems to include the variables related to interpersonal contacts (attitude towards foreigners, ease in establishing contacts, ease in communication) – in their case, we can even refer to positive opinions, especially among people visiting the examined country often, as well as to a large dissonance in assessments between these people and the respondents who have never been to Ukraine.

Finally, it should be noted, that the empirical data had been gathered before the unrests that took place in 2014. Nonetheless, that fact most probably does not impair their validity. Obviously the market is perceived in such a negative way that the recent events are unlikely to make employee opinions visibly worse.

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## UKRAIŃSKI RYNEK PRACY W OPINII POLAKÓW – STEREOTYPY CZY NEGATYWNE DOŚWIADCZENIA?

Na przestrzeni ostatniego dziesięciolecia krótko- i długoterminowa emigracja zarobkowa stała się typowym i nieodłącznym elementem polskiego rynku pracy. Do najczęściej wybieranych kierunków wyjazdów można zaliczyć w większości wypadków państwa Europy Zachodniej, Norwegię, coraz rzadziej natomiast Stany Zjednoczone. Co ważne, celem wyjazdu prawie nigdy nie są wschodni sąsiedzi Polski. Pojawić się może zatem pytanie o przyczyny wspomnianej niechęci do podejmowania pracy w tej części kontynentu. Czy powodowana jest ona wyłącznie czynnikami natury ekonomicznej, czy źródło leży także w obszarze zwykle dość negatywnego wizerunku krajów wschodniej Europy. Celem niniejszego artykułu jest próba oceny, na przykładzie rynku ukraińskiego, postrzegania przez polskich pracowników wschodnich rynków pracy. Ponadto zweryfikowano, do jakiego stopnia oceny te są pochodną funkcjonujących stereotypów czy konsekwencją własnych doświadczeń zawodowych. W trakcie prowadzonych badań liczna grupa respondentów (3129 osób) została poproszona o ocenę ukraińskiego rynku pracy w aspekcie jego aspektów wizerunkowych i kulturowych, społecznych i osobistych, jak również oferowanych perspektyw zawodowych. Pozyskany materiał badawczy jednoznacznie i wyraźnie ujawnił niezwykle negatywny obraz badanego rynku w opinii polskich pracowników. Najgorzej postrzegane były zmienne związane z oferowanymi warunkami pracy i zatrudnienia, najlepiej – chociaż nadal względnie negatywnie – te dotyczące społeczeństwa, w szczególności zaś relacji interpersonalnych. Równocześnie należy podkreślić, że można mówić o funkcjonujących stereotypach – wizyta na Ukrainie w pewnym stopniu skutkuje poprawą opinii na temat tamtejszego rynku pracy.

**Słowa kluczowe:** Ukraina, rynek pracy, opinie polskich pracowników

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# MACROECONOMIC CONSEQUENCES OF NEW PRUDENTIAL REGULATION IN THE BANKING SECTOR

This article presents the impact of new prudential regulations for banking sector and their implications for GDP growth rate. Amongst large numbers of new financial regulations that have been created in recent years, the impacts of Basel III and CDR IV/CRR was chosen for analysis. This article was created for reviewing purposing. The aim of the paper is to create a structured section of macroeconomic effects of Basel III (CRD IV/CRR). So far, the results of researching the effects of the changes on the economy and the banking system analyzed by different institutions - have led to different conclusions, which justifies the need to collect and compare these results. However, it must be noted that conducting such studies is difficult due to various assumptions that are implemented. The main objective of paper was to assess the impact of new prudential regulations for banking sector. Furthermore, it discusses the channels through which changes in regulations translate into economic growth and other macroeconomic indicators. Additionally, an analysis of the macroeconomic impact of these changes in relation to the economies of the world and domestic market was conducted. The results obtained lead to conclusions that the consequences of new regulations will lead to slight decline in future growth of economy. Therefore, there are questions which arise regarding the desired degree for regulation, its scope, scale, and time period that the standards should be maintained.
**Keywords:** banking sector, economic growth, Basle III, capital and liquidity regulations.

## 1. INTRODUCTION

The global financial crisis that has taken place in recent years has resulted in a threat to the security of the entire financial system. In order to avoid errors so far banking supervisory authorities introduced a number of new regulations aimed to increase the safety of banks, as an institution of public trust[3]. These procedures have been forced by the dynamic changes taking place in the area of risk in this market[4].On the one hand, the new prudential standards were introduced to support the safety of banks. The regulatory projects that were introduced in the banking system are geared primarily to reduce the risks in banks. The introduction of new

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[3] K. Szymański, *Konsekwencje kryzysu zadłużenia w strefie euro dla europejskiego i polskiego sektora bankowego*, referat wprowadzający Instytutu Badań nad Gospodarką Rynkową do e-debaty, 2011.
[4] M. Olszak, *Polityka ostrożnościowa w ujęciu makro*, „Problemy Zarządzania” 2012/4, p. 8.

capital requirements should help to increase the solvency of financial institutions, but at the same time to increase interdependence occurring in the banking system[5]. On the other hand, those new regulations impose stricter prudential standards, which are very difficult to fulfill and may lead to limiting the number of customers, which will be able to access to the credit. There is a real danger that will lead to a decline in economic growth.

In the interest of supervisors and individual economies it is to create such regulatory standards that will affect not only the strengthened stability of financial systems but also on the development of the banking system and stimulation of economic growth. The question is whether it is possible to reconcile these two objectives. Therefore, an impression arises that the developed regulation are mainly a response to financial crisis and unilaterally set for prudential purposes. There is a serious danger that the proposed solutions will be contributed to the creation of new, threats which have low researches conducted.

This article is for reviewing purposes. Its aim is to create a structured section of macroeconomic effects of Basel III (CRD IV/CRR). For analysis a study was conducted, where the main focuses was put on the attempts to access the impact of new prudential regulations for the development of the banking sector and their implications for economic growth. In relation to the objectives, the answers were searched for the following research problems:

Q1: What goals were accompanied by the introduction of the new regulations?

Q2: What are the impacting channels of regulatory changes on economic growth?

Q3: What will be the macroeconomic effects of introducing new regulations in the banking system?

These issues have fundamental importance for responding to a question about the real consequences of introducing new prudential standards. They allow verifying of stereotypical beliefs about the need to introduce new higher and stricter financial regulations. It is necessary to find a balance between the dangers of under regulating, and the overregulating the banking system[6]. Amongst large numbers of new financial regulations that were created in recent years, the impacts of Basel III and CDR IV/CRR was chosen for analysis. The analysis focuses on the macroeconomic effects of new regulations, deliberately excluding the impact of these changes on the size of the indicators reflecting the situation in the banks. Moreover, these changes have also been indirectly included in this study.

## 2. MAIN CHANGES IN BASEL III REGULATIONS AND OBJECTIVES ASSOCIATED WITH THEIR OCCURRENCE

Changes in regulation of capital and liquidity in the banking sector are presented in the documents of the Basel Committee by banking supervision[7]. In Poland, the implementation of these guidelines will take place through establishment on the basis of EU regulations: Package

[5] European Commission, *European Financial Stability and Integration*, Brussels 2014.

[6] European Banking Federation, *Principles for a Successful Future of Banking in Europe*, Brussels 2010.

[7] Bank for International Settlements, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems – Revised Version*, Basel 2011–2013.

CRD IV/CRR, Directive 2013/36 / EU and Regulation of the European Parliament and Council Regulation (EU) No 575/2013.The most important new solutions include:

1. Clarification of the concept of equity, by describing their categories and improving their quality - the new definition of own funds have 2 categories: Tier 1 - primary funds that are used to cover the losses from the normal courses of business and Tier 2 - supplementary funds, which are used to cover losses within bankruptcy. Both definitions of these categories have been strengthened. In addition, the list of deductions from own funds was expanded and was permitted to reference these deductions to CET1, abandoning the ability to fulfill the requirements with respect to capital adequacy ratio by means of short-term capital (Tier 3.) The purpose of these changes was to increase the quality and transparency of the capital base of the banks.
2. Establishing quantitative liquidity standards - Basel III introduces two requirements: LCR and NSFR. LCR[8]states that every bank must maintain sufficient quality of liquid able assets to secure financing for 30 days of any problems with liquidity and is therefore designed to strengthen banks' short-term resistance to liquidity risk.[9]NSFR[10]ensures the long-term liquidity. Long-term assets such as; Mortgages, should be funded by liabilities with a maturity of more than one year. NSFR standard is complementary to standard LCR, together they provide short-term and long-term liquidity[11].
3. When increasing minimum capital requirements for banks - the Basel III introduces an additional capital buffer in the form of capital adequacy ratio based on core funds. In accordance, the share capital is to be the value of at least 4.5% of risk-weighted assets, which means that it has to increase my 2.5 % prove the value before. This provision is designed to increase the absorption of capital by banks and at the same time increase their resilience to shocks on financial markets.
4. The introduction of new buffers (security and counter-cyclical) - means that banks will have to maintain a protective buffer capital of 2.5% of risk-weighted assets and the countercyclical buffer ranging from 0 to 2.5% of risk-weighted assets, depending on economic conditions. As in the previous case, the introduction of these buffers is to reduce banks susceptibility to external shocks[12]. The

[8] LCR is defined as the ratio of high-quality liquid assets to net inflows in the horizon of 30 days. This value should be at least 100%.

[9] A. Gemzik-Salwach, *Skutki regulacji Bazylei III dla sektora bankowego i gospodarki,* "Annales Universitatis Mariae Curie-Skłodowska. Sectio H. Oeconomia" 2012, p. 200.

[10] NSFR is the quotient of the available resources of stable funding and the required amount of stable funding. This relationship should be a number greater than or equal to 100%.

D.K. Rosati, *Regulacje makroostrożnościowe a stabilność sektora bankowego*, „Bank i Kredyt" 2014, p. 392.

[12] K. Kochaniak, *Kapitał regulacyjny sektora bankowego w Polsce na tle rozwiązań Bazylei III*, „Zeszyty Naukowe. Polskie Towarzystwo Ekonomiczne" 2011/11, p. 159–160.

legitimacy of using this instrument was explained by the negative impact of banks' losses during the crisis in the sector and real sphere[13].

5. Determination of leverage - has to complement the risk-based measure, which operates within the framework of Basel II. The leverage ratio will apply from 2018, until now there predictions about future intentions for couple of years, that supervisory authority will monitor it. Leverage ratio was set at a minimum of 3%. The purpose of this provision is to prevent excessive leverage of financial institutions[14].

Assessment of objectives of newly created regulations should be considered as reasonable and correct. The essence of the changes is that they serve to strengthen stability of financial system and its resistance to external interference. Efforts were made to ensure that the new regulations prevent errors, which are the main cause of the previous crisis, such as: insufficient capital, global assets financed by short-term sources of systemic risk - the interconnectedness and complexity of operations and the lack of systemic solutions for large institutions conducting bankruptcy[15]. New standards can be implemented gradually and their effects will be monitored, a target period to put them in a final version will be year 2019.

## 3. INFLUENCING CHANNELS IMPACTING REGULATIONS ON GROWTH OF ECONOMY

Although the objectives pursued from creating new prudential standards are reasonable and logical, and are intended to secure solvency, thereby protecting customers and the banks themselves for losses or bankruptcy, their inevitable consequence of an increase in the cost of financing[16]. The global economy is a system of connected vessels and systematic risk, which tend to move through various channels.[17]Transferring the regulatory changes on economic growth takes place mainly through the credit channel. Of all the proposed changes, the greatest impact on economic growth is the introduction of capital and liquidity standards. It is believed that stricter prudential requirements will result in increased interest rates on loans and on demand for capital.[18]Increasing lending rates can be decomposed into cost of financing, risk premium, premium reflecting the market position of the bank and premium reflecting the sensitivity of the cost of capital on the volume of loans.[19]As a result from increasing prices of

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[13] H. Hannoun, *The Basel III Capital Framework: A Decisive Breakthrough*, Bank for International Settlements, Hong Kong 2010; Narodowy Bank Polski, *Opinia NBP w sprawie dokumentu konsultacyjnego Komisji Europejskiej „Possible further changes to capital requirements directive”*, Warszawa 2010.

[14] M. Marcinkowska, P. Wdowiński, S. Flejterski, S. Bukowski, M. Zygierewicz, *Wpływ regulacji sektora bankowego na wzrost gospodarczy – wnioski dla Polski*, Narodowy Bank Polski, „Materiały i Studia” 2014/305, p. 53

[15] E. Miklaszewska, *Duże banki w świetle pokryzysowej architektury regulacyjnej*, [in:] *Finanse w niestabilnym otoczeniu – dylematy i wyzwania. Bankowość*, ed. I. Pyka, J. Cichorska, Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach 2012, p. 181.

[16] J. Przychodzeń, *Europejskie rynki finansowe w obliczu globalnego kryzys*, „Problemy Zarządzania” 2012/4, p. 60.

[17] R. Karkowska, *Koszty ekonomiczne ryzyka systemowego na rynku finansowym*, „Problemy Zarządzania” 2012/4, p. 39.

[18] V. Gafrikova, R. Milic-Czerniak, *Bazylea III – zmiany kapitałowe i ich konsekwencje*, „Bezpieczny Bank” 2011/4.

[19] Basel Committee on Banking Supervision, *Results of the Comprehensive Quantitative Impact Study*, Basel 2010.

credits, demand for consumer loans and investment will be reduced. Consumer demand and investment demand are components of GDP, which means that a decrease in these numbers will translate into a decreasing rhythm of economic growth. In addition, changes in interest rates are affecting the value of exports and imports, prices and the value of financial assets. Decline in GDP translates into a general deterioration of the conditions for the functioning of society and leads to a further reduction in lending due to increased credit risk.

## 4. IMPLICATIONS OF NEW PRUDENTIAL REGULATION IN THE BANKING SECTOR WHICH STIMULATE GROWTH IN THE WORLD

Introduction of new prudential norms were preceded by public consultation and research studies of possible consequences. One of the first studies devoted to this subject was conducted by experts from the Basel Committee, the Banking Supervision, from European Central Bank and European Commission.[20]They show that the consequences of higher capital standards and liquidity ratios translate into economic growth to some extent. It has increased from 0.3% to 2.0% due to reduced frequency and likelihood of financial crises. It is expected that the probability of financial crises will be limited in seven Member States with range of 29% to 89%.The final analysis shows the advantage and benefits of the new regulations that exceed their costs.[21]

However, there are some doubts that Basel Committee did not estimate the exact cost of applying new regulations. Attention is drawn to the following issues: the additional capital required for global banks, too broad definition of systemically important banks, the separation of banking activities of different legal entities, however it is not excluded that the introduction of new regulations may result in further need of regulations.[22]

From another research from Bank for International Settlements it turns out that increasing banks' capital adequacy ratio by 1 percentage, on a constant structure of assets will result in increasing interest rates by 15 basis points. Meeting the liquidity requirements for banks leads to a further increase in interest rates by another 24 basis points. These studies were carried out on the basis of data from the period 1993-2007 with 6844 banks in 13 OECD countries.[23]

According to OECD, macroeconomic effects from introduction of new regulations will result in significant grow in GDP and rising unemployment level. The introduction of new standards will result in decline in GDP in the euro area over the medium term range from 0.08 to 0.23 percentage points per year.GDP of main OECD countries (United States, European area, Japan) according to calculations will decline in range of 0.05 to 0.15 percentage points. These changes are primarily due to increasing credit margins. It is expected that by 2015,

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[20] *Ibidem*.

[21] *Szok regulacyjny a konkurencyjność i rozwój sektora bankowego*, ed. S. Kasiewicz, L. Kurkliński, Warszawski Instytut Bankowości, Warszawa 2012, p. 176.

[22] K. Kalicki, *Wpływ Bazylei III/CRD4 na sytuację sektora bankowego*, http://alterum.pl/pdf/Dr_hab_ Krzysztof_Kalicki.pdf (last viewed 19.09.2014).

[23] M.R. King, *Mapping Capital and Liquidity Requirements to Bank Lending Spreads*, “BIS Working Papers” 2010/324.

lending rates will increase by 15 basis points in 2019 of OECD countries - this means an increase by 50 basis points. In general, increase in capital adequacy ratio by one percentage in the OECD countries translates into an increase in credit margins of 14.4 basis point.[24]Similar conclusions were reached, by the authors of the report: *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements – Final Report*, who presented the research results, with average of 97 models, including 42 models of national economies, 40 models, of International Monetary Fund and 15 models of European Central Bank and the European Commission.[25]. It shows that the increase in the capital adequacy ratio by 1 percentage point will translate into an increase in credit margins by 15 basis points and a decrease in the effective demand for loans by 1.89%, and this translates into a decline in GDP of 0.22% after 35 quarters after conducted changes. This means limiting the annual GDP growth rate by 0.03 percentage points. The studies focus on occurrence of the factors that may mitigate the negative impact of new regulations on interest rates and economic growth. This means strengthening capital base of many banks by retaining earnings, new issues and opportunities for more efficient management of operating costs. The potential for reducing the negative effects of the new regulations is through careful cost management in banks.[26]It is confirmed that the impact of new regulations on the growth of lending rates in the long term will be negligible.

Studies of relationship between Basel III and economic growth in the long term have shown that an increase in the capital adequacy ratio by 1 percentage point, GDP would decrease by 0.09%compared to the baseline scenario, and then with an increase in the demand for liquid assets by a further 0.08% -0.15%.At the same time the forecast is to reduce the amplitude of the fluctuations in GDP[27].

The Institute of International Finance estimates that in 2015 the level of GDP for the United States, European are , Japan, the UK and Switzerland would be about 3.2% lower than it would be if the new regulations were not been introduced (baseline scenario).The decrease in the level of employment in these countries rated an average of 7.5 million. The first adjusting mechanisms have to raise the level of banks' lending rates and limiting access to them. Within five years, it is expected that level of interest rates on loans will increase, in countries with 364 basis points and the appearance of an additional capital requirement at the level of $ 1.3

[24] P. Slovik, B. Cournède, *Macroeconomic Impact of Basel III*, "OECD Economics Department Working Papers" 2011, s. 8–9.

[25] MAGG, A*ssessing the Macroeconomic Impact of the Transition to Stronger Capital and Liquidity Requirements – Final Report*, Bank for International Settlements, Basel 2010.

[26] D.J. Elliott, *Quantifying the Effects of Lending Increased Capital Requirements*, Brookings Institution 2009, www.brookings.edu/~/media/research/files/papers/2009/9/24%20capital%20elliott/0924_capital_elliott.pdf (last viewed 19.09.2014); idem, *A Further Exploration of Bank Capita lRequirements: Effects of Competition from other Financial Sectors and Effects of Size of Bank or Borrower and of Loan Type*, BrookingsInstitution 2010, http://www.brookings.edu/~/media/research/files/papers/2010/1/29%20capital%20elliott/0129_capital_requirements_elliott.pdf (last viewed 19.09.2014).

[27] P. Angelini, L. Clerc, V. Cúrdia, L. Cambacorta, A. Gerali, A. Locarno, R. Motto, V. Roeger , S. Van den Heuvel, J. Vlček, *Basel III: Long-term Impact Economic Performance and Fluctuations*, "Federal Reserve Bank of New York Staff Reports" 2011, p. 485.

billion. However, it was considered that these are the costs for short term, and longer-term changes will bring benefits to achieving financial stability.[28]More detailed results of this estimation are summarized in Table 1.

Table1. Changes in GDP and employment in the global economy due to adaption of requirements-Basel III in 2015

| | **Change of GDP, compared to the baseline scenario (percentage difference)** | **GDP growth (in percentage points)** | **Employment (in millions)** |
|---|---|---|---|
| USA | -2,7% | -0,6% | -2,9 |
| European area | -3,0% | -0,6% | -2,8 |
| Japan | -4,0% | -0,8% | -0,5 |
| United Kingdom | -5,5% | -1,1% | -1,2 |
| Switzerland | -3,7% | -0,8% | -0,1 |
| G3 Group | -3,0% | -0,6% | -6,2 |
| **Total** | **-3,2%** | **-0,7%** | **-7,5** |

Source: based on Institute of International Finance, The Cumulative Impact on the Global Economy of Changes in the Financial Regulatory Framework, Washington 2011, p.11.

The reports conducted by the International Monetary Fund highlight the varying impact of new regulations on individual countries, resulting from the level of economic development. The relatively large decrease in the amount of granted loans can be expected in countries such as: Denmark and Japan, and less in the United States. Generally the estimated increase for granting loans will be by 16 basis points, which will cause a decrease in rate of change of loans by 1.3% in the long term[29].

Studies on the effects of the regulation were carried out also by the European Union. They calculated that the increase in the capital adequacy ratio of banks by one percentage point in the euro area will increase lending rates by 12 basis points in the long term, which is translated into a decline in GDP by 25 basis points over eight years and 36 basis points in the long term[30].

In the face of such a wide variety of test results is difficult to assess the impact of new regulations on economic growth. Due to the differences when adopting and creating various sce-

[28] Institute of International Finance, *The Cumulative Impact on the Global Economy of Changes in the Financial Regulatory Framework*, Washington 2011, p. 11.

[29] T.F. Cosimano, D.S. Hakura, *Bank Behavior in Response to Basel III: A Cross-country Analysis*, "IMF Working Papers" 2011, WP/11/19.

[30] European Commission, *Economic Impact of Changes in Capital Requirements in the Euro-area Banking sector*, "Quarterly Report on the Euro Area" 2011/1.

narios and assumptions, analysis that were obtained are practically incomparable with each other. However, following the quantitative criterion, the negative correlation between the new regulations and economic growth can be determined

## 5. IMPLICATIONS OF NEW PRUDENTIAL REGULATION IN THE BANKING SECTOR WHICH STIMULATE GROWTH IN POLAND

It is not possible to directly transfer the conclusions drawn from studies conducted in the world for the Polish market. When assessing the implications of the new prudential regulations for the domestic, the conditions and prospects of development of the Polish banking sector should be taken into consideration. Despite the undoubted growth of financial integration, also taking place in the area of banking services[31], Polish banking sector has many specific features. There are many indications that banks in the countries of Central and Eastern Europe are less affected by the previous crisis than banks from developed countries[32]. In should be noted that lower banking penetration ratio in Polish Economy has different mode of actions in the banks. Until recently, banks operating on the Polish market have a surplus on economic capital surplus over regulatory capital. The introduction of new legislation on capital adequacy of banks and inhibited activity did not result in a sharp increase in held capital and sometimes lead to a reduction in the surplus. However, the new capital regulations may significantly affect the changes in the capital requirements for specific areas and encourage banks to changes its activity different areas of operations.[33]Presumably, the development of the Polish banking sector will determine access to finance. It may be difficult because of possible occurrence of shortage of free capital on a global scale and the perception of the smaller markets, and thus Polish, as more risky and less reliable.[34]

For Polish market researched were conducted by Financial Supervision Commission to investigate changes in economic growth under influence of Basel III regulation. The study showed that the increase in average capital adequacy ratio may lead to a moderate increase in interest rates on loans and a slight decline in GDP growth. Increase in the capital adequacy ratio by 2.5 percentage points will result in compliance with the study over the next four years, growth in consumer lending rates by 0.56 percentage points and housing by 0.42 percentage points, which means a decrease in demand for housing loans by approximately 7.7%, 3.6% consumer and least - corporate loans by 0.07%.These changes should result in a decrease in consumption and investment, it is projected that there will be a decline in consumer demand

[31] European Central Bank, *Financial Integration in Europe*, 2014.

[32] E. Miklaszewska, K. Mikołajczyk, M. Pawłowska, *Post-crisis Regulatory Architecture and Central and East European Banks*, „The National Economy” 2013, p. -8.

[33] G. Szymańska, *Impact of the development on the capital adequacy regulations for safety, activity and effectiveness of banks*, “Safe Bank” 2011/4.

[34] E. Miklaszewska, *Banki na rynku finansowym: problemy skali, efektywności i nadzoru*, Wolters Kluwer Polska, Warszawa 2010, p. 40.

during this period by 20% and 6% of the investment. The result allow to expect a decline in GDP of 8% over 4 years.[35]. These relationships are shown in table below.

Table 2. Effect of growth capital adequacy ratio by 2.5 percentage points to the basic macroeconomic parameters

| | **Subsequent years of simulation** | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| | **In percentage points** | | | |
| The CPI inflation (y / y) | 0,00 | -0,01 | -0,02 | -0,02 |
| GDP (y / y) | 0,00 | -0,01 | -0,04 | -0,03 |
| | **In percentages** | | | |
| Corporate loan | 0,00 | -0,01 | -0,03 | -0,07 |
| Consumer loan | -0,19 | -1,48 | -2,83 | -3,64 |
| Mortgage loan | -3,85 | -7,81 | -8,25 | -7,67 |
| Overall loan | -0,67 | -1,83 | -2,48 | -2,95 |
| Capital expenditure | 0,00 | 0,00 | -0,03 | -0,06 |
| GDP | 0,00 | -0,01 | -0,05 | -0,08 |

Source: based on P. Wdowiński, Makroekonomiczne skutki wyższych standardów kapitałowych: Analiza symulacyjna dla Polski, Komisja Nadzoru Finansowego, Warszawa 2011, p. 21.

An independent study on the impact of Basel III and CRD IV/CRR for banks was conducted by Marcinkowska, Wdowiński, Flejterski, Bukowski i Zygierewicz36. The analysis confirmed the results of previous studies. That study used 2 econometric models - The single panel model and interdependent multi-equation simulation model (macro-econometric). Both models have shown a positive and statistically significant effect of the solvency ratio, liquidity ratios and on level of interest rates on loans.In the panel model the attention is drawn to differences in sensitivity changes in the capital and liquidity requirements for a group of large banks and other banks[37]. Influence of changes in WIBOR on interest rate of credit provided by large banks is lower than in smaller banks. Taking into account when the criteria adopted in the research division of large banks and others, the first group represented 65% of the total. It can be concluded that the results which were obtained have relatively high importance.

The entire macroeconometric analysis was performed assuming a growth capital adequacy ratio in the banking sector by 4 percentage points and liquidity ratios M2 and M4 by 50 per-

[35] P. Wdowiński, *Makroekonomiczne skutki wyższych standardów kapitałowych: Analiza symulacyjna dla Polski*, Komisja Nadzoru Finansowego, Warszawa 2011, p. 21.

[36] M. Marcinkowska, P. Wdowiński, S. Flejterski, S. Bukowski, M. Zygierewicz, *op. cit*., s. 144–146.

37 Banks were assigned to the "big banks" or "other banks" based on the average value of assets. The division of the panel relied on the assumption that the share of the average assets of large banks (in the sample) was greater than 5%. Mean values were calculated on the basis of the available number of observations in the period 1997-2011. The total share of the large banks in the sector was 65%.

centage points for a long period of time. The research shows that increasing capital and liquidity requirements in the Polish banking sector as a result of the adoption of Basel III solutions and CRD IV / CRR will reduce the level of GDP and economic growth. The decline in GDP growth is associated with a decrease in consumption, investment and lending. Limiting the number of loans is expected to be mainly in the area of housing loans. Downturn may be accompanied by depletion of deposits, which in the long term contributes to the deterioration of liquidity in the banking system. As a result, you can expect an increase in the amount of non-performing loans and the deterioration in the labor market. In terms of numbers, these results are presented in Table 3

Table 3. The effect of increase, in the capital adequacy ratio by 4 percentage points and liquidity ratios M2 and M4 by 50 percentage points on the basic macroeconomic parameters

| | **Subsequent years of simulation** | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| | **In percentage points** | | | |
| GDP (y/y) | -0,05 | -0,37 | -0,31 | -0,16 |
| Unemployment rate | 0,01 | 0,09 | 0,22 | 0,28 |
| | **In percentages** | | | |
| GDP | -0,05 | -0,42 | -0,73 | -0,53 |
| Corporate deposit | -0,21 | -1,40 | -2,02 | -0,38 |
| Household deposit | 0,00 | -0,14 | -0,65 | -1,06 |
| Corporate loan | -0,07 | -1,26 | -2,08 | -2,35 |
| Consumer loan | 0,00 | -0,80 | -2,20 | -3,41 |
| Morgage loan | 0,00 | -5,64 | -9,35 | -9,67 |
| Total loans | -0,02 | -2,86 | -4,69 | -5,12 |

Source: Based on: M. Marcinkowska, P. Wdowiński, S. Flejterski, S. Bukowski, M. Zygierewicz, Wpływ regulacji sektora bankowego na wzrost gospodarczy – wnioski dla Polski, Narodowy Bank Polski, „Materiały i Studia” 2014, 305, p. 180.

## 6. CONCLUSIONS

The conducted analysis tried to show the possible impact of introducing new prudential regulations and how they impact development of economy. Results of the studies which focused on changes on the economy and the banking system analyzed by different institutions often led to divergent conclusions. Please note that all of them were carried out using a large number of assumptions, so the results should be treated with caution.

Most of the studies we can conclude that there is a real, however unknown possibility to slow down economic growth, moreover the analysis of the Basel Committee on Banking Supervision show that new rules will help to achieve high enough level of stability in the financial markets and this should stimulate growth.All other studies contradict this thesis. The most expected result of the new regulations that the demand of banks for equity will increase. Threat to the stability of the financial system will create pressure, which leads to solutions which are mainly aimed at strengthening the security of banks and increase the possibility of absorption by the effects of shocks that have arisen as a result of financial and economic crises. However, the development of new standards includes a lacking wider aspects of economy.

The results for Poland are consistent with the results of studies, for more developed economies. Also in relation to our country, inhibit of economic growth is expected. Polish situation is more difficult in comparison with other economies, because decision-makers in these cases are outside the borders of our country, and the influence of Polish Institutions that shape the regulations is very limited. It can be stated that supervisory authorities more often call it "Home bias", When solving global problems, their attention is based on minimizing consequences for the domestic market, even if it causes expenses for such banks in different countries.

Very often new regulations are based on the analysis of phenomena that do not exist on the Polish market, or are not important. The high level of control for Polish banking system by foreign capital has fair significance. Potential scenarios for banks to adjust to the new rules will depend on macroeconomic conditions, on their individual situation and conditions in the group in which have to operate. As a result of all these considerations, it can be concluded that there are no universal and timeless solutions that can be applied to all countries. There is also concern that the use of the new prudential norms will not lead to achieving the desired effects. Therefore there are questions about the desired degree of regulation, its scope and scale, as well as how long the standards should be maintained.

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## MAKROEKONOMICZNE KONSEKWENCJE NOWYCH REGULACJI OSTROŻNOŚCIOWYCH W SEKOTRZE BANKOWYM

W artykule przedstawiono wpływ nowych regulacji ostrożnościowych na rozwój sektora bankowego i tempo wzrostu PKB. Analizą objęto przede wszystkim regulacje związane z wprowadzeniem Bazylei III i CRD IV / CRR. Celem artykułu są przegląd dotychczasowych badań w tym zakresie i próba uporządkowania wniosków płynących z dotychczasowych rozważań. Jak dotąd wyniki badania wpływu nowych regulacji na gospodarkę i system bankowy często prowadziły do różnych wniosków, co uzasadnia potrzebę gromadzenia i porównywania tych wyników. Jednak należy zauważyć, że porównywanie takich badań jest trudne ze względu na różne założenia, które są dokonywane. Głównym celem pracy była ocena wpływu nowych regulacji ostrożnościowych na funkcjonowanie sektora bankowego. Ponadto omówiono kanały transmisji, przez które nowe przepisy przekładają się na tempo wzrostu gospodarczego i inne wskaźniki makroekonomiczne. Przeprowadzono analizę wpływu tych zmian zarówno w odniesieniu do gospodarki krajowej, jak i światowej. Uzyskane wyniki prowadzą do konkluzji, że wprowadzenie nowych regulacji doprowadzi do nieznacznego spadku przyszłego wzrostu gospodarczego. W związku z tym pojawiają się pytania dotyczące pożądanego stopnia regulacji, jej zakresu, skali i czasu utrzymania.

**Słowa kluczowe:** sektor bankowy, wzrost gospodarczy, Bazylea III, regulacje kapitałowe i płynnościowe

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# THE NECESSITY OF EMPLOYEE EDUCATION

In terms of companies, education and training belong to the most important investments in human capital. Although, education and training of employees is a normal part of the operation of many companies, all enterprises should be aware of its importance and give it constant attention. The basis of employee education is mainly to increase the potential of human resources and human capital, which constitutes the major part of the organization and enables organizations competitiveness in the labor market and of course personal development of employees. One of the most effective approaches to learning and development of human resources in the company is introducing a comprehensive set of educational programs and training. Through the vocational education and training of employees, the company may achieve their greater loyalty to the company and its values. In addition, employees are led to greater independence and have more opportunities for self-fulfillment, especially if they are provided with knowledge and opportunities for skills development in terms of their continuing professional development in the company. The paper points out to the importance of vocational employee education and the role of lifelong learning. The aim is to analyze and compare the employee participation in the activities of lifelong learning at V4 countries. Moreover, a separate attention is paid to participation in non-formal employer-sponsored education supported enterprises. The process of training for enterprises in areas which can contribute to achieving better results in terms of corporate and continual improvements in business processes through more efficient use of human potential is currently one of the important activities in maintaining the quality of personnel. In general, the intensity and coverage of employee education depend on staffing strategy and company policy.

**Keywords:** human capital, formal education, non-formal education, trainings, employer-sponsored learning activities

## 1. INTRODUCTION

The greatest asset of any enterprise is not financial capital, property, the amount of equipment, or the products/services the enterprise offers. Human capital is necessary to the success of any business, so the greatest asset an enterprise has is the people who work for it. Employees as an accelerator of development of intellectual capital are able to bring their skills and talents, ideas and creativity to the enterprise. Also, employees bring innovation, commitment and a desire to learn.

In recent years, a number of factors have come together to focus attention on the economic role of human capital. One of the most important is the rise of the so-called knowledge economy, which relies less on manufacturing objects and more

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on producing and managing data and information[3]. Qualified, properly structured and professionally motivated workforce is essential to the success of any enterprise. Therefore, the main objective of personnel management can be considered as achieving a competitive advantage through the strategic placement of skilled and dedicated employees in the company[4]. It is important to secure the required workforce to optimise professional and qualification structure and consistency of their behaviour with strategic business objectives[5].

Education and formation of professional skills in present modern society has become a lifelong process, have to be permanent and take into account the all actual needs induced of reality of changes. And in this process play an increasingly important role enterprise and its organized educational activities. Nowadays, more and more employers aware that the basis for the success in any kind of business is properly selected and professionally competent staff. Forasmuch as development, community relations, market conditions and other factors of production and business processes, including services to constant change, it is necessary in advance or continuously count on these changes and all employees systematically educate. Execution of the tasks the organization, whose aim is to satisfy the customer's needs in any area of business, expects to have ready staff[6].

## 2. DEVELOPMENT OF HUMAN CAPITAL

Human capital is broadly defined as comprising a mix of individuals' own innate talents and abilities as well as the skills and learning they acquire through education and training. If we look at human capital from the corporate perspective, it is appropriate to define it more narrowly, seeing it mainly as the skills and talents in a workforce that are directly relevant to the success of a company or specific industry[7].

Employees are seen as a source capable of generating economic benefits. This fact in particular emphasizes the importance of human capital. Its level can be increased, either through formal education or various forms of education and training in the workplace. In terms of enterprises education and training belong to the most important investments in human capital[8]. Enterprises have to keep their workforce current and competent. Many past and traditional training practices are unable to meet these challenges.

Every employer tries to have qualified employees that could participate in increasing of competitiveness. This goal can be achieved not only through the correct choice of employees and their motivation, but mainly by providing their permanent professional education and development, which results in harmonizing an employer´s needs with the needs of his employees[9].

The intensity and coverage of employee education depend on human resources strategy and policy of organization. Some organizations prefer to recruit "finished" staff that is

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technically fully prepared to do the job. On the contrary, others insist that their staff can educate by employer, including training (e.g. company working with specific, often own developed software). The approach of some organizations to the educational activities is unsystematic and unstructured often based on economic results (it is paradoxically, as the situation arises that educational activities are carried out only if the results are good).

Education brings development of the organization in terms of improving the quality of the workforce, managing know-how and the overall general level of informedness at all levels of management, manufacturing and service of each enterprise. Enterprises have to keep the skills and competencies of their workforce current[10].

The society's request for a quality workforce is associated with the system of company education where lifelong learning plays an important role. The need for training of human resources is a pillar and a key area of evolving a knowledge society. In order to try to give employees knowledge by further education, companies should be competing to create a properly functioning motivational system consisting of motivational factors of a financial and non-financial nature[11].

### 2.1 Learning, education, trainings

In present days, learning becomes a competitive weapon rather than an annoying cost factor. The success of each business depends more on high-quality employee performance, which in turn requires high-quality training. Corporate executives are beginning to understand that enhancing employee skills is the key to creating a sustainable competitive advantage. In the quest to remain competitive in today's labour-tight market, companies are exploiting advances in technology to train employees more rapidly, more effectively, and at less expense than in the past[12].

In the current knowledge economy, employees in an organization are considered the key competitive advantage and the most important asset. If an employee leaves an organization, they take the knowledge they have acquired with them. The loss of knowledge is a potential threat to an organizations existence, especially if an employee with valuable knowledge leaves to join a competitor[13].

However, every organization has to understand and analyse the goals of its employees, look for the connection with the key goals in order to achieve effective learning thereafter. There is also a difference between learning and education – by learning, we understand a process, in which people obtain new skills and experience, education is one of the ways that an organization undertakes in order to support learning[14].

Education and training is the important way to the development of human capital and therefore are an important part of lifelong learning. Enterprises should ascribe deeper meaning to staff training and devote them sustained attention. One of the effective approaches to training and development of human resources in the enterprise is the imple-

[10] B. Dugasová, Ľ. Bartóková, *E-learning - the opportunity for SMEs*, [in:] *ERENET Profile*, Corvinus university of Budapest, Budapest 2014.

[11] E. Gergelová, *Motivation for Lifelong Learning in Terms of (Un)Employment*, SEFI, Brussels 2010.

[12] K. Bachman, *Corporate e-learning: exploring a new frontier*, 2000.

[13] H. Urbancová, L. Linhartová, *Staff Turnover as a Possible Threat to Knowledge Loss*, "Journal of Competitiveness" 2011.

[14] A. Seňová, K. Teplická, K. Čulková, *Utilization models of machines renovation in mining company*, Bulgaria, Sofia 2010.

mentation of a comprehensive set of educational programs and trainings. These programs focus primarily on the obtaining and improvement of knowledge, skills and abilities of employees.

The main benefits of training are considered[15]:

1. It has a positive impact on the current and future position and status of the employee.
2. The trained employees have less probability of termination and dismissal.
3. The trained employees have less risk of long-term unemployment.

To retain their competitive edge, enterprises started to give care to find out which training techniques and delivery methods enhance motivation, performance, collaboration, innovation, and a commitment to life-long learning[16].

Education and training of employees leads to higher productivity and profit. The basis of the system of vocational education is to allow company employees still expand and update the theoretical and practical knowledge[17]. The aim of vocational education is to eliminate the differences between the profession and the job of the employees to increase the prosperity of the enterprise, employee performance, and employee competitiveness in the internal labour market.

People of all ages in the workforce need to raise continually the level of their skills what can improve their earnings prospects. Thanks to sufficient skills, it is easier for them to find new work if they lose their jobs. Unfortunately, adult training is not spread evenly across the workforce. Employees who are younger and have higher levels of existing qualifications are more likely to receive training from their employers. In effect, those who need training the most – older employees and those with limited education – have the slightest chance to receive it[18].

Continued learning after initial education and training is required to maintain and develop skills, to adapt to structural changes and technical developments, for staying in jobs, for career advancement or to get back into the labour market[19].

Lifelong learning and the acquisition of knowledge for work tasks which have to be organized within small and medium enterprises (SMEs) is more complex than the provision of access to courses and traditional learning opportunities. It presupposes communication or direct face-to-face contact between individuals, needs instructors, students, places – and most important: time for learning and understanding[20].

The need for continuous formation of new skills requires lifelong learning, in which employees themselves have to assume some degree of initiative relating to personal development. The company should regulate this initiative to be in accordance with current requirements but also with its intentions in the distant future[21].

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[15] R. Blundell, et. al. *Human Capital Investment: The Returns from Education and Training to the Individual*, [in:] *Fiscal Studies*, 1999.

[16] K. Bachman, *Corporate e-learning: exploring a new frontier*, 2000.

[17] S. Ručinská, R. Ručinský, *Partnerstvo univerzity a podnikov v regióne ako predpoklad regionálneho rozvoja*, UPJŠ, Košice 2008.

[18] OECD, *op. cit*.

[19] European Commission, *Adult participation in lifelong learning*, 2012.

[20] I. Hamburg, Ch. Lindecke, *Lifelong learning, e-learning and business development in small and medium enterprises*, University of Technology and Economics, Budapest 2005.

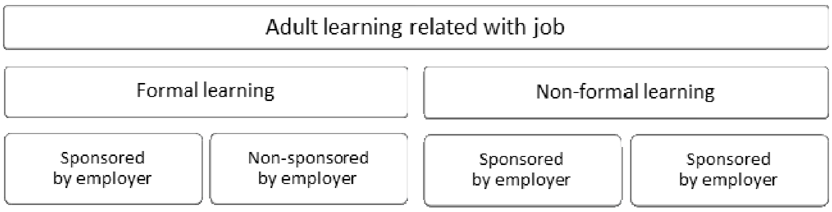
[21] J. Novák, *Efektívny manažment podniku a podnikatelské vzdelávanie*, Filozofická fakulta Univerzity Palackého v Olomouci, Olomouc 2009.

The choice of an appropriate form of education is one of the key factors in the effectiveness of human resources development. There are many different forms of learning. In recent years e-learning became a very popular form of education with the support of modern information and communication technologies.

Training for employees provides sustainability in the current job. Some companies prepare employees, right from the start of their employment, with career plans which automatically includes pre-planned educational activities and further steps towards building fully skilled positions and hierarchical integration within the company. Most of the time the employer pays for this education but the employee sometimes funds a percentage of the costs[22].

Vocational training and development of employees is one of the prerequisites how to handle with the new challenges of demanding business environment. Education belongs to the goal, but also the consequence of modern society. Requirements for the knowledge and skills of individual in modern society are constantly changing, in order to an individual could work as labour force, have to constantly deepen and expand their knowledge and skills. We are no longer at a time when a person during his economic activity made do with what was learned during the training[23].

Figure 1. Classification of adult learning




Source: Self elaboration

After an individual entry to the labour market, employers play a major role in human capital development by sponsoring (mainly) non-formal training in order to maintain productivity. There are a number of reasons that lead us to assume that more-highly educated individuals are more likely to take part in non-formal learning, particularly when it is sponsored by employer, whereas the highly educated tend to work in more-demanding and knowledge intensive occupations, which requires more trainings[24]. The positive relationship between educational attainment and participation in non-formal adult learning is confirmed by numerous studies[25].

[22] E. Gergelová, *Motivation for Lifelong Learning in Terms of (Un)Employment*, SEFI, Brussels 2010.

[23] M. Antošová, *Manažment ľudských zdrojov v praxi*, ES F BERG, Košice 2008.

[24] OECD, *op. cit*.

[25] H. Blossfeld, E. Kilpi-Jakonen, D. Vono de Vilhena, S. Buchholz, *Adult Learning in Modern Societies: An International Comparison from a Life-course Perspectives*, Edward Elgar Publishing, 2014.

## 3. EMPLOYEES IN FORMAL AND NON-FORMAL EDUCATION AND TRAINING

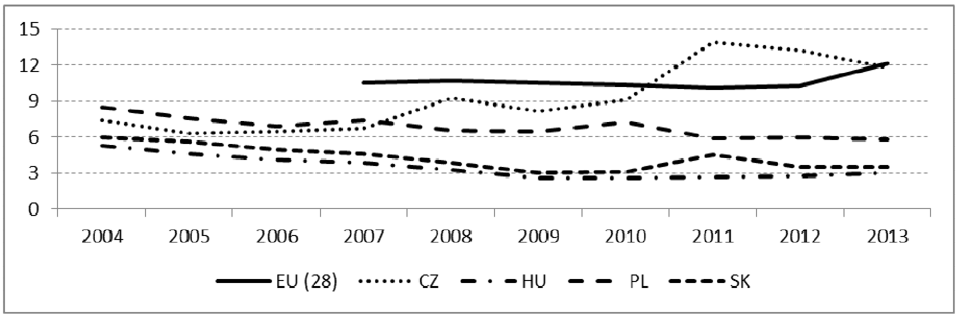
The following chapter deals with formal and non-formal education and training in V4 countries by using Adult Education Survey and EU Labour Force Servey.

Adult Education Survey (AES) provides an overview of the participation of individuals in education and training (formal, non-formal and informal learning). The reference period for the participation in education and training is the twelve months prior to the interview. The survey focuses on people aged 25 – 64 living in private households. A pilot survey took place around the year 2007 and starting from the 2011 survey the AES is carried out every five years[26].

The EU Labour Force Survey (LFS) provides annual data for several education and training indicators. For the indicator "lifelong learning", defined as the participation of people aged 25–64 in education and training. The reference period for the participation in education and training is the four weeks prior to the interview[27].

Participation rate of employees in formal and non-formal education and training in the V4 countries, compared to the EU member states captures Figure 2 and Table 1. Due to unavailability of data is the period observed for the EU 2007–2013, while in the V4 countries we monitor development of indicator since 2004.

Figure 2. Participation rate of employees in formal or non-formal education and training




Source: Eurostat, *Lifelong learning – LFS data*, 2015
Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=trng_lfs_11&lang=en

Participation rate of employees in formal and non-formal education in the V4 countries in 2004 amounted to 5,3 % in Hungary and 8,5 % in Poland. The values of the monitored indicator in Hungary and Slovakia recorded from mentioned year mostly decreasing trend. In Hungary, the value decrease from 5,3 % to 2,6 % in 2009 and 2010 and then increased slightly to 3 %. In Slovakia, this decrease was more pronounced – from 6 % to 3 %. By 2008, Poland reached the highest value of the monitored indicator, but from that year the leader in V4 countries is Czech Republic. Participation rate of employees in formal and non-formal education and training in the Czech Republic increased during 10 years by almost 7 % and since 2010 is the only country with a higher indicator values than the average values for the European Union.

[26] Eurostat, *Adult Education Survey*, 2015.
[27] Eurostat, *Lifelong learning – LFS data*, 2015.

The values of the correlation coefficient achieved in all countries show a strong, positive and statistically significant dependence with the percentage of those employees in the total population (Table 1). The highest dependence is observed just in the Czech Republic and the lowest in Poland.

Table 1. Participation rate of employees in formal or non-formal education and training

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | min | max | average | correlation (with % of population) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EU** | 11,8 | : | : | 10,5 | 10,7 | 10,5 | 10,4 | 10,1 | 10,3 | 12,1 | 10,1 | 12,1 | 10,8 | 0,955 |
| **CZ** | 7,4 | 6,3 | 6,5 | 6,7 | 9,3 | 8,2 | 9,1 | 13,9 | 13,2 | 11,8 | 6,3 | 13,9 | 9,2 | 0,999 |
| **HU** | 5,3 | 4,6 | 4,1 | 3,9 | 3,3 | 2,6 | 2,6 | 2,7 | 2,8 | 3,0 | 2,6 | 5,3 | 3,5 | 0,992 |
| **PL** | 8,5 | 7,6 | 6,9 | 7,4 | 6,6 | 6,5 | 7,2 | 5,9 | 6,0 | 5,8 | 5,8 | 8,5 | 6,8 | 0,944 |
| **SK** | 6,0 | 5,6 | 5,0 | 4,6 | 3,9 | 3,0 | 3,1 | 4,5 | 3,5 | 3,5 | 3,0 | 6,0 | 4,3 | 0,988 |

Source: Eurostat, *Lifelong learning – LFS data*, 2015. [cit. 2015-02-13]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=trng_lfs_11&lang=en

If we pay attention only to the evolution of the participation rate of employees in formal education and training, we come to the following conclusions (Table 2). In this type of education are most involved employees in Poland and the average value of the monitored indicator reached 3,8 %, which is the long term above the average of the European Union. It is followed by Hungary, whose value decreased from 3,1 % in 2004 to 1 % in 2013. In contrast, the Czech Republic also in this separate indicator reached mostly growth, from 1,3 % in 2004 to 2,1 % in 2011. The lowest average value achieved Slovakia (1,5 %), in which positive growth until the 2008 slowed down and in 2013, the rate of participation has only 1 %.

On the basis of the calculated correlation coefficient we can state, that dependence between participation rate of employees in formal education and training and percentage of these employees in total population is strong positive statistically significant. The highest is observed in Hungary and the lowest in Slovakia.

Table 2. Participation rate of employees in formal education and training

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | min | max | average | correlation (with % of population) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EU** | 3,2 | : | : | 2,9 | 2,8 | 2,9 | 2,9 | 2,8 | 2,8 | 2,8 | 2,8 | 3,2 | 2,9 | 0,837 |
| **CZ** | 1,3 | 1,7 | 1,4 | 1,4 | 1,7 | 1,9 | 2,0 | 2,1 | 2,0 | 1,9 | 1,3 | 2,1 | 1,7 | 0,967 |
| **HU** | 3,1 | 2,7 | 2,4 | 2,3 | 1,9 | 1,6 | 1,3 | 1,5 | 1,4 | 1,0 | 1,0 | 3,1 | 1,9 | 0,996 |
| **PL** | 4,3 | 4,6 | 3,9 | 4,1 | 3,7 | 3,9 | 3,9 | 3,4 | 3,4 | 3,2 | 3,2 | 4,6 | 3,8 | 0,938 |
| **SK** | 1,2 | 1,4 | 1,6 | 1,7 | 1,8 | 1,5 | 1,6 | 1,6 | 1,1 | 1,0 | 1,0 | 1,8 | 1,5 | 0,816 |

Source: Eurostat, *Lifelong learning – LFS data*, 2015. [cit. 2015-02-13]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=trng_lfs_11&lang=en

Participation rate of employees in non-formal education and training achieved significantly higher values than in formal education and training. The leader in this indicator is the Czech Republic, where the minimum value of the indicator was reached in 2005 (4,8%) and maximum in 2011 (12,2%). Since 2010, this country reached above-average values also in comparison with the European Union. In Hungary, the participation rate of employees in non-formal education and training in 2009 decreased to 1% and from that year again increased to 2,1% in 2013. Thus in Slovakia, also in Poland has decreased the participation rate of employees in non-formal education and training during the monitored years (Table 3).

Even in this case, the value of the correlation coefficient monitored dependence between participation rate of employees in non-formal education and training and percentage of these employees on total population is very strong, positive and statistically significant.

Table 3. Participation rate of employees in non-formal education and training[28]

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | min | max | average | correlation (with % of population) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EU** | 9,6 | : | : | 8,4 | 8,5 | 8,3 | 8,2 | 7,9 | 8,1 | 9,9 | 7,9 | 9,9 | 8,6 | 0,964 |
| **CZ** | 6,3 | 4,8 | 5,4 | 5,4 | 7,8 | 6,6 | 7,4 | 12,2 | 11,6 | 10,2 | 4,8 | 12,2 | 7,8 | 0,998 |
| **HU** | 2,2 | 2,0 | 1,8 | 1,7 | 1,4 | 1,0 | 1,4 | 1,3 | 1,5 | 2,1 | 1,0 | 2,2 | 1,6 | 0,974 |
| **PL** | 4,6 | 3,3 | 3,4 | 3,6 | 3,1 | 2,9 | 3,6 | 2,7 | 2,8 | 2,8 | 2,7 | 4,6 | 3,3 | 0,908 |
| **SK** | 4,9 | 4,3 | 3,6 | 3,0 | 2,2 | 1,5 | 1,6 | 3,0 | 2,4 | 2,5 | 1,5 | 4,9 | 2,9 | 0,986 |

Source: Eurostat, *Lifelong learning – LFS data*, 2015. [cit. 2015-02-13]. Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=trng_lfs_11&lang=en

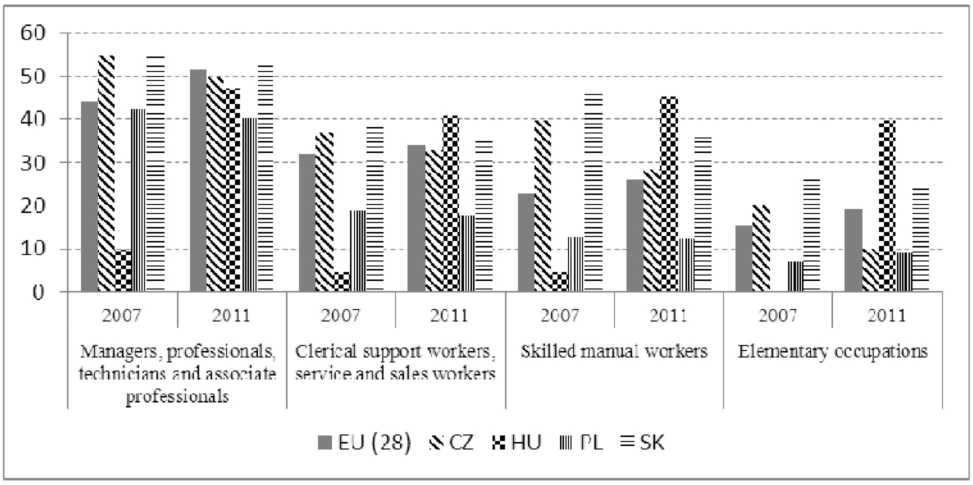
Employers depend on continuing education as a tool for ensuring a highly skilled and knowledgeable workforce. Individuals use continuing education for upward career mobility, job enhancement and personal enrichment. Therefore, Figure 3 shows the participation rate in employer-sponsored learning activities by occupation.

Employer-sponsored learning activities are all activities paid at least partially by the employer and/or done during paid working hours. This comprises formal education and all categories of non-formal education and training (private lessons, seminars, courses and guided-on-the-job training).

During the reported period (between 2007 and 2011), employers most supported education of managers, professionals, technicians and associate professionals. The highest value of this indicator reached just Slovak Republic followed by Czech Republic. In the area of the learning support of clerical support workers, service and sales workers by employers reached in 2011 the highest participation rate Hungary. This country also recognized the largest increase in the reference indicator for the years 2007 - 2011. Participation rate in employer-sponsored learning activities of skilled manual workers was the highest in Slovakia in 2007 and in 2011 it was in Hungary. In promoting education of elementary occupations achieved the worst results Poland, while Hungary and Slovakia best.

[28] Eurostat, *Lifelong learning – LFS data*, 2015.

Figure 3. Participation rate in employer-sponsored learning activities by occupation




Source: Eurostat, *Adult Education Survey*, 2015. [cit. 2015-02-20]
Available at: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=trng_aes_124&lang=en

## CONCLUSION

The process of employee training in enterprises in areas which can contribute to achieve better results in terms of corporate and continual improvements in business processes through more efficient use of human potential, currently belongs to the important activities in maintaining the quality of personnel. Lifelong learning is an important factor in corporate culture, a priority part of personnel policy and human resources development. On the basis of the results of analysis and comparison of V4 countries we can state, that the participation rate of employees in formal and non-formal education is the highest during the monitored period in the Czech Republic. The highest participation rate of employees only in formal education is in the Poland and only in non-formal education is in the Czech Republic. The article also briefly reviewed the participation rate in employer-sponsored learning activities by occupation, specifically of professionals, technicians and associate professionals, of clerical support workers, service and sales workers, of skilled manual workers and also of elementary occupations. According to this, employers most supported education of managers, professionals, technicians and associate professionals.

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## KONIECZNOŚĆ EDUKACJI PRACOWNIKÓW W FIRMACH

Firmy i organizacje obejmują kształcenie i szkolenie z najważniejszych inwestycji w kapitał ludzki. Szkolenia pracowników obecnie stanowią normalną część funkcjonowania wielu firm, jednak wszystkie firmy powinny zdawać sobie sprawę z ich znaczenia. Edukacja pracowników służy przede wszystkim zwiększeniu potencjału zasobów ludzkich i kapitału ludzkiego, który stanowi istotną część organizacji i zwiększa ich konkurencyjność na rynku pracy, oczywiście przyczyniając się do rozwoju osobistego pracowników. Jeden z najbardziej skutecznych sposobów podejścia do uczenia się i rozwoju zasobów ludzkich w firmie wprowadza kompleksowy zestaw programów i szkoleń edukacyjnych. Dzięki dalszej edukacji i szkoleniom pracownicy wykazują większą lojalność wobec firmy, a nawet większe zaangażowanie w osiąganie celów korporacyjnych. Ponadto pracownicy mogą w ten sposób osiągnąć większą niezależność i znaleźć więcej możliwości samorealizacji, zwłaszcza pod względem wiedzy i możliwości rozwoju umiejętności w zakresie ich dalszego rozwoju zawodowego w firmie. W artykule zwrócono uwagę na znaczenie pracowników szkolnictwa zawodowego, rolę kształcenia ustawicznego. Celem są analiza i porównanie udziału pracowników w działalności kształcenia ustawicznego w krajach V4. Omówiono również rolę w przedsiębiorstwach edukacji pozaformalnej. Proces szkolenia dla przedsiębiorstw w tych obszarach, które mogą się przyczynić do osiągnięcia lepszych wyników w zakresie korporacyjnego i ciągłego udoskonalania procesów biznesowych poprzez bardziej efektywne wykorzystanie potencjału ludzkiego, jest obecnie jednym z najważniejszych działań zmierzających do zachowania jakości personelu. Ogólnie intensywność i zakres szkoleń zależą od strategii personalnej i organizacji politycznych.

**Słowa kluczowe:** kapitał ludzki, edukacja formalna, nieformalna edukacja, szkolenia, zajęcia edukacyjne sponsorowane przez pracodawcę

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# REGIONAL FOOD PRODUCTS AND REGION-WISE CONSUMER ETHNOCENTRISM

The article is an attempt to answer the question about the relationship between regional food and buyers' attitudes as well as consumer ethnocentrism phenomenon. The concept of regional products was defined by using both the definition of the labeling associated with this category in the legislation of the EU and terms used by practitioners and theoreticians concerned with food market. On the basis of a review of literature, a number of benefits generated by regional products were shown. Both their individual dimension (benefits for manufacturers, distributors and consumers), and the advantages in macro scale were highlighted. Taking into account the latter, it was found that the regional products may comprise a direct response to the needs of the consumers with ethnocentric attitudes. The choice of this type of product can be not only attractive but also easy for them. Regional products, defined as having a specificity related to the area of origin, in most cases refer to the place of manufacture when it comes to their names. It seems that highly loyal to regional products can be clients defined as 'local patriots', who are buyers with high level of regional ethnocentrism. A number of authors advocate the introduction of this semantic category, besides the broader term of 'consumer ethnocentrism'. They stress regional differences in consumer's preferences as well as applying them in every day choices, not only with national but also local context. The article is a part of this trend.

**Keywords**: consumer behavior, consumer attitude, ethnocentrism , regional food products

## 1. INTRODUCTION

Interest in regional food as a product category in Poland dates back to the period of accession to the European Union and is associated with the ability to support the development of this sector by potential protection registers and EU grant tools. Polish producers take part in various schemes of geographical indications and traditional specialities and use promotional activities funding for high-quality food market. Among 1274 protected symbols admitted in EU records, 36 concern to Polish products. The highest number are Protected Geographical Indications (19), Traditional Speciality Guaranteed (9) and Protected Designation of Origin (8).[3] Along with the increasing interest in the protection of regional products, market analysts and researchers' interest in that category increases, too. The natural question is about the benefits generated by these products, that is, *de*

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[3] DOOR database: DOOR, http://ec.europa.eu/agriculture/quality/door/ (last viewed: 20.05.2015).

*facto*, their relationship to the behavior and attitudes of consumers, including consumer ethnocentrism.

## 2. CONSUMER ETHNOCENTRISM IN THEORY

The concept of "consumer ethnocentrism" was introduced by S. Sharma, T.A. Shimp and J. Shin,[4] and comes from the work of W.G. Sumner from 1906.[5] The American sociologist described ethnocentrism as "a way of seeing, according to which the own group is the center of everything, and all others are scaled and rated with reference to it".[6] The ethnocentric attitude relies on exaggerating one's own cultural heritage; perceiving of it as the best as well as worthy of continuation and following,[7] while minimizing the importance of norms and values of other groups.

Consumer ethnocentrism, in turn, is a sense of responsibility, loyalty and morality of buying products manufactured in a particular country. Ethnocentric consumers are inspired mainly by moral considerations. In their opinion the purchase of imported products leads to job losses, losses in the economy and is unpatriotic,[8] and indirectly brings also damage to them. So they prefer domestic products, even when their quality is lower than those imported, hence S. Smyczek depicts their stance as economic patriotism in the sphere of consumption.[9] Ethnocentric attitudes have been strengthened in times of crisis;[10] in addition to the moral and emotional reasons, ethnocentric consumers are also guided by economic motives:[11] a sense of responsibility for the purchase of domestic products and the protection of local labour market.[12]

## 3. THE ESSENCE OF "REGIONAL FOOD" CONCEPT

In Poland this term can be interpreted in different ways, which among others is a consequence of the fact that in three bills most important for food sector laws this category is

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[4] S. Sharma, T.A. Shimp, J. Shin, *Consumer Ethnocentrism: a test of antecedents and moderators*, "Journal of the Academy of Marketing Science" 1995/23, pp. 26–37.

[5] W.G. Sumner, *Folkways: The Sociological Importance of Usages, Manners, Customs, Mores and Morals*, Athenaeum, Boston 1906, p. 13.

[6] *Ibidem*, s. 13.

[7] A. Szromnik, *Etnocentryzm konsumencki – istota i uwarunkowania rozwoju*, „Marketing i Rynek" 1998/11, p. 9.

[8] S. Sharma, *op.cit.*, pp. 26–37.

[9] S. Smyczek, *Etnocentryzm konsumencki na rynku usług finansowych*, [in:] *Konsumencki proces decyzyjny i jego determinanty*, ed. E. Kieżel, Wydawnictwo Akademii Ekonomicznej im. K. Adamieckiego w Katowicach, Katowice 2006, pp. 105–140.

[10] A. Alsughayir, *Consumer Ethnocentrism: A Literature Review*, "International Journal of Business and Management Invention" 2/3 (2013), pp. 50–54.

[11] S. Smyczek, M. Glowik, *Ethnocetrism of Polish consumers as a result of the global economic crisis*, "Journal of Customer Behaviour" 10/2 (2011), pp. 99–118.

[12] See also: K. Corcoran, L.M. Albisu, *Agro-food business strategies for Origin Labelled Products*, "Agrarwirtschaft" 2001/50, s. 5; G. Giraud, *Consumer Perception of Typical Food Products in Europe*, Paper prepared for presentation at the Xth EAAE Congress „Exploring Diversity in the European Agri-Food System" (Zaragoza, 28–31 VIII 2002), http://ageconsearch.umn.edu/bitstream/24833/1/cp02gi49.pdf (last viewed: 20.05.2015); K. Ittersum et al., *The influence of the image of a product's region of origin on product evaluation*, "Journal of Business Research" 2003/56, p. 215; V. Sodano, *Competitiveness of Regional Products in the International Food Market*, Paper prepared for the 77th EAAE Seminar/NJF Seminar No. 325 „International Agricultural Trade: Old and New challenges" (Helsinki, VIII 2001), pp. 12–17, http://wpage.unina.it/vsodano/regional%20products.pdf (last viewed: 20.05.2015).

not defined. Neither does the Council of the EU, which clarifies the concept indirectly rather than directly, by determining which regional products can apply for the status.

And so Protected Designation of Origin marking refers to an agricultural product or a foodstuff:

- that comes from a particular place, region or country
- the quality or characteristics of which are essentially or exclusively due to a particular geographical environment, including natural and human factors
- whose all stages of production take place in the defined geographical area.

Protective symbol of the Protected Geographical Indication refers to an agricultural product or a foodstuff:

- that comes from a particular place, region or country
- the quality, reputation or other characteristic which are largely defined by its geographical origin
- whose at least one stage of production takes place in the defined geographical area.[13]

For the sake of convenience and with regard to European Union PDO and PGI indications, the common term "regional product" is widely used. There are, however, authors taking attempts to define the notion directly.

For M. Szczygielski "product is the effect of human activities associated specifically with some geographic region – by specific conditions of soil and climate, contributing to the uniqueness of this product, or by separate, traditional for the region of the manufacturing method, which is a part of this region's culture. Regional product is thus identified with the region and its culture and as such should be treated as the property of the regional community".[14]

According to M. Gąsiorowski "regional products are agricultural products and food products, the works of a specific quality closely associated with the area, clearly defining what their area of origin or place of manufacture is. Their characteristics are: geographical location and the fact that they are still produced [...] and also usually the natural way of production and processing ".[15] This definition is broadly consistent with the concept proposed by the EU. In addition, the author stresses that, in this kind of products there is often a criterion for traditional food (if you accept that traditional methods are in accordance with the natural production techniques), though, of course, it is not necessary. Both authors agree with that in order to call a product "regional", that it is the necessary to develop traceable relationships of its character with the specifics of the area of origin. It is not enough that the product was produced in a given location (since it is typical of every product), but it obligatorily must reflect the association with the area of production (by reputation, characteristics, traditions, etc.).

It is wrong, therefore of supermarket chains to advertize as "regional" products simply made in the area of their business. This leads to lowering the value of real regional products and losing their market potential. And this is due primarily to the product's characteristics, generating objective as well as subjective benefits, related to the perception of an

[13] A regulation of the European Parliament and of the Council (EU) No 1151/2012 of November 21, 2012 on the quality of agricultural products and foodstuffs.

[14] M. Szczygielski, *Kujawsko-pomorskie produkty regionalne*, [w:] *Materiały z konferencji „Żywnościowy produkt lokalny szansą rozwoju obszarów wiejskich. Promocja i budowa rynku”* (Przysiek, 5 IX 2006), Wydawnictwo Kujawsko-pomorskiego Ośrodka Doradztwa Rolniczego, Przysiek 2006, pp. 4–6.

[15] M. Gąsiorowski, *Ochrona produktów regionalnych i tradycyjnych*, „Agro-Smak” 2006/2, p. 4.

individual product as well as the whole category. From the point of view of the relationship to ethnocentric attitudes, most important are the benefits that the category brings for manufacturers and other exchange operators, as well as the social, cultural and economic profits. As indicated, the highly ethnocentric consumer choses domestic products, even if they are lower quality than imported, hence in this text, aspects of quality, safety, health and other consumer's benefits will be omitted due to text length restrictions.

## 4. THE BENEFITS OF THE PARTICIPATING ENTITIES IN THE EXCHANGE OF REGIONAL FOOD

As demonstrated by the study of Slow Food International, regional food is generally more expensive than its conventional counterparts. The price of traditional products of regional character in Poland are higher by 30-40%, while in Western Europe the difference may be as high as 200-250%.[16] This is confirmed by the observations of K. Krajewski and R. Zabrocki of 2007.[17] Unfortunately, there is no similar data for regional products that are not traditionally labelled. One can, however, assume that their prices will be similarly higher.

The proof of a growth of interest in these products is reflected not only in higher prices but also increasingly observed attempts at making fake products with a regional character. Unfortunately, the phenomenon of copying products, due to its nature, is generally hard to estimate, hence the lack of data from the growing regional food market in Poland. The scale of making fake products in Poland in general is reflected in the data of Center for Public Opinion Research from 2011. According to these, 30% of Poles buy fakes (1077 people, a representative random sample of adult Polish people).[18] In accordance with the assessments of the authors of the campaign "Be original! Do not buy fakes", the market of making fake goods in Poland was estimated for about 830 million dollars in 2012.[19] Among the most common fakes majority involves clothing and footwear (65%) and cosmetics (24%). Adulterated food can be from 1 to 3% of the circulation of fake goods.[20]

The EU reports that food and beverages are the fourth on the amount vulnerable to adulteration product group. Considering the amount of fake goods seized by the EU officials in 2008, in the first place were tobacco (40 985 038 units), followed by the medical products (11 464 381), the next two groups were clothing (7 955 344) and food & drinks (3 022 482).[21] As Interpol reported in January 2015, operation Opson IV, whose aim was to fight the production of fake food and beverages, during the period December 2014-January 2015 resulted in confiscation of over 2.5 tonnes of illegal products.[22] Interpol and Europol are responsible for these operations, with support given by the Health Department

[16] G. Łyś, *Swojskie jadło*, „Rzeczpospolita, Dodatek Dobra Firma" (17 IX 2004), p. 4.

[17] K. Krajewski, R. Zabrocki, *Zarządzanie produktami tradycyjnymi – problemy, potrzeby* [w:] *Materiały z konferencji „Rynek tradycyjnej żywności o uznanej jakości"* (Ożarów Mazowiecki, 10–11 XII 2007), p. 45.

[18] M. Feliksiak, *Opinie o przemycie, podróbkach i pracy celników*, CBOS: Komunikat z badań, 2011, pp. 1–12.

[19] Social campaign "Be original! Do not buy counterfeits" (2012), http://www.kampaniespoleczne.pl/ wydarzenia,4883,rusza_akcja_badz_oryginalna_nie_kupuj_podrobek (last viewed: 20.05.2015).

[20] M. Feliksiak, *op. cit.*

[21] http://www.the-eu-and-me.org.uk/whats-in-it-for-me/fighting-crime/tackling-counterfeiting-piracy (last viewed: 20.05.2015).

[22] http://www.europol.europa.eu/content/record-seizures-fake-food-and-drink-interpol-europol-operation (last viewed: 20.05.2015).

of the European Commission. One year earlier Opson III resulted in the seizure of more than 1,2 tonnes of products.[23]

A factor that may somewhat increase the resistance of regional products to fakes is a strong security and labelling system. On the one hand, the labels and markings contribute to building the prestige of these products, resulting in the temptation of making a fake. On the other, it also comprises a part of the system of protection. As the authors of the report 'Anti-Counterfeiting Packaging Market by Technology, by Application-Global Trends & Forecast to 2019' believe, along with growing scale of making fakes, also market of indications and protection of original products will develop dynamically. The authors assume that the global anti-fakes, anti-tampering and authentication market is predicted to grow at a healthy CAGR of 14.1% between 2014 and 2019, reaching the value of $128.6 billion.[24]

An additional benefit related to regional food market, found by K. Krajewski and R. Zabłocki, [25] based on data from French and Italian markets[26] is a fixed demand. According to the authors, the high and stable demand in these countries is the result of, among other things, local patriotism and a long, ongoing tradition of manufacturing food products with a "recognized character".

Comparison of producers' benefits in relation to regional food (this time not necessarily traditional) can be found in the development of this category in the UK. Evaluation report[27] indicates that many food manufacturers based their own activities on regional farms. In the case of farmers, production of "specific" – as a form of forward integration – become an additional source of income, and by the diversification of activities, reduce risk and improve the cost-effectiveness of the management.

A positive aspect may be the fact that many regional products are made from local resources. This has to do with the increasing certainty of the manufacturer, and eventually also the consumer as to the quality and safety of the resources. The use of local resources rationalizes the costs of manufacturer, reducing fees for transportation and storage, and macroeconomic scale can positively affect economic growth in the region. Moreover, small food producers have a direct contact with consumers; being observed, evaluated and controlled by consumers cannot afford food fakes – otherwise they would lose their source of income[28] .

The benefits of the manufacturer can also be found at a regional stage in the life cycle of food as an aggregate. According to K. Krajewski and R. Zabrocki, national regional and local brands have a potentially long life, because they are currently at the early phases of the life cycle. After a period of socialist economy, Poland slowly rebuilds the potential of regional food, trying to standardize the models of production and consumption. Proper-

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[23] http://www.europol.europa.eu/content/thousands-tonnes-fake-food-and-drink-seized-interpol-europol-operation (last viewed: 20.05.2015).

[24] *Ibidem.*

[25] K. Krajewski, R. Zabrocki, *Rynek produktów tradycyjnych – szanse, potrzeby, możliwości*, [in:] *Tradycyjne i regionalne technologie oraz produkty w żywieniu człowieka*, ed. J. Dolatowski, D. Kołożyn-Krajewska, Wydawnictwo Naukowe PTTŻ, Kraków 2008, pp. 101–121.

[26] *Ibidem.*

[27] Defra, *Regional Food Strategy Evaluation Report September 2005*, http://archive.defra.gov.uk/ evidence/economics/foodfarm/evaluation/regional/Chapter%201.pdf (last viewed: 14.01.2015), p. 3.

[28] Hanyga K., *Fałszowanie żywności*, „Sprawy Nauki", http://www.sprawynauki.edu.pl/index.php?option=com_content&view=article&id=3019:faszowanie-ywnoci&catid=304&Itemid=30 (last viewed: 19.05.2015).

ly managed regional brands are thus an opportunity to many years of success, as they are just beginning to enter or return the market. More and more large producers of foodstuff are aware that, in order to increase the speed, you might want to promote Polishness and regionalism of their products. This is particularly evident in such categories, in which a reference to the tradition is a unique advantage of product, for example. candy, water, juices, dairy products, sausages, beer, alcohol. Through local character the brand becomes closer to the consumer.[29]

In addition, manufacturers who choose to register and protect regional product in the EU can expect financial support for the organization of producer groups and the promotion of their food.

## 5. SOCIO-ECONOMIC BENEFITS AT THE MACRO LEVEL

According to authors from the Ministry of Agriculture and Rural Development, regional food becomes a showcase of the region thanks to its specific and unique character, and by often artisan and laborious nature of production, getting residents of an area involved in local business development.[30] Thus, it creates the improvement of the economic situation on the Polish country and in small towns. The development of this type of manufacturing is beneficial for environmental, economic and social reasons.[31]

In accordance with *The Strategy for the Identification and Promotion of Traditional Products*, the protection and promotion of regional products and traditional is one of the most important factors of sustainable rural development. It contributes to the diversification of employment, creates non-farm source of income, and improves farmers' economic situation.[32]

M. Błąd points out that regional food products are specific, not anonymous, carrying the message that is associated with the history. They allow the consumer to "touch", feel and taste the specific area of origin. "The product with a soul" is for them not only tasty and nutritious, but it is a part of the history of the place. The purchase is a kind of contact with this culture, tradition, history, community and nature of production area. The product becomes "Ambassador" of the region.[33]

J. Majewski recognizes a very wide range of profits on a macroeconomic scale, refers to a "multiplier effect", that is an extension of the benefits described earlier, for the next group of beneficiaries. As beneficiaries in this context he mentions: farmers, gardeners, fishermen, other suppliers, processors, distributors, employees, owners of transport breweries, distilleries, shops, markets and factory, restaurateurs and hoteliers, the organizers of

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[29] K. Ertmańska, *Etnocentryzm konsumencki jako szansa rozwoju regionów*, „Studia Ekonomiczne i Regionalne" 4/1 (2011), pp. 63–68.

[30] *Regional and traditional products*, release from the Ministry of Agriculture and Rural Development on the III Edition of the contest for the best project/initiative to promote the region through regional or traditional product, http://www.minrol.gov.pl/pol/Jakosc-zywnosci/Produkty-regionalne-i-tradycyjne (last viewed: 14.01.2015).

[31] A. Zygadło, *Zielone światło dla produktu lokalnego*, „Możliwości. Pismo społeczne" 2007/2, p. 8.

[32] *Strategia identyfikacji i promocji produktów tradycyjnych*, Wydawnictwo Ministerstwa Rolnictwa i Rozwoju Wsi, Warszawa 2004, p. 14.

[33] M. Błąd, *Produkty tradycyjne i regionalne – znaczenie oraz możliwości rozwoju*, „Wieś Jutra" 10/99 (2006), p. 47.

the regional events, school owners and travel agents, journalists, teachers, counselors, local communities.[34]

## 6. REGIONAL FOOD AND ETHNOCENTRIC ATTITUDES

Summary of the potential economic, cultural and general public in nature leads to a conclusion that regional products may constitute a direct response to the needs of the ethnocentric consumer. The aspiration of this group of buyers, is to support the national economy, contribute to protecting jobs, take care of the national interest in the broad context of both economic and cultural, environmental and social.[35] Similar thesis is formulated by K. Mazurek-Łopacińska, according to whom "it is expected that in the face of the obvious manifestations of consumer ethnocentrism the scale of demand for differentiated products will grow. Diversification of food expectations dictated by the need to individualize of consumption and ethnocentrism can provide an opportunity for specific products, especially associated with traditional methods and regional character".[36]

However, it should be noted that due to the special nature of the regional products, namely their strong relationship with geographically specified area of production rather than the country, as well as relationships with the culture or traditions often different for certain, narrower social groups than the nation, these are products especially in accordance with the attitudes you specify as regional ethnocentrism. The introduction of this concept has been proposed by, among others, D. Siemieniako et al.,[37] F. Lenglet[38] and P. Fernández-Ferríén and B. Bande-Vilela.[39] The last two authors, referring to the sociological definition of ethnocentrism based on social groups, state that, in the context of individual national economies, there are enough differences that relate rather to subregional ethnocentrism to a region rather than the country. This is confirmed by examination of S.M. Burgess and M. Harris carried out in South Africa,[40] in which they define 14 social groups with different preferences to domestic products. Being Zulus or Afrikaner have a greater impact on the attitude to the product concerned, than the feeling of being South-Afrikaner.

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[34] J. Majewski, *Turystyka kulinarna i kreowanie marki obszaru*, „Rocznik Naukowy Wyższej Szkoły Turystyki i Rekreacji im. M. Orłowicza w Warszawie" 2008/7, pp. 127–132.

[35] See also: M.C. Aprile et al., *Consumers' valuation of food quality labels: the case of the European geographic indication and organic farming labels*, "International Journal of Consumer Studies" 2012/36, pp. 158–165; S. Chambers et al., *Local, national and imported foods: A qualitative study*, "Appetite" 2007/49, pp. 208–213; J.L. Hsu, H-P. Nien, *Who are ethnocentric? Examining consumer ethnocentrism in Chinese societies*, "Journal of Consumer Behaviour" 2008/7, pp. 436–447; O. Kucukemiroglu, *Market segmentation by using consumer life style dimensions and ethnocentrism*, "European Journal of Marketing" 33/5–6 (1999), s. 470; R. Scarpa i in., *Product-Country Images and Preference Heterogeneity for Mediterranean Food Products: A Discrete Choice Framework*, "Agribusiness" 21/3 (2005), pp. 329–349.

[36] K. Mazurek-Łopacińska, *Globalizacja w aspekcie wpływu na zachowania konsumencki*, „Marketing i Rynek" 2001/3, pp. 11–12.

[37] D. Siemieniako et al., *National and regional ethnocentrism. A case study of beer consumers in Poland*, "British Food Journal" 113/3 (2011), s. 404–418.

[38] F. Lenglet, *Influence of terroir products meaning on consumer's expectations and linkings*, "Food Quality and Preference" 32/C (2014), pp. 264–270.

[39] P. Fernández-Ferríén, B. Bande-Vilela, *Regional ethnocentrism: Antecedents, consequences, and moderating effects*, "Food Quality and Preference" 2013/30, s. 299–308.

[40] S.M. Burgess, M. Harris, *Social Identity in an Emerging Consumer Market: How You Do the Wash May Say a Lot About Who You Think You Are*, "NA – Advances in Consumer Research" 1999/26, pp. 170–175.

Also in Poland one can talk about regional specificity. Ethnocentric-oriented consumer will prefer domestic products over imported ones, but at the same time, it is possible that among them will seek those from the Carpathian, and not from other regions of Poland. The consumer will be more closely identified with the region when they see a link between its decisions relating to the purchase of local producers and the development of the region. Hence, the creation of regional and traditional products should be accompanied by building consumer awareness regarding the relationship of their purchases with the environment.[41] According to F. Lenglet consumers with greater power of regional ethnocentrism may be more vulnerable and susceptible to the impact of the regional characteristics of the product (which specifies French term *terroir*), because their purchase allows them to take pride in supporting not only the national economy, but also the regional one.[42] The promotion of employment as a motivation behind ethnocentric attitudes, especially in areas affected by high unemployment, has been observed by Stoklasa, Starzyczna and Zolotykova[43] in their research. Also the inhabitants of Subcarpathian province, interviewed by Szromnik and Wolanin-Jarosz recognized the purchase products of national origin, because this gives employment to the Poles.[44]

However, according to P. Fernández-Ferríén and B. Bande-Vilela, there are still few studies on the regional ethnocentrism, in relation to the national analysis. Among the very few there is an analysis of Turkish consumer behavior by E. Kaynak, and A. Kara. The conclusions state that "a sense of connection with the subregion was a clear indicator of the level of ethnocentrism, which in turn has determined preferences to local products".[45]

Current regional consumer ethnocentrism seems to be an interesting direction of research, especially in the context of the development of the market of regional foods. You might want to take into account this perspective analyses and eyeing attitudes and behavior of Polish consumers, take into account not only their "economic patriotism" reference country, but "small motherland". This is increasingly important in the current era of globalization of the market, when its universality and standardization of products and services increases the need for belonging to the local community (in terms of geographical, cultural, religious and language).[46]

## 7. CONCLUSION

Food produced in a specific and limited area brings a number of advantages, of an individual (the consumer and producer) and macro (economic, cultural, social) character. Regarding the latter, it seems to be a category of interests for the consumers with ethno-

[41] J. Rachocka, A. Sapa , *Wspólnotowa polityka ochrony produktów regionalnych i tradycyjnych a etnocentryzm konsumencki*, „Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Polityki Europejskie, Finanse i Marketing" 2/51 (2009), s. 71–84.

[42] F. Lenglet, *op. cit.,* s. 264–270.

[43] M. Stoklasa, H. Starzyczna, L. Zotykova, *Consumer Ethnocentrism in MS Region*, "International Journal of Social, Human Science and Engineering" 8/3 (2014), s. 2897–2900.

[44] A. Szromnik, E. Wolanin-Jarosz, *Diagnoza poziomu etnocentryzmu konsumenckiego Polaków z wykorzystaniem metody CETSCALE*, „Konsumpcja i Rozwój" 2013/1, s. 98–111.

[45] E. Kaynak, A. Kara, *Consumer perception of foreign products: An analysis of product-country images and ethnocentrism*, "European Journal of Marketing" 36/7–8 (2002), s. 928–949.

[46] S. Tkaczyk, J. Kołuda, *Nowe trendy konsumenckie a sukces organizacji*, „Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach, Seria: Administracja i Zarządzanie" 2013/97, s. 23–41.

centric attitudes. The choice of this type of product can be for them not only attractive but also easy. Regional products, defined as having characteristics related to the area of origin, in most cases, refer to the place of manufacture, providing additional details to its name (e.g. bryndza podhalańska, kiełbasa markowska, powidła krzeszowskie, etc.). It seems that a particular demand for regional products may come from so-called "local Patriots", that is, consumers with a high level of regional ethnocentrism. For the time being, however, there is lack of adequate research carried out in the regions of Poland that could verify this hypothesis.

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[1] Defra, *Regional Food Strategy Evaluation Report September 2005,* http://archive.defra.gov.uk/evidence/economics/foodfarm/evaluation/regional/Chapter%201.pdf (last viewed: 14.01.2015).

[2] DOOR database: DOOR, http://ec.europa.eu/agriculture/quality/door/ (last viewed: 20.05.2015).

[3] Ertmańska K., *Etnocentryzm konsumencki jako szansa rozwoju regionów*, „Studia Ekonomiczne i Regionalne" 4/1 (2011).

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[8] http://www.the-eu-and-me.org.uk/whats-in-it-for-me/fighting-crime/tackling-counterfeiting-piracy (last viewed: 20.05.2015).

[9] Fernández-Ferríén P., Bande-Vilela B., *Regional ethnocentrism: Antecedents, consequences, and moderating effects,* "Food Quality and Preference" 2013/30.

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## ŻYWNOŚĆ REGIONALNA A ETNOCENTRYZM KONSUMENCKI W WYMIARZE REGIONALNYM

Artykuł stanowi próbę odpowiedzi na pytanie o relacje żywności regionalnej z postawami nabywców i zjawiskiem etnocentryzmu konsumenckiego. Na wstępie określono znaczenie pojęcia „produkt regionalny", korzystając zarówno z definicji oznaczeń wiązanych z tą kategorią w prawodawstwie Unii Europejskiej, jak i z określeń przywoływanych przez praktyków i teoretyków zajmujących się rynkiem żywności. Na podstawie przeglądu zarówno literatury krajowej, jak i zagranicznej wykazano wiele korzyści generowanych przez produkty regionalne. Podkreślono ich wymiar indywidualny (korzyści odczuwane przez producenta, dystrybutora czy konsumenta) i korzyści w skali makro (ekonomiczne, kulturowe, społeczne). Biorąc pod uwagę zwłaszcza te ostatnie, stwierdzono, że produkty regionalne mogą stanowić bezpośrednią odpowiedź na potrzeby konsumentów o postawach etnocentrycznych. Wybór tego typu produktów może być dla nich nie tylko atrakcyjny, ale i łatwy. Specyfika produktów regionalnych jest definiowana jako związana z obszarem pochodzenia – w większości wypadków odwołują się bowiem swoją nazwą do miejsca wytworzenia (bryndza podhalańska, kiełbasa markowska, powidła krzeszowskie itp.). Wydaje się, że szczególnie lojalni wobec produktów regionalnych mogą być klienci określani mianem „patriotów lokalnych", czyli konsumenci o wysokim poziomie „etnocentryzmu regionalnego". Za wprowadzeniem tej kategorii znaczeniowej, obok szeroko rozumianego „etnocentryzmu konsumenckiego", opowiada się wielu autorów. Podkreślają oni regionalne różnice w preferencjach nabywców i kierowanie się przez nich w codziennych wyborach konsumenckich nie tylko kontekstem narodowym, ale i lokalnym. Niniejszy artykuł wpisuje się w ten nurt.

**Słowa kluczowe**: zachowanie konsumenta, postawy konsumenta, etnocentryzm, żywność regionalna

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# ПРАКТИЧЕСКАЯ ПРОПУСКНАЯ СПОСОБНОСТЬ ПОЛОСЫ ДВИЖЕНИЯ АВТОМОБИЛЬНОЙ ДОРОГИ

В работе представлен метод расчета практической пропускной способности полосы движения автомобильной дороги. В результате увеличения интенсивности движения на автомобильных дорогах Украины, возникла необходимость проведения анализа условий движения и разработки мероприятий по их улучшению.

Самым методом решения этих задач является проведение анализа условий движения на основе графика практической пропускной способности участка автомобильной дороги. На его основе решается вопрос частичной или полной ее реконструкции. Под частичной реконструкцией понимаем увеличения пропускной способности на отдельных участках или элементах дороги.

Практическая пропускная способность - это максимально возможная интенсивность движения в сечении дороги за единицу времени в конкретных дорожных условиях.

Конкретным дорожным условиям соответствует средняя скорость транспортного потока, а каждой средней скорости транспортного потока соответствует практическая пропускная способность полосы движения.

Практическая пропускная способность применяется при: определении необходимого количества полос движения на автомобильных дорогах, проведении оценке условий движения на автомобильных дорогах, обосновании необходимости проведения реконструкции автомобильной дороги или отдельных ее участков, расчета продолжительности цикла светофорного регулирования движения автомобилей на пересечениях и примыканиях, автоматизированном регулировании дорожного движения по дороге, координированном регулировании движения. Практическая пропускная способность изменяется от наименьшего значения к наибольшему. Наименьшая практическая пропускная способность соответствует колонном движения автомобилей при средней скорости транспортного потока. Наибольшая практическая пропускная способность соответствует колонном движения автомобилей при минимальном интервала (времени проезда динамического габарита). Границы изменения практической пропускной способности полосы движения определяются средней скоростью свободного движения и средней скоростью соответствующей минимальному часовому интервалу.

**Ключевые слова**: практическая пропускная способность, полоса движения, состав транспортного потока, средняя скорость движения транспортного потока

## 1. ВСТУПЛЕНИЕ

Существует три понятия пропускной способности: теоретическая, практическая и максимальная. Теоретическая пропускная способность определяется на основе

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упрощенных динамических моделей транспортного потока. Дистанция между автомобилями, как и динамический габарит зависит от коэффициента сцепления и скорости движения в этих моделях. Длина легкового автомобиля величина постоянная, не соответствует физическому процессу (длина легкового автомобиля меняется в значительном интервале от 2.5м до 5.5м). Итак, теоретическая пропускная способность изменяется в значительной интервале. Этой пропускной способности соответствует ее определения: это максимально возможная интенсивность движения в пересечении дороги в единицу времени.

Максимальная пропускная способность определяется для участка дороги второй категории: горизонтальная, прямолинейная, ширина проезжей части 7,5 м, ширина обочины 3,75. Как видно из этого объяснения, речь идет о пропускной способности легковых автомобилей на участке дороги второй категории при конкретных дорожных условиях соответствует определению практической пропускной способности.

На рисунке 1.1 представлен график изменения пропускной способности в зависимости от скорости транспортного потока.

Линия ABC и линия $A_1B_1C_1$ характеризуют изменение практической пропускной способности соответственно для легковых и грузовых автомобилей. Каждому значению скорости движения соответствуют различные режимы движения транспортного потока от свободного к колонного и изменение интенсивности движения от 1 до *P* авт./ч.

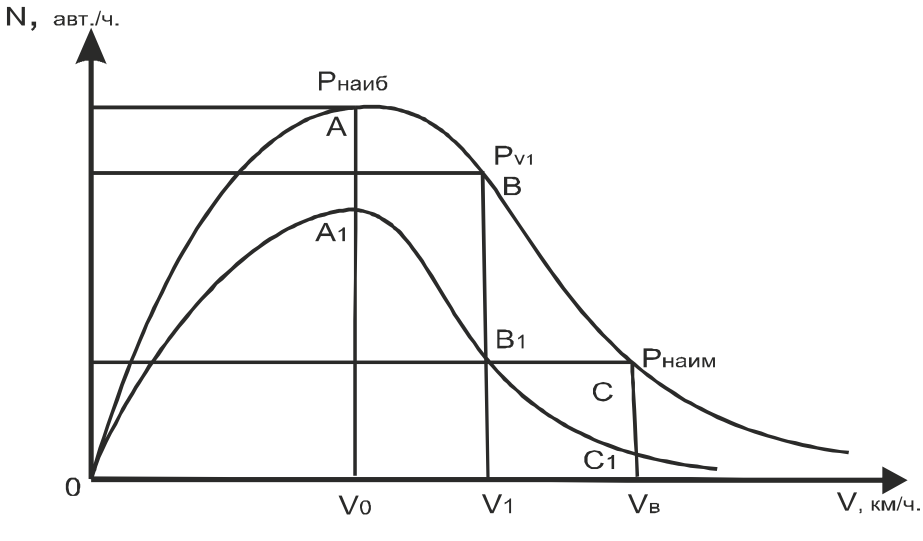


Рис. 1. График изменения пропускной способности в зависимости от скорости транспортного потока

$V_0$ - средняя скорость движения, соответствующая наименьшему интервалу

$V_{\hat{a}}$ - средняя скорость свободного руху движения

$V_1$ - средняя скорость

Зависимость “интенсивность – скорость ” в гидродинамической модели приведена на рисунке 2.

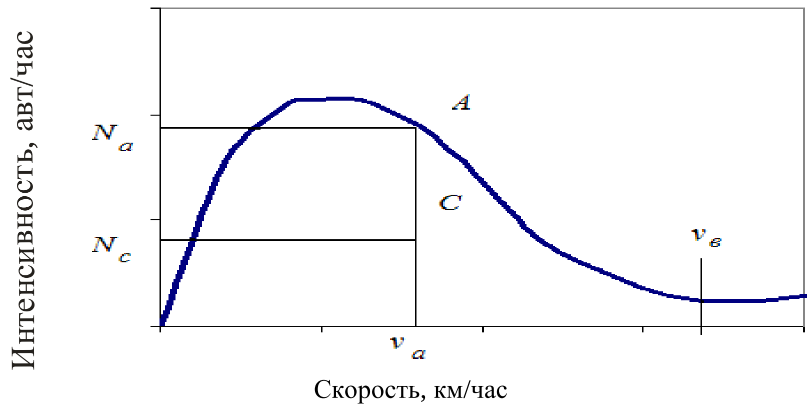


Рис. 2. Зависимость “ интенсивность – скорость ” в гидродинамической модели

По графику (рис. 2) видно, что каждому значению интенсивности движения соответствует определенное значение скорости. Например, в точке А максимальная интенсивность движения $N_a$ соответствует скорости движения $V_a$, а в точке $C$ скорость движения будет та же, а интенсивность $N_c$ будет меньше чем $N_a$.

На самом деле следует рассматривать только одну пропускную способность - максимально возможное количество автомобилей, которое может пройти в пересечении дороги в единицу времени при данном составе транспортного потока.

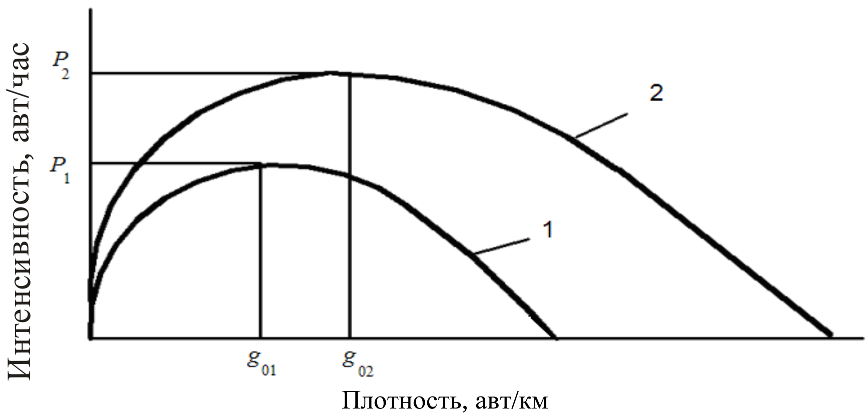


Рис. 3. Зависимость "интенсивность - плотность" для автопоездов (кривая 1) и для легковых автомобилей (кривая 2). Все другие автомобили по своей средней длине располагаются между линиями 1 и 2. Минимальная длина легкового автомобиля равна 4,5 м, - отвечает линии 2, а длина авто поезда - 12 м соответствует линии 1.

Значение практической пропускной способности меняются не только от минимального значения до максимального, а для одной скорости движения она меняется на величину среднеквадратического отклонения, что хорошо видно из рисунка 4.

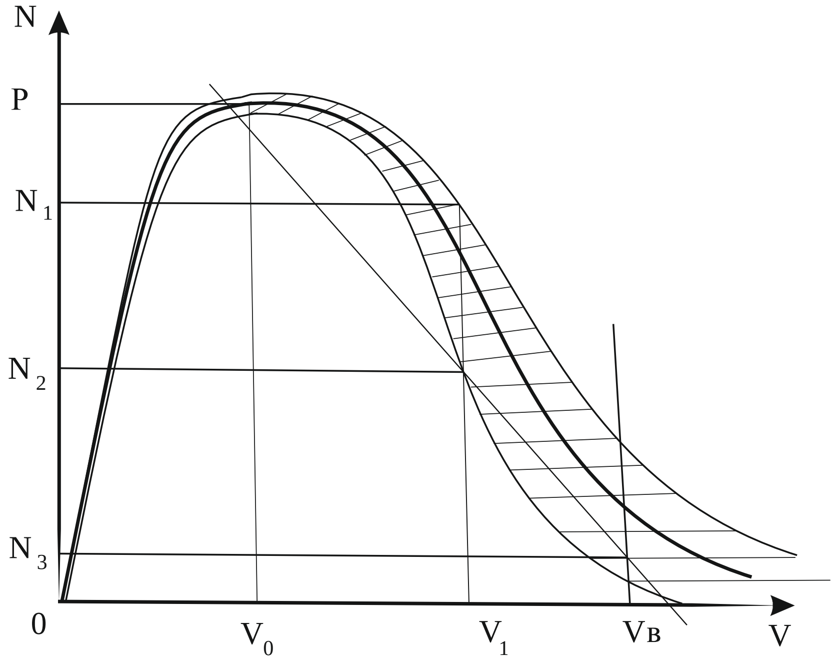


Рис. 4. Изменение практической пропускной способности для одной скорости движения на величину среднеквадратического отклонения

$V_B$ – скорость свободного движения ;
$V_1$ – средняя скорость движения ;
$N_1$ – интенсивность при колонном движении автомобилей соответственно скорости $V_1$ ;
$N_2$ – интенсивность движения при скорости $V_1$, но меньше $N_1$ ;
$N_3$ - интенсивность соответствующая скорости свободного движения.

Прямолинейная зависимость имеет достоверные значения по интервалу скорости от $V_1$ до $V_B$ и интервала интенсивности от $N_2$ до $N_3$.

## 2. АНАЛИЗ СУЩЕСТВУЮЩИХ МЕТОДОВ ПО РАСЧЕТА ПРАКТИЧЕСКОЙ ПРОПУСКНОЙ СПОСОБНОСТИ

Практическая пропускная способность может быть рассчитана на основе:

-функциональных зависимостей, основанных на моделях транспортного потока ;

-коэффициентов снижения теоретической пропускной способности;

-функциональных зависимостей полученных при исследовании характеристик транспортного потока.

Весь комплекс функциональных зависимостей можно разделить на следующие группы :

1). Функциональные зависимости упрощенных динамических моделей ;

2). Функциональные зависимости гидродинамической модели, следования за лидером ;

3). Прямолинейные зависимости „интенсивность-скорость” ;

4).Функциональные зависимости на основе исследований „интенсивность-скорость”

В работе рассмотрены следующие зависимости на основе моделей транспортного потока по связи характеристик „интенсивность-скорость”:

- упрощенные динамические модели ;
- модель следования за лидером ;
- гидродинамическая модель ;
- модель Бирули А.К.;
- модель Трибунского В.М.

Для проведения детального анализа расчета практической пропускной способности взято участок автомобильной дороги Козелец - Бобровица. Дорога IV категории. Интенсивность движения 98 авт/ч. Состав транспортного потока : 40% легковых автомобилей, 50% грузовых автомобилей и 10% автобусов. Длина участка – 4 км, из них 2 км по населенному пункту и 2 км вне населенного пункта. Скорость проезда и радиусы горизонтальных кривых определены на основе технологии GPS, а ширина проезжей части, обочины и расстояние видимости на основе замеров.

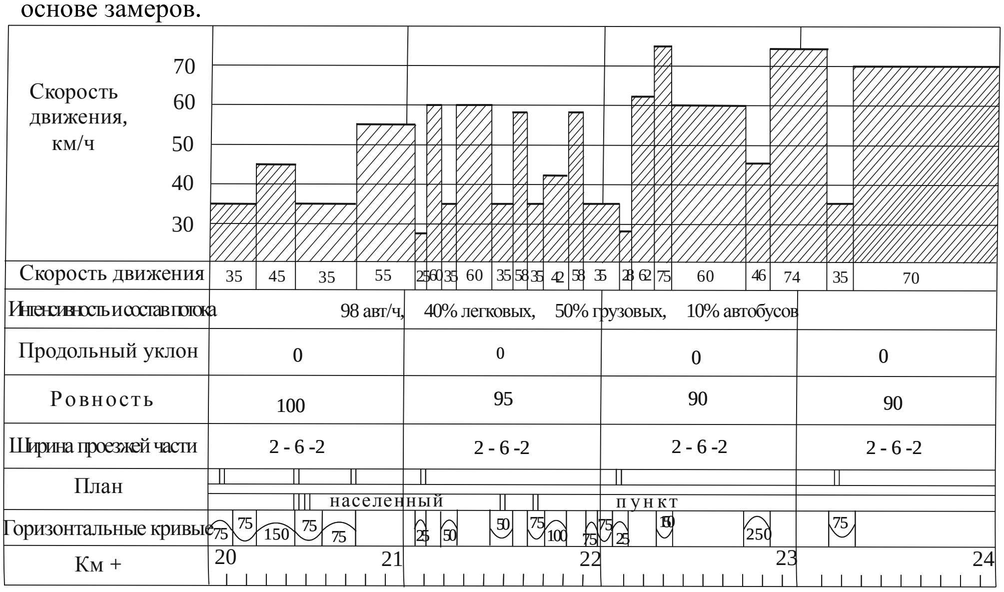


Рис. 5. График скорости движения по автомобильной дороге Козелец - Бобровица

Таблица 1. Сравнительная таблица практической пропускной способности

| Скорость движения, км/ч | Первая динамическая модель | Вторая динамическая модель | Третья динамическая модель | Гидродинамическаямодель | Упрощенная динамическая модель (Бируля А.К.) | Модель следования за лидером Сильянова В.В. | Трибунский В.М. | Чехия | Германия | Хомяк Я.В. | Билятинский А.А. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 27 | 1432,3 | 989,4 | 1279,6 | 1251,6 | 1224,9 | 1365,2 | 1408,7 | 725 | 713 | 2089,7 | 2453 |
| 28 | 1464,4 | 992,5 | 1299,2 | 1247,2 | 1220,6 | 1389,3 | 1408,9 | 725 | 713 | 2016,2 | 2392,1 |
| 33 | 1608,1 | 995,9 | 1381,7 | 1204,2 | 1188,9 | 1481,6 | 1355,4 | 725 | 713 | 1648,5 | 2087,2 |
| 36,8 | 1706,0 | 988,2 | 1429,2 | 1154,0 | 1157,7 | 1520,1 | 1254,1 | 725 | 713 | 1369,1 | 1855,5 |
| 39,5 | 1769,7 | 978,4 | 1872,0 | 1112,2 | 1133,3 | 1530,8 | 1150,2 | 725 | 713 | 1170,6 | 1690,9 |
| 43,8 | 1862,2 | 957,6 | 1487,5 | 1039,0 | 1092,8 | 1519,5 | 930,17 | 725 | 713 | 854,41 | 1428,7 |
| 49,7 | 1976,1 | 925,2 | 1516,7 | 931,81 | 1037,5 | 1447,1 | 519,0 | 725 | 713 | 420,59 | 1068,9 |
| 56,9 | 2095,7 | 880,8 | 1532,2 | 800,55 | 972,2 | 1269,6 | 153,8 | 725 | 713 | 108,8 | 629,88 |
| 58 | 2112,1 | 873,6 | 1532,7 | 781,00 | 962,52 | 1233,9 | 273,1 | 725 | 713 | 189,7 | 562,8 |
| 59 | 2126,8 | 867,2 | 1533,0 | 763,41 | 953,8 | 1199,4 | 385,5 | 725 | 713 | 263,2 | 501,83 |
| 72,4 | 2301,3 | 785,9 | 1519,8 | 549,00 | 848,20 | 555,0 | 2241 | 725 | 713 | 1249 | 315,2 |

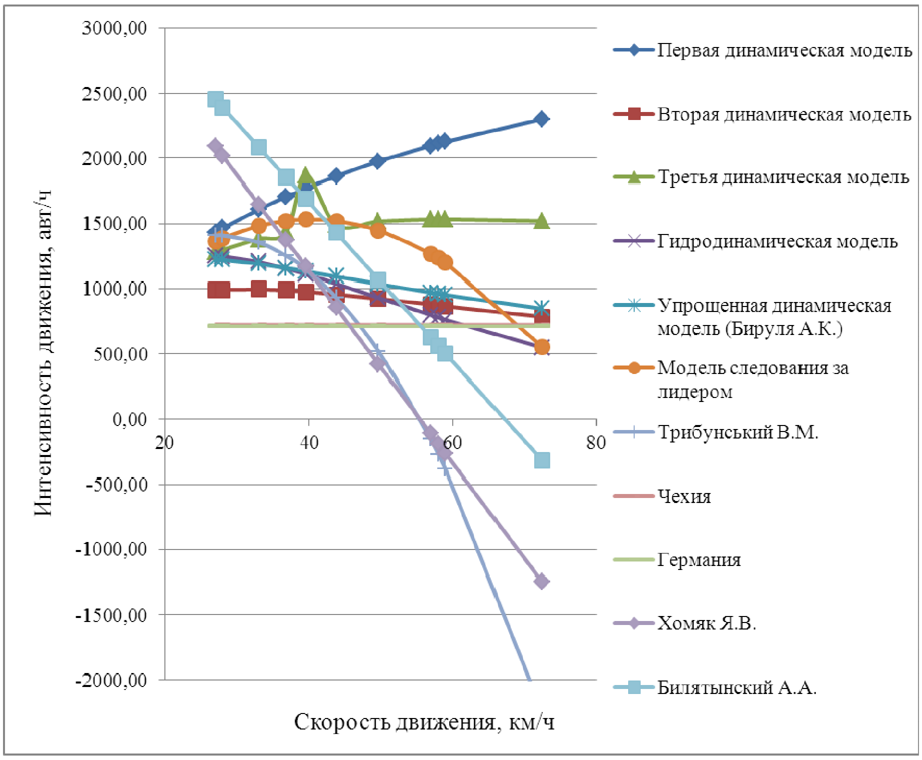


Рис. 6. График функциональных зависимостей „интенсивность - скорость” на основе сравнительной таблицы

Рассчитав пропускную способность для скоростей от 20 до 90 км / ч, видим большое расхождение значений пропускной способности для одного значения скорости. Поэтому нужно найти зависимость, которая наиболее точно отражала физический смысл движения транспортного потока.

## 3. ИССЛЕДОВАНИЕ СРЕДНЕЙ СКОРОСТИ ТРАНСПОРТНОГО ПОТОКА

В условиях высокой интенсивности движения большое значение приобретают вопросы оценки транспортно-эксплуатационных качеств дорог с позиций пропуска потоков автомобилей. Средняя скорость движения является основным параметром для оценки транспортно-эксплуатационного состояния автомобильной дороги. Скорость движения можно установить путем непосредственных измерений на отдельных участках дороги или путем расчетов.

Для определения практической пропускной способности автомобильной дороги нужно определить среднюю скорость движения транспортного потока на всех участках автомобильной дороги. Пропускная способность прямо пропорционально зависит от средней скорости транспортного потока. Есть несколько методов по определению средней скорости движения транспортного потока на автомобильной дороге:

1. Метод на основе интенсивности движения, состава транспортного потока и геометрии дороги
2. Метод линейных зависимостей от интенсивности движения, состава транспортного потока, ширины проезжей части, ширины обочины и т.д.
3. Метод определения минимальной скорости в зависимости от интенсивности движения, категории дороги, радиусов горизонтальных кривых, продольных уклонов и ровности покрытия.
4. Методы основанные на уравнении регрессии с учетом интенсивности и параметров дороги.

Из проведенного анализа практически во всех методах за основу принимается средняя скорость свободного движения. В связи с чем возникает необходимость по проведению исследований по скорости свободного движения автомобилей в различных дорожных условиях и разном состава транспортного потока.

В результате статистической обработки экспериментальных данных и теоретических функций распределения интервала времени и интенсивности движения получены значения средней свободной скорости движения для различного состава транспортного потока на дорогах разных категорий .

Полученные результаты занесены в таблицы и обработаны по закону нормального распределения Лапласа Гаусса.

Таблица 2. Средние скорости свободного движения

| № п/п | Категория дороги | Количество полос движения | Средняя скорость, км/ч | | | |
|---|---|---|---|---|---|---|
| | | | Легковые | Грузовые | Автобусы | Автопоезда |
| 1 | Ia | 6 | 91,13 | 75,70 | 77,50 | 81,03 |
| 2 | Ia, Iб | 4 | 88,04 | 75,77 | 74,61 | 80,00 |
| 3 | II | 2 | 84,29 | 71,90 | 71,50 | 72,93 |
| 4 | III | 2 | 79,72 | 67,06 | 69,33 | 71,11 |
| 5 | IV | 2 | 75,83 | 64,08 | 67,03 | 68,75 |

Среднюю скорость свободного движения транспортного потока определяют как среднестатистическое значение по формуле (1) :

$$V_{своб} = V_{л} \times \alpha + V_{г} \times \beta + V_{ав} \times \gamma + V_{ап} \times \rho , \qquad (1)$$

где $V_{л}, V_{г}, V_{ав}, V_{ап}$ - соответственно средние скорости свободного движения легковых, грузовых автомобилей, автобусов и автопоездов, км / ч., данные берутся из таблицы 2;

$\alpha$, $\beta$, $\gamma$, $\rho$ - доли соответственно легковых, грузовых автомобилей, автобусов и автопоездов в транспортном потоке.

Были проведены экспериментальные исследования средней скорости транспортного потока в зависимости от параметров дороги на дорогах II, III, IV категорий. Замеры проводились на участках с горизонтальным радиусом 10 м, 50 м, 100 м, 600 м, продольными уклонами 18 ‰, 25 ‰. В данном эксперименте замеряли скорость движения транспортного потока на дорогах различных категорий и с разными параметрами.

В результате обработки данных наблюдений были получены следующие зависимости средней скорости движения от радиуса горизонтальной кривой:

При $R \prec 100$ м

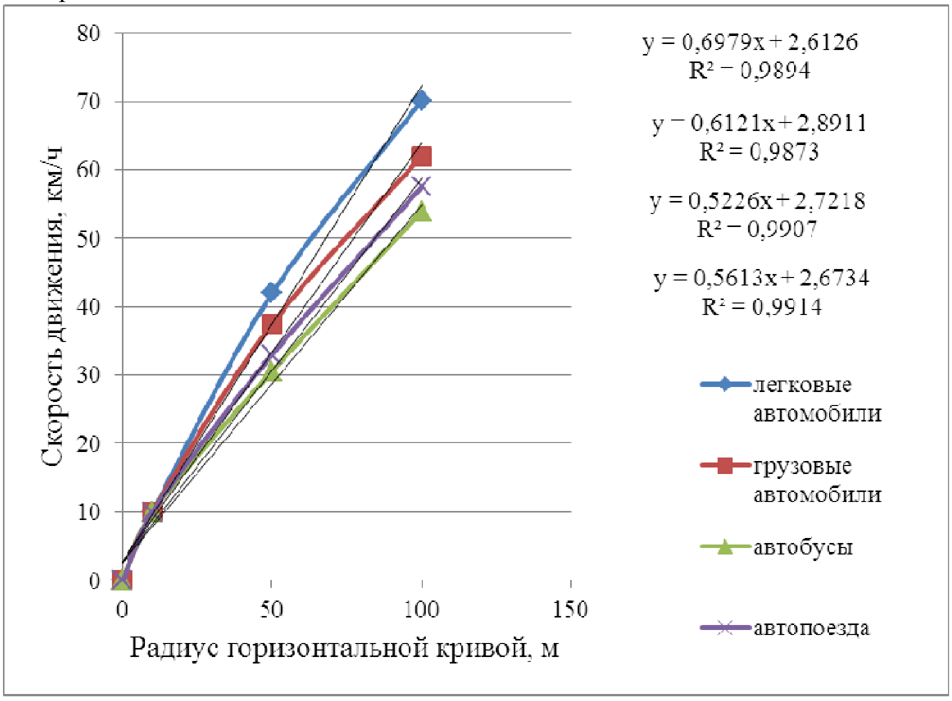


Рис. 7. Зависимость средней скорости движения от радиуса горизонтальной кривой

Где ряд 1 – зависимость для легковых автомобилей ;
Ряд 2 – зависимость для грузовых автомобилей ;
Ряд 3 – зависимость для автобусов ;
Ряд 4 – зависимость для автопоездов.

Общий вид уравнения: при радиусе горизонтальной кривой до 100м

$$V = (0{,}004\, l^2 - 0{,}0863\, l + 1{,}0018)R + (-0{,}0169\, l^2 + 0{,}2793\, l + 1{,}7161) \qquad (2)$$

Где $l$ - длина автомобиля, м ;
$R$ - радиус горизонтальной кривой, м.

Результаты проведенных исследований при $100 \prec R \prec 600$ показаны на рисунке 8.

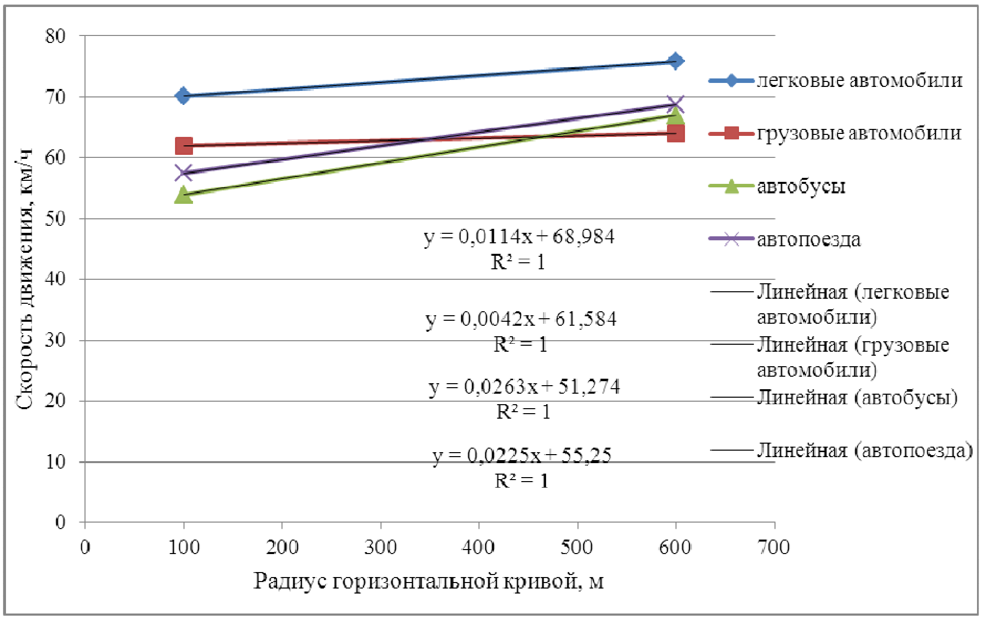


Рис. 8. Зависимость средней скорости движения от радиуса горизонтальной кривой более 100м

Где ряд 1 – зависимость для легковых автомобилей ;
Ряд 2 – зависимость для грузовых автомобилей ;
Ряд 3 – зависимость для автобусов ;
Ряд 4 – зависимость для автопоездов.

Конечным уравнением полученным на основе проведенного экспериментального исследования является:

$$V = \frac{V_0 - V_{100}}{500}(R - 100), \qquad (3)$$

Где $V_{100}$ - скорость движения при $R = 100$м, км/ч, которая определяется на основе уравнения (2)

$V_0$ - средняя скорость свободного движения, км/ч.

Уменьшение средней скорости свободного движения от продольного уклона определенного на основе проведенных экспериментальных исследований :

$$V = V_0 - 283,79\, i \qquad (4)$$

Де $V_0$ - скорость свободного движения, км/ч ;

$i$ - продольный уклон, в долях единицы.

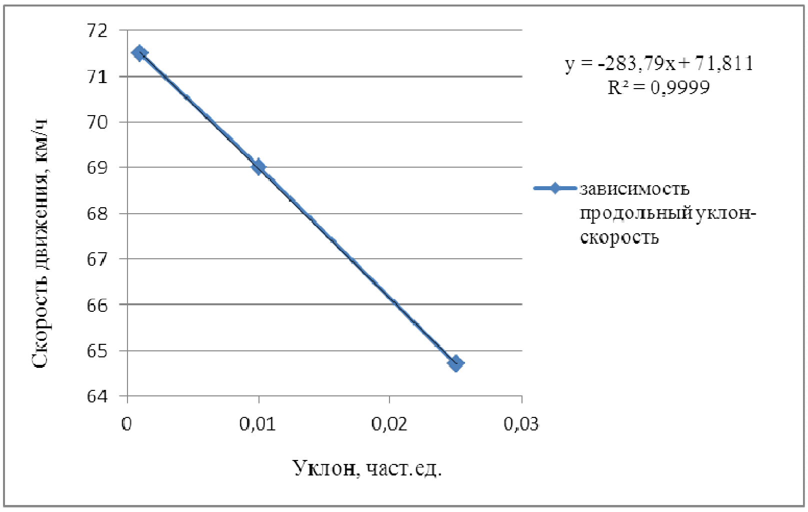


Рис. 9. Зависимость скорости движения транспортного потока от уклона

Средня скорость на спусках приравнивается к средней скорости свободного движения :

$$V_i = V_{своб} \tag{5}$$

Среднюю скорость в зависимости от ровности покрытия определяют по формуле (6) или по графику рис. 10.

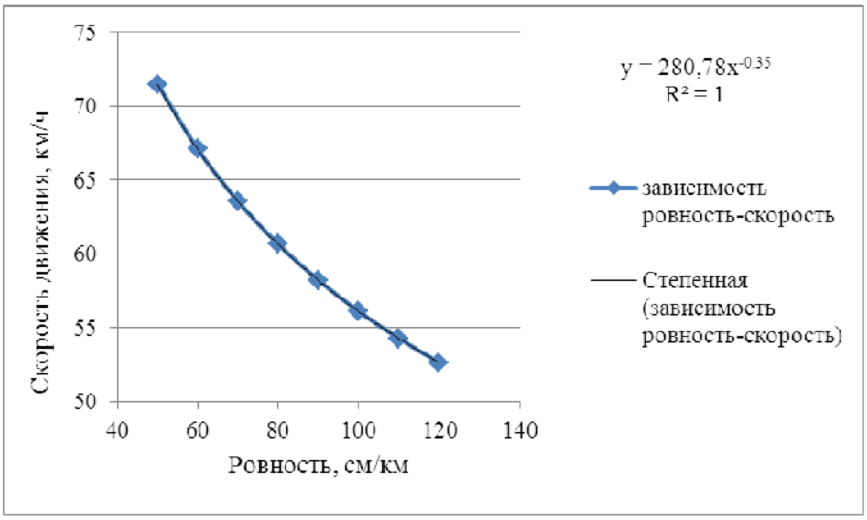


Рис. 10. Зависимость средней скорости движения показателя ровности дорожного покрытия

$$V_P = 280 \cdot P^{-0,35} \tag{6}$$

где $p$ – показатель толчкомера, см/км.

## 4. ИССЛЕДОВАНИЕ ФУНКЦИОНАЛЬНОЙ ЗАВИСИМОСТИ “ИНТЕНСИВНОСТЬ – СКОРОСТЬ”

Для получения этой функциональной зависимости проведено исследование. Исследования проводились на автомобильных дорогах различных категорий. Местами для исследования на автомобильной дороге выбираемые горизонтальные прямолинейные участки дорог с дорожной разметкой как осевой линии и края проезжей части. Последующая обработка проводилась на компьютере стандартными программами. Таким образом набирались данные по типам автомобилей.

Зависимость “интенсивность – скорость” определяется отдельно для легковых, грузовых автомобилей, автобусов и автопоездов длиной 12 м.

На основе данных проводился подбор кривой с помощью программы Exel и Mathcad.

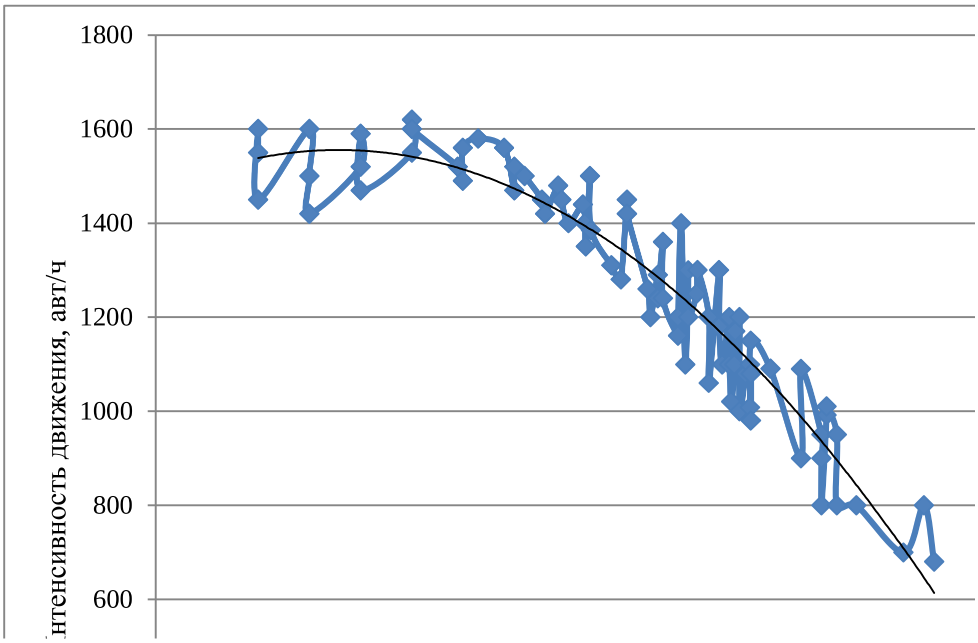


Рис.11. Зависимость "интенсивность-скорость" для легковых автомобилей

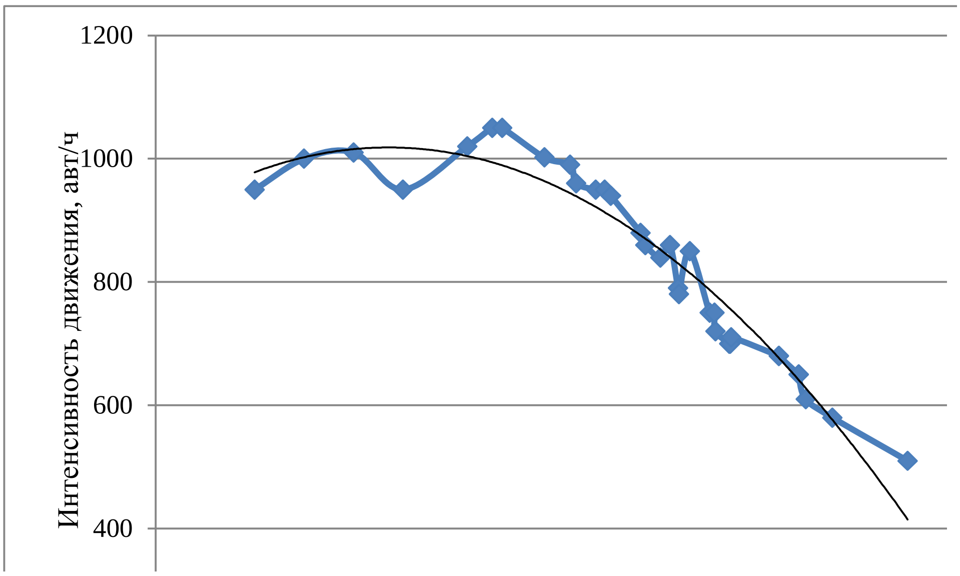


Рис.12. Зависимость "интенсивность-скорость" для грузовых автомобилей

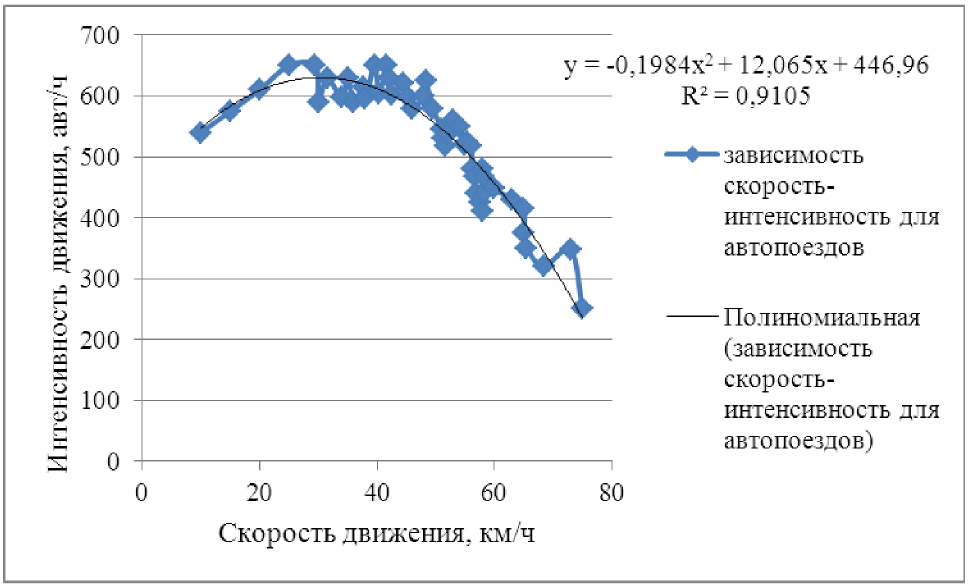


Рис.13. Зависимость “интенсивность-скорость” для автопоездов

Для получения уравнения зависимости интенсивность-скорость в общем виде нужно обработать полученные уравнения для различных типов автомобилей. Для этого найдем зависимость, которая описывала изменение первого коэффициента в зависимости от типа автомобиля. Аналогично для второго и третьего коэффициента.

Достоверность полученных результатов проверяем с помощью коэффициента корреляции.

Коэффициент корреляции указывает на тесноту связи между двумя случайными величинами и изменяется от -1 до +1. При прямой линейной зависимости, то есть когда с ростом значений $x_i$ увеличиваются значения $y_i$, $\rho_{\upsilon\sigma}$ = +1. При обратной линейной зависимости, то есть когда с ростом значений $x_i$, значения $y_i$ уменьшаются $\rho_{\upsilon\sigma} = -1$. Если $x_i$ и $y_i$ независимы, то $\rho_{\upsilon\sigma} = 0$.

Коэффициент корреляции определяется по формуле:

$$r_{xy} = \frac{N\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{Nx_i^2 - (\sum x_i)^2}\sqrt{Ny_i^2 - (\sum y_i)^2}} \tag{7}$$

После того, как установлен коэффициент корреляции, необходимо оценить, существенное отклонение полученного коэффициента корреляции от нуля.

Для решения данной задачи применялся способ Фишера.

Случайная величина Z подчиняется нормальному закону со средним отклонениям $\sigma_Z$.

$$Z = \frac{1}{2}\lg\frac{1+r}{1-r}. \tag{8}$$

$$\sigma_Z = \frac{1}{\sqrt{n-3}}. \tag{9}$$

Так как коэффициент корреляции r является случайной величиной, то необходимо по эмпирическому значению коэффициента корреляции r оценить теоретическое значение коэффициента $\rho$.

С надежностью $\Phi(t) = 0{,}95$, $t = 1{,}96$, поэтому

$$Z - 1{,}96\sigma_Z \le Z_{ген} \le Z + 1{,}96\sigma_Z. \tag{10}$$

Результаты статистической обработки экспериментальных данных интервалов и скоростей движения представлены в таблице 3.

Таблица 3. Результаты статистической обработки кореляции

| Статистическая обработка кореляции | Для легковых автомобилей | Для грузовых автомобилей | Для автопоездов |
|---|---|---|---|
| $r$ | 0,91 | 0,86 | 0,74 |
| $Z$ | 1,5126 | 1,2952 | 0,9536 |
| $\sigma_Z$ | 0,1601 | 0,2182 | 0,2500 |
| $t$ | 1,96 | 1,96 | 1,96 |
| $Z_{ген}$ | 1,1987 | 0,8675 | 0,4636 |
| | 1,8264 | 1,7229 | 1,4436 |
| $\rho$ | 0,8333 | 0,7001 | 0,4330 |
| | 0,9495 | 0,9382 | 0,8944 |

Вывод: теоретические значения коэффициентов корреляции с вероятностью 0,95, лежат в доверительных интервалах.

В результате обработки данных наблюдений получили зависимость интенсивность-скорость с учетом состава транспортного потока в виде :

$$N = (-0{,}0026\,l^2 + 0{,}0538\,l - 0{,}4678)V^2 + (0{,}0277\,l^2 - 0{,}1752\,l + 10{,}182)V + \\ + (18{,}362\,l^2 - 438{,}84\,l + 3069) \tag{11}$$

где $l$ - длина автомобиля, м ;
$V$ - средняя скорость движения, км/ч.

## 5. ВЫВОДЫ

На основе проведенных исследований получены значения скорости свободного движения на дорогах различных категорий и разной состава транспортного потока, разработан метод по расчету средней скорости движения транспортного потока при различном составе и различных дорожных условиях исследований, получено функциональную зависимость «интенсивность-скорость» для различного состава транспортного потока.

Полученные результаты позволяют рассчитать график средней скорости движения транспортного потока и на его основе рассчитать и построить график практической пропускной способности автомобильной дороги или ее участка.

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## PRACTICAL CAPACITY OF ROAD LANE


This paper presents a practical method for calculating capacity of lane highway. As a result of the increase in traffic on the roads of Ukraine, it was necessary to analyze traffic conditions and the development of measures to improve their work.

Most method of solving these problems is to analyze the traffic conditions on the basis of the schedule practical bandwidth road section. Based on it solved the problem of partial or complete its reconstruction.

Partial reconstruction of the mean increase capacity in certain areas or elements of the road.Practical capacity - the maximum possible traffic in a section of road per unit time in the specific road conditions.

Specific road conditions corresponds to the average speed of traffic flow and average speed of each transport stream corresponds to the practical capacity of the lane. The value of the practical capacity is used for: determining the required number of lanes on the roads, assessing traffic conditions on the roads, justifying the need for reconstruction of the road or its individual sections, the calculation of the duration of the cycle of traffic lights traffic control vehicles at intersections and junctions, automatic leveling driving on the road, coordinated regulation of movement. Practical bandwidth ranges from the lowest value to the highest. The smallest practical bandwidth corresponds to a column of cars motion at an average speed of traffic flow. Most practical bandwidth corresponds to a column of cars motion with minimal interval (travel time dynamic dimension).

**Keywords**: practical capacity, traffic stripe, the composition of traffic flow, the average speed of traffic flow

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# THE COMPETITIVENESS OF PODKARPACKIE REGION IN POLAND: A COMPARATIVE ANALYSIS WITH RESPECT TO CHOSEN BENCHMARKS

Regional competitiveness is a phenomenon that is permanently inscribed in the process of managing the socioeconomic development of regions. Institutions of public administration at every level must take into account this aspect when planning strategic policy interventions. This article focuses on the regional dimension, which is essential for cohesion and development policies within the European Union. Effective management of growth, however, requires an appropriate definition of the concept of competitiveness, as well as measuring its condition. This article is an attempt to do this for one region in Eastern Poland: Podkarpackie.

Currently, Podkarpackie is the only region of Eastern Poland that have built a development policy on the basis of innovation. At the same time, the region has many historically conditioned structural problems that hinder its development. It is also strongly determined by the interaction with sub-regional growth centers such as Krakow and Warsaw. Therefore, it is an interesting region to study competitiveness.

In order to measure the competitive position we used the model of competitiveness developed by J. Strojny[4]. For its construction the AHP method was used. Then, on the basis of collected statistical variables, a comparative analysis between Podkarpackie and other regions was carried out. Both the zero-unitarisation method and single-based indices were applied.

**Keywords**: region, regional competitiveness, comparative analysis, AHP

## 1. INTRODUCTION

Competition and the competitiveness of regions is a very widely studied issue in the social sciences, especially in economics and management. The globalizing economy creates new background for all types of organisations to function in. The role of those institutions managing the development of territorial units, including the broadly defined public administration, has also changed. Nowadays, they are responsible for undertaking such

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[4] The Region's Competitiveness Model was presented for the first time during the *International Scientific conference "Economics and Management, ICEM" 2015* in the paper titled: *Implementation of the AHP and benchmarking in Strategic Analysis of Polish Regions.*

actions that will be sustainable in the long-term development of economic systems. In the case of Poland, the following dimensions of such management can be distinguished: (1) international (European Union), (2) national, (3) regional[5], (4) local (districts[6] and municipalities).

The terms of a development policy and its effectiveness at each of these levels of management depends largely on the competitive position of a territorial system. the question remains, of course, as to how to describe the level of competitiveness, as well as how to measure it. The answer to this question is so important that only those areas of the organization or its environment that are a subject to some degree of quantification can be managed. Researchers refer to this issue in various ways. Some focus on the mechanisms of capital flows, their efficiency and their effects on economic growth. Others define multidimensional endogenous potential models and prove their relationship with the wider development process. Still others point to the existence of certain commodity markets, where competing entities are localized in different areas (e.g. cities, regions, countries). Finally, there are concepts relating to two different phenomena, such as convergence and concentration of capital. The mentioned approaches can also be applied to the phenomenon of competition of territorial units.

This article attempts to define and measure competitive position by comparing a group of units in Poland on a regional level. The study was based on the example of one of the voivodships (regional level territory) in relation to the chosen other regions which were treated as benchmarks. In the analysis, we selected the following regions: Mazowieckie, Małopolskie, Lubelskie, Podlaskie and the Zachodniopomorskie. The first two regions were selected because they encompass strong growth centers (Warsaw in Mazowieckie, and Krakow in Małopolskie), which forcefully affect the studied region in many areas of competition. Like Podkarpackie, the other three regions are faced with important structural and developmental problems, hence their role as points of reference. The study posed the following research question: *What are the trends in the competitive position of Podkarpackie compared to the selected regions (benchmarks)?*

Responding to this question, the Region's Competitiveness Model (RCM) included three dimensions: (1) competitiveness with respect to the citizen, (2) competitiveness with respect to companies, and (3) competitiveness with respect to tourists. The general index of competitiveness along with the indices of competitiveness for each of mentioned dimensions were calculated. During the phase in which the model was created and the significance of its elements was measured, the AHP method was used.[7] In essence this means that experts estimate the weights of the variables. In the comparative analysis phase, both the zero-unitarisation method and single-based indices are used. Thanks to the first tool, standardized variables to measure the competitive position on each level of the presented model were achieved. In turn, single-based indices were used in order to show the dynamics of changes in competitiveness level during the analyzed period.

[5] In Poland this level of territorial unit is called voivodship.

[6] In Poland this level of territorial unit is called poviat.

[7] Analytic Hierarchy Process.

## 2. COMPETITIVENESS OF THE REGIONS – LITERATURE REVIEW

The concept of a 'region' is defined in many different ways in the literature. Isolating the region in economic terms should take into account that it "is an area delimited on the basis of the entire collection of interrelated economic phenomena"[8]. It is therefore "a composite part of a larger economic and social space, which differs from other surrounding territories in economic, social, demographic, cultural, natural, and infrastructure systems connected by material and informational relations"[9] The elements that make up the region "are linked with each other and with the natural environment by relationships of coexistence and interdependence, and with the external environment – by the relationship of interdependence with a high intensity"[10]. For the purposes of this study, the concept of the region understood as a voivodship was identified. This is the administrative unit in Poland separated at the regional level (NUTS2[11]). In regional analyses in Poland the voivodship is mostly used as the territorial unit.[12] It is therefore constituted as the "basic unit of structuring and organizing of the socioeconomic reality of the country"[13].

The issue of regional competitiveness can be analyzed from the perspective of economic growth theory, of new economic geography and of course of contemporary theories of regional development. The concept of competition is often interpreted in the context of marketing, and therefore as the fight for customers on some kind of market[14]. Competition can be also identified with the characteristics of an entity (e.g. the region), determining its ability to compete[15]. The literature often mentions the properties of a competitive region, such as the ability to[16]: (1) seize opportunities in an environment, (2) maintain a competitive advantage in terms of overall development processes, (3) build an environment which is conducive to innovation, (4) create a climate for entrepreneurship. The article assumes that the *competitiveness of the region is synonymous with its ability to attract mobile capital and tourists to its territory and, upon this basis, to generate the processes of socioeconomic development and economic growth*[17].

The concepts aimed at clarifying both the competitiveness of the region and the factors affecting it fit mainly under the theory of regional development. To some extent, its foundations can be sought in new economic growth theory. Its basis is found in the models of

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[8] A. Wróbel, *Pojęcie regionu ekonomicznego a teoria geografii*, PWN, Warszawa 1965, p. 19.

[9] V. Snieška, J. Bruneckienė, *Measurement of Lithuanian regions by regional competitiveness index*, Inzinerine Ekonomika-Engineering Economics 1/61 (2009), p. 46.

[10] R. Domański, *Kształtowanie otwartych regionów ekonomicznych*, PWE, Warszawa 1972, s. 7.

[11] NUTS – Nomenclature of Territorial Units for Statistics

[12] *Słownik podstawowych terminów samorządu terytorialnego*, ed. M. Lisiński, Wyższa Szkoła Biznesu w Dąbrowie Górniczej, Dąbrowa Górnicza 2007, p. 101.

[13] T. Czyż, *Zastosowanie modelu potencjału w analizie zróżnicowania regionalnego Polski*, "Studia Regionalne i Lokalne" 2002/2–3, p. 5.

[14] More: M.J. Stankiewicz, *Konkurencyjność przedsiębiorstw. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*, Dom Organizatora TNOiK, Toruń 2002.

[15] More: M. Gorynia, B. Jankowska, *Klastry a międzynarodowa konkurencyjność i internacjonalizacja przedsiębiorstwa*, Warszawa, Difin 2008.

[16] More: M. Lisiński, *op. cit*.

[17] This concept of the regional competitiveness was presented for the first time by J. Strojny in the paper *Implementation of the AHP and benchmarking in Strategic Analysis of Polish Regions* during the International Scientific Conference "Economics and Management, ICEM 2015".

economic growth presented by P.M. Romer[18] and R.E. Lucas[19], who assumed that the ability to generate production in a region stems from the possibility of accumulating capital (human and material), as well as from the technological potential installed there. Both here and in the other models, (e.g. S. Rebelo[20], Ph. Aghion and P. Howitt[21], or O. Galor i D.N. Weil[22]), it is assumed that the endogenous potential has an impact on the volume of production. The main questions in building the basis for the competitiveness are therefore: (1) how can internal resources be developed? and (2) how can internal resources be made more efficient in economic processes?

The key issue in relation to building the region's competitiveness then becomes to achieve a high capital accumulation. In regions that have reached such a state, the level of production and general development are at a high level. This is the basis of the polarization of regions and the formation of highly developed metropolitan systems around big cities. The ability to attract human and material capital makes them growth centers, strongly influencing the environment inside the region, or even beyond it. These phenomena are explained by a number of concepts, such as *Growth Poles* (F. Perroux[23]) or concepts by A.O. Hirschman[24], J. Friedmann[25], and M. Castells[26]. They point to the development of growth centers, which lead to increased disparities in terms of development between regions.

Of course, there is a capital flow between regions. This phenomena concerns both material and human capital. In the first case, there are observed processes of transferring the investment, whereas in the second case, a very significant process of migration can be identified. Flows from the less developed regions to the leading regions often relate to human capital. They cause the divergence phenomenon, and therefore a growing polarization between regions. Flows in the opposite direction are related to material capital (technology) and can therefore accelerate capital accumulation. Thanks to this, less developed regions may begin a path of faster economic growth, and therefore reduce the development gap between them and the leading regions. This phenomenon is known as convergence, thus reducing the variation between regions at the level of socioeconomic development[27].

Flows and capital accumulation positively affect the region's competitiveness in the markets of goods. Today, regional development theories are also very popular, these ex-

[18] More: P.M. Romer, *The Origins of Endogenous Growth*, "Journal of Economic Perspectives" 1994/8, p. 3–22.

[19] More: R.E. Lucas, *On the Mechanics of Economic Development*, "Journal of Monetary Economics" 1988/22, p. 3–42.

[20] More: S. Rabelo, *Long-Run Policy Analysis and Long-Run Growth*, "Journal of Political Economy" 1991/99, p. 500–521.

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[22] More: O. Galor, D.N. Weil, *Population, Technology and Growth*, "American Economic Review" 90/4 (2000), p. 806–828.

[23] More: F. Perroux, *Economic space: theory and applications*, "The Quarterly Journal of Economics" 1950, p. 89–104.

[24] More: A.O. Hirschman, *The strategy of economic development*, Yale University Press, New Haven 1958/58.

[25] More: J. Friedmann, *The world city hypothesis*, "Development and change" 17/1 (1986), p. 69–83.

[26] More: M. Castells, *The Rise of Network Society*, Blackwell Publishers, Oxford 1996.

[27] More: H. Linnemann, J.P. Pronk, J. Tinbergen, *Convergence of economic systems in East and West*, Netherlands Economic Institute, Rotterdam 1965; P. Wójcik, *Dywergencja czy konwergencja: dynamika rozwoju polskich regionów*, "Studia regionalne i lokalne" 32/2 (2008), p. 41–60.

plaining the process of building a competitive advantage based on endogenous capacity to export (for more, see *Staple Theory* by H.A. Innis, D. Drache[28] or *New Trade Theory* by Krugman[29]). From this perspective, the region's competitiveness is built on the efficiency and productivity potential of the enterprises located there. This perspective is presented in M.E. Porter's concept of the competitiveness of nations[30].

Today, the possibilities to export in the broader context (building a competitive advantage in the region) mainly depend on the possibilities of accumulation of human capital and resource of knowledge as a consequence of it. This aspect is also taken into account in contemporary theories, referring both to learning mechanisms in the region (*The Learning Region* by R. Florida[31]), as well as its ability to develop a high specialization in some areas of competences (*Smart Specialization*)[32]. Nowadays a very popular in both, developed and emerging regions is the cluster concept. It creates a kind of entrepreneurial base for development and learning processes[33]. It is also an essential factor in determining the competitiveness of the region.

## 3. MODEL OF THE COMPETITIVENES AND METHODOLOGY OF ITS INVESTIGATION

The aim of the study is to identify the level of competitiveness of the Podkarpackie region of Eastern Poland compared to other selected Polish regions. The main research question is as follows: **GRQ: What are the trends in the competitive position of Podkarpackie compared to the selected benchmark regions?** To cover this question in further detail, a bundle of specific questions was prepared, as follows: DQ1)how can competitiveness be described and measured? DQ2)how is the competitiveness of Podkarpackie region shaped in terms of the factors that most adversely affect its competitive position? DQ3)how is the competitiveness of Podkarpackie shaped in relation to other regions with the systemic problems of development? DG4) which trends can be identified in terms of the competitiveness of Podkarpackie? Compared to other regions, is Podkarpackie improving, or losing, its competitive advantage?

The competitive model used in the study is an operationalization of the definition of competitiveness presented above (Figure 1). It was built in a hierarchical structure in which the competitiveness of the region ($C$) is composed of three dimensions in relation to three separate groups of clients ($C_i$): (1) tourists ($C_t$), (2) citizens ($C_c$), and (3) business ($C_b$). For each of these dimensions, four variables ($C_i n$) were assigned, demonstrating the interest of individual customers in the specific region. In the construction of the model,

[28] More: H.A. Innis, D. Drache, *Staples, markets, and cultural change: Selected essays*, McGill-Queen's Press-MQUP, Montreal 1995.

[29] More: P. Krugman, *Does the new trade theory require a new trade policy?*, "The World Economy" 15/4 (1992), p. 423–442.

[30] More: M.E. Porter, *Konkurencyjna przewaga narodów*, Polskie Wydawnictwo Ekonomiczne, Warszawa 1990.

[31] More: R. Florida, *The Learning Region*, [in:] *Regional Innovation, Knowledge and Global Change*, ed. Z.J. Acs, Pinter, New York 2000, p. 231–244.

[32] Ph. McCann, R. Ortega-Argilés, *Smart specialization, regional growth and applications to European union cohesion policy*, "Regional Studies" 2013, p. 1–12

[33] More: P. Dubini, *The influence of motivations and environment on business start-ups: some hints for public policies*, "Journal of Business Venturing" 1989/4, p.11–26.

the method of AHP (*Analytic Hierarchy Process*) was used[34]. It has been created by T.L. Saaty in the 70s of the last century[35] and is used for multi-criteria preference analysis. During the study, in addition to construction of the model, this method was used to ascertain the weights of single elements of the model. Therefore, the weights of dimensions of competitiveness ($w_i$) and the variables describing these dimensions ($w_in$) were identified, on the basis of assessments[36] by comparing pairs of variables within each dimension of the competitiveness and then comparing between different dimensions of competitiveness. Saaty's nine-point scale was used to provide these comparisons[37].

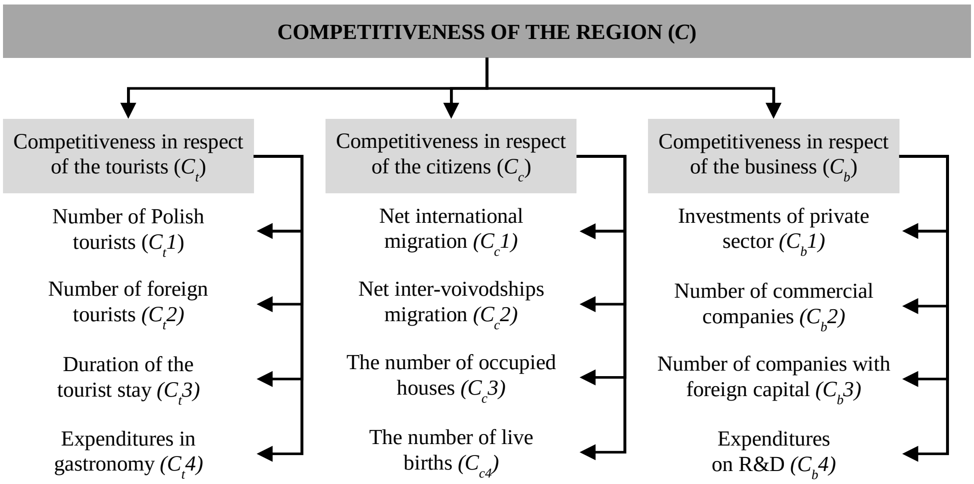


Figure 1. Region's Competitiveness Model (RCM) by J. Strojny.

Source: Own study.

In order to obtain measures of competitiveness, a mechanism of standardization and aggregation was used. In which the zero-unitarisation method was used to convert all variables to a form in which their value is in the range: $C_in \in \langle 0.00;1.00 \rangle$. In subsequent years of the time series, the variables describing all Polish regions were compared. The best region in comparing group (in Poland) obtains the value of $C_in = 1$, and the worst – $C_in = 0$. By converting variables into a comparable form, it was possible to construct indicators for dimensions of competitiveness (Formula 1) as well as the general index of competitiveness (Formula 2). The weighted means were used here, and the weight was calculated on the basis of judgements provided during AHP comparison analysis.

[34] More: A. Prusak, J. Strojny, P. Stefanów, *Analityczny Proces Hierarchiczny (AHP) na skróty – kluczowe pojęcia i literatura*, „Humanities and Social Sciences" 2014/4, p. 179–192.

[35] More: T.L. Saaty, *How to make a decision: the analytic hierarchy process*, "European Journal of Operational Research" 48/1 (1990), p. 9–26.

[36] Judgements were made by experts from Department of Economics in Faculty of Management in Rzeszow University of Technology.

[37] More: A. Prusak, P. Stefanów, *AHP – analityczny proces hierarchiczny*, CH Beck, Warszawa 2014.

$$C_i = \sum_{i=1}^{n} C_i n \cdot w_i n \quad (1)$$

$$C = \sum_{i=1}^{n} C_i \cdot w_i \quad (2)$$

Thus constructed, the set of measures, consisting of 16 standardized variables, three dimensional indicators of competitiveness and one general indicator of competitiveness, were subjected to further analysis. In this step, single-based indices ($S_i$) were constructed, using 1999 as a base year (Formula 3). They allow the evaluation of changes of any meter indicator in an individual year with respect to the beginning of the researched period.

$$S_i = \frac{V_i}{V_b} \cdot 100\% \quad (3)$$

where:

$S_i$ - value of single-based index in *i* year,
$V_i$ - value of variable in *i* year (e.g. $C_i n$, $C_i$ lub *C*),
$V_b$ - value of variable in base year (in research: 1999).

Furthermore, the competitive gap values ($CG_i x/y$) were analyzed. They were calculated as the difference between the values of the same measure in two different regions in a given year (Formula 4).

$$CG_i x/y = V_i x - V_i y \quad (4)$$

where:

$CG_i x/y$ - value of competitiveness gap in *i* year for *x* region regarding to the *y* region,
$V_i x$ - value of variable in *i* year (e.g. $C_i n$, $C_i$ lub *C*) in *x* region,
$V_i y$ - value of variable in *i* year (e.g. $C_i n$, $C_i$ lub *C*) in *y* region.

The scheme of research described below was used to analyze the situation of Podkarpackie in comparison with the other selected Polish regions. As benchmarks, two groups of regions were selected – rapidly developing voivodships with large growth centers, and regions with structural development problems. The first group comprises Mazowieckie and Małopolskie, these being regions which directly threaten Podkarpackie on each of the analyzed markets. They strongly determine the competitiveness regarding to the citizens, as they attract young people. The second group consists of two regions of Eastern Poland, namely Lubelskie and Podlaskie. Like Podkarpackie, they lie on the eastern Polish border, and for a long period they also had comparable levels of competitiveness to that of Podkarpackie. Another peripheral region – Zachodniopomorskie – was also added to this group. For many years, this region has been struggling with development problems that hinder not only the increase, but even maintenance of the level of competitiveness.

## 4. ANALYSIS OF THE COMPETITIVENESS OF PODKARPACKIE REGION WITH RESPECT TO CHOSEN BENCHMARKS

Detailed results of the analysis of the competitiveness of Podkarpackie using the Regional Competitiveness Model are shown in Table 1. It comprises the values of the general indicator (*C*), indicators counted for the individual dimensions of competitiveness ($C_i$) and the variables that describe the dimensions ($C_i n$). Table 1 also presents the so-called local weights, calculated on the basis of the AHP method for dimensions of competitiveness ($w_i$) and variable ($w_in$).

Table 1. Results of the competitiveness analysis of Podkarpackie region in 2013.

| **Indexes of competitiveness** | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***C*** | | ***$C_t$*** | ***$w_t$*** | ***$C_c$*** | ***$w_c$*** | ***$C_b$*** | ***$w_b$*** |
| 0.33 | | 0.15 | 0.16 | 0.48 | 0.28 | 0.31 | 0.56 |
| **Variables for $C_t$** | | | | | | | |
| ***$C_t1$*** | ***$w_t1$*** | ***$C_t2$*** | ***$w_t2$*** | **Ct3** | ***$w_t3$*** | ***$C_t4$*** | ***$w_t4$*** |
| 0.20 | 0.13 | 0.06 | 0.28 | 0.33 | 0.30 | 0.03 | 0.29 |
| **Variables for $C_c$** | | | | | | | |
| ***$C_c1$*** | ***$w_c1$*** | ***$C_c2$*** | ***$w_c2$*** | ***$C_c3$*** | ***$w_c3$*** | ***$C_c4$*** | ***$w_c4$*** |
| 0.85 | 0.19 | 0.25 | 0.16 | 0.00 | 0.18 | 0.58 | 0.47 |
| **Variables for $C_b$** | | | | | | | |
| ***$C_b1$*** | ***$w_b1$*** | ***$C_b2$*** | ***$w_b2$*** | ***$C_b3$*** | ***$w_b3$*** | ***$C_b4$*** | ***$w_b4$*** |
| 0.78 | 0.10 | 0.00 | 0.21 | 0.03 | 0.32 | 0.59 | 0.37 |

Source: Own study.

The comparative analysis of the Podkarpackie region is presented in three steps: (1) analysis of competitive position, (2) analysis of the dynamics of change of competitive position, (3) competitive gap analysis. In each of these cases, the same time series was used, covering the period 1999-2013. Due to the limited length of the paper, the analysis was performed at the level of the general competitiveness index (*C*).

Turning to the first of these dimensions of analysis, it should be noted that the value of the competitive position (*C*) for Podkarpackie calculated for 2013 is 0.33, which means that it is in 8th position among the ranking of competitiveness of all Polish regions. The most competitive is Mazowieckie voivodship ($C = 0.94$). This region has built up a large and constantly growing positive competitive gap in relation to all other regions in the country. It alone creates a separate category both in terms of the dynamics of development and growth processes, and in the area of competitive position.

Other regions in the ranking are at much lower levels. The competitive position of regions: Małopolskie, Pomorskie, Dolnośląskie and Wielkopolskie, values between $C \in \langle 0.40;0.50)$. Podkarpackie belongs to a group of competitiveness within the range of values *C*□□0.30;0.40) which also includes Zachodniopomorskie, Śląskie and Łódzkie. The other regions of Eastern Poland acquire a *C* index value slightly above 0.20 (Lubelskie), or in the range to 0.2 (Podlaskie, Świętokrzyskie and Warmińsko-Mazurskie). Changes in the competitiveness index for Podkarpackie and the benchmarks included in this study are shown in Figure 2.

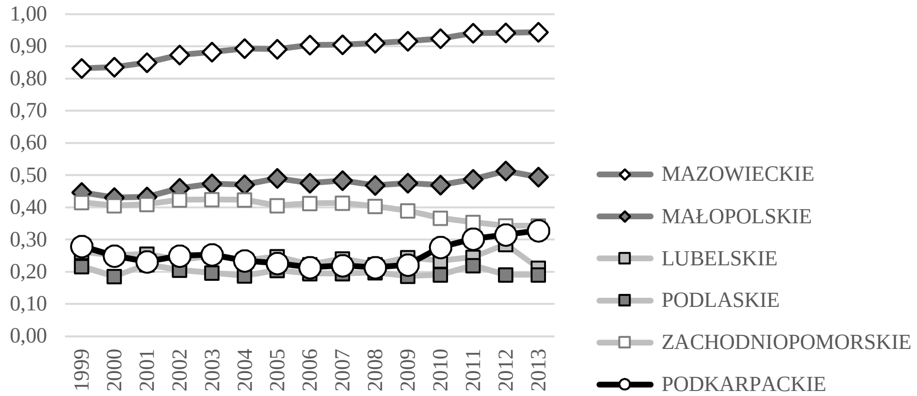


Figure 2. General competitiveness index (*C*) – Podkarpackie in respect to the benchmarks (1999-2013).

Source: Own study based on GUS.

In order to clarify the current situation of Podkarpackie, one should refer to the dynamics of change of the indicator *C*, illustrated by single-based indices, with the base year 1999 (Figure 3). After Polish accession to the EU, Podkarpackie steadily lost its competitiveness. Then, from 2006-2009 there was a relative stabilization of the situation. The turning point was then the crisis period (2009-2013), when there was a significant increase in competitiveness compared to the other Polish regions, especially those with weaker fundamentals of development (e.g. other regions of Eastern Poland). Podkarpackie mainly owes it to the growing attractiveness in relation to companies. They increase their commitment in the region, intensifying R&D activity. This is a good foundation for the further development of an analysed region. It is worth noting that during the researched period, the competitiveness of the voivodships Małopolskie and Mazowieckie systematically increased. In contrast, Zachodniopomorskie has systematically lost competitiveness since accession to the EU.

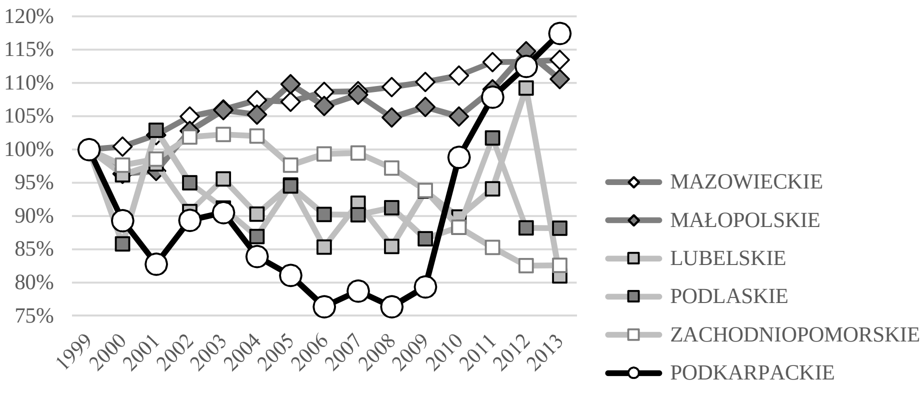


Figure 3. Changes of the general competitiveness index (C) regarding to base year 1999 r. – Podkarpackie with respect to the benchmarks.

Source: Own study based on GUS.

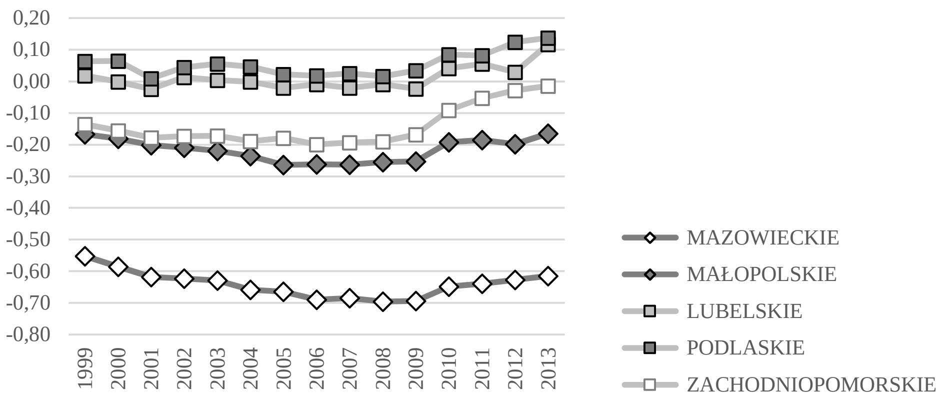


Figure 4. Competitive gap – Podkarpackie with respect to the benchmarks.

Source: Own study based on GUS.

Podkarpackie enjoys strong, positive dynamics which have a favorable effect on its competitiveness as compared to the benchmarks. Currently, in respect to the comparable regions of Eastern Poland (Lubelskie and Podlaskie), this competitive gap amounts up to approx. 0.10. The competitive gap between Podkarpackie and Zachodniopomorskie was also decreased, although in 1999, it was up to -0.14, and in 2006 it was at a level of -0.20. Małopolskie region still maintains a significant competitive advantage over Podkarpackie. In 2013, the competitive gap was in fact -0.17. In the last few years, however, it has been significantly reduced. In the years 2005-2009 it amounted to as much as -0.25. Since 2009, Podkarpackie has also regularly caught up on the competitive gap with respect to Mazowiecki. Currently it amounts to -0.62, while in 2009 it amounted to -0.69.

## 5. CONCLUSIONS

To conclude the presented research, it should be stated that in the field of phenomena covered by the Regional Model of Competitiveness, Podkarpackie has one of the largest dynamics of positive change in the country. In this respect, it stands out among other regions of Eastern Poland. The *smart specialization* strategy it has applied gives results primarily in the area of competitiveness relative to companies. Particularly noteworthy is the high activity of the private sector in terms of investment in R&D. The foundations of this change are both historically conditioned traditions of the aviation industry and the current policy aimed at building a favorable environment for enterprises. The main structural problem is a drastically declining competitiveness in terms of its citizens, and above all, the threat of migration to large cities like Warsaw or Krakow.

It is hard to prejudge to what extent the currently observed, dynamic changes in competitiveness are likely to continue in the coming years. Certainly, Podkarpackie can be seen as a model for the other regions of Eastern Poland, or other less developed voivodships, such as Opolskie or even Zachodniopomorskie. Podkarpackie, by obtaining the previous high rate of growth in competitiveness, has a chance to achieve levels comparable with the Małopolskie within the next 10-15 years. However, it will require to meet two basic conditions: (1) a further increase in the investment attractiveness for enterprises and

(2) stop the negative trends of competitiveness in relation to its citizens. For this purpose, it is necessary to further develop the function of the regional growth center of the city of Rzeszów, which is the capital of Podkarpackie region. Infrastructure projects which are currently implemented around the city allow the preparation of significant investment areas. Other projects generating business-friendly environment also create such an opportunity. Gradual improvements in the attractiveness of the regional labor market also represent a chance to increase the region's attractiveness to young people, thereby increasing human capital.

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[28] Wróbel A., *Pojęcie regionu ekonomicznego a teoria geografii*, PWN, Warszawa 1965.

## KONKURENCYJNOŚĆ PODKARPACIA – ANALIZA PORÓWNAWCZA WZGLĘDEM WYBRANYCH BENCHMARKÓW

Konkurencyjność regionów to zjawisko, które na stałe wpisało się w proces zarządzania rozwojem społeczno-gospodarczym systemów gospodarczych. Instytucje administracji publicznej na każdym poziomie muszą uwzględniać ten aspekt, kształtując politykę interwencji strategicznej. W niniejszym artykule skupiono się na wymiarze regionalnym, który jest podstawowy dla polityki spójności i rozwoju w Unii Europejskiej. Skuteczne zarządzanie rozwojem wymaga jednak odpowiedniego zdefiniowania konkurencyjności jako zjawiska, a co za tym idzie – także pomiaru jej stanu, luki konkurencyjnej oraz obserwowanych tendencji w tym zakresie. Niniejszy artykuł jest próbą przeprowadzenia całego procesu analizy konkurencyjności dla jednego z regionów Polski Wschodniej (województwo podkarpackie).

Celem artykułu jest identyfikacja pozycji konkurencyjnej badanego regionu oraz tendencji w tym zakresie w kontekście wybranych benchmarków, czyli regionów porównawczych. Podkarpackie jako jedyny region Polski Wschodniej zbudował aktualnie czytelną i opartą na innowacyjności politykę rozwoju. Oparł się przy tym na filozofii *smart specialization*, która jest kluczowa dla budowania pozycji konkurencyjnej. Jednocześnie region ten ma wiele historycznie uwarunkowanych problemów strukturalnych, które hamują jego rozwój. Jest także mocno determinowany przez oddziaływanie ponadregionalnych centrów wzrostu, takich jak Kraków i Warszawa. Dlatego też jest to ciekawy przykład badawczy w kontekście zagadnienia konkurencyjności.

W artykule wykorzystano model konkurencyjności autorstwa Jacka Strojnego w celu pomiaru pozycji konkurencyjnej. Do jego budowy wykorzystano metodę AHP. Następnie na podstawie zgromadzonych zmiennych statystycznych dokonano analizy porównawczej Podkarpacia względem wybranych regionów, wykorzystując metodę unitaryzacji zerowanej oraz indeksy jednopodstawowe.

**Słowa kluczowe**: region, konkurencyjność regionu, analiza porównawcza, AHP.

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# BUILDING RELATIONSHIP BETWEEN OEM CUSTOMERS AND SUPPLIERS IN PRODUCT INNOVATION DEVELOPMENT PROCESSES IN B2B MARKET

The main focus of this article is to present conditions to build relationships between Original Equipment Manufacturers (OEMs) customers and their suppliers in product innovation development processes in the B2B market. Analysis of literature and numerous observations indicate that the OEM companies developing the concept of product innovation very often also include suppliers in these processes. These processes are related to cooperation in research on new materials and technological solutions, manufacturing processes and product quality assurance. A key element to start cooperation on product innovation is to choose reliable partners. This choice is preceded by a preliminary assessment of suppliers. This is of particular important for the development of new products, which must meet stringent legal requirements regarding specific threats to the safety of users and the environmental protection. Compliance with these requirements is executed through self-assessment questionnaires, auditing and periodic scoring assessment of the suppliers. It should also be noted that the companies that are the buyers in the B2B market are not limited to impose stringent requirements to suppliers. Many OEMs driving to ensure high quality of purchased materials offer special programs to support their suppliers. Through these programs suppliers are provided with support through training and counseling. The results of these programs help ensure product safety and reduce costs jointly by the partners. This permits the transfer of new product concept in the supply chain.

**Keywords:** relationship marketing, supply chain management, product innovation, business-to-business

## 1. INTRODUCTION

Many Original Equipment Manufacturers (OEMs) concentrate on the selection of key suppliers, shaping long-term relations with them based on the advancement of the technical quality of product solutions. Significant conditions shaping this partnership are the speed of information exchange and individualization of approach, e.g. by means of offering a wider range of services utilising the supplier and getting involved in joint research and development of new products. The process of building relationships with suppliers can be summarized in ten phases. These are:

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Setting the expectations and requirements for suppliers in terms of technical quality and service (before and after sale, frequency of orders, organizational systems (implementation of quality management standards, technical and technological capabilities as well as financial conditions;
Identification of potential suppliers;
Assessment of potential suppliers (through self-assessment questionnaires, analysis of submitted bids, auditing factories owned by providers);
Supplier classifications;
Negotiating the terms of deliveries with supplier;
Choice of supplier;
Contract agreement;
The ordering (establishing order, handling order);
Performance of the contract realization (including the transmission of orders, deliveries and monitoring purchasing process documentation);
Evaluation of co-operation and development of partnerships, including regular rating of suppliers (through the scoring or indicators), assessing the impact of cooperation with the supplier to improve the efficiency of processes in the supply chain (design, purchasing, warehousing, manufacturing, maintenance, environmental and safety management, compliance with best practices in the field of ethical conduct).
A partnership comprises a process in which the customer and the supplier gradually build strong and extensive social, economic and technical relationships. Creating partnerships usually results from some kind of evolution beginning with repeated transactions based on loyalty to the source of purchase and on confidence related to the positive image of a particular partner. Repeated transactions often transform into long-term connections in which relations are regulated by agreements. If the parties are happy with keeping to the arrangements set out in the agreements, their cooperation may transform into a close partnership[2]. This may generate lots of benefits for the partners and these are: improved quality of products and services, prompter of orders, preferential prices, improved communication between the supplier and the recipient (quicker and more complete exchange of information), joint research and development[3]. The benefits enhance the positive images of the partners. In some cases, a partnership between the supplier and the customer may transform into a strategic alliance which is based on joint achievement of specific long-term objectives**.**

## 2. THE ROLE OF SUPPLIER IN NEW PRODUCT DEVELOPMENT

Product innovation development processes have very often the form of projects that focus on introducing new or improving the quality of existing products[4]. Wheelwright and Clark have identified four types of projects related to the development of product innovations:

[2] S.M. Wagner, *Supplier development and the relationship life-cycle*, "International Journal of Production Economics" 129/2 (2011), p. 277–283.

[3] M. Beverland, A. Lindgreen, *Relationship use and market dynamism: A model of relationship evaluation*, "Journal of Marketing Management" 20/7–8 (2004), p. 825–858.

[4] Z. Ge, Q. Hu, Y. Xia, *Firm's R&D cooperation behavior in supply chain*, "Production and operations management" 23/4 (2014), p. 599–609.

Incremental improvement projects which focus on the development of technical quality of products (to improve the mechanical properties, reducing energy consumption) and/ or processes (manufacturing cost reduction by increasing efficiency);
Platform projects, aimed at creating a new model (the model of the product or part thereof) which entail a change in the manufacturing process;
Breakthrough projects whose aim is to develop new products (with new qualitative characteristics) and new processes related to their production, radically different from the previous generation of products;
Research and development projects, focused on creating knowledge on new materials and new technology that may be subject to commercialization[5].
The concept of the new products often begins the so-called basic research (pure research), focusing on identifying characteristics of the product (its composition and basic functions. These research activities include defining and establishing the basic technical characteristics of the components of a product (the characteristics of components). Applied research is related to the transformation of knowledge concerning the characteristics of the product and manufacturing technology policy solutions aiming to adapt the product to meet the needs of users .In many organizations, both at the stage of basic research and applied research there is a need to find potential qualified suppliers in the field of new materials and technology (such as infrastructure). Such providers should comply with the requirements in terms of technical quality (ensure safety of the products) research and development potential, technological capacity as well as financial stability[6]. Successful product innovations, especially in the case of the high-tech sector are very often conditioned by the quality of the cooperation between OEMs and suppliers in the processes of research and development[7]. For this reason, many companies switched their partners to the initial stages of product design processes[8]. Early suppliers' involvement in R & D activities can build stronger partnerships. These relations should be based on mutual trust and seeking common limiting the risks associated with new product quality assurance. This cooperation also permits partners to shorten conducted R & D processes and reduce the costs of these activities. Early supplier Involvement also allows to jointly develop

[5] S.C. Wheelwright, K.B. Clark, *Creating product plans to focus product development*, "Harvard Business Review" 1992/70, p. 70–82.

[6] M. Song, C.A. Di Benedetto, *Supplier's involvement and success of radical new product development in new ventures*, "Journal of Operations Management" 26/1 (2008), p. 1–22; A. Ekici, *An improved model for supplier selection under capacity constraint and multiple criteria*, "International Journal of Production Economics" 141/2 (2013), p. 574–581.

[7] F. Wynstra, A. van Weele, M. Weggemann, *Managing supplier involvement in product development: Three critical issues*, "European Management Journal" 19/2 (2001), p. 157–167; A. Walter, *Relationship-Specific Factors Influencing Supplier Involvement in Customer New Product Development*, "The Journal of Supply Chain Management" 39/4 (2003); M. Hoegl, S.M. Wagner, *Buyer-supplier collaboration in Product Development Project*, "Journal of Management" 31/4 (2005), p. 530–548; S.M. Wagner, *Tapping supplier innovation*, "Journal of Supply Chain Management" 48/2 (2012), p. 37–52, 4–15; J. Ylimäki, *A dynamic model of supplier–customer product development collaboration strategies*, "Industrial Marketing Management" 2014/43, p. 996–1004.

[8] R. McIvor, P. Humphreys, T. Cadden, *Supplier involvement in product development in the electronics industry: A case study*, "Journal of Engineering and Technology Management" 23/4 (2006), p. 374–397; L. Melander, *Buyer-Supplier Collaboration in New Product Development Between Two Equally Powerful Firms: A Case Study of ABB and SKF*, "Operations and Supply Chain Management" 7/3 (2014), p. 107–113.

not only the innovative potential of the partners but also their organizational capacity by improving the efficiency of processes[9].

## 3. THE REQUIREMENTS FOR SUPPLIERS

The choice of a new supplier is preceded by a preliminary assessment qualification which is carried out by: filling in self-assessment questionnaires by suppliers, audits, order a trial party, collection and analysis of bids, and reference visits. Especially important source of information are the results of self-assessment and audits of suppliers that allow you to obtain information concerning:

Implemented technologies (related to the manufacturing process, operation of computerized processes);

Control the infrastructure;

Identification of processes and products,

Systems of measuring and monitoring the quality of products (materials, semi-finished products, finished products);

Innovative capability (research and development, the adaptability of new technologies, the efficiency of the implementation process innovations contribute to costs decreasing);

Implemented and integrated (quality, environmental and safety) management systems and other operational improvement tools (like Toyota Production System, Lean Management) which allow the supplier to ensure organizational efficiency[10].

Increasingly, companies are developing multi-criteria evaluation systems of suppliers, in which the main criteria are: high level of technical quality (documented by product certificates), technical and organizational capacity of the supplier, price, timeliness and flexibility of supply, the provision of pre-sales services (design solutions, technical advice) and after-sales services (delivery, installation, technical service, repair and maintenance, training and counseling), financial position, ethics, forms of communication with customers[11].

Numerous OEM companies (that belong to the high-tech products sector) qualifying new partners for cooperation in product innovation development processes require from their suppliers the use of:

Detailed process maps (taking into account control points, process changeability, responsibility);

FMEA for products and processes (taking into account control plans, flow diagrams and defining critical parameters);

Cost analysis concerning quality and evaluations of process effectiveness;

Statistical process control (e.g. evaluation of process capability and reaching the coefficient level of Cpk > 2.0);

[9] Th. E. Johnsen, *Supplier involvement in new product development and innovation: Taking stock and looking to the future*, "Journal of Purchasing and Supply Management", 15/3 (2009), p. 187–197.

[10] A Hosseininasab, A. Ahmadi, *Selecting a supplier portfolio with value, development, and risk consideration*, "European Journal of Operational Research" 245/1 (2015), p. 146–156; Ch.-Y. Shen, K.-T. Yu, *Enhancing the efficacy of supplier selection decision-making on the initial stage of new product development: A hybrid fuzzy approach considering the strategic and operational factors simultaneously*, "Expert Systems with Applications" 36/8 (2009), p. 11271–11281.

[11] M. Zolghadri, C. Eckert, S. Zouggar, Ph. Girard, *Power-based supplier selection in product development projects*, "Computers in Industry" 62/5 (2011), p. 487–500.

First Part Approval;
MSA - Measurement System Analysis;
Designing experiments;
Robust design methodology;
Calculating efficiency coefficients concerning the equipment and the time of reacting in case of breakdowns;
AQAP (Advanced Product Quality Planning);
PPAP (Production Part Approval Process), and CAP (Customer Approval Package).

The high-tech sector companies may also require that the suppliers apply the specific industry standards e.g. ISO/TS 16949 in motorization sector, ISO 13485 in medical equipment industry, AS 9100 in the aircraft industry and TL 9000 in telecommunication sector. The implementation of those systems should be confirmed by appropriate certificates

## 4. COOPERATION WITH SUPPLIERS IN DEVELOPING TECHNICAL DOCUMENTATION OF PRODUCTS AND TESTING PROTOTYPES

In the design phase the technical quality is defined by the product documentation which includes a description of the components of the product and the list of processes associated with the product realization (processing, assembly, packaging, delivery, installation at the customers), the list of elements of the infrastructure which is essential for these processes. In the case of new products, to develop this documentation, OEMs engages suppliers in the form of cooperating cross-functional teams, which are composed of representatives of various departments of the partners[12]. In these teams the specialist of research and development, production, maintenance, quality control, purchasing, marketing and service departments are involved. Product documentation detailed defines the composition, size (dimensions), shape and components of new product.

A jointly developed by partners description of the product is often a future specification for the supplier[13]. Evidence of compliance with the specifications is the First Piece Qualification (FPQ), which was confirmed by documented test results, inspection and certification of the product. On the basis of the technical documentation are designed the prototypes of new products, which are subjected to laboratory testing and production. Prototype testing of new material (alpha testing) by a supplier in cooperation with OEMs includes an assessment of the prototype as well as the manufacturing processes. The purpose of this testing is to optimize the features of the new product to confirm its compliance with the specifications and ensuring security for future users and the environment. By conducting this type of testing one could better meet the requirements of buyers, improve quality parameters to ensure appropriate service and technical advice for the client as well as resolve any significant problems with the operation of the product.

The positive results of this assessment allow prototype testing in independent laboratories (beta testing), which most often in EU countries are Notified Bodies recognized for providing certification, inspection and testing to guarantee product compliance to the defined safety

[12] S.M. Wagner, M. Hoegl, *Involving Suppliers in Product Development: Insights from R&D Directors and Project Managers*, "Industrial Marketing Management" 35/8 (2006), p. 936–943.

[13] Y.-H. Lee, K.-J. Wang, *Performance impact of new product development processes for distinct scenarios under different supplier–manufacturer relationships*, "Mathematics and Computers in Simulation" 82/11 (2012), p. 2096–2108.

regulations with New Approach Standardization[14]. Laboratory tests are mainly related to the control of the mechanical properties of products and their components under simulated extreme conditions of use. Then OEMs and suppliers carry out production tests, which are validation of the product by the manufacturer. The results of the validation can be used to refine the detailed design (change of raw materials, technological solutions) and to improve operational processes (design, manufacture, transport, installation of the product). Participation of suppliers in validation gives an opportunity to improve the quality characteristics of materials and elements of manufacturing infrastructure.[15]

One could also observe that many enterprises use the concept of Design for Manufacturing. They focus on the reducing the costs associated with the production and improve product quality by simplifying design and manufacturing processes (by limiting the number of parts of the product and reduction the use of materials for production)[16].

## 5. LIFE CYCLE ASSESSMENT AND ECODESIGN

More and more multinational companies require their suppliers to reduce the negative impact of products and processes on the environment through implementation of the concept of Life Cycle Assessment (LCA based on ISO series 14040 standards) and EcoDesign approach[17]. This concept focuses on analyzing and reducing the negative impact of each product on the environment in all phases of their life cycle (design, manufacture, distribution, installation, use, maintenance, disposal / destruction through dematerialization), or reuse of materials (recycling). These activities aim at:

Improved material efficiency (by minimizing consumption of materials, use of materials with low impact on the environment, the use of renewable raw materials and / or use of materials recovered);

Improved energy efficiency (by reducing energy consumption, use of energy sources with low impact on the environment, the use of energy from renewable resources);

Designing (products and processes) for cleaner production and safe use of products (through the use of cleaner manufacturing techniques, avoiding the use of hazardous materials);

[14] R.E. Cole, *From Continuous Improvement to Continuous Innovation*, "Total Quality Management" 13/8 (2002), p. 1051–1056; P.A. Cauchick Miguel, *Portfolio Management and New Product Development Implementation-A Case s Study in a Manufacturing Firm*, "International Journal of Quality & Reliability Management" 25/1 (2008), p. 10–23.

[15] Y. He, K.K. Lai, H. Sun, Y. Chen, *The impact of supplier integration on customer integration and new product performance: The mediating role of manufacturing flexibility under trust theory*, "International Journal of Production Economics" 2014/147**,** p. 260–270.

[16] M.A. Schilling, *Strategic Management of Technological Innovation*, McGraw-Hill Irwin, New York 2005, p. 229; A.K. Kulatunga, N. Karunatilake, N. Weerasinghe, R.K Ihalawatta, *Sustainable Manufacturing based Decision Support model for Product Design and Development Process*, 12th Global Conference on Sustainable Manufacturing**, "**Procedia CIRP" 2015/26, p. 87–92, J. Hartmann, R. Germain, *Understanding the relationships of integration capabilities, ecological product design, and manufacturing performance*, "Journal of Cleaner Production" 2015/92, p. 196–205.

[17] R. Karlsson, C. Luttropp, *Eco -design: What's Happening?*, "Journal of Cleaner Production" 2006/14, p. 1291–1442; T. Sakao, *Quality Engineering for Early Stage of Environmentally Conscious Design*, "The TQM Journal" 21/2 (2009), p. 182–193. F. Brones, M.M. de Carvalho, E. de Senzi Zancul, *Ecodesign in project management: a missing link for the integration of sustainability in product development?*, "Journal of Cleaner Production"2014/80, p. 106–118.

Designing for durability (considering in this respect the length of the operation, maintainability product improvements resulting from the emergence of these technologies);
Designing for reuse of products, recovery and recycling.
Eco-design approach is based on Environmental Effect Analysis (EEA) and takes into account: identification of legal requirements, design planning, conceptual design, construction and evaluation of a prototype, production and packaging).
LCA is a complex process, involving the analysis of the profitability of investment projects with simultaneous emphasis of products on reducing their negative impact on the environment. This concept takes into account measures to determine the quantities of used materials, energy and waste generated at each process (starting from raw material extraction, through manufacturing, distribution, use and reuse / recycling until final disposal)[18]. A particular stage in the design and development of a new product with the use of EcoDesign approach is screening. This analysis takes into account:
Laws requirements (including the restriction of use of hazardous substances, waste management) and the functionality of the product (specifications) and safety for the environment and for users);
Technological capability and business infrastructure;
Suppliers capability of providing the appropriate (new) solutions, technical quality and requirements relating to the fulfillment of requirements for improving the environmental aspects[19].
The effective application of EcoDesign and the concept of LCA helps companies meet the requirements relating environmental supplier statements (environmental product declarations) and application for the use of eco-labeling for products.

## 6. SUPPLIER DEVELOPMENTS PROGRAMS

Many international companies trying to assist local suppliers to meet their stringent requirements by offering them help in the form of consultations and training in the implementation of product innovations and improving operational processes. These activities focus on deliveries of aid in terms of:
Ensure technical quality of products,
Improve efficiency and effectiveness of processes,
Improve working conditions and improve staff qualifications,

[18] D. Pujari, K. Peattie, G. Wright, *Organizational antecedents of environmental responsiveness in industrial new product development*, "Industrial Marketing Management" 33/5 (2004), p. 381–391; K. Nakano, M. Hirao, *Collaborative activity with business partners for improvement of product environmental performance using LCA*, "Journal of Cleaner Production" 19/11 (2011), p. 1189–1197.

[19] F. Ardente, F. Mathieux, M. Recchioni, *Recycling of electronic displays: Analysis of pre-processing and potential ecodesign improvements*, "Conservation and Recycling" 2014/92, p. 158–171; F. Brones, M.M. de Carvalho, E. de Senzi Zancul, *Ecodesign in project management: a missing link for the integration of sustainability in product development?*, "Journal of Cleaner Production" 2014/80, p. 106–118; M. Fargnoli, M. De Minicis, M. Tronci, *Design Management for Sustainability: An integrated approach for the development of sustainable products*, "Journal of Engineering and Technology Management" 2014/34, p. 29–45; E. Benetto, C. Jury, E. Igos, J. Carton, P. Hild, Ch. Vergne, J. Di Martino, *Using atmospheric plasma to design multilayer film from polylactic acid and thermoplastic starch: a screening Life Cycle Assessment*, "Journal of Cleaner Production" 2015/87, p. 953–960.

Reduce level of risk threats in the supply chain in order to ensure continuity of processes carried out by the partners.

Some supplier development programs aimed at improving the environmental impact of products. Green supplier development programs are based on setting goals and formulating supplier task programs, which are associated with the use of less environmentally harmful materials, implementation of more environmentally friendly technological solutions. Many industrial customers require that suppliers have implemented the requirements of European Union directives:

RoHS (Restriction of Hazardous Substances) Directive EU 2003/95/EC,

WEEE (Waste Electrical and Electronic Equipment) Directive 2001/96/EC,

EuP (Eco-design for Energy using Products) Directive 2009/125/EC,

Battery and Accumulator Directive 2006/66/EC,

Packaging Directives 94/62/EC, 2004/12/EC, COM Decision 97/129/EC,

REACH (Registration Evaluation Authorization and Restriction of Chemicals) Regulation 1907/2006/EC[20].

OEMs support their suppliers providing expertise knowledge delivered through training and specialist advice. Enterprises engaging providers in joint projects related to designing new product solutions that use EcoDesign approach. Effective implementation of these programs gives a possibility to the partners improve the quality of products (lower level of non-compliance, introduce product innovations, increase reliability and security), shorten cycle processes and reduce their costs (especially in relation to operational processes such as design, customer service before and after the sale, production / services, transportation and infrastructure maintenance), as well as improve mutual communication[21].

The successful implementation of these programs permits both suppliers and customers to improve the quality of products (lower the level of non-compliance, introduce product innovations, increase reliability and security), shorten cycle processes and to reduce their costs (in particular with regard to operational processes such as design, customer service before and after the sale, production/services, transportation and maintenance of infrastructure) and improve mutual communication[22]. Actions aimed at developing suppliers undoubtedly contribute to a reduction in transaction costs related to the exploration of new supply capacity, conducting audits and other forms of assessment, verification and qualification of the sources of pur-

[20] Q. Zhu, J. Sarkis, K.-H. Lai, *Green supply chain management implications for ‘‘closing the loop’’*, “The Logistics and Transportation Review” 44/1 (2008), p. 1–18; Ch-W. Hsu, A.H. Hu, *Applying hazardous substance management to supplier selection using analytic network process*, “Journal of Cleaner Production” 17/2 (2009), p. 255–264; Ch.-W. Hsu, T.-Ch. Kuo, Sh.-H. Chen, A.H. Hu, *Using DEMATEL to develop a carbon management model of supplier selection in green supply chain management*, “Journal of Cleaner Production” 56/1 (2013), p. 164–172.

[21] Ch. Bai, J. Sarkis, *Evaluating green supplier development programs with a grey based rough set methodology*, “Expert System with Applications” 38/11 (2011), p. 13505–13517; X. Fu, Q. Zhu, J. Sarkis, *Evaluating green supplier development programs with at a telecommunications systems provider*, “International Journal of Production Economics” 140/1 (2012), p. 357–367; F. Salvador, V. Villena, *Supplier Integration and NPD Outcomes: Conditional Moderation Effects of Modular Design Competence*, “Journal of Supply Chain Management” 49/1 (2013), p. 87–113; T. Yan, K. Dooley, *Buyer–Supplier Collaboration Quality in New Product Development Projects*, “Journal of Supply Chain Management”50/2 (2014), p.59–83.

[22] Ch. Bai, J. Sarkis, *Evaluating green supplier development programs with a grey based rough set methodology*, “Expert System with Applications” 38/11 (2011), p. 13505–13517.

chase[23]. In order to ensure the effectiveness of supplier development program is necessary to produce a climate of cooperation based on mutual commitment, trust and open information exchange especially in the area of performance quality (level of compliance with the requirements for the provision and improvement of products and processes ) and cost (access to financial data relating to joint ventures). Effectively implemented, the development programs of suppliers undoubtedly contribute to building the intellectual capital of the partners[24].

## 7. MONITORING OF SUPPLIERS DEVELOPMENT

Many companies monitor activities of suppliers using Supplier Performance Card, collecting data, and conducting appropriate benchmarking rankings take into account their technical quality, timeliness, cost reduction, technological development, the rate of implementation by the supplier of new solutions (adaptation time changes in the process, the product), the possibility of introducing a new product, the reaction rate (for RFQ / preparation of the offer, the complaint / reported a technical problem, the implementation of corrective / preventive), flexibility (adapting to changes in customer orders, changes in the economic environment), improving environmental impact (reducing the consumption of materials / energy, reducing greenhouse gases, reducing waste generation and increase reuse of materials through the introduction of recycling), progress in the implementation of process improvement tools and products[25]. Many companies also assess suppliers on the basis of their level of management focusing on their system of certificates (which conformed the implementation of organizational standards like ISO 9001, ISO 14001). They also audit suppliers periodically. Some international companies require regular reports on progress in improvement of management systems while monitoring suppliers. They also keep monitoring them regularly by means of Performance Feedback Reports Cards which contains data on lowering costs, reducing incompatibility, improving effectiveness indicators and process efficiency indicators, reducing energy consumption, shorter cycles of process completion and optimization of using production capabilities. The above-described behaviour may be presented as a cycle of constant improvement. Companies implementing management systems which conform to organisational standards much more often complete sheets and employ periodical evaluation indicators as well as audit their business partners when shaping their relations with suppliers compared to companies which do not implement systems of this type. They also require that bidders implement quality management systems and also, more and more often, an environmental management system. Observing world trends, one may notice easily that recently suppliers have been monitored from the point of view of meeting the sustainable development requirements following economic aspects (demanding high technical quality, delivery reliability, price competitiveness, technical support), more and more often also environmental aspects and social aspects (princi-

[23] H. Nagati, C. Rebolledo, *Supplier development efforts: The suppliers' point of view*, "Industrial Marketing Management" 42/1 (2013), p. 180–188.

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ples based on the concept of the Global Compact). Many OEMs define for their partners supplier the principles of code conduct. Regarding environment protection requirements, special emphasis is put on suppliers by Japanese firms which laid down detailed guidelines for suppliers. While signing contracts with suppliers, a lot of international concerns make them also sign statements according to which they will be obliged to adopt principles included in clauses of so-called Statements on Business Practices) which are connected with binding laws and ethical standards, avoiding corruption practices and fighting against attempts to bribe domestic and foreign institutions employees, avoiding employee discrimination, protection of international human rights and responsibility for the environment. It is worth noticing that these requirements are not imposed on one party only (by means of forcing suppliers to meet them). More and more companies want to shape their images as reliable partners (customers) and, therefore, draw up purchasing codes of ethics or good practice guides.

## 8. CONCLUSIONS

The international expansion of many companies, especially global companies, increases the importance of technical standardization.. One could also perceive a gap in the field of organizational solutions between international corporations and indigenous businesses. In many cases this gap is reduced by the introduction of the concept of sustainable development. International companies implementing this concept focus on the cooperating with their partners in the supply chain (suppliers and customers), offering them support through joint projects. These initiatives are aimed at improving common processes and developing concepts for new products. Cooperation between OEMs and their suppliers undoubtedly contributes to forming long-term mutually beneficial relationships between partners. Early supplier development in R & D processes can effectively eliminate potential errors associated with new product and mitigate the risk of not guarantees of safety for users and the environment. The effects of this cooperation allow an increase in the technological and organizational capabilities of partners, which affects their competitive advantage.

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## BUDOWANIE RELACJI POMIĘDZY KLIENTAMI I DOSTAWCAMI W PROCESACH ROZWOJU INNOWACJI PRODUKTOWYCH NA RYNKU B2B

Celem artykułu jest przedstawienie uwarunkowań budowania relacji pomiędzy klientami i dostawcami w procesach rozwoju innowacji produktowych na rynku B2B. W artykule opisano poszczególne etapy współpracy pomiędzy OEM i dostawcami w zakresie prac badawczo rozwojowych nad nowymi produktami. Analiza literatury oraz liczne obserwacje wskazują, że przedsiębiorstwa, opracowując koncepcję innowacji produktowych, włączają w te działania także dostawców, prowadząc z nimi współpracę w zakresie badań nad nowymi materiałami czy rozwiązaniami technologicznymi procesów wytwarzania oraz zabezpieczania jakości wyrobu. Elementem kluczowym rozpoczęcia współpracy nad innowacjami produktowymi jest wybór odpowiednich partnerów poprzedzony odpowiednio przeprowadzoną oceną wstępną dostawców. Ma to szczególne znaczenie w wypadku prac na nowymi produktami, które mogą spełniać rygorystyczne wymagania prawne dotyczące szczególnych zagrożeń dla bezpieczeństwa użytkowników i ochrony środowiska. Spełnienie tych wymagań realizowane jest poprzez kwestionariusze samooceny dostawców, przeprowadzanie audytów oraz okresową ocenę punktową (w wypadku stałych kwalifikowanych dostawców). Przedsiębiorstwa będące nabywcami na rynku B2B nie ograniczają się wyłącznie do stawiania rygorystycznych wymagań dostawcom. Wielu producentów wyrobów gotowych, chcąc zapewnić wysoką jakość zakupywanych materiałów, oferuje swoim dostawcom specjalne programy wsparcia. Dzięki tym programom dostawcy mają zapewnione wsparcie poprzez szkolenia i doradztwo. Wyniki tych programów pozwalają zagwarantować bezpieczeństwo produktów oraz wspólnie ograniczać koszty procesów realizowanych przez partnerów.

**Słowa kluczowe:** marketing relacyjny, zarządzanie łańcuchem dostaw, innowacje produktowe, współpraca przedsiębiorstw

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